Managing Stress in Education

Benjamin Kenwright

***Abstract*—Universities face unprecedented challenges with today's economic climate and rising expectations. These expectations extend to students with higher pressures of student life, such as exams, money worries and separation from friends and family - leading to growing stress and anxiety issues. In recent years, stress has been identified as a common problem in learning and education. With stress having an impact on a whole range of factors, such as, health and well-being, emotions, subjectivity, power of organization, social factors and personal motivation. In this paper, we provide a thought-provoking insight into the prevailing causes and management of stress in academia. While a large majority of the pedagogical research in higher education has focused on teaching and learning mechanics, less investigation has been applied to psychological areas, like stress and anxiety; resulting in curricula and lesson plans lacking to empathize and understand student needs. The invariable presence of stress as a 'fact of learning' whereby the individual must take primary responsibility for his or her capacity in coping with this stress is not always so simple. We examine the following dimensions of stress in learning and how it fits in with educational curricula: 1. Understanding stress in a learning and teaching environment; 2. What causes stress in a learning and teaching environment; 3. Stress management intervention techniques for learners to increase their effectiveness (i.e., 'stress-fitness'); 4. Developing curricula which reduces stress to an optimal level; 5. Techniques for managing stress within an academic environment (e.g., game-based learning, social engagement and communication); 6. How to identify the early signs of stress (both as a whole and in individuals)? The impact of stress in education cannot be ignored, hindering the success of students. With stress related issues one of the largest factors for student failure, we contemplate how past research and recent developments need to change to accommodate educational sector to meet tomorrows needs.**

***Keywords*- stress, education, dangers, students, academic, dangers, management, performance**

I. Introduction

What is Stress? Stress is a type of psychological strain with the power to lift us up (motivate us, challenge us and stretch our limits and abilities). On the other hand, stress also has the ability to crush our morals, hinder our performance and even harm our health and more [1, 2]. The notion of psychological stress is common place in today's world [3]. Each individual responds to the demands of stress in their own individual way. Psychological stress occurs when an individual perceives that their environmental demands tax or exceed his or her adaptive capacity [4]. Importantly, stress affects how we feel, think and behave as well as how our body works, because our mind and body constantly interact. For instance, when a student experiences stress (i.e., they perceive a stimuli as challenging or threatening), they believe that their resources for coping with the situation are insufficient for what the circumstances demand resulting in 'stress' [5]. This perceived stress follows a process involving a series of interaction and adaptations whereby an individual would transition and grow (by adapting to the problem to reduce and overcome the stressful situation).

Why do Students Experience Stress? As far back as 1968 [6] higher education has been regarded as a stressful endeavour. One of the biggest fears and stressors for students that has remained consistent over the years is that of failure [7, 8, 9]. Of course, stress is not always bad, in fact, not just students, but everyone feels stressed at times. Small amounts of stress helps students' perform under pressure and motivates them to do their best (see Figure 3. However, when students are constantly running in emergency mode, their mind and body pay the price. The times in a students life when they feel particularly overwhelmed with

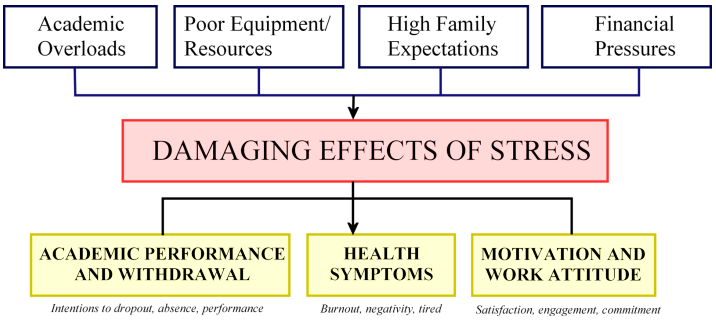

Fig. 1: **Impact of Stress on Students** - Stress can present itself through a whole range of factors beyond simple academic performance.

stress and tension, can feel awful and result in a variety of unpleasant symptoms (see Figure 1). Students who frequently find themselves feeling exhausted and overwhelmed are at a high risk. However, this stress should be managed by both the 'student and the university' - for example, the university should provide support mechanisms to teach students how to recognize the signs and symptoms of chronic stress and how to take the necessary steps to reduce any harmful effects. For instance, studies have show that one of the most potential stressors for students is personal organizational problems [10]. In other areas, bad organizational practices is often connected to 'Toxic Leadership', both in companies and in governmental organizations [11]. Hence, providing support and training mechanisms to students through workshops and activities, like time and organizational techniques, can have a large impact on student stress and anxiety levels.

How do Students Manage Stress? Each student react differently to stressful situations. Students form coping mechanism to deal with stressful situation or demands. For example, in a study by Yum et al. [12] three common coping mechanisms where sacrifice, support and negotiation of arrangements within four domains (self, work, family and social life). These coping mechanisms can have a significant impact upon the students' progress. Gibbons and Gibbons [13] and Guthrie et al. [14] carried out extensive research on stress management - one of their finding was the emphasize on how each individual appraises stressful situations and problems different and how they formulate coping strategies based upon the their past experiences. University students suffer from different kinds of stressors during their education time [7] (academic grades, peer pressure and financial security) which raises the question if students are handing stress correctly (e.g., avoiding or worrying). Each student handles stress in their own way, from devoting all of their time to finding a solution to running away and avoiding the problem (in a hope that the issue will fix itself). Stress manifests itself in various forms. For example, Table I presents a short list of symptoms of stress (ranging from emotional to physical impacts). Emphasizing that stress might hinder one student's memory while another student might be impacted physically (or both). Despite numerous articles that decry the negative consequences of stress and call for intervention and change, few have studied the specific effects of stress-management interventions in education, and even fewer have provided empirical data. Although there is a large literature on stress management in general, its specific application to higher education has been largely unexplored [7].

Contributions The key contributions of this paper are: (1) taking stress into consideration in an educational environment (impacts, such as, retention, student happiness and learning performance); (2) managing stress within curricula; (3) critically review studies related to degrees of stress and the type of stress factors that can be found among undergraduate and post-graduate students during their education; (4) discuss and debate the body of literature on effective interventions of stress in higher education; (5) how to identify the warning signs of stress with student's and within a curriculum; and (6) developing a positive learning agenda (with manageable 'positive' stress levels).

II. Stress in Universities

Sources of Stress (Where does Stress Come From?) Academic stressors that affect students, including but not limited to, academic overloads, course awkward, inadequate time to study, workload every semester, exams awkward, low motivation, and high family expectations were moderately causing academic stress for the students. Studies [15, 7] reported that around 80% of students emphasized that academic workload was their primary stress factor. Undoubtedly, the demands of the university lifestyle is inherently stressful; yet experiencing these as distressing is not inevitable. A review of links between university students' psychological attributes and psychological distress [16] indicate attributes that can be used for efficiently managing stress in academia (i.e., offer insights into intervention techniques to equip students with the ability to manage stress better at university). Few examples of stress 'catalysts' at university include:

- Isolation [17]
- Lack of support [18]
- Ill prepared
- Social/personal factors [19]
- Peer pressure [20]
- Financial
- Grades/expectations
- Physical
- Emotional [21]
- 'Unknowns' - unclear on assessments/what do to
- Failing/falling behind

Research has emphasized in an individuals life, there are various stressful eventsThese stressful life events for individuals can contribute to long term problems, such as, illness and psychological problems [22]. For example, below shows a list of stressful events in an individuals life:

- Death of a spouse
- Marriage, divorce, separation or reconciliation with partner
- Imprisonment
- Death of a close family member
- Injury or illness
- Job loss
- Retirement
- **Exams/deadlines**

For example, in one survey [23], the results showed that 53% of students questioned experienced depression since the beginning of their studies, with 9% reporting that they had considered committing suicide since starting the course. Similar findings have been reported in other studies, emphasizing the drastic impact of stress and anxiety in higher education [24, 25, 26].

Benefits of Stress (Should We 'Remove' Stress?) Importantly, it is not about 'removing' stress but developing policies and strategies that enable students to cope with stress (life-skills). Stress helps a student take

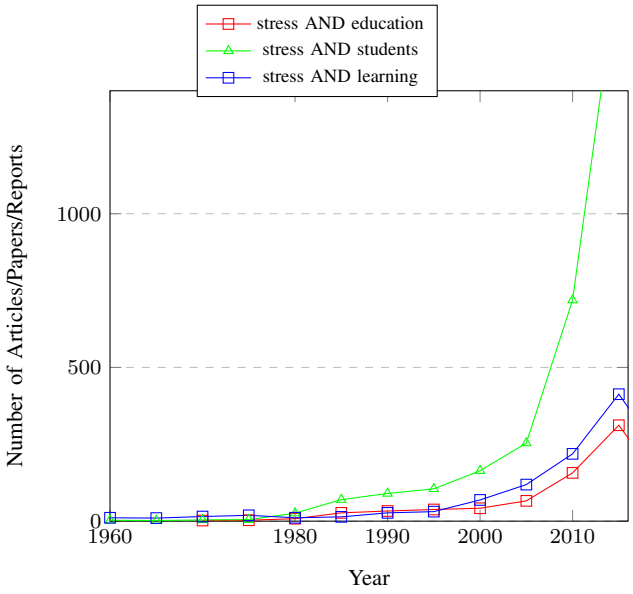

Fig. 2: A coarse guide to the number of articles in the area of stress and education. Plot shows the increasing number of new articles published each year with the keywords in their title over the past few decades (from Google Scholar 16/04/2018))].

action, feel more energized and get results. Only when a student becomes overwhelmed by stress, that stress starts to become a problem. Stress is in part essential in academia, not only for life-skills, but for satisfaction, as one study underlined, lack of stress impairs gratification and fulfillment leading to increased distress [27]. Having students avoiding stressful problems rather than facing them can have a negative impact. Stress can be a motivator, without it, we are under no pressure or demand to accomplish a specific task. Stress is an essential survival element. The "fight-or-flight" mechanism can tell us when and how to respond to danger. This mechanism is triggered too easily, or when there are too many stressors at one time, it can undermine a person's mental and physical health and become harmful. Student's need to be able to manage stress, to prepare them for the real-world, to reinforce stress coping mechanisms that increase stress tolerance [28]. However, stress levels need to be carefully monitored (avoid the 'make or break' ideology).

Key points about stress (not only in education):

- Stress helps the body prepare to face danger (adrenalin and hormones)
- The symptoms can be both physical and psychological
- Short-term stress can be helpful, but long-term stress is linked to various health conditions
- Students are able to prepare for stress by learning self-management tips (educated on how to manage stress levels safely)

Impact Of Stress (Is Stress Really That Important?) Stress in academia goes beyond simply hindering 'student achievement' (memory, concentration and ability to learn and solve problems). Stress can show its results in a variety of ways:

- Professional burnout
- Poor academic performance
- Health issues
- Addictions
- Crime/antisocial
- Absenteeism/attendance
- Dropping out

- Career failure
- Impact family and friends

A number of important metrics correlate with stress, such as, retention and dropout rates. A methodological analysis, critique and review of the literature suggests that a stress is one of the leading problems at universities [16, 29, 30]. For instance, a model based on Durkheim's theory provides a fruitful insight into a large proportion of current research [31] - focusing on future attention on the interaction between student attributes (i.e., dispositions, interests, attitudes and skills) and the influences, expectations and demands imposed by various sources in university environments.

III. Monitoring Stress

While it is common in universities to continuously gather data through surveys on areas such as performance, student satisfaction and drug and alcohol use, there is a need to monitor stress and anxiety levels in students. In studies, an overall increasing trend, shows a large number of students suffer from extreme stress and anxiety [3, 32, 7, 33]. Necessary to continuously monitor and identify stress patterns to help manage and reduce stress. There is no 'gold standard' for the measurement and assessment of stress management [34]. Since stress impacts multiple areas, such as, attendance and grades - these provide indirect feedback opportunities. Combined with more explicit monitoring methods like surveys and student engagement. Provide additional support at specific times, for example, we are able to predictable high stress levels each semester due to academic commitments, financial pressures and management capabilities (lack of time). Listen to students, for instance, allow students to anonymously 'submit' feedback and comments). Social interaction, discussion and news can be encouraged and nurtured through forums (advocate communication).

Identifying Stressed Individuals Academics and students themselves should be made aware of stress indicators. The ability to notice stress in individuals (e.g., students themselves and peers) provides warnings signs (e.g., they need to talk with someone, take a step back and rethink or relax or do exercise to help them manage the psychological strain). For example, when a student is stressed, their body changes in the following ways:

- Attitude and mood changes
- Blood pressure and pulse rate rise
- Breathing is faster
- Digestive system slows down
- Immune activity decreases
- Muscles become tense
- Heightened state of alertness prevents sleep

In addition to educating students on stress, academics need to be able to identify and 'control' the situation in a professional manner - help students cope with stressful situations at hand through support mechanisms. Staff should familiarize themselves with the various symptoms for identifying and managing stress (particularly in urgent or emergency situations - and the necessary university policies and procedures).

IV. Types Of Stress

Stress is not completely 'bad' (but not always good). As pointed out by Hans Selye [35, 36], there are two types of reaction to stress: positive and negative. Positive stress which motivates an individual is known as 'eustress', while the less desirable negative impact of stress on an individual is termed as 'distress (encountered during unpleasant situations). Stress is often avoided because it can either hinder or motivate an individual. The direction the stress takes is directly dependant upon the perception of the 'individual'. Each person responds to stress in a different way, but too much stress can lead to health problems.

There are three main types of stress, as pointed out by the American Psychological Association [37]:

A Acute stress
B Episodic acute stress
C Chronic stress

A. Acute Stress

This type of stress is short-term and is the most common way that stress occurs. Acute stress is often caused by thinking about the pressures of events that have recently occurred (or upcoming demands in the near future). For example, if a student had recently been involved in an argument that had caused upset or has an upcoming deadline, they may feel stress about these triggers. However, the stress will be reduced or removed once these are resolved. It does not cause the same amount of damage as 'long-term', 'chronic stress'. Short-term effects include tension headaches and an upset stomach, as well as a moderate amount of distress. **However, repeated instances of acute stress over a long period can become chronic and harmful**.

B. Episodic Acute Stress

Student's who frequently experience acute stress or whose lives present frequent triggers of stress have episodic acute stress. **A student with too many commitments and poor organization can find themselves displaying episodic stress symptoms.** These include a tendency to be irritable and tense, and this irritability can affect relationships and grades. Student's that worry too much on a constant basis can also find themselves facing this type of stress. This type of stress can also lead to high blood pressure and heart disease.

C. Chronic Stress

This is the **most harmful** type of stress and grinds away over a long period. Ongoing poverty, a dysfunctional family, or an unhappy life (isolated not family/friend support) can cause chronic stress. It occurs when a student never sees an escape from the cause of stress and stops seeking solutions. Sometimes, it can be caused by a traumatic experience. Chronic stress can continue unnoticed, as student's become used to it, unlike acute stress that is new and often has an immediate solution. It can become part of a student's personality, making them constantly prone to the effects of stress regardless of the scenarios they come up against. People with chronic stress are likely to have a final breakdown that can lead to suicide, violent actions, heart attacks, and strokes.

V. Strategies to Manage Stress in Academia

Stress management should be approached in two ways - firstly in supporting students so they are able to manage stress for themselves and secondly, the university having protocols and measures in place to ensure students are put under unnecessary pressure (e.g., over-assessment, impossible deadlines and poor communication) [29]. Universities which focus on managing stress within the curricula (e.g., coping strategies as listed below) would improve student success levels [38, 7, 39].

University Stress Support Options and Curricula Activities Universities need to take an active role in reducing stress through passive and non-passive solutions (e.g., organizing events, curricula structure and counselling) - all contribute to a healthier overall student experience. For example a list of university led activities, include:

- Societies [40]
- Group activities (team work) [41]
- 'Free' days
- Activity/employability weeks (talks/events/trips)
- Leader-boards (game-based learning and gamifying curriculum) [42]
- 'Buddy' system [43]
- Tutor/mentor
- Student spaces (relax/play games/chat)
- Material/assessments transparently clear
- Use language that students understand (simple/less jargon)
- Academics listen to students (communication)
- Peer review [44]

For instance, in the United Kingdom, one such opportunity to help students manage stress is during mental health awareness week [45]. Tackling stress, can go a long way to tackle mental health problems, such as, anxiety and depression, and, in some instances, self-harm and suicide. The national campaign in the UK delivers a series of stress-busting activities across the UK at institutions to help to improve the mental health of students (e.g., stress workshops, Lego serious play, yoga and game-jams).

Helping Students Manage Stress Themselves The students must also embrace the fact that they themselves have a responsibility. The learning process should educate students on the harm of stress and how 'they' can identify and manage stress in a safe manner. Students need to know about the pros and cons of stress - but most importantly how to manage and avoid burn-out. An example list of student-led activities:

- Nutrition - A healthy balanced diet with plenty of fruit and vegetables helps maintain the immune system at times of stress. A poor diet will lead to ill health and additional stress [46]
- Exercise - Studies have shown that exercise can benefit mental and physical state [2]
- Reducing intake of alcohol, drugs and caffeine - These substances will not help prevent stress, and they can make it worse. They should be cut out or reduced
- Prioritizing - Students need to spend time organizing to-do lists to see what is most important to them. Then have them focus of what they have completed or accomplished for the day, rather than what they are yet to finish
- Time - Have students set aside time each day for themselves (personal time). Use it to organize their life, relax and pursue their own interests
- Breathing and relaxation - Meditation, massage and yoga can help. Breathing and relaxation techniques can slow down the system and help students relax. Breathing is also a central part of mindfulness meditation
- Talking - Speaking to family and friends about issues/worries helps students 'let off steam' [32] (e.g., establishing support networks)
- Acknowledging the signs and symptoms - A student can be so anxious about their problem that is causing the stress that they do not notice the effects on their body. Students who experience stress due to long hours may need to 'take a step back'. It may be time to have students review their own working practices or talk to a friend or support worker about managing/reducing their load [47]
- Student's own destressor - Most students' have something that helps them relax, such as reading a book, going for a walk, listening to music, or spending time with a friend or a pet. Joining a choir or a gym helps some students

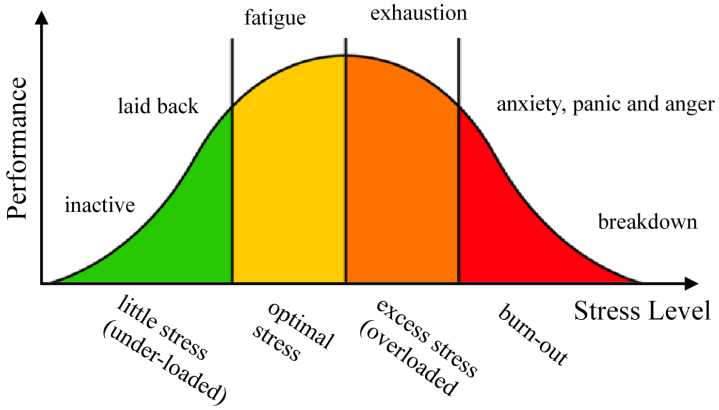

Fig. 3: **Stress Curve** - Classical Yerkes-Dodson Law (presents a relationship between anxiety and performance) [51].

Social Links Studies have shown links between declining emotional health and time students' spending socializing [48, 49] as shown in Figure 4. This is primarily because socializing allows students to 'de-stress'. For example, in a survey by UCLA students it showed that students who used to spend 16 or more hours a week socializing with friends (a decade ago) dropped to half nearly half in 2014.

Effective Communication Communication is an important stress-management skill. Effective communication helps develop relationships, which in turn improves efficiency, morale and most importantly stress levels. Although this seems like an easy skill, there is much more to communication than simply speaking. In fact, communication can cause problems, such as, misunderstandings when not used effectively. When miscommunication happens there tends to be more problems, anger and resentment than if communication were effective in the first place. There are certain things that need to be done to achieve effective communication [50]. Examples of where communication is important:

- Assessment criteria
- Deadlines
- Learning outcomes
- Understanding of the material/subject/tasks
- Financial support
- Social support

Communication problems also include a 'lack' of information - for example, not providing extra details (only the bare minimum, scarcity of communication).

What Happens when Students are Over Stressed? In academia, students are prone to stress due to deadlines, balancing personal life and studies, lack of sleep and/or exercise while trying to achieve top grades [52]. These demands and experiences within universities are inherently stressful and can accumulate to damage a student's well-being in irreversible ways - from psychological issues to heart problems and long-term disabilities. While some studies believe stress makes a student perform better, this is not the whole truth (e.g., the amount and type of stress). Research consistently shows the opposite, with over and long term stress usually causing a person to make 'more' mistakes. Impacting a student's memory to dramatic negative impact their state of mind and health. For instance, some of the ways stress impact a student's life are:

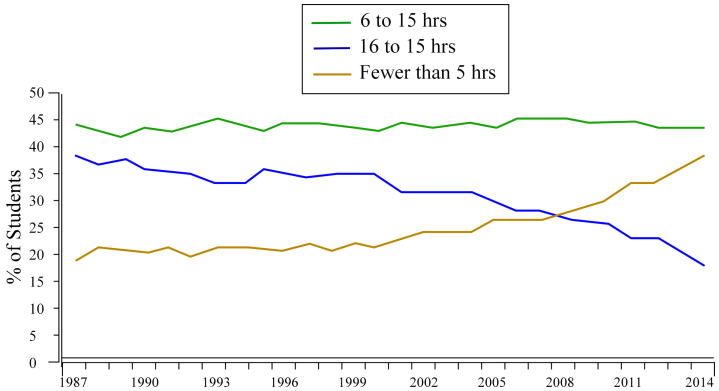

Fig. 4: **Impact of Socializing** - Time spent socializing with friends at university (hrs per week). Survey from 1987 to 2014 by UCLA [48].

- Stress can hinder a student's ability to remember facts and information
- Stress makes it difficult for a student to control their emotions and concentrate
- Stress can affect a students personal life
- Stress can impact a student's health (weaken their immune system, promoting disease, teeth and gum problems, heart, gain weight)
- Stress can cause student's to age (make them look older and tired)
- Stress can lead to long-term disability

Recent studies have shown time and time again the impact of stress on students, from memory and concentration to ability to solve problems and in academic performance [53, 54, 55, 16]. The demands of a university lifestyle are inherently stressful; yet experiencing these as distressing is not inevitable. Links between a student's psychological and psychological distress [16] have been identified - emphasizing that more research is needed to help identify attributes and techniques to equipped students with the ability to manage stress at university.

Interesting and Important Studies have shown that stress is a significant part of a student's life [53, 56]. The real problem occurs when stress is ignored and allowed to run rampant. Of course, different people handle stress in their own ways. **The available research indicates that stress is increasing among students studying in higher education.** Issues such as student retention and student progression are becoming increasingly important for all universities. There are a significant number of studies that have examined stress and this paper critically reviews that research and identifies several issues that as yet have not been explored. Researchers have highlighted a number of key weaknesses in the current literature base [56].

Why is it hard to manage stress in higher education and why hasn't stress in education been solved before? Universities and higher-educational environments are changing to meet tomorrows needs. This encapsulates a variety of factors, such as, social factors, technological and pedagogical breakthroughs - not to mention, governance and financial changes. Obviously, each individual is different (and so are courses) - for example, a medical degree would be substantially different from a mathematical degree - with different assessment methods and environments and student perspectives/experiences. Stress is impossible to eliminate, however, recent surveys have shown increases in stress over the past few years in academia. For example, 80% of college students reported that they often feel stressed according to the most recent ADAA survey on stress and anxiety disorders [33], with 34% of college students feeling depressed at least at one point in every 90 days and 13% getting diagnosed with depression, anxiety or other mental health condition.

VI. Stress in Education

There has been increased attention in the literature about stress levels among students in higher education (see Figure 2). In a recent study conducted by Beiter et al. [3], the top three student concerns influencing stress in academia where, academic performance, pressure to succeed and post-graduation plans. Increasingly, obtaining a college degree is seen as the key to success with many students leaving home to attend post-secondary schools [58, 3]. It has been emphasized that students who go onto higher education see the experience as one of the most stressful times in their lives. , however, a vast majority of graduates see their educational experience at university indispensable (made them who they are today). A review of literature from the past 30 years establishes psychological distress as both a longstanding and current issue affecting university students worldwide [16] - stating that higher education is a crucial stage in an individuals life. While stress is an inevitable part of life, it is very present [59, 3], and is becoming more prevalent among university students [24, 3]. For instance, students (both undergraduate and postgraduate) suffer high levels of stress, which lead to alcohol and drug abuse [60], interpersonal relationship difficulties [61], depression and anxiety [62], and even suicide [63, 64, 24]. Studies at universities have shown increased anxiety scores within students (i.e., one standard deviation above those of non-students) - with higher depression levels increasing significantly throughout the first year of studies. Stress is recognized as the number one factor for academic disruption [48, 49], impacting student professional effectiveness, such as, decreases attention, reduces concentration, impairing decision-making skills and reducing the students' ability to establish relationships (colleagues and peers).

VII. Age, Sex and Subject Area

In recent years, studies have shown an increase in student stress levels. Causes include, decrease in student progress, competition, social factors and society. Interestingly, multiple researchers have shown that these increasing stress levels are higher in women [54, 53]. In a survey by Campbell et al. [65], it showed women were more likely to report unacceptable stress levels compare to men; To reduce stress, women indicate they were more likely to limit commitments, exercise and worry less. The relationship between stress induced cortisol levels and memory differs between men and women [66]. Age makes a huge difference, mature students are able to manage stress more effectively than their younger counterparts due to perspective and life experiences [67, 68].

Technical and Non-Technical Subjects In general, studies between technical and non-technical subjects (like computing and mathematics vs medicine and languages) have shown differences in coping strategies and emotional intelligence in stressful situations [69]. The coping strategy was directly linked to academic success for non-technical students, but not for technical students. One possible reason technical students' seem to manage stress more effectively may lie in the nature of the major. For example, computing and engineering students are often required to accept failure more regularly as they work through exercises and examples (e.g., trial-error) or for more mathematical problems are able to find an absolute solution (not subject to interpretation). As a result, technically minded individuals seem to be able to accept stressful situations better (i.e., their expectations and attitude) - which impact how they approach and face general problems/tasks [70, 69, 71]. For instance, some interesting speculations in the literature [72, 73] based upon studies have shown that the majority of non-technical students (medical/psychology) are more 'empathetic' and 'emotionally developed' compared to technically minded individuals (engineers).

Cognitive symptoms
- Memory problems
- Inability to concentrate
- Poor judgment
- Seeing only the negative
- Anxious or racing thoughts
- Constant worrying

Emotional symptoms
- Depression or general unhappiness
- Anxiety and agitation
- Moodiness, irritability, or anger
- Feeling overwhelmed
- Loneliness and isolation
- Other mental or emotional health problems

Behavioral symptoms
- Eating more or less
- Sleeping too much or too little
- Withdrawing from others
- Procrastinating or neglecting responsibilities
- Using alcohol, cigarettes, or drugs to relax
- Nervous habits (e.g. nail biting, pacing)

Physical symptoms
- Aches and pains
- Diarrhea or constipation
- Nausea, dizziness
- Chest pain, rapid heart rate
- Loss of sex drive
- Frequent colds or flu

TABLE I: Categorizing the symptoms of stress into four main areas [57].

Change and Time Stress factors change over time. As students learn to cope with difficulties and problems, the stress factors change (including the emphasis on what is and is not import). For example, as shown in Figure 5, a first year student will set greater priority on adapting to a new environment and leaving friends and family in the first year compared to the final year of their undergraduate degree [74] which focuses on grades and employability. The reason students ultimately go to university is to become educated, get employed after graduating, feel some level of personal success and get certified (recognized qualification) [3]. An interesting study conducted by Bayram and Bilgel at a university in Turkey reported that freshman and sophomores had the highest levels of stress and anxiety [75], possibly due to responsibility pressures. For instance, it is most likely that first year university students have lived away from home alone - and hence, are responsible for living expenses, food, rent and managing their daily activities (huge change).

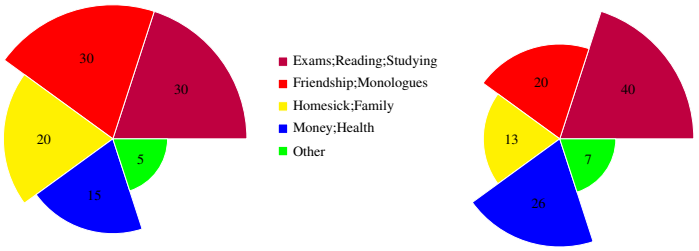

Fig. 5: Stress factors change over time (Left) First year undergraduate students (Right) Final year undergraduate students. Social factors take a priority initially while financial and academic performance take priority towards the end of a curriculum.

Fig. 6: Felt overwhelmed during senior year of high-school (transition to university). Survey of first-year college students from the Higher Education Research Institute at UCLA [48]. Note, while the survey shows 34.6% of students reported that they were frequently overwhelmed increased by 24% since 2005, but has remained relatively stable.

VIII. Conclusion, Discussion and Future Work

This paper reviewed the different academic studies relating to stress in higher education (impact, causes, identification and management of stress). As explained in this paper, we believe stress has a huge impact on a variety of secondary areas (beyond academic performance) - including student retention and health - calling for further research and investigation. Academics need to utilize the findings from recent publications on the topic of stress to manage stress positively (utilizing the potential of positive stress to ensure students are stretched to their full potential without hindering or harming them). Additional studies on stress in higher education and its impacts are severely needed due to the overwhelming evidence. While strategies for identifying and coping with stress have been suggested, these solutions must be embraced holistically across the institution. For example, academics need to work with staff administrators and students to develop and enforce policies which ensure stress management solutions are accepted to reap the benefits and rewards (improved student satisfaction, health, retention, engagement and academic performance). Also it would be helpful for universities to work with organizations, such as, Active Minds, National Alliance on Mental Illness and To Write Love on Her Arms, to promote awareness on psychological stress and health [76]. Combined with inter-university sharing of information collaboration solutions (e.g., through counselling centres and support programs), this would help maximize the impact and reduce psychological suffering on a wider scale [3].

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