

# **Understanding Stress in the Education of Designers: A Study Exploring Learning Pressures for Design Students**

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*Learning pressures can influence the academic performance and psychological well-being of college students. Research has found each student experiences pressure in the learning process, which can negatively impact their learning outcomes if not properly addressed.*

*This study examines learning pressures experienced by undergraduate design students at a Midwestern University in the United States. Students majoring in studio arts, architecture, graphic design, interior design, industrial design, and landscape architecture were surveyed. The survey contained 17 questions that measured stress and pressures caused by peer pressure, self-expectation, time and financial pressures, and future career pressures on a Likert scale. Eight inquiries identified demographic information for additional evaluation and consideration. Investigators found students felt the most learning pressure when not satisfied with their work, specifically when perceiving they were not achieving their own goals. Indicators point to self-esteem as a key component of learning pressures. This paper also shows correlations to learning pressure based on demographic information. Insights gained from this research will help instructors create an empathetic and supportive classroom for students.*

*Keywords: learning pressures, design education, design student stress, undergraduate students*

## **INTRODUCTION**

Research confirms that all students experience pressure throughout their collegiate career, impacting their learning and academic performance (Chen, 2017; Rau, Gao, and Wu, 2008). It is important for faculty and administrators to understand the pressures students are experiencing during this process to create the best learning experience and outcomes for their students. Low academic performance is associated with

dropout in the short term and loss of human capital for societies in the longer term (Freudenberg & Ruglis, 2007). In a 2021 article published by TVET (Technical and Vocational Education and Training) Colleges listing the nine most stressful majors, two design disciplines were included in this short list: Architecture and Arts and Crafts. (Technical and Vocational Education and Training Colleges 2021) The research presented in this paper investigates supporting and expanding upon a study in Taiwan by Professor Whenzhi Chen to understand learning pressures for Industrial design students. Additionally, the research presented here includes supplementary demographic information and expands across a range of design majors at a Midwestern University in the United States. These studies utilized questionnaires to collect their data; this is the typical method to measure learning pressures (Chen, 2017). In Professor Whenzi Chen's paper titled, "Preliminary Study on the Learning Pressure of Undergraduate Industrial Design student," Chen states, "Learning pressure can be experienced in many ways: it can stimulate, be a reaction, or a process. It can cause physiological diseases, behavior problems, and psychological distress if the pressure is not addressed. Students will acquire learning pressure through the learning process with various factors such as stress from courses, barriers to communicating with teachers, ineffective learning methods, poor relations with family and peers, career planning, time management, etc. (Chen, 2017; Peng, Cherng, Chen and Lin 2013, p. 1).

## **LEARNING PRESSURE AND STRESS IN COLLEGE STUDENTS**

Learning pressure and stress negatively impacting college students' educational experience and well-being is not a new topic of concern. Students represent society's investment in the future. The college years are a developmentally crucial period when students transition from late adolescence to emerging adulthood (Arnett, 2000). In 2013 Narasappa Kumaraswamy published an article describing wide-ranging research carried out for over three decades regarding stress, anxiety, and depression among college students. The term 'stress' refers to the psychological state which derives from the person's appraisal of the success with which they can adjust to the demands of the societal environment. (Bhujade, 2017). Stress can bring college students a sense of competence and an increased capacity to learn when they view it as a challenge; however, it can also elicit feelings of helplessness and a foreboding sense of loss when perceived as a threat (Lazarus, 1966). College students frequently have more complex problems today than they did over a decade ago (Udhayakumar & Illango, 2018). Common Stressors in college students include greater academic demands, being on your own in a new environment, changes in family relations, changes in social life, exposure to new people, ideas, and temptations (Kumaraswamy, 2013; Bhujade, 2017). Understanding these pressures acting on their students allows instructors to better connect with students and create a positive classroom environment.

Instructors who understand their students' experiences and that learning pressure can also be beneficial can leverage the most positive classroom experiences. The Yerker-Dodson Law (first established in 1908) postulates that individuals under low and high stress learn the least, and those under moderate stress learn the most. (Kumaraswamy 2013; Mutemeri & Gudyanga, 2008). While academics can be perceived as a positive challenge, potentially increasing learning capacity and competency, if viewed negatively, this stress can be detrimental to the student's mental health. (Beiter, Nash, McCraddy, Rhoades, Linscomb, Clarahan, and Sammut, 2014; Kumaraswamy, 2013; Murphy and Archer, 1996) The ability of an instructor to understand students' learning pressures and how they might lead positively or negatively to stress becomes an essential tool in establishing a positive and effective learning environment. This environment is key to whether students perceive learning pressures and stress as a positive challenge or a threat — directly affecting their educational experience and performance.

The dynamic relationship between individuals and their environment in stress perception and reaction causing pressure to learning situations is especially intensified in college students. The challenges and situations encountered by college students differ from those faced by their non-student peers. (Ross, Niebling and Heckert 1999; Hirsch and Ellis 1996) A college student's environment is unique. While non-academic careers provide their sources of stress, such as evaluation by superiors and striving for goals, college students are subjected to continuous, weekly evaluation, unlike their non-student peers. (Ross, Niebling and Heckert 1999; Wright, 1964)

Obtaining a college degree is the key to success (Thurber & Walkton, 2012). Many students leave their home state to attend a post-secondary school, and the transition can cause stress, anxiety, and depression. (Ross, Niebling and Heckert 1999; D’Zurilla & Sheedy 1991; Towbes & Cohen 1996). Additionally, students often struggle to maintain a high-level academic achievement and adjust to a new social environment during this transition. Regardless of the year in school, college students often deal with pressures related to job finding or a potential life partner. These stressors do not cause anxiety alone. Stress results from the interaction between stressors and the individual’s perception and reaction to those stressors. (Rashid, 2016; Ross, Niebling and Heckert 1999; Romano 1992)

A 2014 study of 374 undergraduate students between the ages of 18 and 24, who were attending Franciscan University in Steubenville, Ohio, indicated that the top three concerns of students were academic performance, pressure to succeed, and post-graduation plans (Beiter, Nash, McCraddy, Rhoades, Linscomb, Clarahan and Sammut, 2014). While one of the initial goals of the Beiter et al. study was to narrow down possible correlates of depression, anxiety, and stress— all the potential sources of concern indicated in the survey had a significant positive correlation with levels of depression, anxiety, and stress. Of the 19 sources of concern surveyed, the ten which caused the most concern were academic performance, pressure to succeed, post-graduation plans, financial concerns, quality of sleep, relationship with friends, relationship with family, overall health, body image, and self-esteem (Beiter, Nash, McCraddy, Rhoades, Linscomb, Clarahan, and Sammut, 2014). Several of the top ten concerns of Beiter et al.’s study —such as finances and pressure to succeed/future success— connect with Professor Whenzhi Chen’s research on learning pressures for Industrial design students. Chen’s main findings were that learning pressure for industrial design students was caused primarily by finances, time, resources, external issues, and future career concerns.

In the Beiter et al. study, when the scores for anxiety, depression, and stress were compared to living status, the off-campus students were the most stressed, anxious, and depressed. In addition, transfer students scored the highest in the three areas measured by the DASS21, with a significant difference in anxiety levels between transfer and non-transfer students. (Beiter, Nash, McCraddy, Rhoades, Linscomb, Clarahan, and Sammut, 2014) Lastly, upper-classmen scored the highest on the depression, anxiety, and stress scales compared with underclassmen. (Beiter, Nash, McCraddy, Rhoades, Linscomb, Clarahan, and Sammut, 2014) When considering these findings in conjunction with Chen’s findings, researchers for the study presented in this paper integrated demographic information into Chen’s learning pressure survey questions and compared data between lower and upperclassmen.

## **STUDY DESIGN OF MIDWESTERN DESIGN STUDENT LEARNING PRESSURES**

The foundation of the study presented in this paper was patterned on the research of Professor Whenzhi Chen’s 2017 study. Chen researched learning pressure for industrial design students in Taiwan and presented his work at a 2017 IASDR (International Association of Design Societies) Conference. Data sets presented in this paper have been isolated to make a direct comparison to support Chen’s findings in Taiwan with our Industrial Design student population at a Midwestern University in the United States. In this study, data sets were expanded across various design majors, and demographic information was included.

Chen’s study was conducted as a 50 Question Survey. Participants were 297 undergraduate Industrial Design Students from several Universities in Taiwan, ranging from public to private. Chen’s study aimed to investigate issues causing learning pressure and the management strategies undergraduate students utilize to relieve them. Chen’s research initiated the idea that learning pressure affects students’ learning process and performance. He postulated that industrial design education specifically emphasizes the operations of real design problems with heavy workloads, which causes learning pressure. (Chen 2017) Chen believes design education is like a coach or apprentice system that involves ‘learning by doing.’ Students need to spend a significant amount of time working on real design problems, but in this process, they experience many learning problems (Chen & Tang, 2013) and time and assignment pressures (Lin & Chen, 2013). He found that learning pressures influence students’ learning performance.

Whenzhi Chen's Learning Pressure questionnaire was designed according to references cited (such as the Education Stress Scale of Adolescents created by Sun, Dunne, Hou, and Xu 2011) and Chen's previous research. A Likert scale with five levels was used to measure the degree of pressure and the efficiency of the pressure management strategies. A score of "1" represented "no pressure," and a "5" represented "tremendous pressure." He determined an average learning pressure of 3.33 (SD = .834) for his group. The core (practice) courses were differentiated from the general education courses. The core courses had the highest learning pressure of 3.56, with the general education courses following with a 2.32 (SD= .963)

Chen categorized the learning pressure questions into 'the twelve components' in the study, containing several questions. The components (categories) were as follows: academic pressure, peer pressure, self-expectations, time pressure, financial pressure, pressure from instructors, external pressure, future career, pressure from parents, resource pressure, achievement, and situational pressure. The main learning pressures from Chen's study were: finance, time, resources, external issues, and future career.

This 2017 study specifically addressed pressure management strategies for undergraduate Industrial Design students. In this area of the survey, there were 'six components.' The components were problem-solving, procrastination and escape, help-seeking, leisure, emotional management, and self-adjustment. The pressure management strategies were determined from previous and related studies. Chen found that students felt the most useful student strategy for managing pressure was leisure, and procrastination and escape were the least useful strategies. All learning pressures were significantly correlated with the procrastination and escape strategy, but the coefficients were low.

Chen's survey questions were developed based on the Educational Stress Scale for Adolescents (ESSA), created by Jiandong Sun, Michael P. Dunne, Xian-yu Hou, and Ai-Qiang Xu. This instrument was created to measure academic stress. A series of cross-sectional questionnaire surveys were conducted with 2,000 adolescents in his country to develop the psychometric properties for this survey. The final 16-item ESSA contained five latent variables: pressure from study, workload, worry about grades, self-expectation, and despondency, which explained 64% of the total item variance. Scale scores show adequate internal consistency. ESSA promises to be a useful tool for those who have a particular interest in academic stress among students.

## **RESEARCH METHODS OF THE MIDWESTERN DESIGN STUDENT STUDY**

Permission for this survey and its survey questions were approved by Iowa State University's Internal Review Board (IRB). IRB approval identification number for this study is 18-507. All participants were required to be over 18 years of age to participate. Participation was voluntary, and participants were advised they could quit the survey. Participants were recruited by convenience sampling via an e-mail sent out to all Iowa State University College of Design majors. The survey was conducted with the use of Qualtrics. Participation was incentivized, with interested participants' e-mails put into a drawing for three \$25 gift cards.

The survey consisted of 17 questions based on Chen's survey questions in the categories of peer pressure, self-expectation, time and financial pressure, situational, and future career pressures. A question regarding emotional health was added.

As with Chen's survey, participants were given a Likert scale where they could agree or disagree with a statement by indicating a "1" representing no pressure to a five representing "tremendous pressure." This survey additionally contained eight demographic questions. These demographic questions addressed students' majors if they were domestic or international students, race, gender, marital status, employment, and housing. This survey will be a longitudinal study in which the same students will be surveyed throughout their college careers at Iowa State University. Data was conducted pre and post-pandemic, so future publications of this research will also compare the learning pressures of students before and after the pandemic. Data were analyzed using SPSS (Statistical Package for Social Sciences). Depending on the type of data, t-test, ANOVA (Analysis of variance), Pearson Correlation, cross-tabulation, and simple frequencies were used to compare mean values and find significant relationships among variables. Nora

Ladjahasan, Assistant Scientist IV for the Institute for Design Research and Outreach (IDRO) at Iowa State University, processed the data.

**SURVEY PARTICIPANTS DEMOGRAPHIC INFORMATION**

All major students participated in the study as follows; Architecture (20.7%), Art and Visual Culture (6%), City and Regional Planning (4.1%), Graphic Design(25.2%), Industrial Design (8.6%), Interior Design (12.8%), Landscape Architecture (7.1%), undecided (7.97) and others (6.4%0 including interdisciplinary studies and double majors (6.4%). The majority of students were white (88%), followed by Asian (3.9%), Black or African American (0.8%), American Indian or Alaskan Native (0.4%), Native Hawaiian or Pacific Islander (0.4%), others (4.2%) and preferred not to answer (2.3%). Also, most participants (97.7%) were domestic students, and only 2.3% were international students. Individuals identifying as females were more engaged in the survey as 73 percent of participants indicated as female, and 25 percent indicated they identified as males. However, this is indicative of the College of Designs enrollment, which has a large majority of those identifying as female. About half of the participants (49%) live in the dormitory or university-owned/managed apartments, 43 percent of participants live outside of campus, and 8% of others.

**MIDWESTERN DESIGN STUDENT LEARNING PRESSURES STUDY FINDINGS**

Initial findings aligned with Chen’s. After collecting data for this study, questions were grouped to see the internal consistency among the 17 questions (listed below in figure 1): questions 8, 9, and 10 represented financial pressures; questions 1, 3, and 7 represented self-expectation; questions 2, 11, and 17 represented situational pressures; questions 4, 5 and 6 represented time pressures; question 12 represented emotional health; question 13 represented peer pressure; question 14 future pressures; question 16 represented achievement and question 15 resources. Students in this survey of Midwestern design students reported that financial pressure caused the greatest internal consistency (Cronbach’s alpha of 0.816), followed by time (.789), self-expectations (.554), and situational pressure (.464). Cronbach’s alpha is a test to see if multiple-question surveys are reliable, meaning how closely related a set of test items are as a group. In other words, it measures the internal consistency of a scale. The acceptable Cronbach’s level varies. For some research, 0.45 to .98 is acceptable, but for some, it is from 0.70 to 0.95.

Table 1. below also indicates the mean of each question. The data shows that the pressure is high when students do not meet their own expectations. Questions 1, 3, and 7 were categorized as self-expectation (Cronbach's alpha of 0.554), showing high learning pressure. Financial pressure represented by questions 8, 9, and 10 showed great internal consistency (Cronbach’s alpha of 0.816), and the data also shows that material costs are a source of learning pressure. However, it seems students do not feel as much pressure concerning the financial costs of portfolio preparation compared to other financial pressures.

**TABLE 1  
SURVEY QUESTIONS: THIS TABLE LISTS THE 17 QUESTIONS ASKED AND THEIR  
MEAN; 1=MINIMUM, 5 = MAXIMUM**

Questions	Mean	SD
1. My design work makes me experience pressure if I am not satisfied with it.		
2. I feel pressure when my design does not meet my own expectations	4.51	0.88
3. I feel pressure that my design will not be approved by the instructors.	4.71	0.72
4. I feel pressure because there is not enough time to complete my design projects	4.17	1.04
5. My time management skills are a source of the pressures I feel.	3.99	1.11
6. I feel there are too many assignments, but not enough time.	3.63	1.13
7. I feel stressed when I cannot achieve my own design goals.	4.60	0.77

8. Project material costs are too high, thus giving me a great deal of pressure.	4.08	1.10
9. The cost of my portfolio is giving me a great deal of pressure.	3.53	1.27
10. The cost of my graduation exhibition makes me experience a great deal of pressure.	3.68	1.24
11. When facing external reviews, I feel a great deal of pressure.	3.94	1.14
12. Learning pressures are affecting my emotional health.	3.87	1.17
13. Competing with graduates from other schools causes me to feel a great deal of pressure.	3.63	1.23
14. Thinking about my future career or study causes me to feel a great deal of pressure.	4.30	1.02
15. My access to College of Design resources (i.e., wood shop, computer lab, 4th-floor print center, reading room, etc.) caused me to feel pressure.	2.65	1.23
16. When my grades are not good, I feel pressure because I have disappointed the teacher.	3.69	1.35
17. In situations where the atmosphere of the class affects my learning, I feel pressure.	3.87	1.15

Question 15 (regarding resources) was ranked lowest—showing resources are not a source of pressure for these Midwestern design students. Several questions did not rank highly for learning pressure compared to the other questions the Midwestern design students were asked. These low-ranking questions were: question 17 (a situational question), question 16 (regarding class achievement), question 14 (about future career), question 13 (regarding peer pressure), and question 12 (regarding emotional health). Two questions (Q5 and Q6) related to time also did not rank highly.

When reviewing correlations in the data (n=266), the question regarding future career (Q14) had a positive correlation with all of the learning pressures. Question 16, representing achievement, positively correlated with all learning pressures except resources. The higher-ranking pressures of financial, time, and self-expectations—along with the lower ranking time and emotional health— all had a positive relationship with all the learning pressures, except for the second time question: my time management skills are a source of the pressure I feel. This second-time question only correlated with the achievement and future questions.

While this survey encompassed a range of design majors, data was isolated for a more direct comparison of Chen’s findings regarding the learning pressures of Industrial design students. This study found that time pressure was higher for other design majors (Architecture, Art and Visual Culture/Integrated Studio Arts, City and Regional Planning, Graphic Design, Interdisciplinary Design, Interior Design, Landscape Architecture) than for Industrial design. Additionally, achievement and financial pressures were comparatively less for Industrial design students than in other majors in this Midwestern university.

This study found that those identifying as female and others felt greater achievement, situational, future, and emotional pressures than males when reviewing demographic data. Individuals living in Iowa State University (ISU) owned dormitories experienced less learning pressure than those living in operated/managed apartments or other housing. Those living outside of ISU-managed housing experienced more financial and emotional health pressures but less time pressure than those in dormitories. In terms of employment, it was found that there is greater emotional health pressure for those working 30+ hours a week compared to those working 10 hours or less, 20–29 hours, and unemployed. Overall, unemployed students experienced less emotional health pressure than those who worked. This study found no significant differences in learning pressures for students by international versus domestic origin or by race.

## CONCLUSION

This study found that students felt the most learning pressure when they were not satisfied with their work, specifically when perceiving they were not achieving their own goals. Encouragement with productive criticism can be a key component of supporting the learning process. For most young adults,

their time at the university is important for the evolution of self-sufficiency. The first years of university education typically overlap with the last adolescent period, which is frequently described as stressful. Students often have problems concerning their new environment during the transition period, and as they adapt to the new environment, educational problems rise to the surface (Kumaraswamy, 2013; Dixon, Robinson Kurpius, 2008). The findings of this study provide information on the learning pressures experienced by design students. Awareness of these learning pressures allows instructors and institutions to provide support and a more productive and positive learning environment.

Colleges should encourage a warm and effective learning environment for students. Support and mentoring are required so that learning pressures and stress can be identified early and dealt with appropriately. Health education programs, mentorship, and a reduction in information overload in the curriculum can be important strategies to enable undergraduates to cope better with the demands of tertiary education. (Kumaraswamy 2013; Bhujade, 2017)

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