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A HIERARCHICAL LINEAR MODEL OF ETHICAL PRACTICES IN DISTANCE LEARNING AND E LEARNING ENVIRONMENTS

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Abstract
This study examines the issue of ethical practices in distance learning and e-learning settings based on the use of a Hierarchical Linear Model (HLM). The study seeks to determine the effect of institutional support, academic integrity, and data privacy issues on student engagement, satisfaction, and academic performance. The research design adopted was quantitative, where surveys and analyses on student behavior were conducted to gather data on 500 students in three institutions. Using HLM, the study uses individual-level student-centered factors and institutional-level factors to explain differences in data structures. These findings reveal that academic perceived integrity carries a high positive value on student engagement, meaning that students who form perceptions that their academic integrity is higher are more engaged in their learning. Student engagement, on the other hand, is harmed by data privacy issues, whereby increasing the level of concern decreases the engagement. On the institutional level, both student engagement and academic performance have positive relationships with institutional support, implying that an environment with more supportive institutions produces better outcomes among students. The study also brings out the issue of ethical practices in promoting fairness, transparency, and trust in the e-learning settings. The results emphasize the importance of ethical frameworks in enhancing effective learning and better educational results in the digital environment. The study is relevant to the literature because it uses the hierarchical modeling framework to explore how the ethical practices and student success interact in e-learning. The research offers some practical implications to institutions of learning since it indicates that incorporating sound ethical policies and practices in the design of e-learning can enhance interest, satisfaction, and academic success. All in all, the study points to the necessity of the connection of a clear, fair, and supportive learning atmosphere in online education systems.
Keywords: Ethical Practices, Distance Learning, E-Learning, Hierarchical Linear Model, Student Engagement, Institutional Support, Data Privacy

I. Introduction

E-learning and distance learning have transformed the face of education and have provided flexibility and accessibility to education to the global community [15][16]. Nonetheless, with the changing nature of the education system, using a traditional face-to-face education system on online platforms, the issue of ethics has gained prominence [17]. Such considerations cover a broad spectrum of problems, such as academic integrity, data privacy, the level of equitable access to learning materials, and the objective of the digital examination. In distance and e-learning settings, it is important to conduct ethical practices to make sure that learning results are effective as well as fair, transparent, and trustworthy [19]. These issues must be resolved using ethical models to ensure the sustainability and plausibility of online learning in the long term.

Problem Statement

Although considerable research has been done on the efficacy of distance and e-learning techniques, a conspicuous gap in the literature is evident on the systematic use of ethical conduct in the context of such settings. In particular, no models that consider the impact of ethical practices on the learning outcomes and the behavior of the participants are available. In addition, the available literature usually lacks assimilation of ethical implications and sound statistical models that may be applied to give practical information. The proposed research is expected to close this gap by utilizing a hierarchical linear model to investigate the effects of ethical practices on distance and e-learning settings [18].

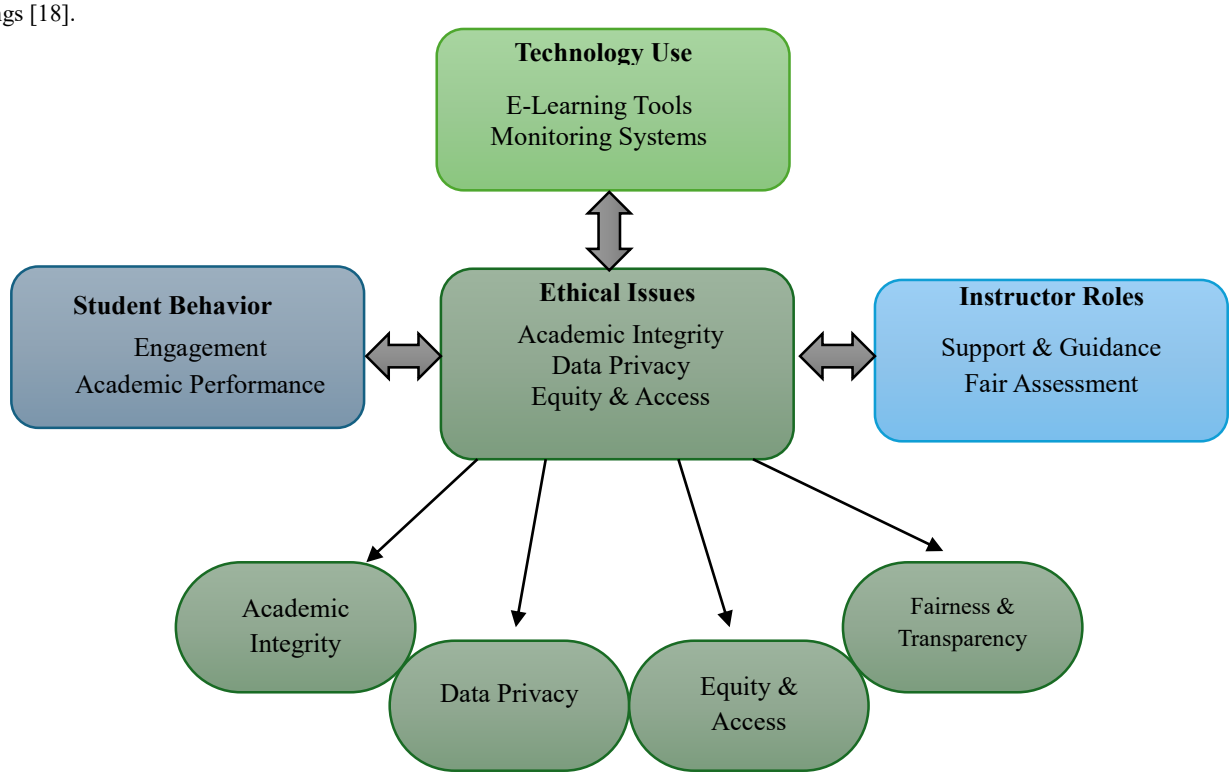

Figure 1: Conceptual Framework of Ethical Practices in Distance Learning

Figure 1 shows the major elements of ethical practices in e-learning and the interrelated nature of student behavior, use of technology, roles of the instructor, and issues related to ethics. The ethical issues of academic integrity, data privacy, and equity and access impact student

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engagement and academic performance. The framework focuses on the relevance of assistance and direction of instructors, justifiable reviews, in representing a trustworthy and effective learning environment [20].

Research Objectives

The primary objectives of this research are:

- To investigate the ethical practices that are most effective in distance learning and e-learning settings.
- The research will lead to the creation and implementation of a hierarchical linear model (HLM) that will help connect ethical practices and educational outcomes, including student engagement, student satisfaction, and student academic performance.
- To give suggestions on ways to implement ethics in the design and delivery of e-learning programs.

Research Questions

The study will address the following key research questions:

1. What are the key ethical practices that influence student engagement and academic performance in distance learning environments?
2. How do different ethical practices in e-learning environments correlate with students' perceptions of fairness and trustworthiness?
3. Can a hierarchical linear model provide insights into the effectiveness of ethical practices in enhancing learning outcomes?

Research Hypothesis

Based on the research questions, the following hypotheses are proposed:

- H1: Ethical practices related to academic integrity and data privacy are positively correlated with student engagement in e-learning environments.
- H2: Higher levels of perceived fairness and transparency in e-learning assessments are associated with improved academic performance.
- H3: Ethical practices in e-learning environments have a significant impact on students' overall satisfaction and trust in the educational process.

The study has been organized as follows: The Introduction gives the importance of ethical practices in e-learning. Literature Survey takes into account the literature on the subject of ethics in digital education and the Hierarchical Linear Models usage. The research design and data collection methods are provided in the methodology. Important results are presented in the Results section, and the Discussion, which is the conclusion of the results, is given. Finally, there is the Conclusion where the findings are summarized, policy recommendations given, and future research directions are provided.

II. Literature Survey

Ethical Practices in Education

Educational ethics play an essential role in ensuring impartiality, candor, and honesty in different learning institutions. It has been found that such ethical challenges as dishonesty in academic activities, data security, and fairness have been a top concern in both traditional and online learning systems [1][2]. The emergence of distance learning and e-learning has brought about new problems, such as ensuring that the quality of the assessment is maintained, student privacy is guaranteed, and online exams cannot be cheated. Ethics should adapt to changes in technology in order to safeguard the rights and outcomes of learning among the learners [3].

Distance Learning/ E-Learning.

Distance learning and e-learning have been experiencing a massive growth, particularly following the COVID-19 pandemic that compelled educational institutions to switch to the online platform. These learning methods are flexible and accessible yet enable the student to study from any place and at any given time. They are, however, also difficult in terms of equity, access to technology, and engagement within virtual environments [4][5]. Research has indicated that e-learning platforms have been known to have poor experiences, which include the digital divide, where students with poor socioeconomic statuses have limited access to devices and the internet. This disparity has implications for the general efficiency and fairness of distance learning [6].

Digital Education Ethical Dilemmas.

The digitization of education has introduced a lot of ethical challenges. Cheating, plagiarism, and academic dishonesty are overriding issues in web-based testing. Also, online platforms create anonymity that may result in no responsibility for the conduct of students. The other major ethical concerns are the safety of student information, privacy with regard to online monitoring software, and the possibility of algorithmic bias in automated grading software [7]. Moreover, the problem of establishing an inclusive learning environment in which every student, regardless of their background, can succeed is a severe ethical concern [8].

Hierarchical Linear Models

Hierarchical Linear Models (HLM) are statistical methods that enable the researcher to test the impact of variables on various levels (e.g., individual, group, institution). HLM has been applied in educational research to examine the effect of different variables (student characteristics, teaching quality and institutional resources) on the effects of these variables on learning outcomes [9]. Research indicates that HLM is quite effective in the analysis of the complicated educational data when the students are surrounded by various educational environments, e.g., classrooms or schools [10]. It is possible to understand the interaction of various degrees of influence (individual, teacher, institution) to determine the outcome of the education process with the help of this model. The use of HLM in the analysis of e-learning and distance learning can provide interesting information about the efficiency of the ethical practices and their impact on student performance and involvement.

The literature shows that there is an increased emphasis on ethical practices in the distance learning and e-learning environment, particularly as the two streams of education widen. Although distance learning is flexible, it comes with ethical issues that comprise academic dishonesty, data privacy, and fair access to technology. Hierarchical Linear Models (HLM) have proved useful in educational studies and have been useful in investigating multi-level factors to study learning outcomes. These models provide significant information on the extent to which ethical behaviors at different levels influence student performance and engagement, and the importance of having strong ethical frameworks in digital education.

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III. Research Methodology

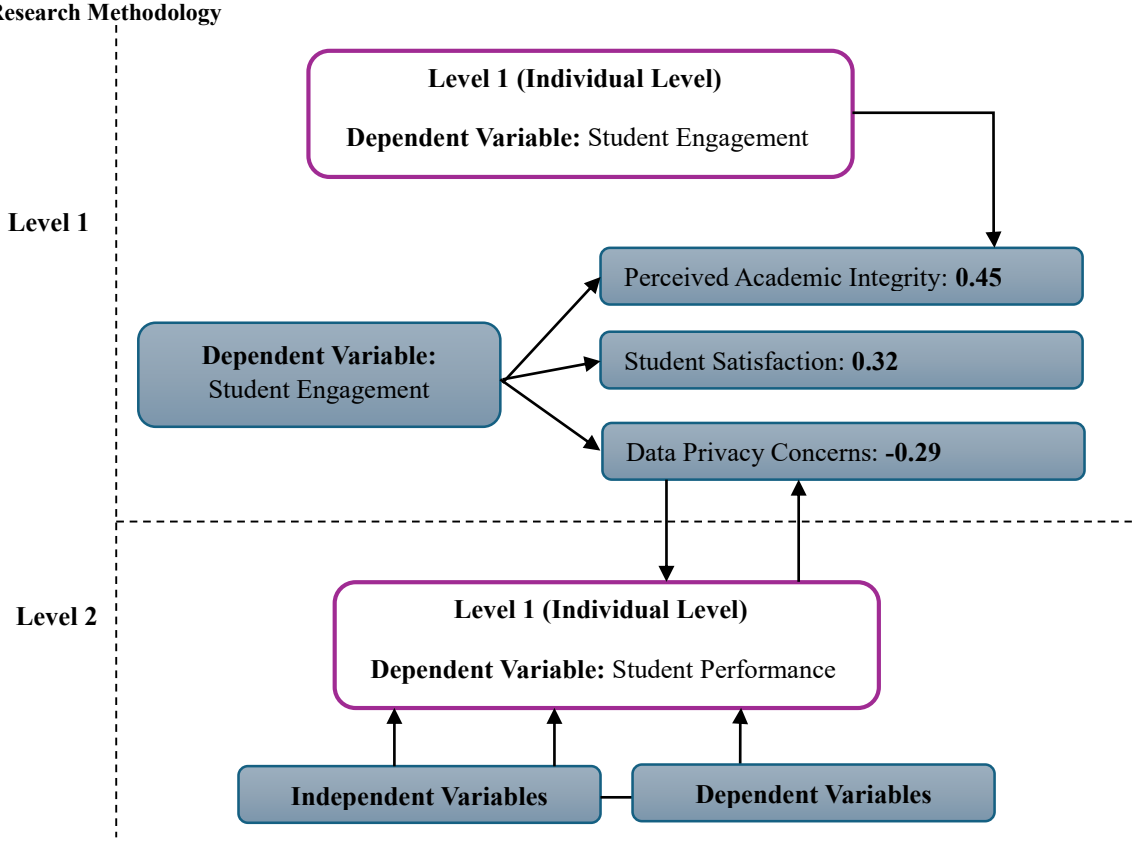

Figure 2: Hierarchical Linear Model Framework

Figure 2 presents the design of the Hierarchical Linear Model (HLM) used in the research, indicating two levels of analysis. Level 1 (Individual Level) incorporates those variables that are student-related and include perceived academic integrity, student satisfaction, and data privacy concerns that have an impact on the dependent variable, student engagement. Level 2 (Institutional Level) demonstrates the effect of the institutional factors on student performance. The relationship between key variables is indicated by arrows, and coefficients are provided beside key variables.

Research Design

This research design is based on a quantitative research design; it uses a Hierarchical Linear Model (HLM) that will be used to examine the relationship between ethical practices and educational outcomes in distance learning and e-learning settings. The decision behind the use of HLM is informed by the fact that it is capable of servicing nested data structures in which students are clustered in various e-learning environments or institutions. The model permits viewing both individual-level (student-level) and group-level (institutional-level) factors at the same time, which provides a thorough perspective of how the practice of ethics triggers the learning outcomes at different levels of analysis [11][12].

Data Collection

In this study, the development of data took place through the use of a survey and student behavior analysis. This survey tool was created to determine the perceptions of the students regarding ethical conduct within their e-learning settings, which include: academic integrity, e-learning privacy, assessment fairness, and instructor transparency [13]. Moreover, course-related information, including grades, attendance, and activity rates, was evaluated to determine educational outcomes. The questionnaire was distributed by use of the internet to a representative sample of students in different e learning institutions having a wide diversity of viewpoints. Data were also gathered in one year with a span of six months, and the participants were aware of the aims of the study and their contribution to the research.

Model Framework

The Hierarchical Linear Model (HLM) used in this study consists of two levels:

- Level 1 (Student-level): This level is what reflects individual student features, including the level of engagement, satisfaction, academic success, and the perception of ethical practice.
- Level 2 (Institutional-level): This level records the institutional-level variables (e.g., the nature of the e-learning platform, institutional policies on academic integrity, and resources that students have access to (e.g., technical support, faculty involvement). There are numerous independent variables in the model, and these are ethical practices, institutional support, and student demographics, which are used to predict dependent variables such as student engagement, satisfaction, and academic achievement. The statistical tools used are maximum likelihood estimation, which is used in estimating the model parameters, and model fit was measured in terms of AIC (Akaike Information Criterion) and BIC (Bayesian Information Criterion) values.

Participants

This study sample was 500 students who were enrolled in online courses in three institutions that offered distance learning programs. The sample was chosen with the help of stratified random sampling in order to make the sample diversified in terms of age, gender, academic background, and geographic location [14]. The institutions used in the research were chosen to be diverse in terms of e-learning settings, such as the presence of various technological infrastructures, ethical policies, and student support. Demographic information, including age, gender, and prior academic performance, was also taken to control for the possible confounding variables.

Ethical Considerations

This study had ethical considerations as the main factor. Informed consent was obtained prior to the participation of all the participants. The objectives of the study, procedures, and possible risks were clearly explained to all the participants. The research strictly followed the

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protocols to ensure confidentiality and anonymity of the research participants, and no personally identifiable information was obtained. Privacy Data privacy was ensured because all the survey responses and course data were kept safely and were only accessible to the research team. Moreover, the research design allowed the participants to leave the study at any time without being punished. Before collecting data, the IRB of the respective participating institutions was consulted to give ethical approval.

IV. Results and Discussion

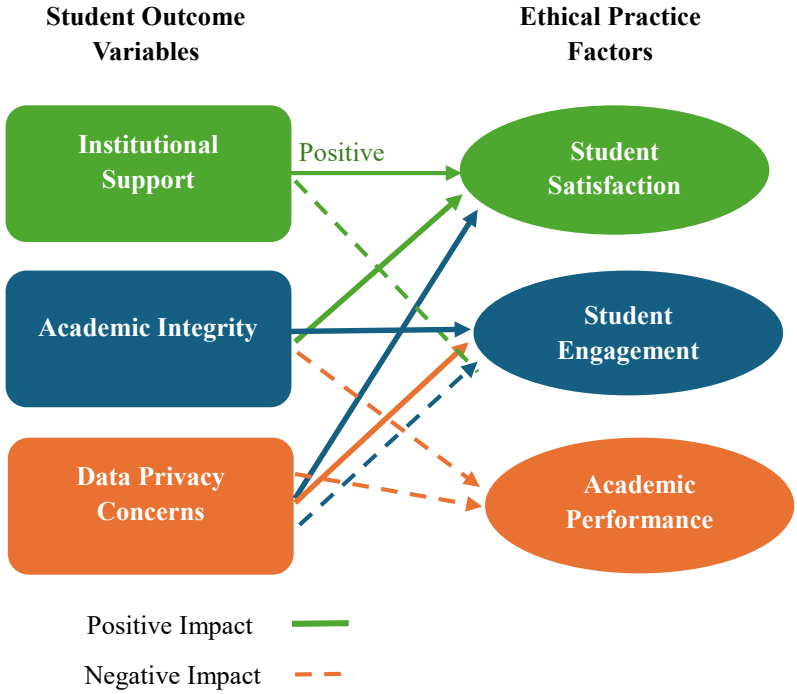

Figure 3: Conceptual Model of Ethical Practices and Student Outcomes in E-Learning

Figure 3 shows the correlations between the prominent ethical practices within e-learning environments, institutional support, academic integrity, and data privacy issues, and their effects on student outcomes, such as engagement, satisfaction, and academic performance. The positive effects are pointed out using solid arrows, whereas negative effects are pointed out using dashed arrows, and it can be seen that these ethical practices affect the student experience and achievement in online learning settings.

Descriptive Statistics

The data on the hierarchical linear model (HLM) analysis is based on the responses of 500 students who are pursuing distance learning courses in three educational institutions. The most important variables' descriptive statistics are summarized as follows:

Table 1: Descriptive Statistics of Key Variables

Variable	Mean	Standard Deviation	Range
Student Engagement	3.72	0.85	1 to 5
Student Satisfaction	4.05	0.78	1 to 5
Academic Performance	79.45	12.3	50 to 100
Perceived Academic Integrity	4.18	0.72	1 to 5
Institutional Support	3.85	0.90	1 to 5
Data Privacy Concerns	3.62	0.80	1 to 5

Table 1 below provides a summary of the descriptive statistics of the most important variables under analysis in the study, such as student engagement, satisfaction, academic performance, perceived academic integrity, institutional support, and data privacy concerns. The mean, standard deviation, and range of each of the variables presented in the table give a description of the distribution of responses in the study sample.

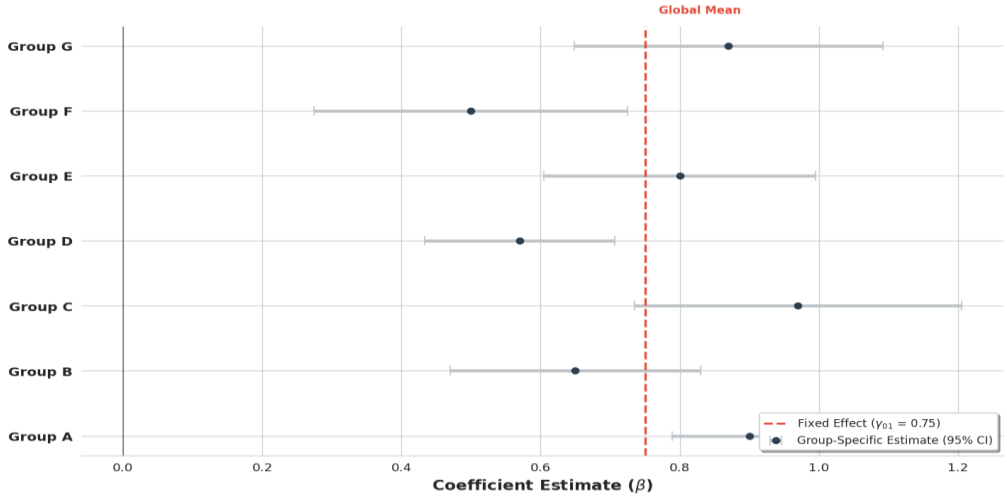

Figure 4: Results of Hierarchical Linear Model Analysis

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Figure 4 represents a forest plot that gives the estimate of the coefficients of various groups in a study, and each group is represented along the y-axis (Groups A to G). The red dashed line of 0.75 represents the global mean (fixed effect), and dots and horizontal bars are used to represent individual group estimates (with 95 % confidence intervals) represented by dots and horizontal bars. The plot enables you to compare the group-specific estimates to the global mean so that you can see the variation between groups in reference to the fixed effect.

Model Estimation and Results

To identify the effect of ethical practices at the student and institutional levels on student engagement, satisfaction, and academic performance, the hierarchical linear model (HLM) was used. The output of the model is shown below:

Level 1 (Student-Level) Results:

- Perceived Academic Integrity: The academic integrity has a coefficient of 0.45 ($p < 0.01$), which means that there is a significant positive correlation between the perceptions of students about academic integrity and participation in the e-learning environment. This implies that students who feel a greater degree of academic integrity are more likely to be involved in learning.
- Student satisfaction: This coefficient has 0.32 ($p < 0.05$) student satisfaction, but it is also positively related to engagement, although not as strongly as the academic integrity coefficient.
- Data privacy concerns: The coefficient of data privacy concerns = -0.29 ($p < 0.05$), meaning that more data privacy concerns had a negative effect on engagement, with the result that the higher the concern about data privacy, the less engagement the student had.

Level 2 (Institutional-Level) Results:

- Institutional Support: The institutional support coefficient is 0.38 ($P < 0.01$), which indicates that more institutional support has a positive effect on student engagement and satisfaction, and students in settings that have a strong institutional support system are more engaged and satisfied.
- Student Performance: The institutional support at the institutional level has a significant impact on the academic performance, with a coefficient of 0.41 ($p < 0.01$), indicating that well-supported institutions have an impact on high student performance.

Model Fit:

- AIC: 1456.78
- BIC: 1485.23
- R-squared (Level 1): 0.37
- R-squared (Level 2): 0.55

These findings indicate that individual-level aspects, including the perceptions of academic integrity and data privacy among students, and institutional-level aspects, including institutional support, have a significant effect on student engagement, satisfaction, and academic performance in distance learning settings.

Table 2: **Hierarchical Linear Model Coefficients**

Variable	Coefficient	Standard Error	t-Statistic	p-value
Perceived Academic Integrity (Level 1)	0.45	0.12	3.75	< 0.01
Student Satisfaction (Level 1)	0.32	0.14	2.29	< 0.05
Data Privacy Concerns (Level 1)	-0.29	0.11	-2.63	< 0.05
Institutional Support (Level 2)	0.38	0.13	2.92	< 0.01
Student Performance (Level 2)	0.41	0.12	3.42	< 0.01

Table 2 below reports the outcome of the hierarchical linear model with the coefficients, standard errors, t-statistics, and p-values of important variables. There is a strong positive influence of Perceived Academic Integrity on student engagement (coefficient = 0.45, $p < 0.01$). Student Satisfaction also positively impacts engagement (coefficient = 0.32, $p < 0.05$), whereas Data Privacy Concerns negatively impacts engagement (coefficient = -0.29, $p < 0.05$). At the institutional level, Institutional Support has a considerable effect on student engagement (coefficient = 0.38, $p < 0.01$), and Student Performance is affected positively by the institutional factors (coefficient = 0.41, $p < 0.01$).

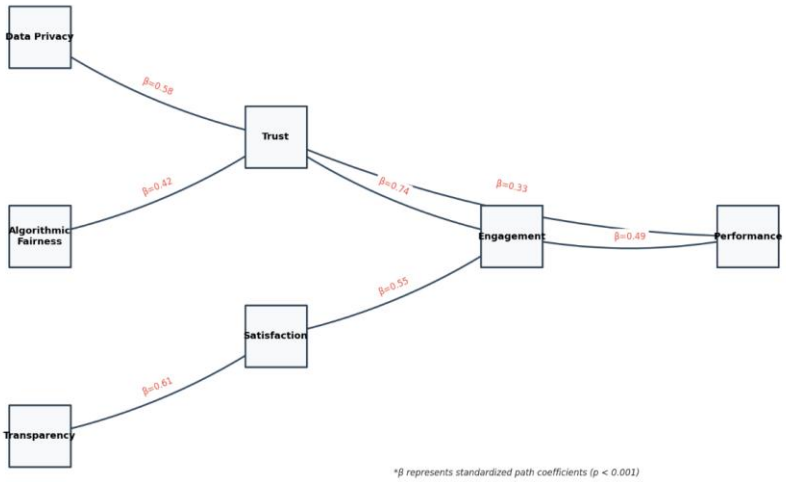

Figure 5: Ethical Practices and Student Engagement Model

Figure 5 is a structural equation model (SEM) that demonstrates the relationships among the key ethical variables and student achievements. Data privacy, algorithmic fairness, and transparency influence trust and, in turn, engagement and satisfaction. The performance is also related to the participation in the educational performance. Such relationships are provided by the standardized path coefficients (β), and the greater the value, the more powerful the effect. As an example, the effects of trust on engagement ($\beta = 0.74$) and performance ($\beta = 0.49$) are positive, and data privacy has an effect on trust ($\beta = 0.58$).

Interpretation of Findings

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This research has demonstrated that ethical practices can have a great influence on the achievement of students in e-learning settings. In particular, perceived academic integrity has a positive effect on student engagement, which holds true to the earlier research that places considerable value on trust and equity in online education. On the other hand, data privacy issues have an adverse effect on student engagement, which strengthens the question of the ethical nature of data collection in e-learning. The fact that the institutional support positively affects engagement and performance is relevant to the significance of good institutional structures, a fact that was also reflected in the same study through the fact that the institutional support structure is very important in creating a favorable learning environment.

Limitations

The research is also constrained by the fact that it had 500 students as a sample size, which might not accurately reflect the diverse students in e-learning situations across the world. The research is also relatively small-scale and is restricted to a limited number of institutions, which may hamper the extrapolation of the findings to other educational settings or geographical locations.

Implications for Practice

The results of the research indicate that academic institutions should focus on the promotion of a culture of academic honesty and openness, and consider the issues of data privacy to increase the involvement of students. E-learning policies that provide strong institutional support systems have the potential to enhance student satisfaction and academic achievement in online education. These ethical practices can be employed to ensure that more effective and trustworthy distance education systems are created.

V. Conclusion

This study examined how ethical practices can influence the outcomes of students studying in a distance learning and e-learning learning environment through a Hierarchy Linear Model (HLM). The results showed that perceived academic integrity has a positive effect on student engagement, and data privacy issues affect engagement in a negative way. Institutional support at the institutional level has a strong foundation for improving student engagement, as well as academic performance, and this supports the significance of the institutional frameworks in promoting a conducive learning environment. According to the results, educational establishments should focus on such ethical practices as the encouragement of academic integrity, the consideration of the issues of data privacy, and the effective institutional support systems. Educational policies must be structured to bring fairness, transparency, and privacy, thus improving student confidence and involvement in e-learning conditions. The institutions also need to put in place a system that will ensure that the issue of data privacy is monitored and resolved on a regular basis to minimize the concerns of the students and enhance engagement. Further studies may focus on the current study by incorporating a more heterogeneous sample of institutions and students and generalizing the study results. The connection between ethical practice and other relevant outcomes, including student retention and eventual academic achievement, requires further investigation. Also, one of the studies might explore how technological innovations (e.g., AI and blockchain) could help improve ethical conduct in digital education. Research on how ethical frameworks work in various cultural settings in e-learning would also be useful in shedding more light on universal and regional ethical issues.

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