

# FROM TEXTBOOKS TO CHATBOTS: THE INTEGRATION OF CHATGPT IN MODERN UNIVERSITY PEDAGOGY

ALI ATEEQ<sup>1</sup>, MOHANNAD MOUFEED AYYASH<sup>2</sup>, MARWAN MILHEM<sup>3</sup>, MOHAMMED ALZORAIKI<sup>4</sup>, QADRI KAMAL ALZAGHAL<sup>5</sup>

<sup>1,3,4</sup>Administrative Science Department, College of Administrative and Financial Science, Gulf University, Sanad 26489, Kingdom of Bahrain

<sup>2,5</sup>Department of marketing and e-commerce, Palestine Technical University-Kadoorie, Tulkarm, Palestine

E-mail: <sup>1</sup>dr.ali.ateeq@gulfuniversity.edu.bh, <sup>2</sup>mohannad.ayyash@ptuk.edu.ps,

<sup>3</sup>dr.marwan.milhem@gulfuniversity.edu.bh, <sup>4</sup>alzoraiki88@gmail.com, <sup>5</sup>qadri.alzaghal@gmail.com

## ABSTRACT

In the present research, the relationship between academic performance, ChatGPT chatbot, and traditional textbooks in the context of higher education is empirically investigated. Understanding these interrelationships is essential for developing successful educational methods in light of the quickly changing educational environments characterized by the fusion of conventional pedagogy and technology. A sample size of 210 participants was used in the research to investigate the educational influence of ChatGPT chatbot and traditional textbooks using Structural Equation Modelling (SEM). These were chosen using convenience sampling, although only 173 respondents were actively involved, providing a reasonably representative demographic. The empirical data produced exciting results. A path coefficient of 0.204, a statistically significant T-value of 2.705, a p-value of 0.003, and a strong positive correlation between ChatGPT chatbot and academic performance were specifically found. Like traditional textbooks, academic performance also showed a strong association, as seen by the strong path coefficient of 0.423, the T-value of 2.663, and the p-value of 0.004. The aforementioned results align with other scholarly investigations that emphasize the significance of corporate governance in promoting sustainable development and the impact of traditional textbooks on improving organizational performance. Organizations aiming to enhance academic performance should prioritize optimizing ChatGPT chatbots and traditional textbooks as viable means of progress.

**Keywords:** *Artificial Intelligence, ChatGPT, Academic Performance, Chatbots, Higher Education, Traditional Textbooks, Student Engagement, Bahrain*

## 1. INTRODUCTION

Education is set for a significant revolution in the modern era, defined by the broad use of Artificial Intelligence (AI) in several industries (Karan & Angadi, 2023; Van Slyke, Johnson, & Sarabadani, 2023). A sophisticated conversational agent created by OpenAI, ChatGPT, is at the forefront of this paradigm-shifting change. ChatGPT has the potential to transform traditional educational techniques because of its exceptional combination of scalability and personalized teaching (Birenbaum, 2023; Smith et al., 2023).

The incredible advancements in technology have tremendously impacted schooling throughout history. From the invention of the Gutenberg press, which revolutionized the dissemination of

knowledge by opening it up to the general public (Rousseau, 2023), to the appearance of digital textbooks, which have greatly improved educational accessibility and efficacy (Dholakia, Ozgun, & Atik, 2023) technology has undergone a transformative evolution within the educational space. Technology, formerly a supplemental tool, is now a crucial component of the academic environment. As shown by the works of Chhabria and Damle (2022), Holohan (2023), and T. Wu et al. (2023) demonstrate that employing cutting-edge neural networks in ChatGPT facilitates complex and intelligent user interactions. As a result, ChatGPT stands out as a shining illustration of the paradigm change that the 21st century has brought about.

Ongoing issues need to be resolved despite the impressive advancements in technology. The main issues surrounding this topic centre on the ethical implications of protecting data privacy, the possibility of eliminating the human element from the educational process, and the degree of readiness both teachers and students show in adjusting to cutting-edge technological advancements (Ray, 2023). The current corpus of research on the implications of AI in education has thoroughly investigated the possible impacts of AI on many facets of the educational environment (Atlas, 2023; Rudolph, Tan, & Tan, 2023). However, it is significant to highlight that the current research largely ignores the strategic and ethical issues connected with the integration of ChatGPT, a particular AI model, into higher education institutions. The assertion above leads to a substantial knowledge gap.

Two essential questions guide our research activities to fill this gap: How does the use of ChatGPT in university pedagogy compare with traditional textbook methods regarding student comprehension, retention, and engagement? What are the potential long-term implications of substituting traditional textbook methods with AI chatbots regarding students' critical thinking skills, reliance on technology, and ethical considerations related to data privacy and accessibility?

The two main objectives of this inquiry may be outlined as follows, taking into account the questions above: It is essential to dive into the topic to assess and compare ChatGPT's effectiveness to traditional textbook techniques in improving student understanding, retention, and engagement in the setting of a university environment. In addition, looking at the long-term effects of integrating ChatGPT into higher education is necessary. This inquiry will largely focus on critical thinking, how much students depend on technology, and the moral problems raised by data privacy and resource accessibility.

The main goal of this research project is to fill a present knowledge gap by conducting a thorough analysis of ChatGPT's use, applications, and limitations in the context of higher education. This study's primary goal is to provide a thorough strategic plan that will serve as a road map for those working in technology, policy, and education. This proposed strategy's primary goal is to highlight the efficient and ethical integration of ChatGPT within the academic environment, with a focus on

protecting students' welfare and academic achievements since they stand to benefit most from this ground-breaking technological transformation (Atlas, 2023; Rudolph, Tan, & Tan, 2023).

## 2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Within an evolutionary period characterized by rapid and exponential digital technology progress, the educational pedagogical domain is experiencing a profound and significant transformation. Renz and Hilbig (2023) have highlighted the considerable impact of Internet-based educational platforms in facilitating a paradigmatic shift. These platforms have played a crucial role in catalyzing this shift, thereby supporting their potential for transformative change. The scalability and adaptability of virtual learning environments have garnered significant praise, as they provide unparalleled flexibility in the delivery of pedagogical content (Alnagrat, Ismail, & Idrus, 2023). Nevertheless, as Alshaikh (2023) wisely suggests, progress in these areas is not devoid of its accompanying difficulties, especially in harmoniously incorporating them into pre-existing educational structures.

In the context described, educational technology has witnessed the emergence of AI and natural language processing as significant contributors. These technologies have demonstrated considerable potential, particularly in the domain of conversational agents or chatbots (Tapalova & Zhiyenbayeva, 2022). The initial versions of the technology have shown promise in their potential to bring about significant changes (Truong & Diep, 2023; Zaragoza, Seidel, & Santagata, 2023). However, it is important to note that there are certain limitations regarding cognitive understanding and the capacity to facilitate authentic interpersonal exchanges, as highlighted by Maragno et al. (2023).

In the given context, the emergence of OpenAI ChatGPT has been regarded as a significant breakthrough, primarily due to its exceptional capabilities in natural language processing (Zheng et al., 2023; Zhu et al., 2023). In revolutionary research conducted by Wu et al. in the year 2023, it was determined that the capabilities of ChatGPT surpass the realm of simple question-answering, instead promoting profound cognitive engagement. The utilization of ChatGPT has demonstrated its

ability to effectively involve students within an educational setting tailored to their individual needs, thereby fostering an environment that promotes improved comprehension (Santos, 2023; Shu & Gu, 2023).

Alneyadi and Wardat (2023) enhance our comprehension by elucidating that ChatGPT is not designed as a comprehensive substitute for conventional educational mediums. Instead, it functions as an additional instrument specifically crafted to enhance knowledge acquisition (Atlas, 2023; Mendoza et al., 2022). According to McMurray et al. (2023), an ideal educational environment would involve the harmonious coexistence of ChatGPT alongside conventional textbooks and classroom lectures. This integration would result in a mutually beneficial and comprehensive learning encounter characterized by synergy and holistic pedagogy.

Nevertheless, it is of utmost importance to exercise prudence and circumspection. In their scholarly work, Kelly et al. (2022) present a cautionary narrative emphasizing the importance of exercising careful judgment when considering the widespread implementation of AI-driven platforms. The technology's fallibility raises pertinent questions, encompassing a wide range of concerns, such as the potential for misinformation and a decline in critical thinking skills. The utilization of AI in educational settings gives rise to a complex array of ethical dilemmas, primarily centred around issues of data privacy and the potential for depersonalization within the academic sphere (Raman et al., 2023; Kooli, 2023; Sallam et al., 2023; Yang et al., 2023).

However, the prevailing scholarly discourse posits a landscape that diverges significantly from the dark, the future frequently portrayed in more general narratives concerning the incorporation of technology within educational environments. According to Bhutoria (2022), a wise scholar in the field, the trajectory of education in the forthcoming years does not entail a rigid dichotomy between technology and human educators. Instead, it calls for a harmonious and well-rounded fusion that leverages the advantages of AI, like ChatGPT, while safeguarding the invaluable subtleties inherent in human guidance.

In brief, the progression of ChatGPT and comparable platforms signifies a pivotal moment in

contemporary educational methodologies. As society progresses more profoundly into the realm of blended pedagogy, it becomes imperative to embrace a well-rounded and multifaceted strategy that effectively utilizes the potential of technology while remaining cognizant of its inherent constraints. The convergence of these various components can create a stronger, more dynamic, and fair educational environment as long as we approach this transformation with the appropriate level of comprehension it deserves. Future research should persist in examining the multifaceted consequences of these integrations to verify their effectiveness and proactively address any potential disadvantages.

## 2.1 ChatGPT in University Pedagogy vs. Traditional Textbook Methods

The introduction of AI chatbots, demonstrated by ChatGPT, within higher education has sparked a burgeoning academic investigation that seeks to juxtapose these technological advancements with conventional textbook approaches. According to Reyna (2023), ChatGPT has been identified as a tool that can significantly enhance student comprehension. The capacity of the platform to provide real-time, personalized responses offers a highly dynamic learning experience that has the potential to surpass the advantages of static text found in traditional textbooks. On the other hand, textbooks possess inherent advantages as they provide a methodical and standardized pedagogical framework that fosters an environment conducive to consistent and structured learning (Gonsalves & Pearson, 2023). The texts above function as meticulously curated repositories of knowledge subjected to rigorous academic examination, offering a well-organized trajectory for advancing intellectual development.

In the realm of student engagement and retention, ChatGPT demonstrates a notable advantage. The heightened levels of engagement and more effective retention through active participation have been attributed to the platform's inherent interactive features (Almusaed, Almssad, Yitmen, & Homod, 2023; Mogavi et al., 2023; Nguyen, Cao, Nguyen, & Nguyen, 2023). In contrast, the utilization of traditional textbooks provides a learning experience that is characterized by a self-paced and introspective approach, thereby facilitating the development of profound analytical thinking skills (Mncube & Maphalala, 2023; Yang, Majumdar, Li, Flanagan, & Ogata, 2022).

The swift integration of AI chatbots, such as ChatGPT, within academic environments has prompted inquiries regarding the possibility of excessive dependence on technology (Laestadius, Bishop, Gonzalez, Illenčik, & Campos-Castillo, 2022). The potential consequences of excessive reliance on AI-generated responses among students are worth considering. Over time, this reliance may undermine their ability to think critically as they become accustomed to the instantaneous nature of these AI-generated solutions rather than engaging in thorough analyses of the issues they encounter (Dai, Liu, & Lim, 2023).

Furthermore, the integration of AI in the field of education raises significant ethical concerns. The concerns mentioned above primarily pertain to the crucial aspects of data privacy and the fair allocation of educational resources (Nguyen, Ngo, Hong, Dang, & Nguyen, 2023; Rusmiyanto et al., 2023). Digital platform utilization presupposes specific technological infrastructures, which may not be universally accessible (Lee & Lee, 2023).

Given the complex nature of this matter, an increasing number of scholars are advocating for adopting a blended approach that effectively synergistically harnesses the advantages of both AI chatbots and traditional textbooks. Implementing a balanced methodology has the potential to enhance the overall learning experience by effectively leveraging the interactive capabilities of AI chatbots, while simultaneously upholding the critical analytical rigor fostered through textbooks.

Compared to conventional textbook approaches within higher education, the current discourse surrounding the implementation of AI chatbots, such as ChatGPT, offers a multifaceted and promising terrain for scholarly investigation. The existing body of literature, although extensive in examining the advantages and difficulties associated with various aspects, frequently lacks a thorough analysis encompassing pedagogical efficacy, ethical factors, and long-term consequences. When considering the complex landscape of university pedagogy, it becomes apparent that a potential solution for its future lies within a hybrid model that effectively leverages the advantages offered by both existing paradigms. The proposed model can accommodate the ever-changing requirements and abilities of modern-day learners and align with the ethical and fair principles that form the foundation of educational

methodologies. Therefore, the subsequent hypotheses were proposed:

**H1:** Students who utilize ChatGPT for learning in a university setting will exhibit higher comprehension, retention, and engagement levels than those relying solely on traditional textbook methods.

**H2:** Students instructed primarily through AI chatbots will rely more on technology for problem-solving and information retrieval than those using traditional methods.

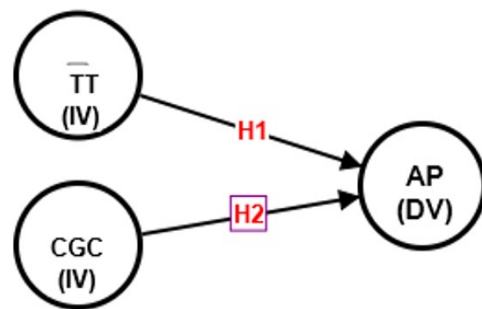


Figure 1: Conceptual Framework

Note: AP= Academic Performance, CGC= ChatGPT Chatbots, TT= Traditional Textbooks

### 3. METHODOLOGY

The current research carefully made sure that all participants were included voluntarily and that strict ethical guidelines obtained their informed permission. The participants' names were kept secret, and their anonymity was maintained throughout the whole study with great care on the part of the researchers. Al Balushi, Ali, and Alzoraiki (2022) laid forth the ethical standards for academic research, and Ali, Alzoraiki, and Al Aghbas (2022) provided further evidence for their assertions. This careful method is in keeping with these standards. Data were gathered for the research project using a convenience sample technique. The study's participant pool comprised 210 volunteers from various professional backgrounds and Bahraini organizations. The suggested sampling parameters by Krejcie and Morgan (1970) were followed while determining the sample size. These requirements said that a sample size 173 would be statistically adequate to accomplish the study's goals.

To gather information, we created a web-based survey from April 18 to May 29, 2023, to perform a thorough assessment of the inclusion of ChatGPT within the educational framework of colleges. The study was carefully designed to examine how higher education settings are gradually moving away from traditional textbook techniques and toward using AI-based teaching technologies. Analyzing relationships between latent variables in data analytics required advanced statistical programs like SPSS 28, PLS-SEM4, and Amos. The Cronbach's alpha coefficient was calculated to validate the survey instrument's reliability and internal consistency, and the result was a value of 0.854 (Ateeq, Alzoraiki, Milhem, & Al-Absy, 2023). The methodology used in this work not only strongly supports its methodological rigour but also complies with the ethical and scientific norms necessary for generating substantial academic contributions.

## 4. RESULTS

### 4.1 Reliability and Composite Reliability

The strong internal consistency of the constructs is emphasized by Cronbach's alpha coefficients (AP: 0.763, CGC: 0.873, TT: 0.796) and Composite Reliability scores (AP: 0.850, CGC: 0.887, TT: 0.872), which all exceed the accepted threshold of 0.70 (Abdulrahman; Al Balushi, Ali, & Alzoraiki, 2022). The study's validity must be substantiated by situating each construct (AP, CGC, TT) within relevant theoretical frameworks and literature. Additionally, the selection of items must be based on extensive empirical evidence or expert validation. The high-reliability measures also confirm the constructs' validity, demonstrating that they precisely assess their intended constructs. It is essential to address potential threats to validity, such as measurement inaccuracies or sample bias, with methodological rigour and empirical justification. Choosing evaluation criteria that are consistent with the objectives of the study and the properties of the constructs guarantees a concentrated assessment (Al-Fahim et al., 2024; Milhem, Ayyash, Ateeq, & Alzoraiki, 2024; Naz et al.). The methodological decisions of this study are substantiated by empirical evidence and confirm other pertinent research, thereby enhancing the study's credibility and augmenting its scientific worth.

Table 1: Reliability and Composite Reliability.

Construct	Cronbach's alpha	Composite reliability (CR)	Average variance extracted (AVE)
AP	0.763	0.850	0.502
CGC	0.873	0.887	0.553
TT	0.796	0.872	0.562

Key: AP= Academic Performance= ChatGPT Chatbots, TT= Traditional Textbooks

### 4.2 Convergent Validity

Convergent validity is achieved when the factor loadings of items inside a construct exhibit statistical significance and surpass a threshold of 0.5. Additionally, it is considered satisfactory if the CR exceeds 0.7 and the Average Variance Extracted (AVE) reaches 0.5, as proposed by Ali (2022). All structures in the provided data, namely AP, CGC and TT, meet the specified requirements. The factor loadings indicate a range between 0.631 and 0.717, indicating the strength of the relationships between the observed variables and their corresponding latent constructs. Additionally, all CR values are above the threshold of 0.85, meaning the measurement model has high internal consistency and reliability. Furthermore, the AVE values vary from 0.502 to 0.562, providing evidence for convergent validity across the constructs (Al-Fahim et al., 2024).

Table 2: The Convergent Validity Analysis.

Construct	Cod e	Num ber of item s	Facto r Loadi ng	(CR)	(AVE)
Academic Performance	AP	6	0.642	0.850	0.502
ChatGPT Chatbots	CGC	7	0.717	0.887	0.553
Traditional Textbooks	TT	6	0.631	0.872	0.562

Key: \*factor loading: variance explained by the Variable on that particular factor <0.7 or higher to be accepted (Ali, Alzoraiki, AL-Tahitah, Almaamari, & Al-shaibah, 2023). \*CR: Measure scale reliability overall and prefer it with CFA. \*AVE: measures the level of variance captured by a construct 0.5 accepted. AVE: Average Variance Extracted. CR: Composite Reliability.



### 4.3 Correlations

Table 3 illustrates The Pearson correlation coefficients between three variables, namely AP, CGC, and TT. All values range between -1 and 1, indicating the strength and direction of linear relationships. The Pearson correlation coefficient between AP and CGC is 0.406, showing a moderate positive association. This implies that when the value of AP grows, there is a tendency for CGC also to increase. The variables AP and TT have a modest positive link, with a correlation coefficient of 0.499. The correlation coefficient between CGC and TT is 0.439, indicating a comparable level of correlation between the two variables. Given that all values are below 0.5, it may be inferred that the correlations, albeit notable, reveal relatively weak strength. It is essential to acknowledge that correlation does not always indicate causation (Ateeq et al., 2024; Onwuegbuzie & Daniel, 1999).

Table 3: Correlations Test.

	AP	CGC	TT
AP	1.000	0.406	0.499
CGC	0.406	1.000	0.439
TT	0.499	0.439	1.000

Key: AP= Academic Performance, CGC= ChatGPT Chatbots, TT= Traditional Textbooks

### 4.4 Assessment of Measurement Model

Figure 2 (Placed in APPENDIX1 at the end of this paper) shows the author's conceptual framework and hypotheses model.

### 4.5 Covariances

The provided matrix illustrates the covariances between AP, CGC, and TT. Covariance quantifies the extent to which the returns on two assets are related regarding their directionality. A high covariance signifies a tendency for asset returns to demonstrate a parallel movement, while a negative covariance value implies an inverse relationship between the returns (Mishra, Sharif, Khuntia, Meo, & Khan, 2019; Nagi, Nigam, Ateeq, Al-Maamari, & Almeer, 2023). For instance, the covariance between the variables AP and CGC is 0.327, indicating a positive association. It is prudent to use care when interpreting data, particularly concerning covariance. It is important to note that a more

significant absolute covariance does not always indicate a stronger association between variables. This is because covariance is not standardized, unlike correlation (Heckens & Guhr, 2022).

Table 4: Covariances Test.

	AP	CGC	TT
AP	0.712	0.327	0.333
CGC	0.327	0.911	0.332
TT	0.333	0.332	0.627

Key: AP: Academic Performance = ChatGPT Chatbots, TT= Traditional Textbooks.

### 4.6 Goodness-of-Fit of the Model

The model has satisfactory conformity to the data, as shown by several indexes. The obtained P value of 0.000 is significant, above the conventional threshold of 0.05. This suggests that the model exhibits a substantial departure from a saturated model, as noted by Liang and Zhang (2011). The Chi-Square to degrees of freedom ratio of 4.350 falls below the suggested threshold of 5, indicating a satisfactory level of fit (Prasad, 2022). Furthermore, it is worth noting that the root mean square error of approximation (RMSEA) value of 0.063 falls below the commonly accepted threshold of 0.08, as suggested by Shi, Wang, and Zhu (2023), indicating a satisfactory level of approximation error. The GFI and AGFI values strongly fit the targeted benchmark of 0.90 (Amini & Hidayat, 2023), as seen by their respective values of 0.900 and 0.925.

Nevertheless, the NFI shows a marginal deficiency with a value of 0.870. However, the Tucker-Lewis Index and Comparative Fit Index (CFI) values, which are 0.981 and 0.936, respectively, are above the recommended threshold of 0.90 as Pratt et al. (2023) suggested. In general, the model demonstrates a strong alignment with the data.

Table 5: Goodness-of-Fit of the Model.

Model Fit	Estimated model	Acceptable value
P value	0.000	
ChiSqr/df	4.350	Less than 5
RMSEA	0.063	Less than 0.08
GFI	0.900	More than 0.90
AGFI	0.925	More than 0.90
NFI	0.870	More than 0.90
TLI	0.981	More than 0.90
<b>CFI</b>	<b>0.936</b>	<b>More than 0.90</b>

**4.7 Estimates Parameter for Latent Variables**

The estimated values for the latent variables AP, CGC, and TT are correspondingly 0.504, 0.911, and 0.627. All three estimates demonstrate statistical significance, as p-values less than 0.001. This suggests strong associations between the estimates and their respective observable indicators. The importance of the estimate is further supported by the t-values, which indicate the number of standard deviations by which the estimates deviate from zero. Specifically, the t-values for AP, CGC, and TT are 6.374, 7.591, and 7.391, respectively. According to Hair, Ringle, and Sarstedt (2013), high t-values often indicate that the latent Variable has a strong predictive ability for its corresponding indicators. The standard errors linked with the data give a means of quantifying the level of uncertainty, where smaller numbers indicate more reliable and consistent estimations(Lewis & Poole, 2004).

Figure 3: Estimates Parameter for latent Variable.

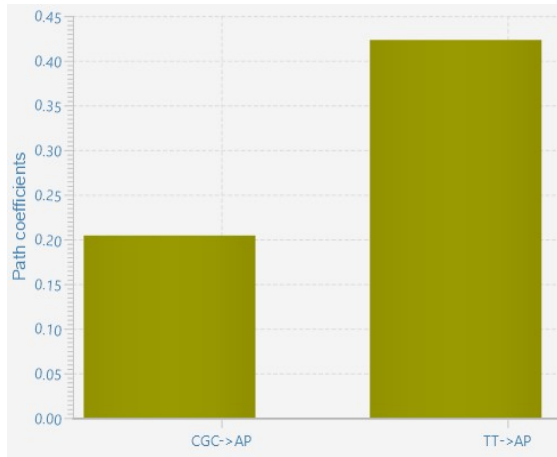


Table 6: Estimates Parameter for latent Variable.

	Parameter estimates	Standard errors	T values	P values
AP	0.504	0.079	6.374	0.000
CGC	0.911	0.120	7.591	0.000
TT	0.627	0.085	7.391	0.000

Key: AP: Academic Performance = ChatGPT Chatbots, TT = Traditional Textbooks.

**4.8 Discriminant Validity for Latent Variables**

The empirical evidence supports the discriminant validity of the AP, CGC, and TT latent variables. Based on the Fornell-Larcker Criterion, it is expected that the square root of the Average Variance Extracted (AVE) for each latent Variable will exceed the strongest correlation it has with any other latent variable. The correlation coefficient between AP and CGC and AP and TT is lower than the correlation coefficient between AP and itself, with values of 0.709. In a similar vein, it can be shown that both CGC (0.744) and TT (0.749) surpass their respective maximum correlation values. Therefore, discriminant validity is established (Al-refer, Ali, Ateeq, & Alzoraiki, 2023).

Table 7: Discriminant Validity Analysis.

	AP	CGC	TT
AP	0.709		
CGC	0.406	0.744	
TT	0.499	0.439	0.749

Key: AP: Academic Performance = ChatGPT Chatbots, TT= Traditional Textbooks.

Note: The square root of the average variance extracted is represented by a diagonal, while the other elements reflect the correlation estimate.

**4.9 The Prediction Relevance of the Model**

The coefficient of determination (R-square) for the provided model is 0.292. This finding suggests that the model accounts for roughly 29.2% of the variance in the dependent Variable. Although the model offers valuable insights into the behaviour of the dependent Variable, a considerable proportion (about 70.8%) of the variability remains unaccounted for. Hence, the model might benefit from including further predictors or enhancements to better account for a more significant portion of the variation (Alzoraiki et al., 2023). Table 8 displays the R-square values, while Figure 3 presents their visual representation.

Figure 4: R<sup>2</sup>.

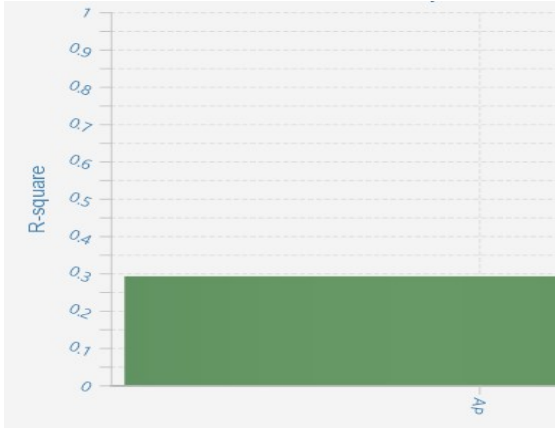


Table 8: Coefficient of the determination result from R<sup>2</sup>.

	R-square
AP	0.292

Key: AP: Academic Performance = ChatGPT Chatbots, TT = Traditional Textbooks.

Higher value is preferred: 0.67 substantial, 0.33 average, 0.19 weak (Ali & Habtoor, 2022).

#### 4.10 The Assessment of the Inner Model and Hypothesis Testing Procedures

The main goal of Structural Equation Modelling (SEM) is to elucidate and quantify the associations between various variables. In our present evaluation, two hypotheses were formulated and examined using the Structural Equation Modelling (SEM) approach. The data reported in this study offers significant evidence to support both proposed hypotheses.

Table 9: Mean, STDEV, T values, P values, Decision.

NO	Hypothesis	$\beta$	$\mu$	SD	T. Value	P values	Decision
H1	CGC -> AP	0.204	0.202	0.076	2.705	0.003	Supported
H2	TT -> AP	0.423	0.434	0.159	2.663	0.004	Supported

Key: AP: Academic Performance = ChatGPT Chatbots, TT: Traditional Textbooks.

Beta ( $\beta$ ): Values from -1 to +1. Assess significance and confidence intervals. P-values: The Significance value is based on the degrees of freedom  $p < 0.05$  Cheah (2020).

#### 4.11 Path Model Significance Results

**H1: CGC -> AP:** A relationship between CGC and AP exists. The hypothesis demonstrates a positive link between CGC and AP, as shown by the path coefficient ( $\beta$ ) 0.204. The T-value, representing the number of standard deviations by which our coefficient deviates from zero, is 2.705. In structural equation modelling (SEM) analysis, T-values of 1.96, which corresponds to a confidence level of 95%, are commonly regarded as statistically significant. The p-value of 0.003 falls below the conventional significance level of 0.05, supporting further the assertion that the observed link is statistically significant. Hence, this finding provides evidence in favour of the idea that enhancements in corporate governance culture have the potential to impact academic performance positively. Previous studies have shown the significant impact of proficient corporate governance on facilitating sustainable development and optimizing resource allocation, hence improving organizational performance (Lăzăroi, Ionescu, Andronie, & Dijmărescu, 2020)

**H2: TT -> AP:** The TT to AP. The hypothesis posits a beneficial relationship between using traditional textbooks and academic performance. The observed route coefficient in this context has a much greater magnitude, measuring 0.423. The association remains statistically significant, as shown by a T-value of 2.663. The obtained p-value of 0.004 provides more support for this assertion. This finding illustrates that investments or enhancements in TT may significantly influence AP. This finding is consistent with contemporary perspectives on business operations, whereby the impact of Traditional Textbooks and technological improvements on an organization's efficiency, competitive positioning, and overall success is acknowledged (Alfawaire & Atan, 2021)

In conclusion, the evidence provides support for both hypotheses H1 and H2. The available information indicates that prioritizing the improvement of CGC and allocating resources towards TT can improve Academic Performance. Therefore, Organizations interested in enhancing performance measures should contemplate directing their attention towards these potential solutions.



## 5. DISCUSSION

There is a sizable academic debate within educational technology on the complex interactions between ChatGPT chatbots, traditional textbooks, and academic performance. The current study uses Structural Equation Modelling (SEM) to examine the complicated relationships between numerous components, emphasizing the dynamic and intricate character of contemporary educational techniques (Skulimowski & Köhler, 2023).

The study results show a high and substantial correlation between Academic Performance and ChatGPT chatbots. This is corroborated by the fact that there is a statistically significant correlation between these variables, as shown by the path coefficient of 0.204 and the p-value of 0.003. The empirical data in this study is consistent with prior scholarly works, particularly the study of Alshahrani (2023), which shed light on the beneficial effects of chat tools with AI on student engagement and academic outcomes. Furthermore, a growing body of academic works that emphasize the mutually beneficial relationship between technology and educational outcomes (Berger, Mackenzie, & Holmes, 2020; Duha & Saputro, 2022; Niedlich, Kallfaß, Pohle, & Bormann, 2021) are consistent with the improvement in academic achievement that can be attributed to ChatGPT chatbots.

The research shows how interactive chatbots, in particular, might serve as a pedagogical turning point for AI technology, making it easier to combine conventional teaching techniques with digital platforms. The aforementioned finding is in line with the investigation made by Huang, Hew, and Fryer (2022), who emphasized the value of chatbots in creating a learning environment that is more adaptable and individualized. This supports the instructional usefulness of ChatGPT chatbots even further.

It is essential to admit that the value of traditional teaching approaches should not be minimized or ignored in light of the fascinating advancements in educational technology. Sen and Mehtab's (2021) offer a thorough and wise perspective on the ongoing value of traditional instructional tools, including didactic lectures and interpersonal interactions. The study's findings suggest that technologically-infused pedagogies may sometimes lack the social and interpersonal

components fundamental to traditional educational systems.

The academic work by Saura, Ribeiro-Soriano, and Saldana (2022) brings a nuanced viewpoint to the ongoing discussion. It emphasizes the importance of using a well-rounded pedagogical strategy that successfully combines the benefits provided by traditional and digital educational systems. The results of their study show that, despite the popularity of digital platforms due to their convenience, conventional knowledge sources are still necessary for developing a thorough comprehension of topics.

Additionally, Bera and Shrivastava (2020) provide a thorough categorization scheme for various forms of instructional material. They contend that although traditional textbooks are crucial for building conceptual understanding and developing critical thinking skills, the ChatGPT chatbot is very successful at imparting factual and procedural information. Therefore, an integrated educational approach is essential to achieving academic greatness in the digital era.

Educational policymakers and practitioners must use the mutually advantageous features of both conventional and contemporary educational technology to traverse the rapidly changing educational environment efficiently. In conjunction with other academic efforts, the present study shows a substantial shift toward an all-encompassing, flexible, and effective educational framework. Attaining academic greatness in the present era of technological breakthroughs requires adopting a thorough and balanced strategy that effectively uses the benefits of ChatGPT chatbot and traditional textbook approaches.

### 5.1 Limitations and Future Research

The current study provides significant insights into the connections between ChatGPT chatbot, traditional textbooks, and academic performance. However, it is essential to acknowledge and address several inherent limitations of this study. The primary focus of the research was to investigate the direct correlations between ChatGPT chatbot and academic performance. The aforementioned focus may inadvertently neglect certain mediating or moderating factors that have the potential to impact these relationships. These factors include but are not limited to students' pre-existing technological

knowledge, cognitive capabilities, motivational aspects, and even instructors' level of proficiency with technology (Niedlich, Kallfaß, Pohle, & Bormann, 2021; Duha & Saputro, 2022).

Furthermore, it is important to note that the sample utilized in this study consisted of a convenience sample selected explicitly from professionals and organizations located within the Kingdom of Bahrain. The sample used in this study meets the statistical requirements established by Krejcie and Morgan (1970). However, it is essential to note that the geographical and professional characteristics of the sample may restrict the applicability of the findings to larger populations and different educational settings (Al Balushi, Ali, & Alzoraiki, 2022).

Thirdly, it should be noted that the study in question depends on self-reported data, a method inherently susceptible to various biases, including but not limited to social desirability bias and recall bias. The methodological approach employed in the study by Berger, Mackenzie, and Holmes (2020) did not incorporate objective measures, such as performance metrics or independent evaluations, to validate self-reported academic performance and engagement levels.

Furthermore, the research endeavour utilized cross-sectional data, imposing constraints on the capacity to establish causal relationships or ascertain the enduring effects of ChatGPT chatbot and traditional textbooks on Academic Performance. Using longitudinal studies would yield more resilient and reliable outcomes pertaining to the progressive dynamics of these associations (Huang, Hew, & Fryer, 2022). Also, although the investigation did evaluate the pedagogical effectiveness of the ChatGPT chatbot by employing quantitative measures like Cronbach's alpha coefficient, it did not explore additional qualitative aspects, including student satisfaction or the influence on critical thinking abilities. These factors are essential in comprehensive education (Saura, Ribeiro-Soriano, & Saldana, 2022).

Finally, the assessment of digital tools compared to traditional methods within the scope of this study may not encompass the complete range of their intricacies, subtleties, and contextual effectiveness. The study failed to take into account the potential variations in educational content that

may be more effectively delivered through one method as opposed to the other, as well as the possible synergistic effects that may arise from the combination of these methods within a blended learning setting (Sen and Mehtab, 2021; Bera and Shrivastava, 2020).

In light of these limitations above, it is recommended that forthcoming studies adopt a multifaceted methodology encompassing both qualitative data collection techniques. Additionally, it is advised that future studies expand their participant pool to encompass a broader range of educational environments and demographic cohorts. Moreover, an in-depth examination of the possible mediating or moderating factors and the incorporation of objective performance measures can provide a more comprehensive comprehension of the intricate dynamics between ChatGPT chatbot, traditional textbooks, and academic performance.

## 5.2 Implications of the study

The implications of the study results have wide-ranging effects on many areas, including research, the creation of policies, and the delivery of education. These results add to the body of research already in existence that examines the dynamic interaction between technology and traditional teaching methods in higher education settings.

By illuminating the complex relationships between ChatGPT chatbot, traditional textbooks, and academic performance, this research study significantly adds to the current academic conversation. By focusing on other elements that were not taken into account, such as cognitive load, instructional design, and socioeconomic characteristics, future research may expand upon the core understandings offered in this study (Duha & Saputro, 2022; Niedlich, Kallfaß, Pohle, & Bormann, 2021). The paper also presents a workable paradigm for analyzing the effects of AI technologies on education. This framework may be used to create training programs for businesses and elementary and secondary schools in various educational settings.

Policymakers who create and influence educational technology policies are interested in the study results. The relationship between ChatGPT chatbot and academic performance emphasizes the need to allocate funds for the creation of AI-driven

educational tools while also acknowledging the continued importance of tried-and-true instructional strategies that have value in the long run (Saura, Ribeiro-Soriano, & Saldana, 2022; Sen & Mehtab, 2021). The study mentioned above also raises significant ethical questions about data privacy and fairness that call for the development of comprehensive policies to control the use of AI in educational settings (Nguyen, Ngo, Hong, Dang, & Nguyen, 2023; Rusmiyanto et al., 2023).

The research provides empirical support for using AI-driven chat technologies, such as ChatGPT, in educational settings, which helps practitioners. However, a balanced and integrated strategy that benefits from both digital and traditional resources is required due to the continued importance of conventional teaching methods. The development of crucial soft skills like critical thinking and collaboration, as well as improved academic achievement, may all result from using a balanced approach (Bera & Shrivastava, 2020; Huang, Hew, & Fryer, 2022).

The research underlines the need for pedagogically sound and morally sound AI technologies to be developed in education. Implementing such initiatives may include multidisciplinary teams of educational specialists, technologists, and policymakers working together to build instructional technology. This collaborative method ensures that the final products are ethically sound, founded on educational ideas, and compliant with governmental and institutional rules (Alshahrani, 2023).

Finally, this research substantially develops our understanding of the complex interaction between contemporary technology tools and traditional educational practices. Adopting a comprehensive strategy for the holistic development of education is actively supported among those involved. These stakeholders include academics, decision-makers in government, educators, and technologists. Adopting this strategy may successfully handle the numerous dimensions and components of education, resulting in a more thorough and well-rounded educational experience. Additional and priceless insights that might help people adapt to and succeed in the ever-changing educational environment may be offered by future research projects that try to solve the constraints inherent in this study.

## 6. CONCLUSION

Recognizing and respecting the inherent worth of traditional pedagogical techniques and cutting-edge technology advances in an ever-evolving educational environment marked by the rising integration of digital technologies is essential. The current research aims to highlight the significance of effectively fusing diverse paradigms to create the ideal educational environment. ChatGPT Chatbot, a pedagogical tool powered by AI, is used in education by offering unmatched adaptability, customization, and promptness in educational exchanges. According to Alshahrani, Skulimowski, and Köhler (2023), this technology can improve the academic experience.

The long-lasting value of traditional textbook approaches is crucial, nevertheless. The activities outlined above, which have endured the test of time, have repeatedly shown the capacity to foster essential skills like critical analysis and synthesis and to develop deep conceptual understanding (Sen & Mehtab, 2021; Bera & Shrivastava, 2020). The distinction between digital and conventional teaching techniques, previously obvious in the quickly evolving educational scene, is increasingly disappearing. A harmonic fusion is taking place using the distinct advantages and characteristics of both techniques (Saura, Ribeiro-Soriano, & Saldana, 2022).

In this situation, the cohabitation of dynamics is a stimulant for extending the criteria that characterize effective learning experiences rather than just as a final result. Educators and policymakers may access a wider variety of teaching and learning experiences characterized by more depth and complexity using a multidimensional pedagogical framework. The harmonic blending of multiple information distribution methods transcends the confines of compartmentalization. Instead, it fosters an educational environment that is dynamic, adaptable, and student-centred (Huang, Hew, & Fryer, 2022).

However, we must always be vigilant while we go through this fortunate territory so that we can successfully deal with the limitations and challenges ahead of us. It is crucial to carefully address ethical issues relating to data privacy and provide fair and equitable access to technology to stop the continuation of social inequalities (Nguyen, Ngo, Hong, Dang, & Nguyen, 2023;

Rusmiyanto et al., 2023). Additionally, concerns about the possible loss of critical thinking skills due to an overreliance on technology highlight the need for a well-rounded pedagogical approach that consistently assesses its effectiveness using data-driven insights (Dai, Liu, & Lim, 2023).

The study above has broad repercussions that affect many stakeholders in the educational system. As a result, educators must alter their educational strategies. On the other hand, it is up to policymakers to create rules that are both forward-looking and firmly based on educational empiricism. Finally, students must arm themselves with the knowledge and skills necessary to navigate a world that is always changing successfully. The results of our study show that blending traditional and contemporary educational materials is inevitable and beneficial, heralding a new age that offers a more sophisticated, adaptive, and effective educational experience.

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APPENDIX 1

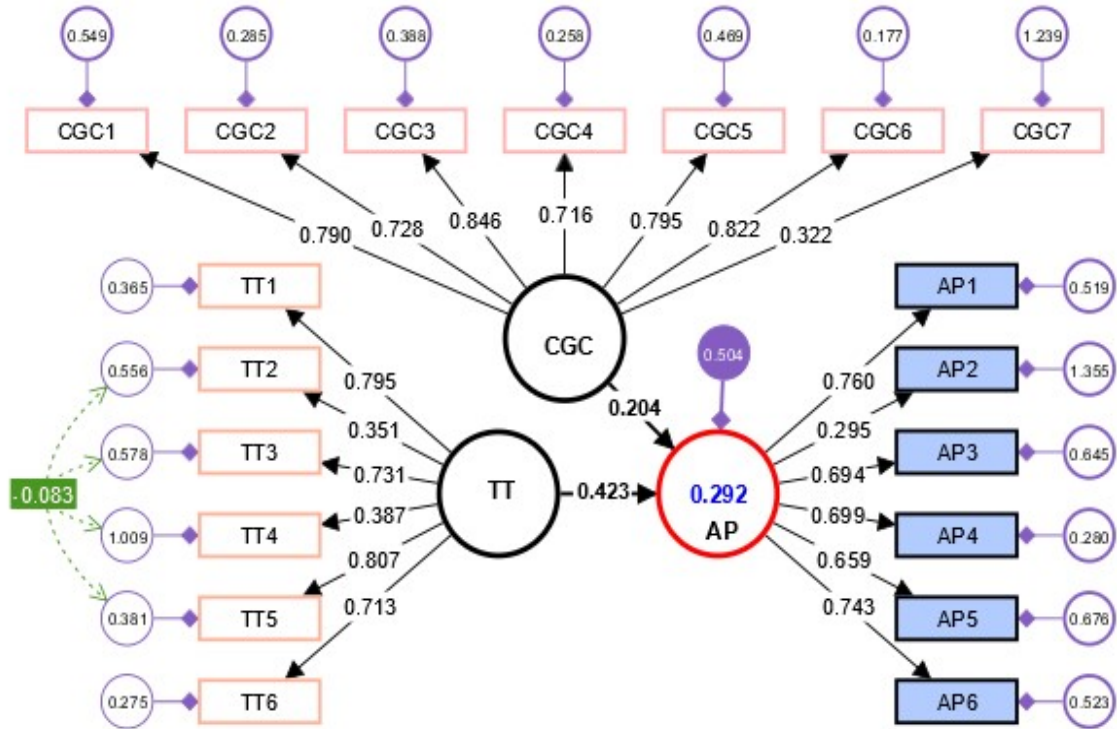


Figure 2: Author's Own Conceptual Framework and Hypotheses Model.