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Research article

Satisfaction of essential needs in E-learning as a mediator of the links between students' attitudes and ethical misbehaviors

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ABSTRACT

The current study investigated the links between attitudes toward e-learning, satisfaction of essential needs in e-learning and ethical misbehavior in a survey of 1001 students from different higher education institutions in the Kingdom of Saudi Arabia. Structural equation modeling analyses present-that a positive attitude toward e-learning was linked to lower levels of ethical issues, and those links were explained in part (i.e., mediated) by higher levels of the satisfaction of essential needs. In contrast, an unaccepted view about e-learning was associated with lower levels of the satisfaction of essential needs during E-learning and correspondingly higher levels of ethical misbehavior engagement. The effects are tackled in the sense of essential-need satisfaction in e-learning, principled themes, and exposure to e-learning.

The primary objective of this study is to examine the relationship between students' ethical behaviors and their attitudes toward e-learning, using the framework of the Self-Determination Theory. E-learning has opened new horizons for individuals who were unable to enroll in higher education institutions [1–3]. It also provides an opportunity for employees to obtain specialized knowledge and skills that help them perform their tasks to the fullest or change their career paths. Moreover, e-learning is an ideal option to keep the individual abreast of the explosion of knowledge and technological development. In other words, it has been an attractive method to obtain new knowledge and skills throughout life [4,5]. Therefore, many organizations allow their employees to study in a way that does not conflict with their job duties [6]. Research has shown that e-learning meets the expectations of learners who have occupational, familial, social, and personal tasks and obligations, as the methods for learning and teaching tend to utilize an interactive method of communication and overcome educational barriers. In addition, it decreases the cost of education and increases the possibility of flexible scheduling for staff and learners [7,8].

Relatedly, the COVID-19 pandemic affected human beings' lives directly and indirectly e.g. Ref. [9]. It directed educators, experts, and educational leaders to look for new ways to manage the academic crisis in their countries, as students were out of schools because of countries' preventive strategies to minimize the effect of the pandemic [4,9]. As such, during the pandemic, e-learning and distance learning became the only options for students in countless countries. In addition, attitudes toward e-learning are now expected to be more realistic, as they reflect individuals' personal experience. However, students' perceptions and attitudes toward e-learning vary, as there are students who perceive it positively and students who perceive it negatively [10–12]. Therefore, for e-learning to be an effective learning process and promote educational achievement, the readiness of students is anticipated to be one of the most essential requirements [13]. Higher education institutions are expected to develop and utilize effective e-learning programs. However, the uncertain atmosphere of e-learning can be a source of struggle for some students [14].

While e-learning offers flexibility and other forms of interactivity, there are some challenges with online learning. For example,

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ethical concerns regarding students' behaviors have been the frequent subject of scholarly research [15,16], especially during the radical changes that were a result of COVID-19, as high percentages of both teachers and students were not very well experienced with e-learning [17–19]. Specifically, students who had not been exposed to e-learning before the pandemic may have engaged in more unethical behaviors e.g. Refs. [20–23], in comparison to those who had engaged in e-learning. This could be a result of students', educational institutions', and teachers' experiences of carrying out e-learning courses [22]. The increased use of virtual classrooms has caused ethical problems [19]. Students are more likely to rely on easier ways to obtain their degrees without taking into consideration the ethical rules [24]. For instance, studies have revealed that students admit to cheating by using technology [16,25]. In a mixed-methods study, Adams and DeFleur [26] found that search committee chairs in both public and private higher education institutions tend to hire and trust individuals who earned their degree via traditional courses. In addition, individuals who earned their doctorates online have slim opportunities to obtain a job in such institutions, especially as information and communication technology (ICT) has reshaped the delivery of knowledge and skills to audiences targeted by institutions. Unfortunately, virtual learning does not emphasize ethical issues and does not provide cultural and social support for cultivating cultural and moral values [27,28].

As such, the current study examined the links between student's ethical behaviors and their attitudes toward e-learning. The study applied the concept of essential psychological needs as proposed by Deci and Ryan [29–31] in Self-Determination Theory (SDT) to examine how the satisfaction of the highlighted essential needs which are also referred to as basic psychological needs, can serve as mediators in explaining the association between students' attitudes toward e-learning and ethical misbehaviors during e-learning. The research questions of the current study are:

- What is the relationship between students' attitudes of e-learning and their ethical misbehaviors during e-learning?
- How does the satisfaction of the essential needs mediate the relationship between students' attitudes of e-learning and their ethical misbehaviors during e-learning?

1. Literature review and hypothesis development

1.1. Students' attitudes toward E-learning

Studies have indicated that students' attitudes towards e-learning are not similar. Specifically, reports have suggested that students prefer an e-learning course over a traditional course, as it is a helpful and enjoyable tool for them [11]. Furthermore, a study with university students in India shows that students have positive attitudes towards e-learning and their acceptance of it [2]. However, another study of 377 students at the Liaquat College of Medicine and Dentistry indicated that students prefer face-to-face courses over e-learning courses [10]. Similarly, Bali and Liu [32] show in their study of 107 undergraduate students in Taiwan, that a traditional course led to more positive perceptions in comparison with e-learning. Furthermore, in a study that aimed to investigate the perceptions of 387 students at KSAU in Saudi Arabia, Algahtani et al. [33] showed a slightly positive perception of e-learning by students. While female students emphasized a high likelihood of cheating and scams in e-learning, they acknowledged that e-learning may reduce personal efforts to acquire knowledge. Studies have also investigated students attitudes toward e-learning and face-to-face setting. For example, in a survey of 30 teachers and 141 students from different colleges, Kulal and Nayak's [34] study revealed that students are comfortable with e-learning courses, but they do not believe that they can replace face-to-face courses. In addition, the study indicates that teachers are facing challenges in conducting e-learning courses effectively (lack of training, technical issues, etc.). Thus, it is essential to consider that attitudes towards all aspects of learning as it influences human behavior and motivation are significant [35]. Specifically, students are more likely to invest the time, energy, and focus to develop understanding during e-learning, if they have positive attitudes toward it [36].

2. Students' ethical issues

Studies suggest that ethical problems exist across many disciplines internationally [18,37]. For instance, using data collected from 224 undergraduate students in the United Arab Emirates, Khan and Balasubramanian [25] reveal that students admitted to cheating by using technology. A majority of studies on e-learning effectiveness have highlighted some issues related to unacceptable behaviors by students during e-learning. As such, e-learning courses can be viewed as fertile environments of unethical behaviors, as they reflect the students' morals and principles [17]. It is important to mention that ethical concerns in academia are also present in traditional courses. For example, a cross-sectional study conducted by surveying 369 students from the main Romanian university centers revealed that over 70% of the participants engaged in unethical behaviors [38]. Every higher education institution cares about its reputation, therefore, it takes academic honesty into consideration before implementing a new method or strategy [10,39,40].

Students' unethical behaviors during e-learning can be associated with negative academic consequences, such as a poor level of achievement and a low level of meeting targeted learning outcomes e.g., Ref. [41]. In contrast, ethical academic behaviors can be associated with positive consequences. For instance, a study by Ayoub and Aladwan [17] that collected data from 155 students in Jordan shows a positive relationship between the integrity of students who were taking online courses and academic learning quality. This suggests that grades on activities, quizzes, and exams during online courses may not be sufficient sources to reflect students' learning [20,42].

The negative association between unethical behavior during learning and negative consequences is not limited to academia. A study has found a linkage between unethical behavior during school and unacceptable behavior in the workplace [18]. Furthermore,

faculty members have expressed concern about e-learning. In a study that utilized observations, questionnaires, and informal interviews of a sample that contained 10 faculty members and 66 students of Tanjungpura University, Apriliaswati and Fitrianingrum [43]highlight that around 73% of faculty members believed that students are less likely to be honest, responsible, and good in utilizing written and oral language during e-learning. However, around 78% of the students contradicted the highlighted opinion of the faculty members. The study indicates that faculty members and students declared that some students tend to use inappropriate virtual backgrounds during e-learning, which results in distraction for both the lecturer and the co-learners. They are also usually not taking e-courses in a suitable environment.

Ethical misbehaviors may be more common during virtual courses in comparison to traditional courses. Many studies conducted in the field of education and psychology aim to compare unethical behaviors in e-learning settings and face-to-face settings (e.g., Refs. [37,44–46]). In a survey of 214 undergraduates at a large southeastern university, Jenkins et al. [45] found that the COVID-19 pandemic increased students' first-time cheating and made students more creative in cheating with faculty who tried to combat dishonest behavior. However, engagement in unacceptable behavior can be reduced by changing strategies and utilizing effective tools. For instance, in a quasi-experimental study, Dendir and Maxwell [44]compared proctored online testing with online proctoring testing of two online courses (Principles of Microeconomics; Geography of North America) by conducting a study of 648 students at a public university in the U.S. The results indicated that online proctoring testing is associated with a decrease in students' scores, which can be ascribed to the challenges that faced students who used to engage in cheating during exams. In another a quasi-experimental study, Wuthisatian [47]compared the grades of MBA students in an economics course that was offered in two proctored settings (online proctoring and face-to-face proctoring). The results of the study revealed that the grades were significantly lower in the online proctoring setting, which can be attributed to the students' carefulness in following fixed procedures, as they were not familiar with conducting an online proctored test. In a study that collected data via surveys of around 1220 faculty member and 1825 students in Slovak universities, Bušíková and Melicheríková [15] found that students violated academic ethical standards five times more often during e-learning in comparison with traditional courses.

Furthermore, in a study conducted by collecting data from Chinese universities to investigate students' academic dishonesty, Yang et al. [48]found that a high percentage of female students indicated that the absence of penalties resulted in their own and their classmates' academic dishonesty. Similarly, male students indicated a low level of attention by the students as the reason for engaging in academic dishonesty. Furthermore, students from business colleges referred to inadequate capabilities as the major reason for engaging in academic dishonesty, while students from engineering colleges referred to self-interest as the motive for academic dishonesty. In general, the study concludes that opportunism, inadequacy, and self-promotion positively predict academic dishonesty. In an experimental study conducted by observing the behaviors of 1200 participants in San Diego, Kajackaite and Gneezy [46] found that individuals are more likely to lie when the incentives to do so increase. Specifically, individuals' decisions to lie follow a simple analysis of the cost, which leads individuals to determine the advantage of engaging in unacceptable or acceptable behaviors.

3. Students' three essential needs in E-learning

Self-determination theory (SDT) has been utilized in many fields, one of which is the educational field and, more specifically, e-learning during COVID-19 [30,31,49–53]. It suggests that individuals' motives for engaging in a behavior are significant [30,31,54]. The theory proposes three innate needs, namely, autonomy, competence, and relatedness. The need for autonomy refers to individuals' feelings that they have control over their lives; the need for competence refers to individuals' feelings of effectiveness in conducting tasks; and the need for relatedness refers to individuals' feelings of connection to their surroundings. From this theory's point of view, students have an inherent desire during their learning to master, relate, and experience autonomy [30,31]. In a study of undergraduate students, Wang and colleagues [52] found that consistent with previous findings in traditional learning contexts, the examination of satisfaction and dissatisfaction regarding essential psychological needs demonstrated distinctive influences on learners' motivation and learning outcomes in e-learning setting. The current study sought to examine needs satisfaction in e-learning as a mediator of the links between attitudes toward e-learning and e-learning ethics.

Recent studies have utilized SDT as a theoretical framework to investigate e-learning [14,49,50]. In a study that used pre- and post-questionnaires to collect data from 1201 students who were enrolled in grades 8 and 9 of middle schools in China, Chiu [49] found that the essential needs serve as predictors of students' engagement. Similarly, in a qualitative study that was conducted by analyzing interviews with 36 students and 18 teachers in China, Chiu [50] found that e-learning that supports individuals' autonomy has a positive role in developing the two significant lifelong skills of digital literacy and self-regulated learning. In a longitudinal study that was conducted by collecting data (surveys in September and December) from 350 university students in Canada, Audet et al. [14] found that conscientiousness and openness to experience were related to higher self-efficacy and to diverse kinds of autonomous motivation for e-learning. Similarly, in a study conducted by gathering data from 267 online students, Chen and Jang [55] highlight that providing contextual support for autonomy and competence needs for students enrolled in an online course can predict the satisfaction of the learners' essential needs. Based on a cross-sectional investigation involving 1, 727 students from high school and multiple universities in China, Wang and colleagues [53] found that needs satisfaction for e-learning are highly recommended. The results of the current study regarding essential needs in e-learning may be affected by cultural differences between individualistic and collectivistic cultures [31,49,50,56,57]. However, as we live in an era of globalization and knowledge accessibility as a result of technical advancements, this concern is not expected to play major role.

In the light of the conclusions described previously, we predict that those learners who regard e-learning from a negative perspective, will be less interactive, confounded, and will not be able to satisfy their needs adequately. In addition, students who have negative attitudes towards e-learning are more likely to engage in ethical misbehavior. Finally, students who perceive that the e-

learning environment does not satisfy their essential needs are more likely to engage in ethical misbehavior and less likely to have positive attitudes of e-learning. Based on the conceptualization above, the current study hypothesized that:

H1. Higher levels of all three forms of needs satisfaction in e-learning predict lower levels of engagement in ethical misbehavior (Fig. 1).

H2. Positive attitudes of e-learning predict higher levels of all three forms of needs satisfaction in e-learning (Fig. 2).

H3. Positive attitudes of e-learning predict higher levels of all three forms of needs satisfaction in e-learning, which in turn predict lower levels of engagement in ethical misbehavior (Fig. 3a & Fig. 3b).

4. Methods

4.1. Procedure

The sample of the current study was recruited from four Saudi universities by inviting students who were exposed to virtual classrooms. As a result of utilizing e-learning during COVID-19, all universities in the Kingdom of Saudi Arabia started to use virtual classrooms for some of their courses. The data for the study were collected after the universities partially reopened with restrictions (December 2021 to January 2022), which allowed for adequate time to draw results based on students' experiences of e-learning. The study was evaluated and approved by an institutional review board (IRB: Taif University's ethics approval reference [HAO-02-T-105]) and required finishing a 15–18-min anonymous electronic survey that was sent to potential participants who were enrolled in four universities in four different geographical locations. The online questionnaire was sent to these universities, and then it was delivered to undergraduate students. The students were informed that participation was voluntary and that confidentiality of their information would be ensured and collected data would be only used for the purpose of the current study.

4.2. Participants

The 1001 respondents were 50.30% female (female: 504; male: 498) and had average ages of 20.98 years ($SD = 2.02$). The respondents reported an average GPA of 3.67 ($SD = 0.83$). All the respondents were pursuing bachelor's degrees (100%). None of the demographic data mentioned were utilized as control variables in the analysis.

4.3. Measures

A 6-point response scale ("Not at all" to "Extremely") was utilized for the measures' items. Three measures were used to conduct the study, namely, a student attitudes of e-learning measure [10,12], an e-learning needs satisfaction measure [50], and an ethical behavior measure. The correlations between the components of student's ethical behavior and global needs satisfaction range from −0.55 to −0.64. Typically, if the correlation between two variables is below 0.7, it is often considered reasonable evidence of discriminant validity.

4.4. Students' attitudes of E-learning

The seven items developed for the current study measured students' attitudes of e-learning in relevant domains (e.g., "I believe e-learning enhances my educational experiences."). The responses indicated a high internal consistency in the current sample (Cronbach's α = 0.95).

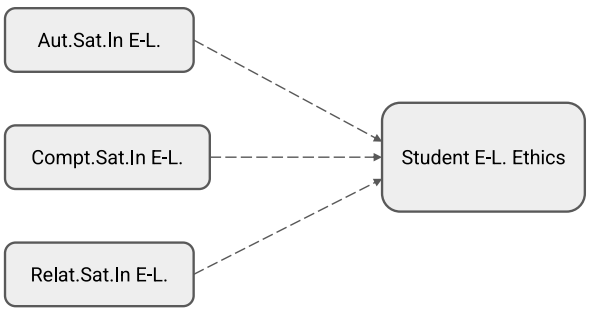

Fig. 1. Note: Aut.Sat.In E-L. = Autonomy satisfaction in E-learning; Compt.Sat.In E-L. = competency satisfaction in E-learning; Relat.Sat.In E-L = relatedness satisfaction in E-learning; Student E-L. Ethics = Student E-learning ethics.

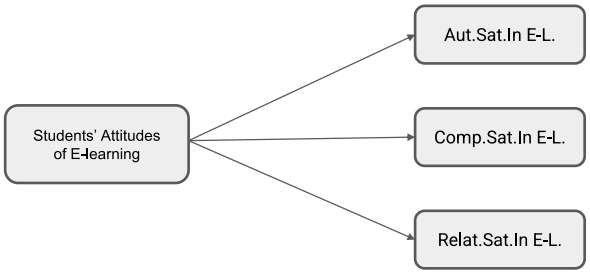

Fig. 2. Note: Aut.Sat.In E-L. = Autonomy satisfaction in E-learning; Comp.Sat.In E-L. = competency satisfaction in E-learning; Relat.Sat.In E-L. = relatedness satisfaction in E-learning.

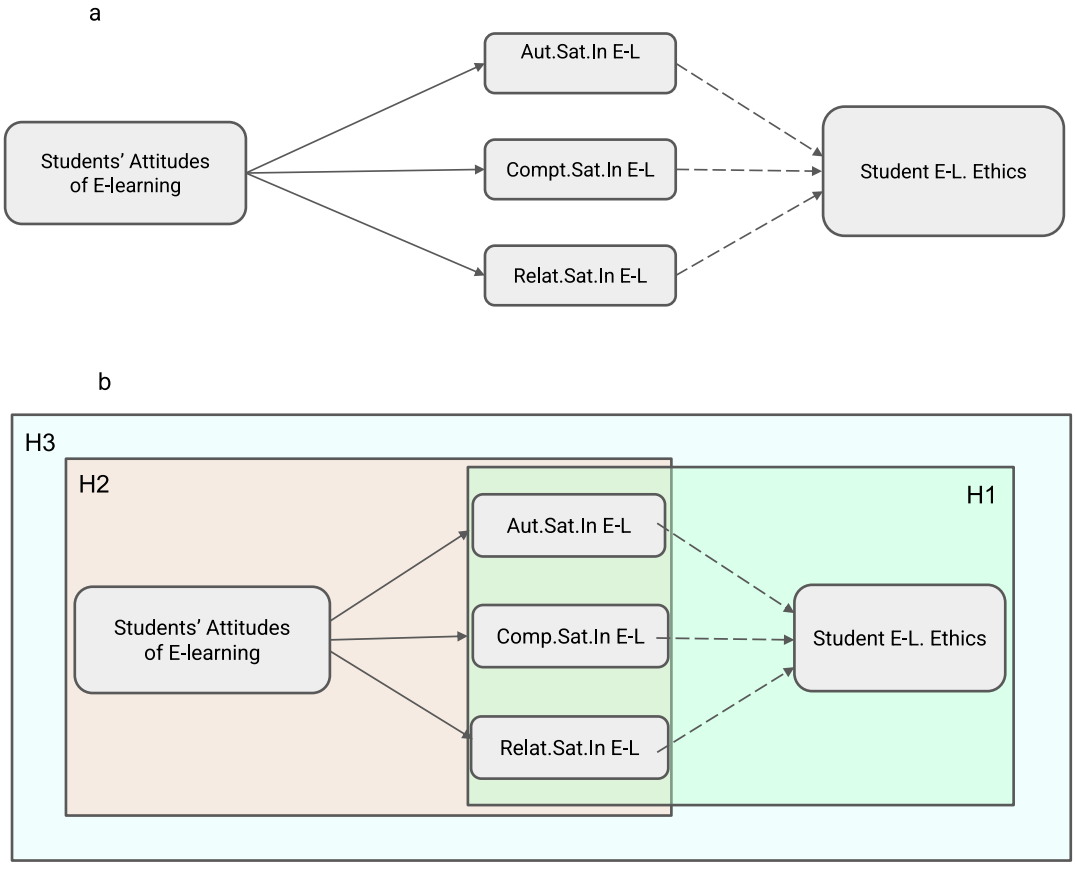

Fig. 3. a
Note: Solid line indicates positive effect, dashed line indicates negative effect. Aut.Sat.In E-L. = Autonomy Satisfaction in E-Learning; Compt.Sat.In E-L. = Competency Satisfaction in E-Learning; Relat.Sat.In E-L = Relatedness Satisfaction in E-Learning; Student E-L. Ethics = Student E-Learning Ethics, Fig. 3b
Note:Aut.Sat.In E-L. = Autonomy Satisfaction in E-Learning; Comp.Sat.In E-L. = Competency Satisfaction in E-Learning; Relat.Sat.In E-L = Relatedness Satisfaction in E-Learning; Student E-L. Ethics = Student E-Learning Ethics.

4.5. E-learning needs satisfaction

Fourteen items from the BPNS were modified to fit the purpose of the study (BPNSS) [50,58] by assessing the extent to which the autonomy, competence, and relatedness needs were satisfied during e-learning. Four items assessed autonomy (e.g., "I have enough freedom to make decisions related to my academic work during e-learning"; $\alpha = 0.91$), five items assessed competency (e.g., "I feel completely confident that I can learn online."; $\alpha = 0.94$), and five items assessed relatedness (e.g., "I feel close to my peers in the virtual classroom during e-learning."; $\alpha = 0.89$). Overall, the responses indicated a high internal consistency of global needs satisfaction in the current sample (Cronbach's $\alpha = 0.97$).

4.6. Students' ethical behavior

Sixteen items developed for the current study measured the level of engaging in what could be considered ethical misbehavior in various domains, namely, the assignments domain, exam domain, and attending lectures domain [38,59]. Specifically, seven items assessed assignment ethical behavior domain (e.g. “”; $\alpha = 0.96$), four items assessed exam ethical behavior (e.g. “I rely on taking the answers from my colleagues during the online test”; $\alpha = 0.94$) and five items assessed lecture attendance ethical behavior (e.g. “I attend electronically without being prepared to participate or interact.”; $\alpha = 0.93$). Overall, the responses indicated a high internal consistency in the current sample (Cronbach's $\alpha = 0.98$).

4.7. Translation process of the measures to Arabic

A majority of the measures in the survey were initially developed by diving into studies that were conducted in English and Arabic. Although the general essential needs questionnaire BPNSS had already been translated and validated in Arabic-speaking samples [60], the specialized questionnaire of BPNSS in e-learning was included in the translation process [49,61]. The survey was translated into Arabic by four individuals fluent in both languages. Those four separate translations were combined to produce a consensus Arabic translation. Then, two new translators were hired to translate the measures back into English. Lastly, the author of this study compared those two back-translations to the initial survey to confirm the fidelity of the translation process.

5. Results

5.1. Descriptive and Bi-variate correlations

As shown in Table 1, on average, participants had relatively positive attitudes of e-learning ($M = 4.49$) compared to engagement in ethical misbehavior (e.g., $M_{exam\ ethics} = 2.17$). As expected, components of student's ethical behavior highly correlated with one another ($r > 0.85$). These three components were subsequently used as indicators of a latent student ethical behavior variable in the SEM analyses. Additionally, the components of global needs satisfaction highly correlated with one another ($r > 0.80$) and were subsequently using in SEM analyses as indicators of a latent global needs satisfaction variable. Lastly, attitudes of e-learning as well as components of global needs satisfaction negatively correlated with components of student's ethical behavior, suggesting that people who have more positive attitudes of e-learning engage in less unethical behavior, on average.

5.2. Mediation results

5.2.1. Analyses

Following Baron and Kenny's [62] guidelines, a simple model was first run treating students' attitudes of e-learning as a predictor of e-learning ethics without including mediators in the model. Two extra SEM models were then run to test the remaining mediation criteria and MacKinnon's asymmetric confidence interval approach was used to test the significance of the indirect paths [63]. All analyses were run in R [64] using SEM in the lavaan package [65]. The author estimated two models to examine the effect of attitudes of e-learning on student's ethical behavior, as mediated by needs satisfaction (Fig. 4a & Fig. 4b). Model 1 tested global needs satisfaction as a latent variable mediator (Fig. 4a). Model 2 tested the observed components of needs satisfaction as distinct mediators of the effect between attitudes of e-learning and student's ethical behaviors (Fig. 4b). Both models fit the data well (CFI >0.95, RMSEA <0.08, Fig. 4a and b).

5.3. Model 1: Global Need Satisfaction as a mediator

Tables 2 and 3 show the effects of attitudes of e-learning on student's ethical behavior, both directly and indirectly. Attitudes of e-learning had a significant direct effect on student's ethical behavior, such that positive attitudes of e-learning predicted lower levels of engagement in ethical misbehavior ($\beta = -.35$). Additionally, this effect was mediated by global needs satisfaction. Specifically,

Table 1
Descriptive statistics and bivariate correlations among study variables.

Variable		Possible Range	M	n	SD	Correlations among Scales						
						1	2	3	4	5	6	7
1	Assignment Ethics in E-Learning	1 to 6	2.26	1000	1.52	–						
2	Exam Ethics in E-Learning	1 to 6	2.17	999	1.55	0.93	–					
3	Lecture Attendance Ethics in E-Learning	1 to 6	2.26	999	1.48	0.88	0.91	–				
4	Autonomy Sat. in E-Learning	1 to 6	4.53	1000	1.40	−0.59	−0.61	−0.61	–			
5	Competency Sat. in E-Learning	1 to 6	4.55	1001	1.30	−0.63	−0.64	−0.64	0.89	–		
6	Relatedness Sat. in E-Learning	1 to 6	4.33	999	1.39	−0.55	−0.57	−0.58	0.85	0.83	–	
7	Students' Attitudes of E-learning	1 to 6	4.49	1000	1.40	−0.64	−0.66	−0.65	0.88	0.87	0.81	–

NOTE:. Sat. = Satisfaction; All correlations significant at $p < 0.001$.

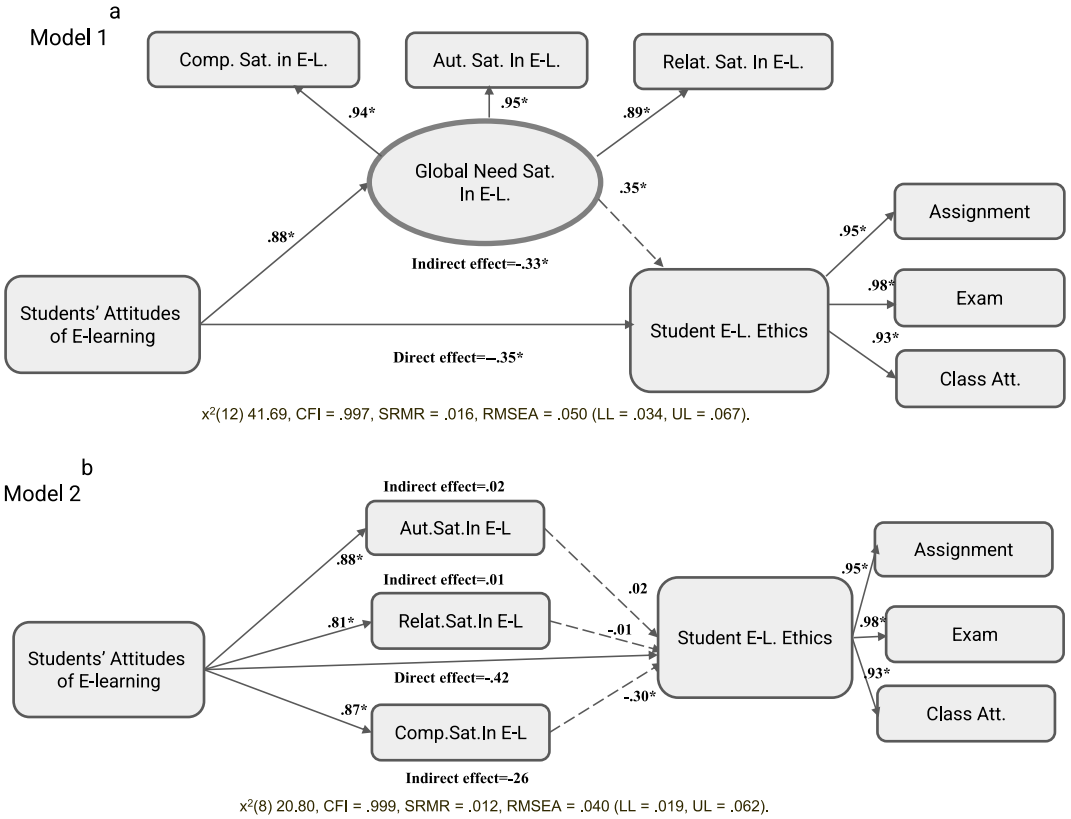

Fig. 4. A model 1
Note: Global need Sat.in E-L. = Global need satisfaction In E-learning; Aut.Sat.In E-L. = Autonomy satisfaction in E-learning; Comp.Sat.In E-L. = competency satisfaction in E-learning; Relat.Sat.In E-L = relatedness satisfaction in E-learning; Student E-L. Ethics = Student E-learning ethics; Class Att. = Class attendance, Fig. 4b model 2
Note: Note: Student Perc. Of E-L. = Student perception of E-learning; Aut.Sat.In E-L. = Autonomy satisfaction in E-learning; Comp.Sat.In E-L. = competency satisfaction in E-learning; Relat.Sat.In E-L = relatedness satisfaction in E-learning; Student E-L. Ethics = Student E-learning ethics; Class Att. = Class attendance.

attitudes of e-learning positively predicted global needs satisfaction, which in turn negatively predicted engagement in ethical misbehavior, resulting in an indirect effect = −0.33. Fig. 4a highlights how the link between attitudes of e-learning and engagement in ethical misbehavior was significantly linked by global e-learning needs satisfaction.

5.3.1. Model 2: autonomy, competency, and relatedness during E-learning as distinct mediators

Similar to Model 1, in Model 2, attitudes of e-learning had a significant direct effect on student's ethical behavior, such that positive attitudes of e-learning predicted lower levels of engagement in ethical misbehavior ($\beta = -.42$). In line with hypothesis 2, positive attitudes of e-learning predicted higher levels of all three forms of e-learning needs satisfaction autonomy, relatedness, and competency (Fig. 4b). This suggested that having more positive views on e-learning predicted higher levels of needs satisfaction. Moreover, we found partial support for hypothesis 3. Specifically, positive attitudes of e-learning predicted higher levels of all three forms of e-learning needs satisfaction, however, only competency in turn predicted lower levels of engagement in ethical misbehavior. While autonomy and relatedness had non-significant indirect effects = 0.02 and 0.01, respectively, competency had an indirect effect = −0.26. Taken together with results from Model 1, this suggests that global needs satisfaction mediating the effect between attitudes of e-learning and student's learning ethics is strongly driven by the competency component of need satisfaction. In other words, student's positive attitudes on e-learning predicting lower levels of engagement in ethical misbehavior is partially mediated by a need to feel competent in an e-learning environment.

6. Discussion and suggestions

This investigation traces students' exposure about e-learning by referring to SDT which is suggested by Deci and Ryan's [61] model. A sample of 1001 students from different Saudi Universities were taken by highlighting the essential needs that mediate the connection between attitudes toward e-learning and level of misconduct engagement in e-learning courses. Commensurate with the expected hypothesis, negative attitudes towards e-learning resulted in dissatisfaction of e-learning and increased ethical misbehaviors. In

Table 2
Standardized path coefficients from the SEM structural models testing global need satisfaction in E-learning (MODEL1) and specific components of need satisfaction in E-learning (MODEL2) as mediators.

MODEL 1: Global Need Satisfaction in E-L. as a Mediator	*β*	*SE*	*Z*	*p*
Variables				
Latent Students' E-Learning Ethics				
Assignment Ethics in E-Learning	**0.951**	0.004	249.304	<0.001
Exam Ethics in E-Learning	**0.977**	0.003	343.821	<0.001
Lecture Attendance Ethics in E-Learning	**0.927**	0.005	188.316	<0.001
Latent Global Need Satisfaction in E-Learning				
Autonomy Satisfaction in E-Learning	**0.951**	0.004	254.410	<0.001
Competency Satisfaction in E-Learning	**0.938**	0.004	221.102	<0.001
Relatedness Satisfaction in E-Learning	**0.889**	0.006	137.188	<0.001
Path Predicting Students' Learning Ethics				
Latent Global Need Satisfaction in E-Learning	**−0.351**	0.071	−4.917	<0.001
Students' Attitudes of E-learning	**−0.350**	0.070	−4.997	<0.001
Path Predicting Need Satisfaction in E-Learning				
Students' Attitudes of E-learning	**0.925**	0.005	202.635	<0.001
MODEL 2: Components of Need Satisfaction as Mediators	*β*	*SE*	Z	*p*
Variables				
Latent Students' E-Learning Ethics				
Assignment Ethics in E-Learning	**0.951**	0.004	250.183	<0.001
Exam Ethics in E-Learning	**0.977**	0.003	343.567	<0.001
Lecture Attendance Ethics in E-Learning	**0.927**	0.005	188.381	<0.001
Correlations among Forms of Need Satisfaction in E-Learning				
Autonomy Satisfaction with Competency Satisfaction	**0.523**	0.023	22.746	<0.001
Autonomy Satisfaction with Relatedness Satisfaction	**0.498**	0.024	20.898	<0.001
Competency Satisfaction with Relatedness Satisfaction	**0.436**	0.026	17.022	<0.001
Path Predicting Students' Learning Ethics In E-Learning				
Autonomy Satisfaction in E-Learning	0.017	0.062	0.280	0.780
Competency Satisfaction in E-Learning	**−0.296**	0.057	−5.157	<0.001
Relatedness Satisfaction in E-Learning	−0.011	0.048	−0.232	0.817
Students' Attitudes of E-learning	**−0.423**	0.054	−7.881	<0.001
Paths Predicting Autonomy Satisfaction in E-Learning				
Students' Attitudes of E-learning	**0.881**	0.006	158.334	<0.001
Paths Predicting Competency Satisfaction in E-Learning				
Students' Attitudes of E-learning	**0.871**	0.006	145.059	<0.001
Paths Predicting Relatedness Satisfaction in E-Learning				
Students' Attitudes of E-learning	**0.812**	0.009	92.010	<0.001

Note: β= standardized coefficient; *SE*= standard error; *Z* =z-value; *P* = probability value.
Significant path coefficients ($p < 0.05$) have been bolded for ease of interpretation. MODEL 1 demonstrated excellent fit: χ^2 (12) = 41.69, CFI = 0.997, SRMR = 0.016, RMSEA = 0.050 (LL = 0.034, UL = 0.067). MODEL 2 also demonstrated excellent fit: $\chi^2(8) = 20.80$, CFI = 0.999, SRMR = 0.012, RMSEA = 0.040 (LL = 0.019, UL = 0.062).

Table 3
Testing significance of indirect paths with MacKinnon's asymmetric confidence interval approach.

Indirect Path Tested	Indirect Path Estimate	95% Confidence Interval	
		Lower Limit	Upper Limit
Attitudes ofE-L.=>Global Need Sat.inE-L.=>Ethics (Model1)	−0.325	−0.455	−0.195
Attitudes ofE-L.=>Autonomy Sat.inE-L.=>Ethics (Model2)	0.015	−0.092	0.123
Attitudes ofE-L.=>Competency Sat.inE-L.=>Ethics (Model2)	−0.258	−0.356	−0.160
Attitudes ofE-L.=>Relatedness Sat.inE-L.=>Ethics (Model2)	−0.009	−0.085	0.067

Note: Attitudes of E-L. = Students' Attitudes of E-learning; Sat. in E-L = Satisfaction in E-Learning; E-L. = E-Learning.
Comparing indirect effects across Model 1 and Model 2. The need satisfaction and competency indirect paths tested were statistically significant by this approach. The significance of these indirect effects was tested with MacKinnon's asymmetric confidence interval approach (see MacKinnon, 2008). MacKinnon's Asymmetric Confidence Interval Approach in mediation analysis provides more accurate confidence intervals by utilizing resampling techniques, ensuring robust estimations even with small sample sizes or non-normally distributed data. This can be seen by the fact that the 95% confidence intervals did not include the value of zero (suggesting that there is less than a 5% chance that these were spurious effects – $p < 0.05$).

addition, the essential needs satisfaction played a pivotal role in mediating the association between attitudes toward e-learning and ethical behaviors.

6.1. Exposure towards E-learning: expected ethical behavior

The results drawn from the analysis reflect the basic function of attitudes on forecasting ethical misconduct that has less effort to acquire knowledge and ethicality eg, Ref. [33]. Since students have a great appetite to score well in order to meet their expected standards, they are often searching for methods to tackle these standards without considering the short- and long-term implications of their behavior [43,45]. Most notably learners with limited e-learning experience or instructors lacking proficiency in e-learning, have lower level of ability to break through the attributes of e-learning platforms [45]. In a broad sense, the outcomes of the present investigation demonstrate that the connection between students' attitudes and ethical misconduct is consistent with previous studies [17,25,38].

6.2. Attitude toward E-learning could determine level of needs satisfaction in E-learning

This study's finding that attitude predicts essential needs satisfaction aligns with different studies [14,30,31,66]. Students' attitudes are significantly influencing students in terms of how they behave and how they are motivated to learn [35]. From another dimension, there is a closeness between positive association, positive perception, positive satisfaction toward e-learning with reference to psychological needs [52,53]. Positive attitudes towards e-learning is an indication of students openness and those students are more likely to have a high standard of e-learning environments, which supports basic needs (i.e., relevance, autonomy, & competence) [14]. Correspondingly, the results of the current study show that attitudes toward e-learning can stand as a predictor for basic satisfaction needs. In other words, learners had a high level of autonomy and competence needs satisfaction when classrooms were delivered virtually.

6.3. Discontentment Of essential needs in E-learning could link to ethical misbehavior

The findings demonstrates the role of having a reliable environment that supports basic needs, as the dissatisfaction of these needs predicts ethical misconduct which is in line with a body of literature [30,31,33,47,54]. For example, students who feel that a lower level of autonomy are more likely to engage in ethical misbehaviors when they are not observed by an authority figure [47]. Likewise, the results of this investigation demonstrate that a lower level of essential needs satisfaction is connected to a high level of engagement in ethical misbehavior. This aligns with the results of Algahtani et al. [33] and what has been highlighted by Van den Broeck and colleagues [67] as they concluded that satisfaction of essential needs predicts internalization. The dissatisfaction of autonomy, relevance, and competence needs make students less likely to integrate e-learning which, in turn, makes them engaged in ethical misbehaviors.

7. Limitations and implications

The findings of this study are confined to a number of aspects. First, the sample was selected from students in some Saudi universities. This means the results of this study should not be overgeneralized to include all Saudi universities or all students globally. An upcoming study is needed to include a larger sample from various local, regional and international universities. Second, since the present study was drawn upon self-reports of attitude toward e-learning and ethical misbehavior engaging, future studies could utilize a mixed methods approach to provide further context and insight regarding the topic of study. Additionally, future studies could incorporate data from participants from multiple levels such as teachers or faculty members, or even student advisors. This would enhance the findings by providing multiple viewpoints, and limiting potential biases in the dataset. Third, the findings of this investigation are based on correlational and cross-sectional investigation, which does not allow one to conclude directions of causality between the variables. Thus, a future study could investigate the hypotheses from this study with a longitudinal methodology that considers the potential causal interactions between variables. Fourth, there may be other relevant variables and potential mediators not considered in this study that could influence the relationship between attitudes of e-learning and ethical behaviors and other potential mediators. Upcoming studies could examine relevant variables and potential mediators, such as individual personality traits, prior experiences with e-learning, or the specific e-learning platform used. Fifth, essential needs and ethical behaviors may be affected by cultural differences between individualistic and collectivistic cultures. Future studies are recommended to investigate how cultural differences affect perceived essential needs and engaging in ethical misbehaviors.

In conclusion, a major goal of learning is to not only meet targeted outcomes, but to meet student needs and improve their attitudes towards the learning experience. A future direction may involve exploring the effects of learning interventions on students' needs satisfaction, attitude, and ethical misbehavior. For example, supportive and interactive learning environments may increase students' essential needs satisfaction and positive attitudes towards e-learning, and even decrease involvement in ethical misbehaviors. In short, the Covid-19 pandemic has taught us that it is no longer enough to consider just grades and exams. More importantly, it is imperative that educators consider students' wholistic experience, and psychological needs, throughout the learning journey. Finally, the findings demonstrate that positive attitudes of e-learning relate to reduced ethical misbehavior and can predict levels of needs satisfaction. In contrast, dissatisfaction in e-learning needs correlates with increased ethical misbehavior. In addition, the components of essential need satisfaction play a pivotal role in mediating this relationship.

Data availability statement

Regrettably, the author is unable to share the data due to restrictions outlined in the IRB protocol and instruments, which specified the data's exclusive utilization for analysis in the current study.

CRediT authorship contribution statement

Tarik Abdulkreem Alwerthan: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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