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Learning-Journal, a Transformative Learning Tool for First-year Engineering Students

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Sahar Mari is a seasoned learning assistance professional, workshop facilitator, and instructor with over 10 years of experience in higher education. With a passion for creating holistic student experiences and helping students develop healthy learning habits, Mari has earned a reputation as a trusted mentor and advisor. As an academic adviser at Northwestern University in Qatar, she provides comprehensive support to students navigating the academic landscape, drawing on her diverse expertise in tutoring, teaching, coaching, and design. Through designing numerous innovative programs and initiatives, Mari has helped countless students achieve academic success. Her commitment to lifelong learning is evident in her ongoing pursuit of new technologies, teaching methods, and learning trends. Mari's collaborative approach and leadership skills have earned her the respect and admiration of her colleagues and students alike. Mari earned an M.F.A. in Graphic Design and Visual Experience from Savannah College of Art and Design after completing two B.F.A. degrees, one in Graphic Design and one in Fashion Design, from Virginia Commonwealth University School of the Arts in Qatar. With her unwavering dedication to student success, her innovative approach to program design, and her collaborative spirit, Sahar Mari is a true asset to the field of student support services.

Ms. Sara AlBanna, SLB

Sara AlBanna is a recent graduate from Texas A&M University at Qatar with a degree in petroleum engineering. She currently works as an field engineer at SLB. As a dedicated engineer, she is passionate about creating positive change in the industry. Her diverse undergraduate research projects, ranging from the impacts of migration on education to the development of multilateral wells, reflect her interests in multidisciplinary pursuits. AlBanna is a multifaceted individual, identifying as an author, artist, and petroleum engineer. She deeply cares about language and promoting cultural exchange through finding innovative innovative ways to gamify learning in education. As an experienced field engineer, she serves as a trusted mentor and advisor to junior engineers in local and international engineering societies. AlBanna advocates for women in engineering, through serving in engineering societies focusing on women mentorship and coaching. Her passion for promoting diversity and inclusivity in the engineering industry makes her an inspiring figure for future generations.

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Dr. Nayef Alyafei received his Ph.D. in Petroleum Engineering from Imperial College London in 2015 and joined Texas A&M University as a faculty member in 2015. Dr. Alyafei is known for his passion for teaching with a unique teaching style. He received several teaching awards such as the Teaching Excellence Award 2019, Faculty of the year 2019, and the Distinguished Achievement College-level Award for Teaching. In addition, Dr. Nayef has recently launched his educational YouTube channel Petrohow, along with his textbook on Fundamentals of Reservoir Rock Properties.

[GIFTS] Learning-Journal, a Transformative Learning Tool for First-year Engineering Students

Abstract

[GIFTS] In this paper, we will discuss the process of developing a customized printed learning journal for first-year engineering students studying at an international branch campus of an American university in the Middle East. Specifically, the project aimed to help the multicultural student body, composed mainly of English language learners, adjust to a Western higher education institution. This printed planner, designed for a single semester, featured pertinent information for students in the transition from high school to university and provided a visual roadmap with weekly advice on how to navigate their new academic environment. Besides these main aspects, the journal included exercises to help students set goals for each week, track their habits, schedule appointments, and calculate their GPA. Organizational tools included the academic calendar in various formats (semester at glance, monthly, and weekly) highlighting important deadlines such as the first and last days of the semester, redefined days, the last day to drop a course, etc. The planner incorporates interactive elements to appeal to students through the integration of multimedia and augmented reality (AR) content. The AR content primarily shows examples of how to fulfill prompts and how to use certain learning tools. Moreover, QR codes are spread throughout the physical journal providing online resources, including informative and motivating TED talks and short videos showing support staff (Admissions, Academic Services, Student Affairs, Records, etc.) to help students build relationships, in addition to lowering the barrier to asking questions or seeking help. Besides providing a place for students to keep track of their deadlines and assignments, the journal encourages reflective writing, as writing promotes both critical thinking and learning. These prompts are spread throughout the learning journal. This project addresses the necessity of creating a tool to help students transition from high school to university and ignite the students' desire to become lifelong learners. Documenting the impact the journal had on incoming students and research participants was recorded through interviews, surveys, and focus groups throughout the development and deployment process. One of the student researchers reflected on their experience working on the project and discussed how the data collection informed critical design decisions at the end of the paper.

Introduction

The transition from high school to university involves significant adjustments, including the acculturation to a new academic environment, sometimes even a change in the language of instruction, and social expectations and norms. This transition period is known to define the critical decisions students may make in subsequent years. Findings from a study led by Katanis [1] found that the expectations students set for their first-year experiences were either partially or not met. Students encountered a much heavier workload than expected, in addition to finding university studies uninteresting. In terms of academic progress, more than half of the respondents were affected by poor time management. According to Tabuenca, Greller, and Verpoorten [2], first-semester university students lack the initiative to regulate their study times effectively; however, they cannot be expected to do this themselves and need specific guidance, potentially from an advisor. Another study [3] where students were trained in time management skills found that students had significantly less stress and an increased tendency to feel in control of their time. This greatly improved their ability to complete tasks and reduced the likelihood of procrastination. A similar study [4] on engineering majors also found that students' perception of their control of time positively correlates with their academic performance. By establishing a link between time management and GPA, the study identifies a potential barrier to student success and provides justification for strategies that can further improve student performance.

Enrolling students at an institution is not enough; institutions must also provide necessary support for students to succeed in their studies, as noted by Engstrom and Tinto [5]. Based on

this notion, an academic institution is responsible for supporting its student population to flourish. The journal provides an overview with precursory introductions to direct students to relevant resources on its pages, on campus, and even online. First-year university students may find it hard to approach staff or upper-class people to ask questions. Thus, they may prefer a more accessible support system. Having a system that acts as a guidebook, anticipates students' most frequently asked questions, and supplies students with easy access to navigate a newfound environment. A study conducted by Kantanis [1] revealed that nearly 40% of students expressed a lack of confidence in their ability to learn independently at the university level. Furthermore, the study found that nearly half of the respondents had not been successful in forming a friend group, which is recognized to be a critical factor in the student's level of adjustment and stability. Taking these factors into account, the pilot project intended to provide a simple but effective tool that aids first-year students in their transition period.

To achieve this, the research team created an introductory journal to support incoming first-year students. The journal incorporated organizational tools, information about the university, and available student resources. The journal's intention was not only to help students hone their organizational skills but also to improve learning, prioritize responsibilities, and assist students in allocating time to connect with each other.

Project Approach

Throughout the planning stages of the journal, the research team, comprising a faculty member, a staff member, and three undergraduate researchers, considered three main features:

- Provide organizational tools such as weekly calendars to help students track their assignment deadlines and other important dates
- Inspire healthy habits through a habit tracker, student tips, and other resources
- Provide a personal space for reflective journaling; mood tracking; and academic, professional, and personal growth

Considering these goals, the team developed an initial version incorporating the above mentioned features and printed five copies to user-test the semester before the planned release (Fall 2020). Having undergraduate students test the journal helped identify areas for improvement and potential additions to the project to enhance the first-year students' year experience. All aspects of the journal were actively studied on a weekly basis, and each student researcher drew their independent observations and evaluations. The accumulated comments were compiled to restructure the initial prototype and improve the project. The redesign ranged over a wide spectrum of categories that included, but were not limited to:

- **Visuals:** The journal's visual language, including color scheme, graphic interpretation, and legibility.
- **Language:** Language was reviewed and reworded to include more informal terms to ease the readers' experience. In addition, students recommended adding more interactive prompts.
- **User relatability:** To ensure that users could connect with the journal in different ways adjustments were made including the manipulation of language, incorporating midterm season reminders and time-relevant prompts, and adding memes and stickers for a more joyous user experience. Prompts were moved to correspond with the time of the semester, e.g., Week 5 would offer tips on exam preparation ahead of midterms.

Other notable features of the journal are the numerous short tips framed as advice from upper-class students. The advice is concise and relevant and uses language that appeals to incoming students. Apart from the printed information, the journal features several QR codes, each linking to helpful websites and short videos to inspire, motivate, and educate. These sections also provided organizational tips to help students identify their personal comfort zones, introduced development courses they could participate in during breaks, and study plans for finals. In short, this student journal is designed to answer typical first-year student questions and be a guide to what students may encounter in their first semester and year at university. With that said, the journal remains tailor-built for the unique university culture on campus, which is reflected by the integration of English and Arabic text, such as the title of the journal, motivational quotes, cultural references, and interactive sections comparing high-school and university culture. Enrolling in an international branch campus may yield the benefit of staying home and having a support network already in place; however, students often underestimate the acclimation needed to be a student at an American university.

After implementing the feedback and additions following the team's user testing, an updated version of the journal was designed. For example, the name of the journal was changed based on the user testing results and the overall feedback from the research team. The initial journal-title of "Ta'sees" *(Arabic: foundation)* turned into a more student-tailored version of "Mufakirati" *(Arabic: my journal).* Although the journal had a new name and design, the primary purpose remained the same: to enhance first-year students' experience with the transition from high-school to university. These adjustments were made during the spring of 2020. User testing and the data gathered during this time were affected by the Covid-19 pandemic, which forced many educational institutions to switch to remote instruction.

To encourage students to use the journal, the research team collaborated with first-year seminar course instructors at the university. In the fall semester of 2020, the refined pilot journal was distributed to the incoming undergraduate class, approximately 120 students, to begin the second phase of user testing. Student researchers led focus groups to analyze the usefulness and applicable functionality of the journal to the first-year students' experience. The fall 2020 semester, unlike previous semesters, was conducted entirely online. Incoming students picked up their journal copies after completing orientation. A member of the research team visited each section of the first-year seminar course to introduce the journal, explained how to use it to get the most out of it and asked students to complete one of the featured exercises to get them started. Throughout the semester, regular social media posts reminded students to actively engage in journal exercises. Students who consistently used the journal derived the greatest benefits. A series of surveys and interviews were helpful throughout the journal deployment phase to track how the planner was being received by its intended audience. Well over half the participating students documented that they had been using the journal weekly, ranging from 5-7 times a week. A higher percentage acknowledged that the journal helped them stay on top of their studies. Due to the unanticipated aspect of an online first-year experience, a gap was quickly identified where students could not fully immerse themselves and act on the suggestions covered in the journal, especially those involving physical locations on campus. During the semester, students were not allowed to visit campus and missed out on community-building and extra-curricular activities, which were designed to facilitate friendship-making and familiarize students with their new environment. Given the circumstances, many students reported at the end of the semester that the journal was one of the few things that elicited a bond between them and the university; they were eager to receive a copy of the following spring semester edition before the end of Fall 2020. Thus categorizing this feedback as successful in terms of creating a sense of belonging with the institution.

Perspective   of   a   Student   Researcher

Developing a successful student intervention is impossible without including students in the process. The research team adopted a collaborative and inclusive design process resulting in a successful journal. Working on this project provided students with a transformative educational experience, where they took on various roles, such as researchers, content creators, editors, presenters, and focus group facilitators. With this strong emphasis on student involvement, the following section describes the experience of working on this project firsthand by one of the undergraduate student researchers who also co-authored this paper.

As a petroleum engineering student the bulk of my expectations for university were to gear up for technical contents and materials. Working on "Mufakirati" pushed me to reflect on soft skills, their impact, importance, and active development. This project taught me the importance of user-testing and showed me the range of individual experiences. I was able to readily present the answer of questions I had about "who to go to" and "what to ask" in the journal anticipating what the next cohort might need. Providing resources and references that were helpful to me in the hopes to be the same or more for others; from the perspective of the student, to the expectations of a professor. I personally enjoy journaling and am a great advocate for it. This made having a journal and academic guide combination all the more exciting. The best feature is the personalization that comes from a tailor built university journal. It gives a sense of belonging and community, and also a sense of importance that the university is attuned to the experience of its students. Using the journal while simultaneously developing it helped reinforce the strategies in my everyday life. Time management is a term that is often used in an abstract form and putting it to practice gave me a proper perspective on what it actually looks like in a practical sense. — Sara Albanna, Class of 2022.

Due to the unanticipated consequences of the global pandemic in early 2020, the initial testing phase and deployment phases were not designed for the new online-learning setup. As the prototype was developed in the previous academic year (2019-2020), some of the content was not relevant as students were prohibited from visiting the university campus. Considering these shifts in user experience provided the research team with a new perspective. The lessons learned from working on the project allowed for new additions that could further enable upcoming editions of the journal to be more interactive, such as:

1. A guided virtual tour for students identifying important locations.
2. Introductory videos and short clips from focal persons on campus that will be relevant to the journey of incoming students.

Adopting a university journal to assist incoming engineering undergraduates can improve their overall experience and establish good habits from the start of their journey. Based on the positive feedback, high return of survey data, and numerous inquiries about a new journal version, the research team successfully met its objective of creating a useful tool for incoming first-year students. Besides the anticipated benefits of this project, the journal developed a sense of community and belonging for students starting university in the fall of 2020. The journal was one of the few physical artifacts that helped students feel connected to the university. Due to limited resources, the project paused after the pilot journal.

References

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Appendix I

The following subsections outline different sections and their purpose and provide a visual reference.

Yearly and Weekly Overview (See Image 1 and Image 2)

Time management is one of the most critical skills to develop. To help students hone their organizational skills, prioritize weekly goals and stay ahead of their deadlines, the journal includes various visual calendar templates. The yearly view incorporates all important and general dates from the academic calendar and lays it out over two pages. The weekly view offers a 7-day spread, where students can note weekly due dates and to-do lists. The reflection pages are usually 2-3 pages long with either lined or blank spaces where students can freely express their thoughts. These pages also include inspirational quotes in English and Arabic. Besides these quotes, the reflection pages feature emojis to enable a quick visual reflection on the user's emotions.
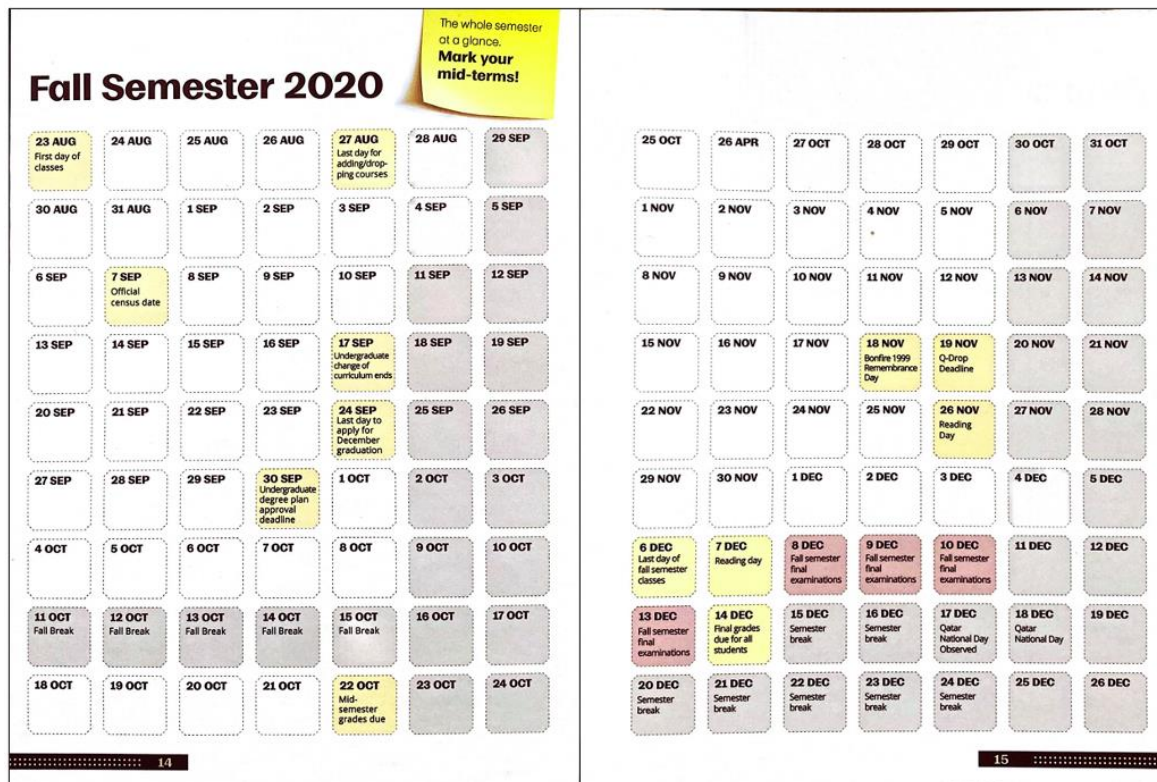

Image 1. Yearly Overview
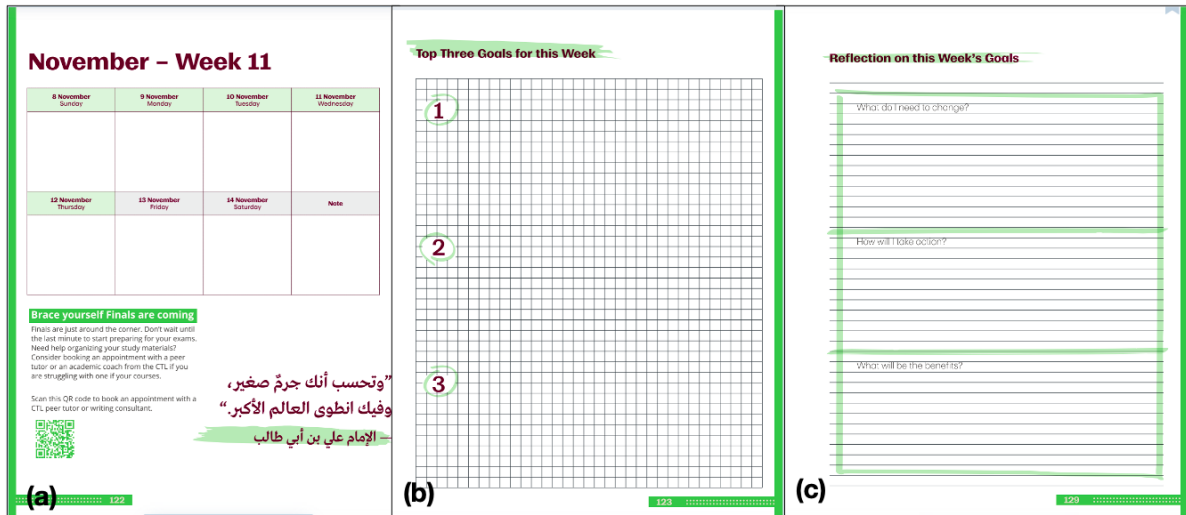
Image 2. (a) Weekly view (b) Top goals for the week (c) Reflection of weekly goals

University Guide (See Image 3 and Image 4)

First-year university students are inundated with information during orientation. They often have difficulty recalling the important resources shared at the beginning of the semester because they believe they will not need to access them. To address this obstacle, the front matter of the journal is loaded with general information relevant to all students. This section includes floor plans with highlights indicating the locations of classrooms, labs, and study spaces. In addition, explanations and summaries of various student services are listed, including academic services (e.g., this is where you meet your advisor), the library (e.g., this is where to borrow books, DVDs, and access online resources), the Center for Teaching & Learning (e.g. this is where you can book an appointment with a tutor for free), Student Affairs (e.g., this is where you can join a student organization), etc.

Image 3. University Floor Plan

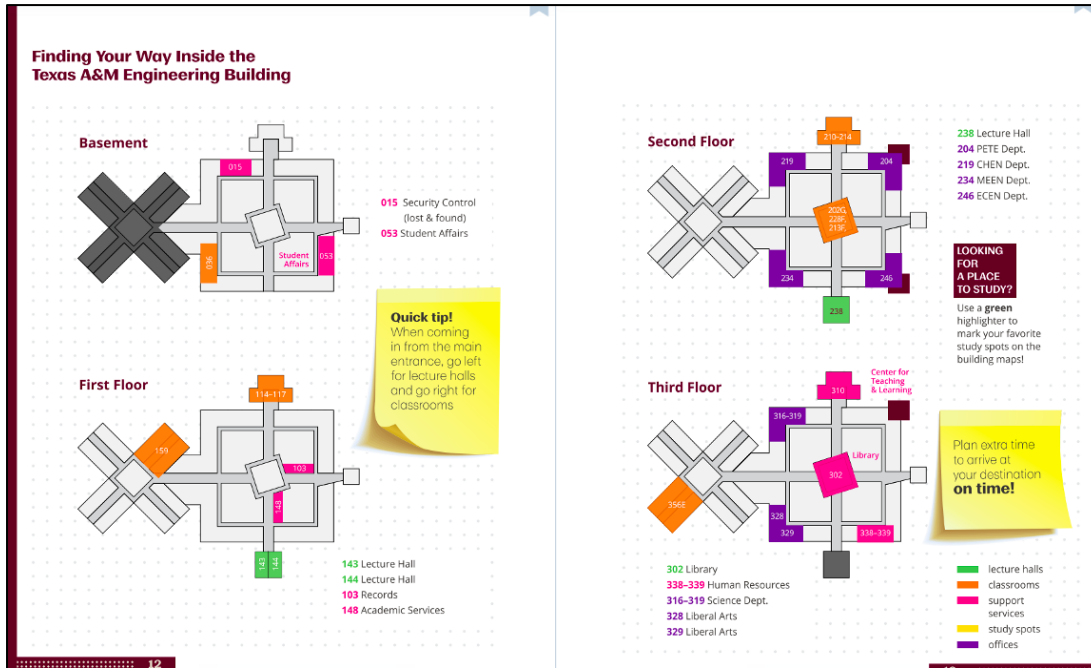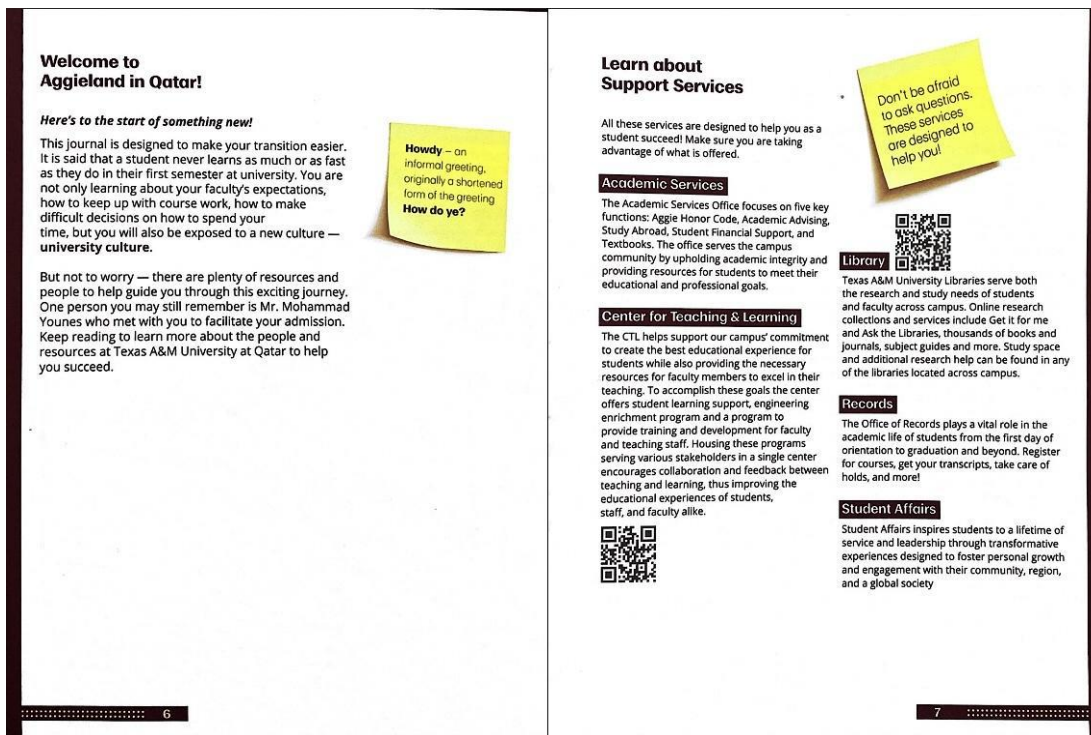

Image 4. Student Resources

Habit Tracker (See Image 5)

Research illustrates the significance and positive outcome of tracking progress [6]. Besides developing self-awareness, students are motivated to continue their habit streak using a visual tracker. In addition, students get the satisfaction of ticking a box daily to complete their tasks, which motivates them to keep up their work. The habit tracker is a visual tool to assist students in establishing and keeping up healthy habits. and not miss out on ticking their daily boxes. Measuring and tracking their progress in a certain activity holds them accountable for how they use their time and keeps them focused on their goals. To further encourage in establishing habits early that students can build and carry further into their undergraduate journey, this section was appointed at the beginning of the journal to start off with strong habits in place for the rest of the academic year.

Image 5. Habit Tracker

Self-Assessments (See Image 6)

Developing self-awareness as a person and learner is critical for a student's academic success. Aside from weekly reflective prompts, the journal includes various self-assessments, such as a post-test analysis and a stress self-assessment. Knowing when one makes a mistake, what learning strategies work best for an individual, and how one's emotional state can affect their learning are all important discoveries. To provide a platform to explore and identify one's own preferences, self-assessments were prioritized. In addition, the undergraduate researchers favored these activities over others as they helped them understand their emotions and develop an awareness of their mental well-being.

Stress Self-Assessment

Add up the numbers you ticked. Your total score will be between 10 and 50. The higher your score, the more likely it is that you feel confident about your ability to cope with stressful events. For total scores below 30, reflect on items for which you have concerns and consider talking with a trusted friend, family member, instructor, counselor, or advisor.

Your thoughts and actions can reduce or add stress to your life. As a college student, your ability to cope during stressful events is paramount to ensure your success. Rate each of the following statements honestly by circling the appropriate number. Completing this exercise will help you clarify your ability to cope with stress.	Almost Always		Sometimes		Almost Never
	5	4	3	2	1
1. I let go of negative thoughts and worries at the end of the day.					
2. I have a high tolerance for frustration and discomfort.					
3. When I get angry, I express it appropriately.					
4. I use positive self-talk during stressful situations.					
5. I use my feelings of tension as an indicator that I need to do something to reduce stress.					
6. I manage my time well enough to prevent stressful situations from occurring.					
7. I experience a manageable amount of anxiety during tests.					
8. I use relaxation techniques during stressful events.					
9. I take responsibility when I do something wrong or inappropriate.					
10. When I have a conflict with another person, I resolve it appropriately.					

Source: Sellers, De, et al. Academic Transformation: The Road to College Success. Pearson, 2015.

Feeling so Stressed that You Don't Know Where to Turn?

Stop by Dr. Steve Wilson's office. You may remember him from orientation, he is the university's psychologist and is an expert in stress management, procrastination and test anxiety. It might feel weird going to talk to him, but his office is tucked away on the third floor so you sneak in without any of your friends seeing who you are going to meet with. He has helped countless students and is here to help you!

Services Offered:

1. Personal counseling
2. Stress management and biofeedback training
3. Self-help and outreach
4. Consultation and referral
5. Eligibility for Services

Counseling services are available free for students currently enrolled with Texas A&M at Qatar TAMUQ. During the first counseling session the counselor and student will together determine if other services are more appropriate based on student's situation and concerns.

There are three ways in which TAMUQ students may make an appointment for counseling:

1. Visit the Department of Student Affairs at TAMUQ in Suite 053. (currently unavailable)
2. Call +974.4423.0316
3. Email Dr. Steve Wilson at stephen.wilson@qatar.tamu.edu

Appointments are available from 7:30 a.m. – 3:30 p.m. Sunday through Thursday

Learn how to make stress your friend.

Feeling stressed? Go to the gym or join one of the university's sport teams!

Image 6. Stress Self-Assessment