Effects of Academic Workload on the Burnout of Students during Online Learning

Ma. Janice J. Gumasing, Christian Jay E. Sesnorio, Henrie Louis P. Subido, Charles Kristian K. Ilo
School of Industrial Engineering and Engineering Management
Mapua University
Muralla St., Intramuros, Manila, Philippines
mjjgumasing@mapua.edu.ph, hlpsubido@mymail.mapua.edu.ph,
cjesesnorio@mymail.mapua.edu.ph, ckkilo@mymail.mapua.edu.ph

Abstract

As a preventative measure against the spread of the coronavirus disease, most educational systems worldwide have shifted to remote learning (COVID-19). However, the quick shift to online learning has produced some difficulties that have yet to be overcome. This paper aims to describe the effects of academic workload on student burnout during online classes. Students in the Philippines face difficulties with remote learning after the COVID-19 crisis. The researchers used data from a sample of 204 respondents obtained from a digital survey containing their responses. The research aims to analyze and give an interpretation of the survey results with the use of Pearson correlation analysis. The content analysis revealed the following categories of effects of academic workload on student burnout during online classes: work is hurried and rushed, workloads are challenging to manage during online classes, feeling discouraged, irritated, stressed, and annoyed, feeling burnout, and feeling fatigued. Furthermore, regression analysis proved that students' academic burnout is significantly influenced by physical workload, reduced sense of performance, effort, and frustration. Thus, education and counseling support are needed to reduce the student's burnout during online learning.

Keywords
Academic workload, burnout, COVID-19,

1. Introduction

Due to the current situation in the Philippines, schools and universities have decided to postpone face-to-face classes indefinitely and instead conduct online classes. As a result, students study at their respective homes while finding it difficult to study online (Santos, 2020). Studies have been conducted by (Yang, Chen & Chen, 2021) that academic workload on student burnout is one of the factors limiting students' ability to perform well in online classes. It also takes a toll on students' physical and mental health as new problems arise. Students' physical and mental health are currently suffering due to the movement from normal life to a new environment or system that they are in.

A study by (Alam et al., 2021) showed that many students complain about the academic workload during online classes, which leads to burnout and harms their health. In particular, their mental and physical health because they are required to sit for long periods in front of computer screens, which can cause back and eye problems, eating problems, and even sleep problems. The researchers want to know how strong the relationship between academic workload burnout and students' physical and mental health is and whether online classes are hazardous to students.

This study was designed to address the presence of academic workload on the burnout of undergraduate students during online classes and its relationship to their physical and mental health during online classes and help instructors and the university appraise the workload given to students. Students will benefit from this research by analyzing and assessing the academic workload assigned to them to avoid burnout and prepare for potential risks to their physical and mental health. The findings of this study will also assist professors in assessing and limiting the academic workload assigned to students and ensuring that activities distributed during online classes are appropriate for the

student's abilities. School administrators would be aware of the effects of academic workload on student burnout, allowing them to facilitate or improve learning methods and instructions. This research could also help government agencies improve the development and delivery of online classes. They could implement a substantial academic workload and an appropriate number of online class hours because they are in the highest position of educational institutions. Finally, this study serves as an excellent foundation or reference for future researchers who may conduct a more comprehensive study on the potential effects of academic workload on student burnout during online classes.

1.1 Objectives

This paper intends to assess the perceived effects of academic workload on the burnout level of undergraduate students in the Philippines during online learning. Specifically, the study aims to determine the relationship and impact of academic workload on student burnout during online classes using the NASA TLX Workload Questionnaire and Maslach Burnout Inventory.

2. Literature Review

Bartley and Golek (2004) define online learning as distance learning or distance education. In some instances, the abrupt transition from in-person classes to online classes takes a toll on every student because they are used to physically interacting with an instructor and not being forced to learn from a computer screen. This led to the conclusion that online classes are less effective than in-person classes, but Loeb (2020) believes they are better than no classes. Several risks of online learning continue to emerge, as Code and Jett (2020) state that learning screen time causes eye strain. Because of poor posture, some people may experience muscle fatigue, headaches, tingling sensations, and decreased performance (Mehdi, 2020).

According to a study, using a computer for extended periods may harm a person's physical and mental health (Nazarlou, 2013). Individuals commonly experience symptoms such as eye strain, blurred vision, headaches, backaches, and neck pain due to visual problems and poor working habits caused by excessive screen time (Cole et al., 1996). Furthermore, allocating a significant amount of time to online learning increases the number of hours students must sit in front of a screen, leaving them sedentary for several hours (Dugan, 2018). Continuing this practice for an extended period may result in students experiencing back pain, shoulder pain, and neck pain due to slouching or straining.

Students are always expected to meet deadlines, regardless of the learning mode, and the amount of work they must complete is constantly piling up. This brought up the topic of mental workload, which is defined as the difference between a person's maximum capacity for mental load in a motivated state and the workload on the burnout demands of a task (Hart & Staveland, 1998) and also an intervening variable such as attention, which must be deduced from changes in performance. However, to perform optimally, one must pay attention to whatever one do. This can be difficult when severe workload burnout results in compromised performance quality, and performance declines when mental and physical demands are excessive (Kantowitz, 2000).

One of the aspects of a person's physical and mental health that is affected by workload burnout in students, resulting in compromised performance, is their physical and mental health. Students subjected to a high mental workload may suffer from fatigue, overstress, pain, illness, and other symptoms (Prastawa, Susanto & Nofri, 2018). This occurs when the task's demand exceeds the student's ability or capacity. The decrease in work productivity may be due to fatigue from working for an extended period (Ulfah, Nurcahyo & Dwiandhono, 2013). A high mental workload can result in a lack of sleep to complete given tasks, and according to Choi et al. (2018), people who sleep for less than 5 hours will experience high levels of stress.

Students are frequently perceived as stressed individuals, particularly those who devote most of their time to maintaining high academic performance. Students' stress levels tend to rise due to the amount of academic workload burnout they experience. Students under academic stress may engage in emotional eating or meal skipping (Choi, 2020). Chamberlin et al. (2019) discovered that students with high levels of stress had poorer nutrition habits and were more likely to binge eat than students with lower stress levels.

3. Methods

3.1. Survey Questionnaire

The data gathered in the study was obtained using an online survey questionnaire. The survey was randomly distributed to college students in the Philippines. The survey's structure is based on questions that seek answers to the effects of academic workload and student burnout during online classes. Respondents are asked for their age, gender, place of residence, year level, and program. Furthermore, the respondents were also asked about their assessment of the level of academic workload using the NASA-TLX workload questionnaire. The NASA task load index (NASA TLX) is a tool for measuring and conducting a subjective mental workload assessment. The TLX also employs a paired comparisons procedure. This involves presenting 15 pairwise combinations to the participants and asking them to select the scale from each pair that has the most effect on the workload during the task under analysis. This questionnaire measured the following factors: mental workload, physical workload, temporal workload, performance, effort, and frustration using a 7-Point Likert scale ranging from 1-strongly disagree to 7-strongly agree.

In addition, a burnout questionnaire using Maslach Burnout Index (MBI) was used in the study to measure the student's psychological assessment of burnout. Maslach Burnout Inventory – Human Services Survey is a 22-item survey that covers three areas: Emotional Exhaustion (EE), Depersonalization (DP), and low sense of Personal Accomplishment (PA). Each subscale includes multiple questions with frequency rating choices of (1) never, (2) a few times a year or less, (3) once a month or less, (4) a few times a month, (5) once a week, (6) a few times a week, or (7) every day.

3.2. Statistical Analysis

The data gathered from the survey questionnaires were analyzed using Minitab version 20. The study was conducted using a 95% confidence level, and the results of $p<0.05$ were considered significant. The Pearson correlation analysis was used to determine the association between the factors of academic workload and factors of student burnout. Furthermore, multiple regression analysis was employed in the study. The multiple regression analysis generates an equation to describe the statistical relationship between one or more predictor variables and the response variable. The significance and relationship of independent variables were determined and used as the functional equations to interpret the impact of the independent variables on the dependent variable. The academic workload index was identified as the dependent variable in this study. In contrast, the indicators for burnout, such as emotional exhaustion, personal accomplishment, and depersonalization, were identified as independent variables.

4. Results and Discussion

4.1. Demographic Profile

The researchers had gathered a total of 204 respondents for this study. It was found that the majority of respondents were between the ages of 22 and above, accounting for 42.2% of the total, with males accounting for 55.9% of the total. The majority of respondents (53.9%) live in a city-type community, while 46.1% are from the province. Most student respondents (25.5%) are currently enrolled in the engineering program.

4.2. Result of Academic Workload Assessment

Table 1 shows the descriptive statistics of respondents' responses in terms of academic workload. Six (6) variables were captured from the survey questionnaire that was focused on mental workload, physical workload, temporal workload, performance, effort, and frustration. The average scores for measuring variables were calculated to obtain the mean scores to test the respondent's degree of agreement. Based on the 7-point Likert scale, a mean of 3.5 was taken as the minimum acceptable mean score, which indicates that any item with a mean score above 3.5 agreed that respondents feel overloaded based on the given variable. Based on the results, respondents had all agreed that their assigned tasks during online learning are mentally and physically demanding, they feel hurried or rushed during the pace of the task, they find it hard to work to accomplish their level of performance, and they feel insecure, discouraged, irritated, stressed and annoyed when performing a task. However, respondents felt successful when they could accomplish the task asked of them. However, the variable that has the highest score is mental workload.

Table 1. Result of Academic Workload Questionnaire

Items	Mean	Std. Dev.	Range	Agreement
Mental workload	5.853	1.038	1-7	Agree
Physical workload	5.392	1.344	1-7	Agree
Temporal workload	5.441	1.309	1-7	Agree
Performance	5.225	1.414	1-7	Agree
Effort	5.608	1.045	1-7	Agree
Frustration	5.382	1.186	1-7	Agree

According to a study by Dewi et al. (2021), the amount of attention required while doing cognitive tasks such as online learning impacts the mental burden. The switching from a traditional learning model to a fully online learning model necessitates a higher level of concentration since it requires students to adapt to new habits and procedures, transforming a learning activity previously classified as an automated activity into one that requires more attention span/degree. Based on a study by Clarke et al. (2015), the learning process using technology as a learning media will result in higher pressure. In a study by Hove and Corcoran (2008), they discovered that using e-learning increases users' irritation levels compared to traditional techniques. Users of e-Learning had to be able to use high-tech equipment like computers and the Internet. If users' capacity to operate the equipment is limited, it may increase their mental effort. Because of the lack of face-to-face conversation, another side effect of e-learning is sleepiness. Sleepiness is also another factor that affects attentiveness, which, in turn, reduces productivity (Feidakis et al., 2014).

4.3. Result of Student Burnout Assessment

The descriptive statistics of respondents' responses in terms of student burnout are shown in Table 2. The survey questionnaire collected three (3) variables related to emotional exhaustion, personal accomplishment, and depersonalization. The mean scores were calculated from the average scores to measure variables to test the respondent's degree of agreement. A mean of 3.5 was chosen as the lowest acceptable mean score on the 7-point Likert scale, indicating that any item with a mean value above 3.5 agreed that respondents feel burdened depending on the identified variable. Based on the results, respondents agreed that they think burnout is reflected by the following variables: emotional exhaustion, reduced sense of personal accomplishment, and depersonalization. However, the highest score variable is a reduced sense of personal accomplishment.

Table 2. Result of Burnout Questionnaire

Items	Mean	Std. Dev.	Range	Agreement
Emotional Exhaustion	5.46	0.77	3-7	Agree
Personal accomplishment	5.58	0.9	3-7	Agree
Depersonalization	5.35	1.11	3-7	Agree

According to Donkor et al. (2020), burnout is a state of emotional weariness characterized by a loss of passion for work. Excessive workload, personal pressures, and persistent workplace tension can result in emotional exhaustion, a chronic symptom of somatic and emotional depletion. Burnout is a mental health condition that develops due to work-related stress and involves a constant reactivity to ongoing interpersonal pressures. Overwhelming exhaustion, emotions of cynicism, and alienation are all critical contributors to burnout. A perception of ineffectiveness and lack of accomplishment may also result.

The link between smart gadget use and stress and burnout has piqued the curiosity of researchers all around the world. It's widely assumed that prolonged exposure to computer and smartphone screens causes stress-related ailments. These can manifest as psychological, cognitive, or physical impairments, and they can harm a person's quality of life and everyday function (Hossman & Hermann, 2003).

4.4. Result of Correlation Analysis

Table 3 shows the Pearson r correlation results. Each attribute of the academic workload was tested to each burnout attribute to examine their association. The result indicated that academic workload indicators have a minor to very

high correlation with the burnout indicators. Specifically, frustration is very high correlation to emotional exhaustion, reduced sense of personal accomplishment, and depersonalization.

Table 3. Result of Regression Analysis

Factors	Pearson correlation (r)	p-value	95% CI	Remarks	level of association
Mental workload → emotional exhaustion	0.433	<0.001	(0.260,0.578)	significant	Moderate
Mental workload → personal accomplishment	0.456	<0.001	(0.287,0.597)	significant	Moderate
Mental workload → depersonalization	0.269	0.006	(0.079,0.440)	significant	Minor
Physical workload → emotional exhaustion	0.555	<0.001	(0.404,0676)	significant	High
Physical workload → personal accomplishment	0.502	<0.001	(0.340,0.634)	significant	High
Physical workload → depersonalization	0.486	<0.001	(0.322,0.622)	significant	Moderate
Temporal workload → emotional exhaustion	0.523	<0.001	(0.387,0.665)	Significant	High
Temporal workload → personal accomplishment	0.475	<0.001	(0.309,0.613)	Significant	Moderate
Temporal workload → depersonalization	0.357	<0.001	(0.174,0.515)	Significant	Moderate
Performance → emotional exhaustion	0.429	<0.001	(0.255,0.575)	Significant	Moderate
Performance → personal accomplishment	0.28	0.004	(0.091,0.450)	significant	Minor
Performance → depersonalization	0.412	<0.001	(0.236,0.561)	significant	Moderate
Effort → emotional exhaustion	0.632	<0.001	(0.499,0.736)	significant	High
Effort → personal accomplishment	0.605	<0.001	(0.591,0.791)	significant	High
Effort → depersonalization	0.519	<0.001	(0.361,0.648)	significant	High
Frustration → emotional exhaustion	0.777	<0.001	(0.394,0.670)	significant	Very High
Frustration → personal accomplishment	0.758	<0.001	(0.519,0.748)	significant	Very High
Frustration → depersonalization	0.776	<0.001	(0.321,0.621)	significant	Very High

According to Caballero et al. (2007), in the case of burnout, the student faces academic life with a sense of apathy and dissatisfaction, which manifests in physical and emotional manifestations and evasive behaviors and symptoms that match this discomfort. Constant tiredness and fatigue; mental exhaustion; lack of ability to nurture personal relationships; social distancing; complex mood states (such as anxiety, irritability, and mild depression); difficulty focusing or attentive during any task are some of the symptoms identified during online learning (Figueroa et al., 2019). Maintaining structure in an in-person setting was difficult enough; however, the ongoing COVID-19 pandemic has thrown whatever skills the students had out the window. The struggle to maintain balance has somehow worsened and is causing academic burnout. According to a study by Atalayin et al. (2015), burnout, which is a widespread problem among students, impacts numerous aspects of students' functionality, contentment, and outlook on the future by causing them to experience psychological difficulties such as despair.

4.5. Result of Regression Analysis

After performing a correlation analysis, a multiple regression equation was calculated to predict the model for academic burnout based on academic workload variables. The regression analysis generates an equation to describe the statistical relationship between one or more predictor variables and the response variable. The significance and relationship of independent variables were determined and were used as the working equations for the basis in the interpretation of the impact of the independent variables on the dependent variable. From there, a regression model was developed, as shown in Table 4. A significant regression equation was found with an R^2 of 59.66%. The predicted model for academic burnout is shown in Eq. 1.

Equation (1):

Academic Burnout = 1.401 + -0.036 mental workload + 0.126 Physical workload – 0.083 Temporal workload + 0.157 Performance + 0.336 Effort + 0.212 Effort

Table 4. Result of Regression Analysis

Term	Coeff	SE Coef	T-Value	P-Value	VIF
Constant	1.401	0.408	3.70	0.08	
Mental workload	-0.036	0.068	-0.54	0.591	1.71
Physical workload	0.126	0.052	3.12	0.002	1.70
Temporal workload	-0.083	0.059	-1.39	0.166	2.07
Performance	0.157	0.039	3.96	0.000	1.09
Effort	0.336	0.080	4.21	0.000	2.41
Frustration	0.212	0.060	3.57	0.001	1.72

The models were simplified by leaving only the coefficients significantly different from 0, having $p<0.05$. The coefficient indicates that for every one value increase in the academic workload variable, one can expect an increase in academic burnout. Therefore, indicators that can predict students' academic burnout are physical workload, reduced sense of performance, effort, and frustration. The R-square value is calculated, and it measures how close the data is to the regression fit line. The model summary of the regression analysis incurred an adjusted R^2 of 62.07%, which indicated that independent variables in the equation were strong predictors of the academic workload.

The data were checked using the normal probability plot and residual scatter plot to see if the data met the conditions of linearity, homoscedasticity, and independence conditions. As shown in Figure 1, the residual plots were almost as close to the normal straight diagonal line as the normal probability plot, indicating that the residuals were of approximate normal distribution. Furthermore, the scatter plot revealed that most of the plots clustered in an almost rectangular form along the zero line, with approximately equal dispersion around zero and no strong tendency to be larger or less than zero, indicating that the residuals were linear homoscedastic. As a result, there was no cause to be concerned about the regression assumptions being violated.

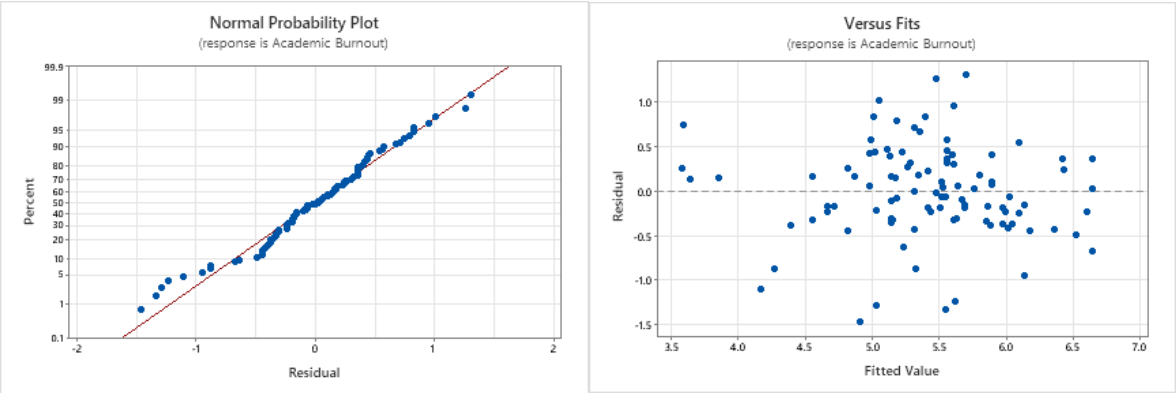

Figure 1. Normal Probability Plot & Residual Plot

5. Conclusion

The findings of this study can be used to look at how health, stress, and workload are associated and draw conclusions about what this means for undergraduate students doing online learning. This study's findings have significant consequences for mental health professionals. The study showed that burnout, a widespread problem among students, impacts numerous aspects of their lives, including their functionality, contentment, and outlook on the future, causing them to experience psychological issues such as despair. When a student seeks psychiatric help with complaints like disappointment due to high expectations, inactivity due to a lack of energy, frustration due to giving up personal expectations, lack of interest, and sensitivity, mental health professionals may be able to provide them with more efficient help if academic burnout is suspected.

References

Alam, F., Yang, Q., Bhutto, M. Y., & Akhtar, N, *The influence of e-learning and emotional intelligence on psychological intentions: Study of stranded Pakistani students*. Frontiers. Retrieved February 6, 2022, from 2021.

Atalayin, C., Balkis, M., Tezel, H., Onal, B., & Kayrak, G., The prevalence and consequences of burnout on a group of preclinical dental students. European Journal of Dentistry, 09(03), 356–363. 2015.

Bartley, S. J., & Golek, J. H. , Evaluating the Cost Effectiveness of Online and Face-to-Face Instruction. Educational Technology & Society, 7(4), 167–175. 2004.

Caballero, C.; Abello, R.; Palacio, J. Relación del burnout y el rendimiento académico con la satisfacción frente a los estudios en estudiantes universitarios. Av. Psicol. Lat., 25, 98–111. 2007

Chamberlin, A., Nguyen-Rodriguez, S., Spruijt-Metz, D, Academic-related factors and emotional eating in adolescents. The Journal of School Health. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5990036/ , 2019.

Choi, D. W., Chun, S. Y., Lee, S. A., Han, K. T., & Park, E. C. , Association between sleep duration and perceived stress: Salaried worker in circumstances of high workload. *Int J Environ Res Public Health;15,796:1-11, 2018.*

Choi, J. , Impact of Stress Levels on Eating Behaviors among College Students. Retrieved from https://res.mdpi.com/d_attachment/nutrients/nutrients-12-01241/article_deploy/nutrients-12-01241.pdf , 2020.

Clarke, T., Ayres, P., & Sweller, J, The impact of sequencing and prior knowledge on learning mathematics through spreadsheet applications. Educational Technology Research and Development, 53(3), 15–24.2005.

Cole, B.L., Maddocks J.D., Sharpe K, Effect of VUDs on the eyes – Report of a 6-year epidemiological study. Optom Vis Sci; 73:512-528 1996.

Dewi, D. S., Khairunnafi, F., Dewi, R. S. i, & Sudiarno, A., The Effect of Mental Workload, Stress, and Learning Motivation on Student Learning Achievement during Online Courses. Proceedings of the 11th Annual International Conference on Industrial Engineering and Operations Management Singapore. 2021.

Dugan, J. E, Teaching the body: A systematic review of posture interventions in primary schools. Educational Review, 70(5), 643-661. 2018.

Feidakis, M., Daradoumis, T., CaballÃ, S., Conesa, J., & Conesa, J., Embedding emotion awareness into e-learning environments. International Journal of Emerging Technologies in Learning (iJET), 9(7), 39–46. 2014.

Figueroa, A.P.; Plaza Gómez, M.T.; Riaño, H.E.H. Validación de instrumentos para la medición de Resiliencia y Síndrome de Burnout en estudiantes del programa de Ingeniería Industrial de la Universidad de Córdoba (Colombia). Espacios, 40, 30. 2019

Hart, S.G. & Staveland, L.E., Development of NASA-TLX (Task Load Index): Result of empirical and theoretical research. Amsterdam: Elsevier Science Publisher. 1998.

Hossmann KA, Hermann DM. Effects of electromagnetic radiation of mobile phones on the central nervous system. Bioelectromagnetics., 24:49–62., 2003.

Hove, M. C., & Corcoran, K. J., Educational technologies: Impact on learning and frustration. Teaching of Psychology, 35(2), 121–125., 2008.

Kantowitz, B. H., Attention and mental workload. *Sage Journals, 44.* 2020. *doi.org/10.1177/154193120004402121*

Loeb, S., How effective is online learning? What the research does and doesn't tell us. Education Week. Retrieved from https://www.edweek.org/ew/articles/2020/03/23/how-effective-is-online-learningwhat-the.html , 2020.

Mehdi, T. S, Online classes may affect physical health: experts. *The New Indian Express.* Retrieved from https://www.newindianexpress.com/cities/hyderabad/2020/jun/24/online-classes-mayaffect-physical-health-experts2160494.html, 2020.

Nazarlou, M. M., Research on Negative Effect on E-learning. *International Journal of Mobile* Santos, A. P., In the Philippines, distance learning reveals the digital divide. 2020. Retrieved from https://eu.boell.org/en/2020/10/06/philippines-distance-learning-reveals-digital-divide

Poku, C.A., Donkor, E. & Naab, F. Determinants of emotional exhaustion among nursing workforce in urban Ghana: a cross-sectional study. *BMC Nurs* **19,** 116 ,2020.

Ried, D., Motycka, C., Mobley, C., & Meldrum, M, Comparing Self-reported Burnout of Pharmacy Students on the Founding Campus with Those at Distance Campuses. *Americal Journal of Pharmaceutical Education 2006*.