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INVESTIGATING GENDER DISPARITIES IN EMOTIONAL
RESPONSES TO ONLINE LEARNING ENVIRONMENTS:
IMPLICATIONS FOR EDUCATIONAL EQUITY

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Abstract:

This study explores the relationship between gender and emotional experience among undergraduate students enrolled in online distance learning (ODL) at UiTM Permatang Pauh, Penang. Understanding the emotional effect of transitioning to online distance learning, particularly amidst the COVID-19 pandemic, is crucial. Data analysis included correlation analysis to examine the relationship between gender and emotional experiences, as well as independent sample t-tests to compare emotional responses between male and female students. A total of 69 students participated, including 36 men and 33 women. The correlation analysis revealed significant gender disparities in emotional experience: male students reported higher levels of enjoyment ($r = 0.831, p < 0.01$) and hope ($r = 0.408, p < 0.05$), whereas female students reported lower levels of anxiety ($r = -0.389, p < 0.05$) and boredom ($r = -0.671, p < 0.01$). Independent sample t-tests confirmed these disparities in enjoyment, hope, anxiety, and boredom (all $p < 0.05$). These findings highlight the importance of considering gender-specific emotional responses to enhance inclusivity and optimise learning outcomes in diverse educational settings.

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This work is licensed under [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/)**Keywords:**

Online Distance Learning (ODL), Emotional Experiences, Independent Sample t-test and Correlation.

Introduction

Due to the COVID-19 pandemic, many universities decided to discontinue their face-to-face learning programs in favour of online learning to minimize the impact on students' academic progress (Tang et al., 2021). Online learning ensured that students could continue their education even if they were unable to attend traditional classroom settings. Additionally, it made it possible for international students who were unable to travel to take classes remotely.

Online learning has become an established method because it is effective at addressing the differences between conventional classroom settings and the internet environment (Sarimah et al., 2024). The online method gives students more flexibility, but it also calls for greater self-discipline from instructors and students. In order to finish the material in the allotted time, students must put in the necessary effort. The class timetable usually imposes discipline, which they must muster in order to move through the material in a timely manner (Arias et al., 2018)

However, there are significant challenges in ensuring the seamless operation of online learning. Many students, face challenges like not having internet access, slow internet speeds at home, or need to find a way to go past a barrier set up by the internet to access certain websites or online tools. According to Adedoyin and Soykan (2023), digital competency and technology infrastructure, socioeconomic factors (educational inequality), assessment and supervision, a severe workload, and compatibility (certain disciplines, like sports sciences, require physical interactions) are key challenges of online learning. In order to relate with students emotions toward online learning during Covid-19, Baltà-Salvador et al. (2021) find that majority of students were not happy with the quality of their online education during the COVID-19 shutdown, and they felt that it had a negative impact on their academic achievement. In addition, studies in education and psychology have highlighted worries regarding the mental health of students who have had to abruptly transition to online learning environments and attend classes under lockdown.

There is currently no conclusive decision about the relative benefits of online learning over in-person instruction, despite the fact that numerous instructors have expressed differing views regarding the effectiveness of online learning. Investigations into the efficacy of online learning are ongoing. Factors such as cost-effectiveness, student satisfaction, and academic outcomes are key considerations in assessing the feasibility of online education as a replacement for traditional classroom instruction.

Around the world, the COVID-19 pandemic has caused extraordinary disruption in a number of industries, with education being one of the most affected. Educational institutions around the world, including those in Malaysia, were forced to quickly adjust to alternate forms of instruction in response to the public health emergency in order to slow the virus's spread. There were many opportunities and problems for both students and instructors as a result of this sudden transition from traditional face-to-face learning to online modalities, which required a

paradigm shift in educational delivery methodologies. In the context of online learning, students' emotional experiences are crucial because they have a significant impact on their motivation, engagement, and academic performance. In order to obtain a better understanding of Malaysian students' subjective experiences and views, more research is necessary to fully understand the emotional landscape of these students throughout the shift to online learning. In order to maximize learning results and student well-being in the face of continued pandemic uncertainty, educational institutions must have a thorough understanding of how Malaysian students feel about online learning.

Thus, the objective of the paper is to investigate gender disparities in emotional responses among undergraduate students enrolled in online distance learning (ODL) at UiTM Permatang Pauh, Penang, particularly considering the shift from traditional face-to-face learning to online learning due to the COVID-19 pandemic. The study aims to understand the emotional effects of this transition and its impact on learning outcomes. Specifically, the paper examines the emotional experiences of enjoyment, hope, anxiety, and boredom in relation to gender, utilizing correlation analysis and independent sample t-tests to assess the differences between male and female students.

Related Work

A major change in the education sector was brought about by the COVID-19 epidemic, which forced many universities to switch from classroom learning to online learning. After a few years implementing online learning, students gave positive and negative feedback on their new norms of learning. The effects of increasing psychological distress and changes in cognitive and behavioural patterns in response to COVID-19 can vary among individuals due to different demographic factors. Gender is one important factor for such variance (Zhao et al., 2022). Differences in female and male students' adaptation responses were expected to be reflected in their course performance (Pilotti et al., 2022). However, a recent study of Mohamad et al. (2020), there was no significant difference in satisfaction, and intention to continue usage of ODL among male and female students. Meanwhile, Idrizi et al. (2023) found that gender had no major influence on online course test results, compared to traditional class results, where female students scored slightly better on the overall academic success.

Next, according to Jiang et al. (2021), their data showed symptoms of stress, anxiety, and depression among the higher education institutions students in Malaysia, Indonesia, Thailand, and China during the outbreak of COVID-19. Anxiety was reported to be most profound among the students, followed by depression and stress. More than half of the participants expressed anxiety beyond the normal level. Next, Savitsky et al., (2020) had studied about anxiety and coping strategies among nursing students during the COVID -19 pandemic and the results showed anxiety level among female students was usually higher than among males in previous studies and was also found in their study.

University must play an important role in developing student's self-esteem, as this can lead to increases in academic performance. Individuals with high self-esteem are more likely to persist in their activities despite initial setbacks, and they are less likely to be discouraged by feelings of inadequacy and self-doubt. Individuals with strong self-esteem are more inclined to face obstacles with confidence and take pride in their personal growth and accomplishments. Previous study has investigated the relationship between self-esteem and students' academic

success (e.g., Rosli et al., 2012), arguing for a positive association in which high self-esteem is a crucial predictor of academic achievement among students (Rosli et al., 2019).

Online resources had a substantial impact on people's stress levels and ways of dealing with them as well as their overall enjoyment and satisfaction (Maican & Cocorada, 2021). This emphasizes how crucial it is to consider these interconnected elements when creating online course designs. In addition to demographic characteristics like as gender, age, learning capacities, family history, and parental education, earlier research has revealed that psychological elements such as perceived social support, self-esteem, and shyness influence students' academic success (Safeer et al., 2021).

Students' academic performance is greatly impacted by self-assurance, acknowledgment, and self-guided learning (Khairuddin et al., 2020). Particularly in trying times like the COVID-19 epidemic, online distance learning (ODL) has proven to be an extremely successful teaching strategy (Dhawan, 2020; Zaman & Nashmena, 2021). However, it's crucial to remember that, in some cases, ODL could not always result in positive consequences. For example, poor internet connectivity might cause a negative relationship between students' pleasure and online learning (Zaman & Nashmena, 2021).

Overall, while online learning offers numerous advantages, such as flexibility, accessibility and cost-effectiveness, it also presents challenges, including self-paced learning and learning resources, which must be addressed to ensure equitable and effective educational experiences for all students.

Table 1: The Advantages and Disadvantages of Online Learning.

Aspect	Advantages	Disadvantages
Flexibility	Online learning allows for more flexibility in scheduling, allowing students to learn at their own pace and at times that are convenient for them. (Maican & Cocorada, 2021).	Lack of structure can lead to procrastination and lack of motivation. (Safeer et al., 2021).
Accessibility	Online learning provides access to education for students who are unable to attend physical classes for various reasons, for example, health issues and geographical constraints. Jiang et al. (2021)	Poor internet connectivity or a lack of access to appropriate technologies can limit students' capacity to fully participate in online learning. (Zaman & Nashmena, 2021).
Cost-effectiveness	Online learning is cost-effective for students since it saves them money on transportation and provides access to free internet resources. Dhawan (2020) and Zaman & Nashmena (2021)	Initially investing in technology and training for educators might be costly. Dhawan (2020) and Zaman & Nashmena (2021)
Self-paced learning	Students can move through the content at their own pace, allowing for personalized learning and accommodating varied learning styles. Rosli et al. (2012)	Reduced opportunities for networking and social engagement can result from a lack of face-to-face interaction. (Safeer et al., 2021).

Diverse learning resources	Students can access courses and materials from institutions across the world, increasing their learning experience. (Khairuddin et al., 2020)	Language and cultural barriers may hinder effective communication and understanding. (Dhawan, 2020; Zaman & Nashmena, 2021).
Gender	Online learning environments may minimize gender prejudices and stereotypes that can occasionally exist in traditional classroom settings, resulting in a more inclusive learning environment for both male and female students. (Zhao et al., 2022).	Female students may feel higher levels of stress and anxiety in online learning environments than male students, maybe due to social pressure or gender-specific expectations. Idrizi et al. (2023)

Materials and Methods

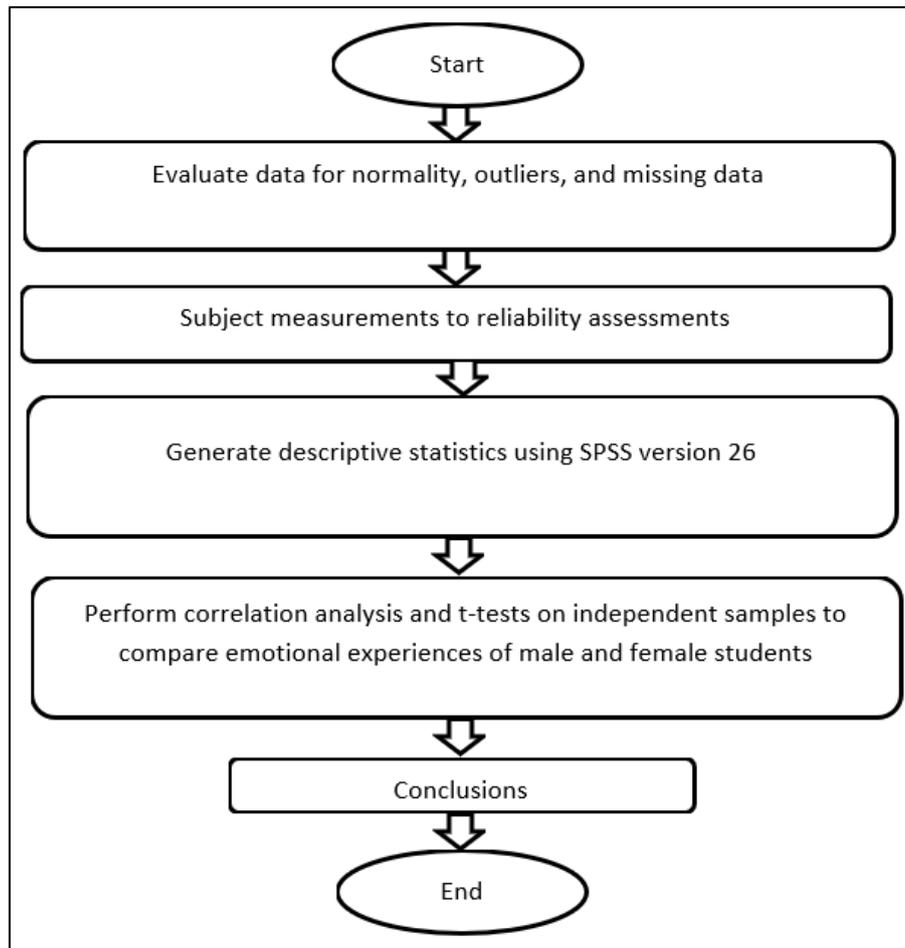
Research Design and Study Procedure

The main purpose of this study is to investigate gender disparities in emotional responses at UiTM Permatang Pauh, Penang, with 69 undergraduate students (36 men and 33 women) enrolled in online distance learning (ODL). The questionnaire is divided into two main sections. Section A relates to the respondent's demographic data. Section B pertains to the emotional experience factors of the included items, which assess enjoyment, hope, anxiety, and boredom. The survey used Likert-scale items to assess the wide range of emotions towards online distance learning (ODL). This research utilized a quantitative approach adapted from preliminary studies by Pekrun et al. (2011). Data for this study, which investigates gender disparities in emotional responses among undergraduate students enrolled in online distance learning at UiTM Permatang Pauh, Penang, was collected through a structured electronic survey administered via Google Forms. All respondents, who were students from the Faculty of Engineering at UiTM Pulau Pinang Branch, provided their answers online using the Google Form, accessible through university communication channels and online learning platforms. Student participation is one of the obstacles to this study. Given the challenges of conducting research during the COVID-19 pandemic, reaching and engaging students, especially those involved in online distance learning, is a significant challenge.

Data were initially evaluated for normality, outliers, and patterns of missing data, as recommended by Shipherd et al. (2024). All measurements were subjected to reliability assessments. Descriptive statistics for all variables were generated using SPSS version 26. This study used correlation analysis to examine the relationship between gender and emotional experiences. According to Ikhwan et al. (2024), the degree of correlation between two variables was determined according to the criteria outlined in Table 2. Additionally, t-tests on independent samples were used to compare the emotional experiences of male and female students. Figure 1 shows that the flowchart outlines the sequential steps involved in the data analysis process, starting from the evaluation of data for normality, outliers, and missing data to the performance of correlation analysis and conducting t-tests on independent samples.

Table 2: Degree of Correlation

Criteria	Remark
$0.8 < p < 1.0$	remarkably strong correlation
$0.6 < p < 0.8$	strong correlation
$0.4 < p < 0.6$	moderate correlation
$0.2 < p < 0.4$	weak correlation
$0.0 < p < 0.2$	remarkably weak correlation

**Figure 1: Data Analysis Flowchart for Investigating Gender Disparities in Emotional Experiences**

Results

Preliminary Analyses

The data were initially screened for normality, outliers, and patterns of missing data. Skewness and kurtosis values for the enjoyment, hope, and anxiety subscales, as well as the enjoyment and boredom subscales, indicated that the data was normally distributed (all values were between -1 and +1). Sixty-nine students selected the button to agree to participate in the study. All students filled out the survey, yielding a total sample size of 69. There were no missing values on the questionnaire items. The data was filtered for outliers using z-scores, with a cut-

off of ± 3.0 . No univariate or multivariate outliers were found in the sample. The Means and standard deviations for emotional responses across genders are shown in Table 3.

Table 3: Means and Standard Deviations

Variable	Gender	N	Mean	Standard Deviation
Enjoyment	Male	36	4.5833	0.64918
	Female	33	4.0909	0.52223
Hope	Male	36	4.4167	0.64918
	Female	33	4.0909	0.67840
Anxiety	Male	36	3.3333	0.75593
	Female	33	2.9091	0.67840
Boredom	Male	36	2.1818	0.58387
	Female	33	2.7500	0.51747

Independent sample t-tests were conducted for the emotional responses (enjoyment, hope, anxiety, and boredom) across two gender groups (male and female), as shown in Table 4. Independent sample t-tests revealed that there is a significant difference in the mean enjoyment scores between males and females ($t = 3.452$, $df = 67$, $p = 0.001$). Males (mean = 4.5833) reported significantly higher enjoyment levels than females (mean = 4.0909), with a mean difference of 0.49242. The 95% confidence interval for the difference in means ranges from 0.20767 to 0.77718, further confirming the significant difference. Even though the variances are not equal, there is still a significant difference in the mean hope scores between males and females ($t = 2.034$, $df = 65.849$, $p = 0.046$). Males (mean = 4.4167) have higher hope scores compared to females (mean = 4.0909), with a mean difference of 0.32576. The 95% confidence interval for the difference in means is between 0.00597 and 0.64555, indicating a significant difference in hope levels. With unequal variances, there is still a significant difference in anxiety levels between males and females ($t = 2.457$, $df = 66.974$, $p = 0.017$). Females (mean = 2.9091) reported higher anxiety levels than males (mean = 3.3333), with a mean difference of 0.42424. The 95% confidence interval for the difference in means ranges from 0.07956 to 0.76892, confirming the significant difference in anxiety. Furthermore, there is a significant difference in the mean boredom scores between males and females ($t = 2.280$, $df = 67$, $p = 0.026$). Females (mean = 2.7500) reported higher boredom levels compared to males (mean = 2.1818) with a mean difference of 0.56818. The 95% confidence interval for the difference in means is between 0.07070 and 1.06566, indicating a significant difference in boredom levels.

Table 4: Independent Sample t-test

Variable	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
				Lower	Upper
Enjoyment	0.001	0.49242	0.14266	0.20767	0.77718
Hope	0.046	0.32576	0.16016	0.00597	0.64555
Anxiety	0.017	0.42424	0.17268	0.07956	0.76892
Boredom	0.026	0.56818	0.24924	0.07070	1.06566

Correlation

Correlation analysis (Pearson's correlation coefficient) in Table 5 was used to examine the strength and direction of the relationship between gender and emotional responses. There is a

strong positive correlation between enjoyment and hope for males ($r = 0.831$, $p = 0.000$) and a weak positive correlation for females ($r = 0.241$, $p = 0.007$). Among males, hope is moderately positively correlated with anxiety ($r = 0.408$, $p = 0.014$), whereas among females, hope is weakly negatively correlated with anxiety ($r = -0.389$, $p = 0.025$). Both males and females show a moderately positive correlation between anxiety and boredom (males: $r = 0.516$, $p = 0.001$; females: $r = 0.516$, $p = 0.002$). Among females, there is a strong negative correlation between enjoyment and boredom ($r = -0.671$, $p = 0.000$). These correlation findings provide valuable insights into the interrelationships between different emotional responses and highlight potential gender differences in the associations between these variables. The underlying factors contributing to these correlations and differences between male and female participants may require further research.

Table 5: Pearson's Correlation Coefficient

Gender			Enjoyment	Hope	Anxiety	Boredom
Male	Enjoyment	Pearson	1	0.831**	0.116	-0.025
		Correlation				
		Sig. (2-tailed)		0.000	0.499	0.885
		N	36	36	36	36
	Hope	Pearson	0.831**	1	0.408*	0.025
		Correlation				
		Sig. (2-tailed)	0.000		0.014	0.885
		N	36	36	36	36
	Anxiety	Pearson	0.116	0.408*	1	0.516**
		Correlation				
		Sig. (2-tailed)	0.499	0.014		0.001
		N	36	36	36	36
Boredom	Pearson	-0.025	0.025	0.516**	1	
	Correlation					
	Sig. (2-tailed)	0.885	0.885	0.001		
	N	36	36	36	36	
Female	Enjoyment	Pearson	1	0.241	-0.241	-0.671**
		Correlation				
		Sig. (2-tailed)		0.177	0.177	0.000
		N	33	33	33	33
	Hope	Pearson	0.241**	1	-0.389*	-0.043
		Correlation				
		Sig. (2-tailed)	0.007		0.025	0.812
		N	33	33	33	33
	Anxiety	Pearson	-0.241	-0.389*	1	0.516**
		Correlation				
		Sig. (2-tailed)	0.177	0.025		0.002
		N	33	33	33	33

Boredom	Pearson	-0.671**	-0.043	0.516**	1
	Correlation				
	Sig. (2-tailed)	0.000	0.812	0.002	
	N	33	33	33	33

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Discussions

Enjoyment

Male students reported significantly higher levels of enjoyment compared to female students in online distance learning. This suggests that male students may find greater satisfaction and pleasure in the online learning experience, possibly due to factors such as comfort with technology or the nature of course content. Furthermore, the strong positive correlation between enjoyment and hope among male students implies that a sense of enjoyment may contribute to feelings of optimism and motivation towards their academic pursuits.

Hope

Male students exhibited significantly higher levels of hope compared to their female counterparts in the context of online distance learning. This suggests that male students may maintain a greater sense of optimism and belief in their capacity to excel in their academic pursuits. The positive correlation between hope and enjoyment among both genders implies that feelings of hope may contribute to a more positive and gratifying learning experience. However, the contrasting correlations between hope and anxiety, which showed a positive correlation among males but a negative correlation among females, indicate subtle gender-based differences in how hope interacts with other emotional experiences. Further exploration into the underlying factors influencing these gender-specific differences in hope could provide valuable insights for supporting students' emotional well-being in online learning environments.

Anxiety

Conversely, female students exhibited higher levels of anxiety compared to their male counterparts. This disparity in anxiety levels may stem from various factors, such as differences in coping mechanisms, perceptions of online learning challenges, or broader societal influences. The positive correlation between anxiety and boredom observed in both genders suggests that feelings of anxiety may contribute to a sense of disengagement or lack of interest in online learning activities, further highlighting the importance of addressing emotional well-being in educational settings.

Boredom

Female students also reported higher levels of boredom in online distance learning compared to male students. Factors such as course design, interaction levels, or individual learning preferences could influence this elevated sense of boredom. The strong negative correlation between enjoyment and boredom among female students indicates that higher levels of enjoyment are associated with lower levels of boredom, emphasising the potential role of engaging and enjoyable learning experiences in reducing feelings of monotony and disinterest.

Limitations of the Study

The study's primary limitations include a relatively small and specific sample size of undergraduate students from the Faculty of Engineering at UiTM Pulau Pinang Branch, which may limit the generalizability of the findings. The use of self-reported questionnaires based on Likert-scale items could introduce response bias or social desirability bias, given the subjective nature of emotional experiences (Zerbe & Paulhus, 1987). Additionally, the cross-sectional design employed restricts the examination of causal relationships between gender and emotional responses over time. Future research should also continue to explore other influential variables, such as age, socioeconomic status, and prior academic performance. Furthermore, the correlational nature of the analysis means the findings cannot determine causality, and the results may not be applicable to students in traditional face-to-face learning environments.

Conclusion

The study successfully examined gender disparities in emotional responses to online distance learning (ODL) among undergraduate students at UiTM Permatang Pauh, Penang, achieving its objectives. The findings clearly demonstrate significant differences in emotional experiences, including enjoyment, hope, anxiety, and boredom, between male and female students. Specifically, male students reported higher levels of enjoyment and hope, while female students exhibited higher levels of anxiety and boredom. Furthermore, the correlation analysis provided insights into the complex relationships between these emotional responses, highlighting distinct patterns between genders.

The study makes several contributions to the field. First, it enhances our understanding of students' complex emotional experiences in the context of online distance learning, particularly in relation to gender disparities. By uncovering these differences, the study underscores the importance of considering gender-specific factors in designing and implementing educational interventions and support mechanisms. Additionally, the findings contribute to the broader discourse on inclusive education practices, emphasising the need to address emotional well-being in online learning environments to optimise student engagement and learning outcomes. Overall, the study provides valuable insights that can inform future research efforts and educational policies aimed at promoting equitable and supportive learning environments for all students.

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