Original Research

The Role of E-Learning Crack-Up Perception and Fear of Academic Year Loss in Students' Psychological Distress and Academic Performance

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Abstract

This study examines the effect of e-learning crack-up perception (ECUP) and fear of academic year loss (FAYL) on psychological distress (PD). The study also explores the impact of PD on students' academic performance (AP). It uses a quantitative method based on data collected from Egyptian medical university students using convenience sampling. The study utilized 313 cases to get the final results. Using path analysis through analysis of moment structures (AMOS) software, the study confirmed a positive effect of ECUP on FAYL ($\beta = 0.061$; CR = 3.069; $p < 0.01$) and PD ($\beta = 0.098$; CR = 2.840; $p < 0.01$). Moreover, the study confirmed a positive effect of FAYL on PD ($\beta = 0.181$; CR = 3.910; $p < 0.01$), and the path analysis demonstrates a negative impact of PD on AP ($\beta = -0.008$; CR = 0.348; $p > 0.01$). The study's findings assist policymakers and university authorities in reducing PD among medical students by reducing burden and pressure, reducing fear of failure, and diminishing the problems that exist during the online or e-learning process. AP should be enhanced by getting rid of PD, anxiety and stress among students, particularly that which results from and is produced during the use of e-learning and online systems. Finally, the findings of the study contribute to the literature of psychology, management, business, and medical science, specifically in terms of students' AP, PD, and mental problems.

1. Introduction

In academic environments, controlling psychological distress (PD) is essential because it negatively affects academic performance (AP), professional competency, and long-term well-being. Tenacious stress can damage focus and memory, leading to lower academic achievement and increasing the risk of burnout and physical health issues [1, 2]. Similarly, the enhancement of mental distress can lead to higher rates of depression and suicide among academic students [3]. Factors such as e-learning crack-up perception (ECUP) and fear of academic year loss (FAYL) play essential roles in enhancing PD [4-7]. In short, PD negatively impacts students AP [4, 8, 9]. More clearly, within medicine, FAYL is found to create fear among students toward assessment systems if public examinations are not held. They become nervous concerning academic year decisions and losing the academic year as a result [10, 11]. Similarly, the ECUP is more costly than a physical classroom, creating issues for students and universities [6, 12].

The domain literature shows that numerous factors both positively and negatively affect PD and AP in universities, including FAYL, ECUP, psychological support, isolation, technical difficulties, a lack of engagement, inadequate access to technology and lack of online participation, fear of academic failure, learning environment, anxiety, fear associated with COVID-19, decreased cognitive functioning, reduced concentration, and diminished motivation, fatigue, feelings of nervousness and restlessness, sadness, and e-learning settings [5, 6, 10, 11, 13-17]. More specifically, the empirical investigation by [12] claims a positive connection between FAYL, ECUP, and PD directly and indirectly the connection between ECUP and PD. However, diverse gaps exist in the literature that need to be explored. For example, the literature lacks investigation via an integrated framework with FAYL, ECUP, PD and AP in a single model. There is also a distinct lack of literature focusing on Egyptian medical students and their experiences with PD. After COVID-19, higher educational institutes developed effective online learning systems to accommodate changes in learning goals. In this regard, students feel high anxiety, stress and depression in Egypt due to academic pressures [18]. Moreover, concerns over academic loss have led universities to adopt flexible e-learning solutions during crises, although technical limitations still pose challenges [2, 19]. Thus, considering this, we established the research questions:

RQ1: What is the role of ECUP and FAYL in enhancing PD among Egyptian medical university students?

RQ2: How does PD play a role in developing AP among Egyptian medical university students?

The study aims to examine PD and AP through the predictive relevance of ECUP and FAYL among Egyptian medical university students. The study findings assist policymakers and university authorities decrease PD through different sources, such as reducing fear, stress, and e-learning crack-up. Moreover, the study also helps enhance students' AP to diminish psychological and mental problems and create a conducive and tension-free environment, possibly enhancing the student's

productivity and AP. Finally, the study's findings enrich the depth of literature by contributing other empirical evidence from a developing context, specifically from medical university students.

2. Literature Review and Conceptual Model

2.1 E-Learning Crack-Up Perception (ECUP)

ECUP refers to a negative experience using e-learning systems, where learners face frustrations such as clumsy course navigation, a problematic enrollment process, uncreative tasks, and generalized performance feedback [12]. Other factors that can create frustration include disliking the student assessment methods, struggling with internet access, and finding the e-learning system more expensive than traditional classrooms [6]. Despite some support from instructors, these challenges lead to an overall perception that e-learning is less effective and more inconvenient than physical learning environments. ECUP played a significant role in contributing to PD among students during the COVID-19 pandemic as it significantly enhances anxiety, stress, and frustration. According to [3], FAYL mediated the connection between e-learning disruptions and PD, with instructional strategies and teachers' motivation as mitigating factors. Similarly, [20] argues that the sudden shift to e-learning increased anxiety due to isolation and inadequate e-learning infrastructure. Among students, it created frustration with the perceived inefficiency of e-learning, contributing to disengagement [21]. Even tech-savvy students, such as those studying IT, reported stress and burnout when e-learning was perceived as overwhelming or ineffective [22]. In the perception of [23], e-learning was often viewed as inferior to traditional methods, leading to dissatisfaction and added psychological strain. Consequently, ECUP, due to various challenges, significantly augmented students' PD, specifically during the pandemic and through their everyday routines.

2.2 Fear of Academic Year Loss (FAYL)

FAYL refers to students' anxiety and uncertainty regarding disruptions to their academic progress. This fear stems from several factors, such as uncertainty about when the academic session will start, apprehension about changes in assessment systems or the possible cancellation of public exams, and nervousness about decisions related to the academic year [3, 6]. Students also worry about their prospects, fearing that delays or interruptions may hinder their ability to pursue higher education. Ultimately, FAYL amplifies concerns about educational setbacks and future opportunities. Importantly, it is a recurring theme across several studies that examine the influence of the COVID-19 pandemic on students' mental health and AP. In the empirical research of [6], FAYL works as a mediator between ECUP and increased PD, which highlights it as a significant contributor to student anxiety. Similarly, [5] explores technical difficulties and insufficient support during e-learning to amplify students' FAYL, which ultimately impacts students' long-term academic goals. FAYL, alongside poor instructional strategies and teacher motivation, intensifies the PD of university students in Pakistan [3]. [24]'s study focuses more on academic self-efficacy and stress; the fear of failure conferred in the survey relates to broader concerns about academic setbacks, indirectly suggesting FAYL as a factor. Lastly, [12] touches on student stress and performance concerns, which can be seen as indirectly linked to FAYL, as academic disruptions during the pandemic could foster anxiety about the completion of the academic year.

2.3 Psychological Distress (PD)

PD refers to a state of emotional suffering characterized by a variety of negative feelings that disrupt an individual's well-being [11]. It presents as persistent fatigue without a clear cause, feelings of nervousness and restlessness, often so intense that the individual struggles to calm down or sit still as well as a sense of hopelessness, depression, and sadness, with some experiencing emotions so severe that nothing can cheer them up [10]. Individuals may also feel worthless or overwhelmed, finding everyday tasks require significant emotional effort. Such symptoms have substantial emotional strain and conditions such as anxiety or depression [3, 6]. [1]'s study highlights the detrimental impact of PD on AP, particularly in e-learning settings, which suggests that universities should enhance support mechanisms for distressed students. In the perception of [17], PD moderates the association between personality temperaments and a sense of hopelessness among young adults. [25]'s study examines the evolution of PD with age, revealing that health, social relationships, and economic factors significantly affect distress levels in older adults. A cross-sectional view of distress among higher education students in Ireland connects it to academic pressures and advocating for integrated mental health resources [26]. As argued by [16], the unique PD experienced by university students during wartime stresses the prominence of psychological support in crises. Lastly, [27] assesses PD among high school students in Bangkok and demonstrates that academic and familial pressures are vital contributors and call for comprehensive mental health programs in schools.

2.4 Students' Academic Performance (AP)

Students' AP can be defined as how much they accomplish their educational goals. This performance is characterized by productivity levels, where high productivity specifies effective time management and effort in academic tasks, while low productivity proposes disengagement. Intense concentration and emphasis during study sessions are crucial for absorbing information, while active participation in educational activities improves learning through collaboration [12]. Excellent memory retention allows students to recall and utilize knowledge effectively, while resourcefulness and imitation demonstrate a proactive approach to overcoming challenges by seeking resources and learning from others [1, 3]. Thorough examination preparation, encompassing diligent study habits and revision techniques, plays a significant role in assessment performance [4, 5]. [28]'s study highlights the substantial role of goal-directed rumination and PD in shaping academic outcomes over time. Nutrition also plays a critical role, as [29]'s investigation found that regular breakfast consumption is linked to better AP and lower mental distress among adolescents. Moreover, [30] underlines the necessity of mental health support, predominantly in high-stress fields like medicine, as mental health distress negatively affects students' academic achievements. Higher levels of PD and burnout correlate with poorer performance in first-year college students [9]. Besides, [31] argues that inadequate sleep adversely impacts both AP and psychological well-being. [8]'s study further investigates the detrimental effects of academic distress on undergraduate performance. In the same notion, [32] demonstrates that coping styles can mediate the negative impacts of PD and social media use on AP.

In the above literature, numerous factors are predictors (positive or negative) of PD and AP in various contexts, specifically fatigue, feelings of nervousness and restlessness, sadness, e-learning settings, FAYL, ECUP, psychological support, isolation, technical difficulties, a lack of engagement,

inadequate access to technology and lack of online participation, fear of academic failure, learning environment, anxiety, fear associated with COVID-19, decreased cognitive functioning, reduced concentration, and diminished motivation, etc., [1, 3, 5, 6, 10, 11, 13-17]. More closely, the study of [12] confirmed the positive association between FAYL, ECUP, and PD directly and indirectly the connection between ECUP and PD. However, the literature still has gaps that need to be explored. The literature provides no investigation of ECUP, FAYL, PD, and AP in an integrated way. Contextually, this evidence also lacks empirical evidence from Egyptian medical university students. Hence, based on the existing knowledge and contextual gaps, the present study framework connects ECUP, FAYL, PD, and AP in a single framework (see Figure 1). ECUP was included because it underlines a negative experience with e-learning systems, where learners face frustrations such as clumsy course navigation, a problematic enrollment process, uncreative tasks, and generalized performance feedback [12]. Besides, FAYL points out students' anxiety and uncertainty regarding disruptions to their academic progress [3, 6]. Likewise, PD shows a state of emotional suffering considered by various negative feelings that disrupt an individual's well-being [11]. Finally, students' AP underlines accomplishments of their educational goals in terms of productivity in academic tasks, intense concentration, and active participation in educational activities to improve learning through collaboration [12].
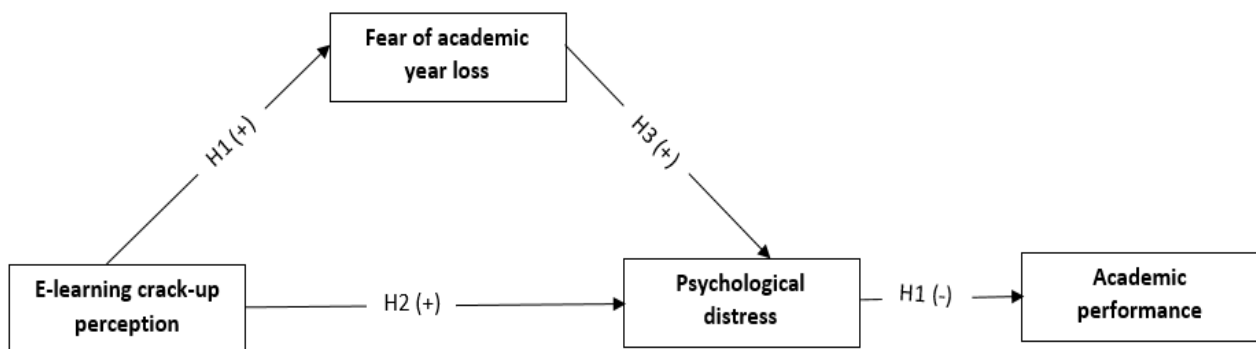
Figure 1 Conceptual model of the study. Source: Developed by the authors.

3. Hypotheses Derivation

3.1 E-Learning Crack-Up Perception (ECUP) and Fear of Academic Year Loss (FAYL)

ECUP, as a positive predictor of FAYL, had gained significant attention, which started during the COVID-19 pandemic when students confronted unparalleled challenges in adapting to online learning. The negative perceptions of e-learning, often called "e-learning crack-up," enhance PD among students [6]. This distress is primarily driven by a mediating factor—the fear of failing to meet academic milestones or losing an academic year, which has become an unescapable concern during the shift to distant education. In the perception of [3], ECUP can lead to enhanced anxiety and distress, although the presence of effective instructional strategies and enthused teachers can alleviate these effects, reducing the FAYL. Moreover, scholars like [12, 33] offer evidence that stress induced by e-learning encounters negatively affects students' AP, strengthening the perception that students may not complete their academic year. PD directly correlates with academic failure fears, particularly when students face problems adjusting to e-learning platforms [15]. This fear is compounded by the stress of potential academic delays, which can cause further emotional strain.

According to [5], the perceived ineffectiveness of online learning exacerbates FAYL, which assists in a cycle of enhanced anxiety and stress. Students' struggles to adapt to the e-learning environment only increase these fears, which suggests that the lack of familiarity and comfort with online learning platforms further exacerbates students' concerns about academic failure [23]. Similarly, in [1], students' psychological readiness and readiness for e-learning are crucial in extenuating the distress related to the process and the fears of losing academic progress.

Consequently, the above literature claims a positive association between ECUP and FAYL [5, 15, 23, 33]. More closely, [12] confirmed these connections (between ECUP and FAYL) in the presence of PD. However, with AP as a leading outcome construct, the association between ECUP and FAYL is still not explored empirically. Therefore:

H1. ECUP is positively associated with FAYL.

3.2 E-Learning Crack-Up Perception (ECUP) and Psychological Distress (PD)

ECUP is a positive and substantial predictor of PD. This relationship was observed as strong during the COVID-19 pandemic, which is reinforced through the mediation of FAYL [12]. According to [6], students perceive more challenges in online learning—such as isolation, technical difficulties, and a lack of engagement—which increases their FAYL and intensifies their PD. This is reinforced by [3], who confirmed that instructional strategies and teachers' motivation can alleviate or aggravate these fears. In the same direction, [5] further identified that factors like inadequate access to technology and lack of online participation directly influence the fear of academic failure, further enhancing stress. [12]'s study demonstrates that students who adopt effective coping strategies may better manage these stressors, though the overall learning environment still plays a crucial role. Moreover, studies like [15, 34] confirm the negative impact of online learning fatigue on mental health, with many students fraught to adapt to the new mode of education, which increases feelings of helplessness and distress. Furthermore, [35, 36] point out that students who are less prepared for e-learning experience higher levels of anxiety and stress, compounded by the fear of failing or losing academic progress. It is urgent and essential for universities to rethink their e-learning frameworks to deliver psychological and educational support to students, mitigating long-term mental health challenges [37, 38].

The literature shows a positive connection between ECUP and PD, especially during the pandemic. However, in everyday routines, these relationships need to be further confirmed among Egyptian medical universities as medical students feel anxiety and fear problems (such as failure). Hence:

H2. ECUP is positively associated with PD.

3.3 Fear of Academic Loss (FAYL) and Psychological Distress (PD)

Across several contexts, FAYL has a deep and substantial role in developing PD. Predominantly, these associations are found during the pandemic. In this way, [33] reported that, following one year of online education, students experienced an enhanced fear of academic delays, which significantly contributed to their PD, driven by inconsistent online learning environments. The impact of ECUP on PD demonstrates that FAYL acted as a mediator between disrupted e-learning experiences and amplified mental health issues among college students [6, 7, 39]. According to evidence from [40], the fear of COVID-19 among university students, although concentrated on

health, is also interconnected with academic concerns, aggravating PD. In the United Arab Emirates, [41] confirmed that knowledge, anxiety, and fear associated with COVID-19 significantly contributed to PD among university students, with academic disruption being a notable factor. [15]'s study specifically concentrated on nursing students in Iran, resulting in the fear of losing the school year being a critical mediator in the connection between e-learning challenges and PD. In Pakistan, FAYL, alongside e-learning problems, significantly impacted university students' psychological well-being [3]. [42]'s study inspected the broader influences of fear and anxiety surrounding COVID-19 on life satisfaction, revealing PD and sleep disturbances as mediators, which may indirectly relate to academic fears. Mental health issues faced by students in Pakistan demonstrate that online education pressures and fears of failing contribute to PD [36]. Scholars like [43-45] explored the association between fear of COVID-19 and PD among cancer patients to determine a parallel perspective on how fear can amplify distress in various contexts. In the study of [46], the role of cyberchondria as a mediator between fear of COVID-19 and stress in university students suggests the complex interplay of academic pressures and psychological health.

Consequently, FAYL is confirmed as the positive predictor of PD among all students' disciplines, specifically those with the massive burden and stress of education and career settlements. Hence, to confirm these associations among Egyptian medical university students, we propose:

H3. FAYL is positively associated with PD.

3.4 Psychological Distress (PD) and Academic Performance (AP)

PD negatively affects students' AP, where increased levels of distress correlate with decreased cognitive functioning, reduced concentration, and diminished motivation, eventually leading to poorer academic activities [13, 14]. The cyclical nature of this association demonstrates that underperformance in academics can further aggravate PD, creating a feedback loop that perpetuates both emotional struggles and academic difficulties over time [28]. The students, primarily first-year and undergraduates, confront high levels of vulnerability to distress due to academic transitions, with many experiencing burnout and anxiety that negatively impact their ability to achieve academic goals [8, 9]. Besides, poor sleep quality, often linked to enhancing PD, has been confirmed to be a significant mediator, particularly in high-pressure environments like medical schools, where sleep deprivation is common [4, 31]. According to [47, 48], environmental and cultural factors affect distress, which leads to enhanced AP. For instance, religious minorities and migrant students may experience unique stressors that not only heighten their distress but also impair their academic success. The COVID-19 pandemic has strengthened these issues, as the sudden shift to e-learning created additional psychological burdens. Students who were not sufficiently prepared for this shift reported higher levels of distress, leading to more significant academic challenges and lower performance [1, 49-51]. Interventions with structured counseling programs have been established to reduce distress and improve academic outcomes over time [51, 52].

Consequently, the domain literature shows the negative role of PD in developing students' academic performance or achievement. However, in the presence of other positive factors of PD, such as ECUP and FAYL, this connection needs further confirmation. Thus:

H4. PD is negatively associated with AP.

4. Methods

4.1 Approach and Respondents

Due to the presence of facts with a high clarity level and outcomes in numbers and graphs, we used the quantitative approach. In business, management, social, management, and medical research, this approach has a massive reputation and is frequently applied strategy [53-55]. Similarly, the domain researchers of AP, ECUP, FAYL and PD, such as [3, 5, 6, 10, 11, 14, 15, 17], frequently applied the same strategy.

We targeted different medical universities in Egypt, where we collected the data from university medical students. Egyptian medical universities are increasingly acknowledging the toll of PD on medical students' AP and mental health, implementing gradual interventions to confront these issues. Contextual studies in Egypt demonstrate high rates of stress, anxiety, and depression due to academic pressures [18]. Besides, concerns over academic loss have led universities to adopt flexible e-learning solutions during crises, although technical limitations still pose challenges [2, 19]. Therefore, investigating medical students' AP, ECUP, FAYL and PD is essential, and universities taking initiatives reflect a growing commitment by Egyptian universities to support students' mental health and academic success amid various challenges [56].

4.2 Data Collection Methods

The researchers used both offline and online data collection methods to gather the cross-sectional data. The offline data was collected using in-person visits to Egypt's several medical universities, where we first obtained authorization from the deans and directors to attend the respondents' classes. We used a convenience sampling technique to reach respondents with the least amount of resources swiftly. Similarly, Facebook pages, WhatsApp groups for medical students, and emails were used to gather the web data. The data was collected between January 2022 and December 2022. We asked for consent to participate in the study and took into consideration the respondents' ethical values. Additionally, we protected their confidentiality and privacy when utilizing their answers. They signed a consent form and provided it to us. We collected 313 usable cases for the final analysis in this manner.

4.3 The Full Collinearity Test

The standard method bias (CMB) is a severe problem that needs to be ensured for every researcher to maintain the validity and reliability of the study. In this regard, the researchers took serious measures and conducted a collinearity test to avoid this momentous issue. We correctly followed the recommendations of [57, 58], where we applied a variance inflation factor (VIF) to assess the complete collinearity analysis. A VIF greater than 3.3 ensures extreme collinearity with CMB, although its values less than or equal to 3.3 confirm CMB's unavailability. In the present study, all values of VIF appear to be less than 3.3 for the study factors. These acquired values guaranteed no CMB issue (Table 1).

Table 1 Full collinearity VIF.

S.No.	Factor	VIF [<3.3]
1	E-learning crack-up perception [ECUP]	1.421
2	Fear of academic year loss [FAYL]	2.003
3	Psychological distress [PD]	2.555
4	Academic performance [AP]	1.893

Source: The researchers' calculations.

4.4 Measurements

We assessed all the factors based on items adopted from the domain literature. Specifically, we measured predictors such as ECUP and FAYL on eight and five items, respectively, and evaluated PD on ten items. The ECUP, FAYL, and PD items are borrowed from [10, 11], as used by [6]. Finally, AP is assessed with six items adopted from [12] (see details in Table 2).

Table 2 Survey questionnaire used in the study.

S.No.	Construct	Item details	Developer
1	E-learning crack-up perception [ECUP]	ECUP1: Finding the course was clumsy. ECUP2: The procedure of enrollment was not an easy task. ECUP3: Task performance was not as creative as the book. ECUP4: Performance feedback was in general. ECUP5: The instructor was supportive. ECUP6: I did not like the students assessment procedure. ECUP7: it was not easy to access the internet. ECUP8: E-Learning system is more costly rather than physical classroom.	[10, 11]
2	Fear of academic year loss [FAYL]	FAYL1: It is uncertain, when academic session will start. FAYL2: I am afraid with assessment systems public examination may not be held. FAYL3: I have become nervous concerning the academic year decision. FAYL4: I am worried about future higher study because I probably would not admit myself. FAYL5: I am afraid of losing the academic year.	[10, 11]
3	Psychological distress [PD]	PD1: I often feel tired out for no good reason. PD2: I often feel nervous. PD3: I often feel so nervous that nothing can calm me down. PD4: I often feel hopeless. PD5: I often feel restless or fidgety. PD6: I often feel so restless that I cannot sit alone.	[10, 11]

		PD7: I often feel depressed.	
		PD8: I often feel that everything is not an effort.	
		PD9: I often feel so sad that nothing could cheer me up.	
		PD10: I often feel worthless.	
		High productivity.	
4	Academic performance [AP]	Strong focus on concentration. Active participation in academic activities. Excellent memory retention. Resourcefulness and initiative. Through examination preparation.	[12]

Source: Adopted by the researchers from domain literature.

5. Results

5.1 Respondents' Profile

The respondent's profile suggests that most respondents who contributed to the study were males (n = 211 or 67.41%) against females (n = 102 or 32.59%). Regarding the age of the respondents, a majority of respondents were 24-26 (n = 145 or 46.33%) years of age, while a minority of students were 18-20. Moreover, most respondents (n = 126 or 40.25%) had moderate internet quality, while only 19.81% (n = 62) had limited internet quality. Finally, a majority of students had extensive previous online learning experience (n = 166 or 53.04%), while only 11.50% (n = 36) had less than six months (see Table 3).

Table 3 Respondents' profile.

Indicators	Category	Frequency	Percentage
Gender	Male	211	67.41
	Female	102	32.59
	Total	*313*	*100.0*
Age [years]	18-20	32	10.22
	21-23	88	28.12
	24-26	145	46.33
	27 and >	48	15.33
	Total	*313*	*100.0*
Access to technology [Internet quality]	High speed, reliable	125	39.94
	Moderate, sometimes unreliable	126	40.25
	Limited access, often unreliable	62	19.81
	Total	*313*	*100.0*
Previous online learning experience	Extensive (more than 1 year)	166	53.04
	Moderate (6 months 1 year)	111	35.46
	Minimal (less than 6 months)	36	11.50
	Total	*313*	*100.0*

Source: Authors' survey data.

5.2 Measurement Model

To ensure convergent validity, we ensured the measurement model, which best measures the extent to which the scale or the questionnaire items are connected. To conduct this aspect, we followed the suggestions of [59, 60], where we concentrated the value of loadings, composite reliability (CR) and average variance extracted (AVE), where we fixed their cut-off values as >0.70 for loadings and CR, while for AVE as >0.50. As shown in Table 4, the loading values of almost all items noted above are the required values (>0.70), but items such as AP4, ECUP3, PD4 and PD7 are not found with their required values. As a result, we decided to delete these to avoid any further issues with the analysis. The values of CR also exceeded the required values (>0.70) for all the constructs of the study. Furthermore, AVE's values for all the constructs are also found above the required values (>0.50) for all the constructs. Finally, to ensure the excellent and adequate measurements of the model, we also ensured its internal consistency, where its overall reliability was found to be 0.857. In contrast, reliability for every factor appeared to be >0.70 with fair scores [60]. In this way, we achieved satisfactory convergent validity.

Table 4 Measurement model.

Construct	Indicator	Factor loadings	CR	α	AVE
E-learning crack-up perception [ECUP]	ECUP1	0.873			
	ECUP2	0.853			
	ECUP4	0.833			
	ECUP5	0.819	0.931	0.786	0.659
	ECUP6	0.788			
	ECUP7	0.761			
	ECUP8	0.749			
Fear of academic year loss [FAYL]	FAYL1	0.855			
	FAYL2	0.839			
	FAYL3	0.828	0.915	0.819	0.683
	FAYL4	0.810			
	FAYL5	0.798			
Psychological distress [PD]	PD1	0.862			
	PD2	0.840			
	PD3	0.838			
	PD5	0.818	0.933	0.829	0.666
	PD6	0.802			
	PD8	0.788			
	PD9	0.762			
	PD10	0.750			
Academic performance [AP]	AP1	0.888			
	AP2	0.861			
	AP3	0.828	0.918	0.862	0.692
	AP5	0.799			
	AP6	0.778			

Notes: CR = Composite reliability; AVE = Average variance extracted; Deleted items = AP4; ECUP3; PD4 and PD7

Next, we ensured the discriminant validity (DV) by assessing the extent to which a degree does not reflect some other construct. Low correlations between all the dealings of interest and the measure of other variables can establish this postulation. In this way, [61]'s test is the best solution to ensure DV, where we found the square root of the average variance extracted to be greater than its correlations for all constructs. This ensured a satisfactory DV (Table 5).

Table 5 Discriminant validity.

| Construct	1 PA	2 PD	3 ECUP	4 FAYL
1. PA	0.645			
2. PD	-0.380	0.782		
3. ECUP	0.155	0.329	0.689	
4. FAYL	0.104	0.465	0.247	0.765

Source: Calculated by the researchers.

Note(s): "Diagonals represent the square root of the AVE while the other entries represent the correlations".

ECUP = E-learning crack-up perception; FAYL = Fear of academic year loss; PD = Psychological distress; AP = Academic performance.

5.3 Structural Model

Before moving to the evaluation of hypotheses, we ensured the model fit as it is essential in SEM due to its assistance in providing the theoretical model that adequately signifies the observed data [62]. In SEM, predominantly with software like AMOS, measuring model fitness is indispensable to validate that the models' associations and constructs align with the collected data [63]. This well-fitting model suggests that the proposed assembly of the connections among constructs is reliable, appropriate, and interpretable. In this way, in our study, we found the required model fit indicators, i.e., CMIN/χ^2 (1.882), GFI (0.911), AGFI (0.923), NFI (0.940), CFI (0.933) and RMSEA (0.031) within the adequate ranges (see Figure 2).
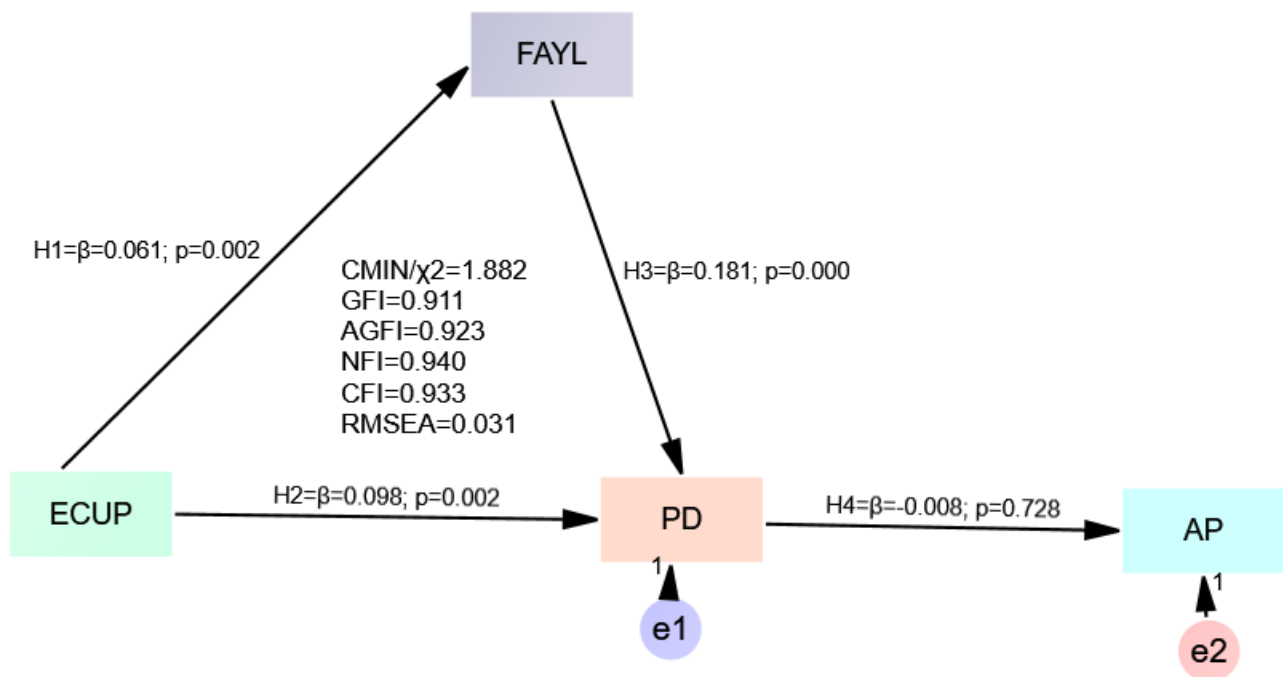
Figure 2 Path analysis. Source: Calculated by the researchers.

The results of path analysis demonstrate a positive effect of ECUP on FAYL and PD [(H1 = β = 0.061; CR = 3.069; p < 0.01) (H2 = β = 0.098; CR = 2.840; p < 0.01)], which confirms H1 and H2. Moreover, the effect of FAYL on PD is confirmed as positive (H3 = β = 0.181; CR = 3.910; p < 0.01). Hence, H3 is accepted. Finally, as per expectations, PD is found to be a negative predictor of AP, which supports H4 (H4 = β = -0.008; CR = 0.348; p > 0.01) (see Table 6 and Figure 2).

Table 6 SEM analysis.

H.No.	Relationships	β	SE	CR (t-value)	p-value	Result
H1	ECUP → FAYL	0.061	0.020	3.069	0.002	*Accepted*
H2	ECUP → PD	0.098	0.035	2.840	0.005	*Accepted*
H3	FAYL → PD	0.181	0.046	3.910	0.000	*Accepted*
H4	PD → AP	-0.008	0.029	0.348	0.728	*Accepted*

Notes: SE = Standard error; CR = Critical ratio; p < 0.001.

ECUP = E-learning crack-up perception; FAYL = Fear of academic year loss; PD = Psychological distress; AP = Academic performance.

6. Discussion

The present study explored the PD and AP through ECUP and FAYL among Egyptian medical university students. The study's results suggest a positive effect of ECUP on FAYL, supported by domain studies such as [1, 3, 5, 12, 15, 23, 33], which confirmed the positive connection between ECUP and FAYL. These results show that when students perceive their courses as inept or poorly designed, it increases concerns that their education may be insufficient for exams and future practice, intensifying fears of academic setbacks. An unwieldy enrollment process adds logistical

frustrations that may avert timely progress, further fueling anxieties over potential delays. Tasks that mirror textbook content without creativity or further communicating elements may leave students feeling underprepared in a practical field like medicine, enhancing worries about their academic competency. Generic performance feedback fails to clarify individual progress or areas needing improvement, growing uncertainty about academic standing. Even with supportive instructors, the contrast between personal guidance and an overall frustrating e-learning experience may deepen students' concerns. Negative perceptions of valuation procedures can add to this anxiety, particularly if students feel the evaluations are unfair or poorly suited to measure their skills. Limited internet access disrupts learning consistency, while the higher costs of e-learning, such as technology expenses, add financial stress without an assured quality outcome.

Furthermore, the study validated a positive effect of ECUP on PD, which is supported by the domain literature [12, 15, 34-38]. These results show that when students perceive their courses as incompetent or lacking in quality, they may feel anxiety or frustration, fearing that their education is deficient for their challenging field, which can lead to PD. A complex enrollment process creates an additional barrier to access, potentially developing feelings of helplessness or annoyance. Tasks that lack creativity and resemble textbook learning may fail to involve students meaningfully, instigating disinterest and perhaps making them feel frustrated or detached from their studies, which can elevate stress. Receiving general, non-personalized feedback can leave students uncertain about their AP and progress, leading to self-doubt and stress over potential shortcomings. Although a supportive instructor can mitigate some of this distress, it may not be enough to counterbalance a frustrating e-learning environment. Dislike for assessment procedures further compounds anxiety, particularly if students feel these methods are unfair or ineffective in measuring their abilities, intensifying the stress related to academic success. Difficulties in accessing the internet create additional hurdles to learning, which can lead to feelings of frustration and isolation, as well as fears of falling behind. Finally, the higher costs associated with e-learning, from internet and device expenses, can place added financial pressure on students, leading to distress as they face increased costs without assurance of adequate learning.

The analysis also claims the positive effect of FAYL on PD. This result is accorded with domain literature [3, 15, 40, 41, 45]. These outcomes suggest that the fear of losing academic progress can contribute to tenacious feelings of tiredness, as students may disburse excessive energy worrying about their educational futures, leaving them physically and mentally exhausted without immediate cause. This fear can also intensify nervousness, making students anxious about their ability to keep up, particularly in a high-stakes field like medicine. Such constant worry may evolve into a state of extreme nervousness or a feeling that nothing could alleviate their anxiety, especially if they sense a real risk of delay or failure. The view of falling behind can also foster a sense of impossibility, particularly for students who feel that their hard work may not guarantee progress, triggering feelings of depression and sadness. This can intensify restlessness or fidgetiness, as students struggle to find comfort in their situation, leading to physical symptoms of distress like an inability to sit still or focus. Besides, FAYL may lead students to feel that their efforts lack value or reward, growing a sense of worthlessness and sadness that is hard to alleviate.

Finally, PD negatively affects AP. This result also aligns with previous studies [1, 4, 8, 9, 48-51]. These adverse effects suggest that students' feelings of anxiety or restlessness may inspire them to increase their productivity, directing their stress into academic work as a way to regain a sense of control. This sensitive urgency can lead to stronger emphasis and concentration, as students might

fixate on their studies to escape feelings of distress and improve their academic standing. PD might also push students to actively participate in academic activities, seeking reassurance from instructors or peers to mitigate anxiety. The fear of failure or academic delay could lead them to prepare carefully for exams, engaging in rigorous study sessions to reduce self-doubt and avoid falling behind. This distress-driven effort may also boost resourcefulness and initiative as students find creative ways to overcome obstacles in learning, concentrating intensely on memorization and retention to achieve a sense of academic security. Thus, despite being taxing, PD may inadvertently encourage students to adopt behaviors that improve AP as they seek relief and comfort through academic success.

The study has several limitations. The survey is based only on quantitative methodology, where cross-sectional data is used to conclude. The study did not underprop the conceptual framework with a particular theory. Besides, the study only concentrated on a few constructs, such as ECUP, FAYL, PD and AP, with direct paths. Moreover, the study only focused on Egyptian medical university students. Finally, the study sample size is restricted to 313 samples only.

7. Conclusion

In conclusion, overall results suggest a positive effect of ECUP on FAYL and PD. Besides, the study confirmed a positive effect of FAYL on PD. Finally, the path analysis demonstrated a negative impact of PD on AP. The study suggests various impactful strategies for Egyptian medical universities to enhance e-learning experiences and sustain student wellbeing. First, universities should prioritize developing comprehensive training programs for students and faculty on directing online learning platforms. This tactic will help to reduce negative perceptions of e-learning, which can contribute to FAYL. Besides, establishing dedicated technical support teams can further support students dealing with overwhelming challenges associated with online learning, lessening anxiety and nurturing a more positive educational experience. To directly address FAYL, institutions must implement proactive academic counseling services that guide students in their academic paths and deliver personalized strategies for overpowering obstacles to academic progression. Regular communication about educational policies, grading systems and course completion pathways would empower students to consider their situation better, mitigating fears of potential academic setbacks.

The establishment of mental health resources is also essential. Universities should improve counseling services, providing accessible and stigma-free avenues for students to seek sustenance for PD. Offering stress management workshops and flexibility training can prepare students with effective coping strategies, helping them to navigate the academic pressures inherent in medical education. Furthermore, implementing regular valuations to monitor both AP and psychological well-being is crucial, such as embracing check-ins, surveys, and feedback forms that identify at-risk students early on and consenting to timely interventions that positively affect their academic journey. Universities should explore flexible curriculum designs, including hybrid learning models that assimilate e-learning and in-person instruction. This flexibility accommodates diverse learning preferences and helps reduce the stress and anxiety associated with a fully online educational format. Finally, institutions should commit to ongoing research to evaluate the developing impact of e-learning on students' mental health and academic outcomes. Creating robust feedback mechanisms will empower students to voice their concerns and experiences with e-learning, allowing universities to improve their approaches in real time.

The outcomes of this study have substantial theoretical implications that enhance the existing literature on educational psychology, e-learning, and AP. By representing how perceptions of ECUP affect emotional and psychological factors, the study encompasses current e-learning theories to incorporate students' subjective experiences, which advocate for models that account for these perceptions in shaping academic behaviors. The integration of FAYL and PD highlights the association between academic fears and emotional responses, bringing into line with transactional models of stress, which accentuate the role of individual appraisals in persuading coping strategies. Besides, the negative connection between PD and AP proposes that PD must be regarded in models predicting academic success, challenging traditional frameworks that often overlook mental health. Henceforth, conducting the research within the cultural context of Egyptian medical universities adds a critical dimension, highlighting the standing of cultural factors in shaping e-learning experiences and outcomes. Generally, the study lays the groundwork for developing intervention frameworks to mitigate the adverse possessions of FAYL and PD on AP, encouraging responsive learning environments that continually assess student perceptions and emotional well-being.

In the future, researchers should apply mixed methods or qualitative approaches to investigate the same issue. Any concerned theory should be used to underpin the conceptual framework of the study. Other factors such as working environment, anxiety, stress, commitment, and e-learning methods should be added to future studies' conceptual frameworks. Other sectors, such as health care and SMEs, may be considered to examine the employee's PD and firm performance accordingly. Finally, the sample size should be enhanced for suitable and generalizable results.

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Author Contributions

Abdelwahed NAA developed the conceptualization framework, hypotheses of the study, analyzed the data and discussed the results in the light of literature. Ramish MS developed the methods and write-up of the manuscript. Both authors accepted the final version after revisions.

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Competing Interests

The authors have declared that no competing interests exist.

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