

Article

How Does Cultural Upbringing Influence How University Students in the Middle East Utilize ChatGPT Technology?

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Abstract: The Middle East, with its diverse cultures and adherence to social norms, offers a relevant case study for exploring the current research question. Using established theories of social interaction and technology acceptance, this research examines how cultural background shapes student interactions with ChatGPT. Analyzing data from 202 online surveys, our findings underscore the gender-based disparities in ChatGPT use, potentially revealing consequences for technology adoption within the Middle East. This study contributes to a deeper understanding of how cultural upbringing influences AI utilization and paves the way for developing more culturally sensitive and inclusive AI systems. By promoting a more equitable and informed approach to AI adoption in the Middle East and beyond, this research offers valuable insights for future research directions and technology applications.

Keywords: AI; ChatGPT; cultural upbringing; higher education; gender

1. Introduction

Driven by the complex convergence of historical, political, and social issues, the Middle Eastern countries have emerged as focal points for interdisciplinary research. More researchers are investigating these collectivist cultures of the Middle Eastern countries (Basurrah et al. 2022; Samara 2021) and studying how and why these values influence various aspects of society. One such facet is technology adoption. Unlike individualistic cultures where people rely on formal information sources, collectivist cultures, like those in the Middle East, often place greater weight on the subjective experiences of early adopters (Papadopoulos and Cleveland 2023). With the rise of generative artificial intelligence (GAI) tools forming the latest technological revolution, understanding these cultural nuances becomes paramount. The Middle East, lacking clear technical regulations and strategies, faces multifaceted challenges in navigating the appropriate use and adoption of GAI (Mannuru et al. 2023).

Several studies have shown the significant impact of culture, such as gender discrimination and biasness, on the adoption of different technologies (Bird and Rhoton 2021; Wong and Daming 2024). In an empirical study conducted by Al-Omouh et al. (2022) on the role of cultural values in the adoption of social commerce in the Middle East, the authors noted that there is a significant tendency toward risk aversion in such societies. People in those societies tend to avoid drastic change and uncertain situations, which plays a significant role in limiting the adoption of social commerce. Furthermore, collectivist orientations seem to have a substantial impact on technology adoption. In a study conducted by Pookulangara and Koesler (2011), collectivist societies appeared to be wary of embracing new technologies for online shopping.

Moreover, collectivist values may affect the decision-making process behind the adoption of technologies. Al-Omouh et al. (2022) found that individuals with high collectivist values tended to greatly rely on in-group sources of information when making decisions



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regarding social commerce adoption. Furthermore, factors, such as inclusivity and equity in technological advancements, are an important element to investigate in such cultures, especially with the emerging technologies, including ChatGPT. Recent research suggests that institutional elements fostering the engagement of racial minorities, women, and sexual minorities in self-employment could potentially enhance advancement, even amidst escalating levels of inequality (Patel et al. 2021). Moreover, societal norms and expectations can limit women's mobility, freedom of expression, and access to resources (Akbar et al. 2023). ChatGPT, a large language model developed by OpenAI, is able to learn from a wide range of text data and can generate responses based on natural language input. In a critical analysis conducted by Adeshola and Adepoju (2023), it was highlighted that ChatGPT might have unanticipated socioeconomic effects. Although ChatGPT may be accessible given that it is partially free, there is a positive correlation between search interest in ChatGPT and indicators of human capital, which may indicate that people in lower-income countries are less likely to search for and use ChatGPT given the close relationship between the gross domestic product (GDP) per capita and human capital. As a result of ChatGPT use, there are differences in the acquired competitiveness, skill sets, levels of development, and economic growth between countries, businesses, colleges, and individuals. These discrepancies are referred to as Artificial Intelligence (AI) divides or digital divides (Wach et al. 2023). Building on Fujii et al. (2024) findings of gender bias in Natural Language Processing (NLP) embeddings, which can perpetuate bias in GAI systems, these disparities expose a widening digital divide. Notably, advanced economies, leveraging their established digital infrastructure, are better positioned to adopt AI technologies, like ChatGPT. Conversely, developing economies face significant obstacles due to a lack of infrastructure, hindering their ability to compete in the AI race (Wach et al. 2023).

Conducting further research regarding the adoption of such technologies in the Middle East is crucial, with a focus on the divide that will further amplify existing gender disparities. The MENA region is a unique case where researchers could explore how technology usage could be affected by traditional cultural values. In western societies, students interact with technology and are more academically and socially independent (Ong and Chu 2022), while the Middle East is culturally sensitive. In this region, people are binned by respect to their culture and authority figures, in addition to restricted social norms (Hatfield and Rapson 2015). Exploring these interactions will highlight the challenges that users might face when using AI effectively to support their learning and career readiness. It is therefore important not to overlook the differences between Western and Middle Eastern users as it is not a one-size-fits-all approach to AI usage.

Understanding these cultural differences, rather than homogenizing users, can empower individuals (Brändle and Kuckertz 2023). This study, focusing on the under-researched Middle East, aims to provide valuable insights for policymakers, educators, researchers, and developers. By exploring how cultural factors influence ChatGPT use and its implications for technology and gender studies, this research seeks to illuminate the complexities of the Middle East's AI adoption. Furthermore, it highlights a significant yet under-addressed disparity in the region, gender.

The current study responds to the gap that was identified by Crompton and Burke (2024), who encouraged researchers to empirically explore the new tools, such as ChatGPT. Therefore, our main research question is to understand how cultural upbringing and gender might impact university students' usage of ChatGPT. To demonstrate this, the study develops a conceptual model drawing from the Role Theory and the Unified Theory of acceptance. Through the lens of both theories, the research validates the proposed model to identify drivers, mediators, and boundaries of how cultural upbringing disparities between men and women in the Middle East influence the utilization of ChatGPT.

The Unified Theory of Acceptance and Use of Technology (UTAUT) model, proposed by Venkatesh et al. (2003), has been applied to many fields that adopted technology. It has been mainly applied to e-learning, e-commerce, and e-banking (Afshan and Sharif 2016; Sezer and Yilmaz 2019; Verkijika 2018). This model identifies four factors that affect

technology acceptance or usage. These factors are performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FCs). PE refers to the degree to which an individual performs better when using a system (Lu et al. 2009). In the context of generative AI tools, like ChatGPT, this relates to perceptions of how effectively the tool assists with academic or professional tasks. EE addresses the ease of use associated with the technology and the degree of convenience, noting that it becomes insignificant after continuous usage (Venkatesh et al. 2003). Generative AI systems, known for their intuitive interfaces, align with this construct by minimizing the learning curve for new users. SI refers to the degree to which the person is influenced by others in using a system. Finally, FC is the availability of resources and support that will facilitate the use of a specific technology.

Several researchers used UTAUT to investigate AI and other emerging technologies. According to (Camilleri and Camilleri 2023), students' adoption of mobile learning was significantly predicted by their performance and effort expectations. Their study aligns with Andrews et al. (2021), who highlighted the role of UTAUT constructs in explaining librarians' and academics' adoption of AI tools in services and operations. Similarly, within the AI domain, the model has been instrumental in uncovering user motivations and barriers. Studies, such as Al-kfairy (2024), have applied UTAUT to explore ChatGPT's educational applications, emphasizing the importance of facilitating conditions like access to reliable internet and institutional support. This research further highlighted that performance expectancy often drives educators' and students' willingness to engage with ChatGPT, as its capabilities streamline productivity.

The UTAUT model's adaptability across various contexts underscores its relevance to understanding ChatGPT adoption within the Middle Eastern cultural framework. By integrating cultural dimensions and gender as moderating factors, this study extends the UTAUT model to offer nuanced insights into the intersection of culture, technology, and gender dynamics.

This research equips universities with a deeper understanding of the intricate factors shaping technology adoption in the Middle East. Policymakers will gain valuable insights to craft effective strategies, while business strategists can leverage these findings to promote digital literacy and empower women. Ultimately, this study bridges the gap between technology and the cultural context, enriching academic discourse and paving the way for a more inclusive technological landscape in the Middle East, where gender equity takes center stage.

2. Literature Review and Hypothesis Development

While significant progress has been made in addressing gender disparities, thanks to advocacy efforts and policy changes, the [Global Gender Gap Report \(2021\)](#) estimates it will still take over a century to achieve full equality. This persistent gap remains a major obstacle to achieving the United Nations Sustainable Development Goals (SDGs), particularly in relation to stable and prosperous societies (Leal Filho et al. 2019). The Middle East, with its rich cultural tapestry, deep-rooted traditions, and religious influences, presents a complex case study. Here, historical factors, ongoing modernization efforts, and entrenched gender disparities create an uneven landscape for equality (Koburtay et al. 2020). Research suggests that these disparities have deep historical roots, with women traditionally confined to domestic roles and limited participation in the workforce (Ephrem et al. 2021; Karshenas 2021).

Historically, women have been largely excluded from political participation, with minimal representation in government bodies. However, global progress has been achieved, with the proportion of women holding parliamentary seats increasing from 13.4% in 2000 to 24.3% by January 2019 (Hessami and da Fonseca 2020). These advancements extend beyond politics, with women making strides in areas like management and education (Akbar et al. 2023). Nevertheless, significant challenges persist in ensuring equitable participation across various fields, including technology use and the tech industry (Charles et al. 2023).

Gender disparities, alongside cultural/social norms and religious beliefs, continue to play a significant role in shaping user behavior, habits, and decision-making processes within the technological domain.

The interplay between gender and technology use, as well as workplace dynamics, has received growing scholarly attention. For instance, [El Haddad et al. \(2019\)](#) investigated the impact of organizational justice and sustainability on the 360-degree feedback appraisal system, with gender as a mediating variable. Their research highlights how gender can influence perceptions of fairness and sustainability within organizational settings. Furthermore, gender plays a significant role in the delicate balance between career and family life. Studies, like [Karkoulian et al. \(2016\)](#), reveal that women often face greater difficulties due to perceived time constraints and a lack of spousal involvement in domestic chores.

The pervasiveness of gender bias has garnered attention beyond academic circles. The European Union Agency for Fundamental Rights (FRA), for instance, advocates for policies like “discrimination testing” and “situation testing in real-life situations” to audit algorithms for bias in data processing ([Goodman and Trehu 2022](#)). This highlights the importance of addressing gender not only as a mediating variable in organizational contexts or work–family balance but also as a potential source of bias within algorithmic systems. Implementing such measures requires collaborative efforts from both the public and private sectors.

Shifting focus to the Middle East, technological advancements are demonstrably reshaping societal dynamics, including attitudes towards and acceptance of new technologies. The region has witnessed a rapid integration of digital tools and platforms into various aspects of daily life, with promising economic and environmental benefits ([Hossin et al. 2023](#)). Notably, technology adoption has become a perceived marker of social progress and modernization ([Clingan 2024](#)). This digital transformation is driven by a surge in information and communication technology (ICT) use ([Akinoso 2023](#); [Appiah-Otoo and Song 2021](#)). By 2021, the MENA region boasted a remarkable 97.5% mobile phone penetration rate and 66% internet usage ([Bogdan-Martin 2019](#)).

As the Middle East navigates the rapid evolution of technology, a critical question emerges: how do cultural upbringings shape the utilization of cutting-edge technologies like generative Artificial Intelligence (AI)? One recent example is the swift adoption of ChatGPT, a powerful language model developed by OpenAI, since its release in November 2022. ChatGPT’s ability to perform tasks, like email composition, essay writing, and code generation, has garnered significant global attention ([Aad and Hardey 2024](#); [Silva et al. 2024](#); [Wu et al. 2023](#)). Investigating the nuances of ChatGPT use within the Middle Eastern context becomes essential. By examining how cultural influences differ between men and women, this research can illuminate distinct patterns in technology adoption, usage, and perception.

2.1. Theoretical Framework

To understand how cultural upbringing and gender might impact university students usage of ChatGPT, this research will be founded based on two theories: Role Theory (A. H. [Eagly et al. 2000](#)) and Unified Theory of Acceptance and Use of Technology ([Venkatesh et al. 2003](#)). We propose social role theory as a theoretical framework that we use as a lens to understand existing findings and to propose future research to explain the complicated ways in which gender shapes the usage of ChatGPT.

Role theory is a concept in sociology and social psychology that holds that the majority of everyday activity is the performance of socially defined roles. Each role entails a set of rights, duties, expectations, norms, and behaviors that an individual must confront and fulfill (A. H. [Eagly et al. 2000](#)). Social roles encompassed “appropriate” and “permitted” forms of behavior that were directed by social norms that were well recognized and hence determined expectations (A. [Eagly et al. 2012](#)). [Eagly et al. \(2012\)](#) argues that socialization, gender stereotypes, gender roles, and physical differences all interact to influence the behaviors of men and women. The theory claims that social behavior similarities

or differences are due to the role distribution within a society. Men and women are expected to play different roles compared to specific expected social structures (Ruggiero and Cupertino 2018); furthermore, Biddle (2013) claimed that this theory helped scholars to set the boundaries of members' actions and interactions in a common social system and expect individuals' interpersonal reactions in a defined group via role distribution and interdependence (Biddle 2013).

The Unified Theory of Acceptance and Use of Technology argues that the utilization of technology is contingent upon behavioral intention (Venkatesh et al. 2003). It has four main factors that influence the use of technology (Venkatesh et al. 2003, 2012). The first factor, social influence, is the extent that the individual believes that key persons believe that they should utilize a specific technology. The second factor, performance expectation, is the degree to which utilizing a specific technology will provide benefits. The third factor, effort expectation, is the degree of ease associated with using the technology. The fourth factor, facilitating conditions, is the perception of the availability of resources and support to utilize the specific technology (Williams et al. 2015).

2.2. Influence of Effort and Performance Expectation on ChatGPT Utilization

Performance expectancy is described as the extent to which technology users believe that utilizing technology will contribute to improvements in their performance of a certain task and lead to positive outcomes with less effort (Venkatesh et al. 2003). In the context of utilizing technology, like ChatGPT, effort expectation would involve users' perceptions of how easy or challenging it will be to interact with the generative AI system and how to prompt it to generate desired results. This AI tool has been used by educators, for example, to create tasks and classroom activities using minimal efforts while delivering satisfactory results (Aad and Hardey 2024); this has positively influenced educators to adopt and regularly engage with the technology. The same is true for students who are now using ChatGPT to answer assignment questions, create essays, and plan and prepare presentations (Aydin and Karaarslan 2022). Chat GPT usage has expanded to all industries, not only education. Employees of different positions and ranks are now adopting it to increase their productivity (Adeshola and Adepoju 2023).

The perceived ease of use (PEOU) of a technology, like ChatGPT, is a well-established factor influencing user adoption (Venkatesh et al. 2003). Users are more likely to embrace technologies perceived as efficient and user-friendly. In culturally specific contexts, like the Middle East, where religious values play a significant role, technology adoption, including ChatGPT use, may be further influenced by religious beliefs (Al Lily et al. 2023; Battour et al. 2024). A growing body of research on AI and ethics focuses on the normative analysis of AI technologies to guide the development of ethical frameworks that maximize benefits and mitigate risks (Taddeo and Floridi 2018). Individuals' assessments of a technology's ethical implications can also influence usage patterns. Ethical egoism, for instance, suggests that actions promoting individual interests are morally acceptable (Borenstein and Howard 2021).

Therefore, we hypothesize that users who perceive ChatGPT as beneficial will demonstrate continued engagement with the technology.

H1. *Performance expectation will positively influence the utilization of ChatGPT.*

On the other hand, individuals embrace technology and adopt it when they feel that it assists them in everyday lives. According to a recent study, users accept the use of a technology when they feel it is easy to use with less effort (Kelly 2016). Effort expectation refers to the perceived level of the ease or difficulty associated with using a particular technology (Ateş and Garzón 2023). This is linked to how confident and able the user is in effectively navigating and utilizing the technology whether it is an AI, ChatGPT, or any other technological tool (Akinoso 2023). Believing in one's capabilities and competence shape their decisions in using technology. Individuals who possess a high level of self-efficacy are

more likely to perceive the use of new technology as less demanding, thereby increasing their willingness to adopt it. On the contrary, those with lower self-efficacy may perceive the learning curve to be challenging, leading to potential resistance to technology adoption. Bandura's self-efficacy theory (1977) provides a valuable framework for understanding that self-efficacy may prove to be instrumental in lowering perceived effort expectations and fostering a smoother transition towards the adoption of novel technological solutions, such as ChatGPT. Self-efficacy is shaping young people nowadays who rely more on their skills and who are more prone to dive into entrepreneurial intentions using technology (Hoang et al. 2020). Therefore, we propose the following hypothesis:

H2. *Effort expectation will positively influence the utilization of ChatGPT.*

2.3. Social Influence and the Use of ChatGPT

Currently, mobile devices have become vital for almost everyone. Individual behavior was clearly related to the increased use of mobile devices and the formation of digital habits during the pandemic. We have started to witness the major impact of Artificial Intelligence (AI) on our lives, and it will continue to have a significant impact on our society during the next few decades (Aad et al. 2024; Olhede and Wolfe 2018). Examining the impact of ChatGPT on individual behavior in a collectivistic society, such as the Middle Eastern countries, requires an understanding of the role of gender and culture in behaviors. Al-Omoush et al. (2022) found that individuals with high collectivist values tended to greatly rely on in-group sources of information when making decisions regarding social trading and attitudes. Furthermore, cultural inertia can explain some of the social attitudes toward gender roles in such societies (Constantin and Voicu 2015). The Middle Eastern culture has long been considered one of the factors behind differences in individual behavior, leading to different systems of values and individual behavior between men and women. The main reason that an individual will display social behavior is to belong to a group in his own society. Thus, we hypothesize the following relationship:

H3. *Social influence will positively influence the utilization of ChatGPT.*

On the other hand, facilitating conditions is the perception of the availability of resources and support to utilize the specific technology. It refers to the users' belief that they are supported by the surroundings when using a specific technology (Davis et al. 1989). It is establishing the appropriate conditions, such as resources, training, policies, etc., that permit a specific technology, such as ChatGPT, to prevail among users (Paul et al. 2015). In academia, for example, we have seen a rise in the use of mobile devices among students, as this can help them access educational content anytime and anywhere, provided they have a connection; therefore, the availability of such a technology and its benefits encouraged students to use it (Camilleri and Camilleri 2023). During COVID-19, teachers and students who received appropriate training and support from their institutions with online learning had a more positive experience than those who did not have facilitating conditions. Facilitating conditions, as described by Camilleri and Camilleri (2023), pertain to an individual's belief in the capacity of existing organizational and technical infrastructure to support technology use. Neslin and Shankar (2009) emphasize that facilitating conditions are linked to the availability of resources and support necessary for individuals to effectively use technology. Challenges, such as insufficient assistance, delayed support, incomplete information, and limited resources, can hinder the acceptance and use of technology (Kamaghe et al. 2020). The global development of internet connectivity and social media networking sites has rapidly transformed worldwide communication, particularly through the use of popular mobile devices and platforms (Ambarwati et al. 2020). Thus, we hypothesize the following relationship:

H4. *Facilitating conditions will positively influence the utilization of ChatGPT.*

2.4. Gender as a Moderator

Although the Middle Eastern countries are witnessing rapid modernization leading to shifts in traditional gender roles, we still see many gender disparities in the Middle Eastern countries. Men are often positioned as the breadwinners and protectors, responsible for upholding family honor and securing resources. Women, meanwhile, typically assume the role of nurturing caregivers, ensuring the stability and emotional well-being of the family unit (Ephrem et al. 2021). Hutchings and Weir (2006) argue that Arab Middle Eastern women's roles are defined by their family setting, culture, and traditions. The Arab region's societal and cultural standards are thought to be strongly patriarchal, with distinct gender distinctions (Dagher et al. 2015); therefore, we expect that there will be differences in the usage of ChatGPT taking into consideration the society and the culture. Females will tend to use ChatGPT tools more than males in order to achieve what they are attempting to achieve. Thus, we propose that gender moderates the relationship among the four factors of UTAUT and the behavior to use ChatGPT (e.g., See Figure 1). Therefore, we hypothesize the following:

H5. *The positive relationship among the four factors of acceptance and usage of technology and the behavior of using ChatGPT (utilization of ChatGPT) is moderated by gender.*

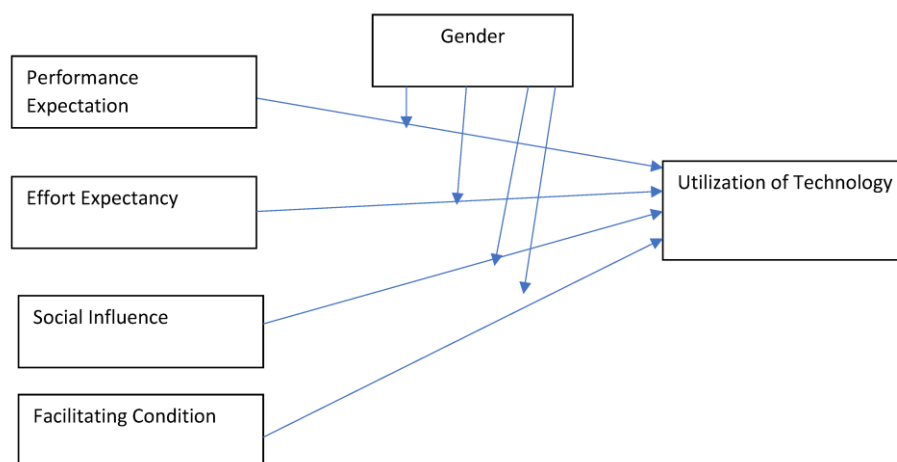


Figure 1. The conceptual model for our study.

3. Methodology

This study employs an exploratory survey design to investigate the interplay among cultural upbringing, gender, and university students' utilization of ChatGPT in the Middle East. The survey approach allows for the collection of data from a large sample, enabling the exploration of potential relationships between these variables.

3.1. Sample and Participants

The target population for this study comprises undergraduate and graduate students enrolled in universities across the Middle East. To recruit participants, we utilized a convenience sampling technique, distributing the survey through platforms, such as university social media groups, academic forums, and student WhatsApp groups. This approach, while efficient, may introduce certain limitations, as discussed further in the limitations section.

These platforms were chosen to target specific student demographics, ensuring broad participation across institutions. The recruitment message emphasized the research purpose and included a direct link to the survey. Data collection was conducted over a three-month period to maximize reach and response rates. Participation was voluntary, and efforts were made to remind students to complete the survey through follow-up posts and

messages. While convenience sampling was employed due to practical constraints, the chosen platforms provided access to a diverse student population.

A total of 400 surveys were distributed, with 350 responses received. After data cleaning and filtering for incomplete responses, a final sample of 202 usable responses was obtained, yielding a response rate of 50.5%. The majority of participants were single (97%), aged between 18 and 24 years old (97%), and female (62%). Additionally, 93% were undergraduate students, and 4% were graduate students. The sample primarily comprised students from Lebanon, Jordan, Palestine, and Syria.

3.2. Research Instrument

In this study, a 7-point Likert scale survey questionnaire was employed, with the range being strongly disagree (1) to strongly agree (7). To measure the usage and acceptance of technology we adapted the UTAUT construct developed by Venkatesh et al. (2003) with four dimensions. The four dimensions were performance expectancy, effort expectancy, social influence, and facilitating conditions. To measure the performance expectancy dimension, we used four items. A sample item is “I believe that ChatGPT is useful in my studies”. To measure the effort expectancy dimension, we used four items. A sample item is “I believe that ChatGPT is useful in my studies”. To measure the social influence dimension, we used three items. A sample item is “People who are important to me think I should use ChatGPT”. To measure the facilitating conditions dimension, we used four items. A sample item is “I have the resources necessary to use ChatGPT”. In Table 1, we present the dimensions of the UTAUT construct and the items for each dimension. In addition to the UTAUT construct, we also asked demographic questions, for example, gender, age, marital status, education, employment status, and others. Finally, questions related to cultural upbringing were addressed, for example your country of residency, country of birth, and the community.

Table 1. UTAUT Variables and items.

Variables	Items	Source
Performance Expectancy	“I believe that ChatGPT is useful in my studies”	Venkatesh et al. (2003)
	“Using ChatGPT increases your chances of achieving important things in your studies”	
	“Using ChatGPT helps you get tasks and projects done faster in your studies”	
	“Using ChatGPT increases your productivity in your studies”	
Effort Expectancy	“Learning how to use ChatGPT is easy for me”	
	“My interaction with ChatGPT is clear and understandable”	
	“I find ChatGPT easy to use”	
	“It is easy for me to become skillful at using ChatGPT”	
Social Influence	“People who are important to me think I should use ChatGPT”	
	“People who influence my behavior believe that I should use ChatGPT”	
	“People whose opinions I value prefer me to use ChatGPT”	
Facilitating conditions	“I have the resources necessary to use ChatGPT”	
	“I have the knowledge necessary to use ChatGPT”	
	“ChatGPT is compatible with technologies I use”	
	“I can get help from others when I have difficulties using ChatGPT”	

3.3. Ethical Considerations

The study protocol, including the survey instrument, was reviewed and approved by the Institutional Review Board (IRB), IRB# LAU.SOB.SA4.10/Oct/2023, to ensure compliance with ethical research guidelines. Informed consent will be obtained from all participants before they begin the survey. Anonymity and confidentiality of participant responses will be maintained throughout the research process.

3.4. Common Method Bias

Given that the assessed construct was a self-report, we took preventative measures to reduce the possibility of common method bias. We adjusted for common method bias in two ways because the data were self-reported, which may have influenced the empirical results. The protocols advised by Podsakoff et al. (2003) and (Podsakoff et al. 2012) were followed. We provided detailed information about the safeguards in place in our consent to secure the respondents' confidentiality and anonymity. In addition, we aimed to eliminate respondent evaluation fear and response distortion by clearly communicating to respondents that there were no correct or incorrect answers to the survey items, allowing them to answer the items as honestly as possible (De Clerck et al. 2021; Podsakoff et al. 2003).

Before analyzing our hypotheses, we used Harman's single-factor test, as advised by Podsakoff et al. (2003) and Podsakoff et al. (2012). Podsakoff et al. recommended that all constructs and items be forced into a single component to examine the variation that a single component will provide. There were no discernible variations in the data in our sample, according to the results. One component in the sample accounted for 38% of the total variation, which was below the 50% cutoff (Podsakoff et al. 2003). As a result, common technique bias is not a concern.

4. Results

To ensure the scale reliability in our context, we ran an exploratory factor analysis. The exploratory factor analysis (EFA) was conducted on the four factors of the UTAUT scale to ensure the loading of the items on the right factor. In our sample, we discovered that the scale is generating three factors and not four factors as it is mentioned in the original article by Venkatesh et al. (2003). Performance expectancy's items loaded on the factor and social influence's items loaded on the factor. However, we had the items of effort expectancy and facilitating condition items all loaded on one factor. After examining the items, we decided to name this factor the "Harmony" factor due to the description of the items included. Table 2 presents the loading of the items on the three factors instead of four factors. Regarding our behavioral variable, the use of ChatGPT, all items loaded on the corresponding factor. Table 3 presents the means, standard deviation, correlation, and Cronbach's alpha of the variables.

Table 2. Results for UTAUT (N = 202).

Items	Factors	
	*PEX	*Harm *Soci
"I believe that ChatGPT is useful in my studies"	0.805	
"Using ChatGPT increases your chances of achieving important things in your studies"	0.849	
"Using ChatGPT helps you get tasks and projects done faster in your studies"	0.634	
"Using ChatGPT increases your productivity in your studies"	0.756	
"Learning how to use ChatGPT is easy for me"		0.780
"My interaction with ChatGPT is clear and understandable"		0.676
"I find ChatGPT easy to use"		0.770
"It is easy for me to become skillful at using ChatGPT"		0.666
"People who are important to me think I should use ChatGPT"		0.835
"People who influence my behavior believe that I should use ChatGPT"		0.897
"People whose opinions I value prefer me to use ChatGPT"		0.896
"I have the resources necessary to use ChatGPT"		0.864
"I have the knowledge necessary to use ChatGPT"		0.849
"ChatGPT is compatible with technologies I use"		0.837
"I can get help from others when I have difficulties using ChatGPT"		0.678

*PEX = Performance expectation; *Harm = Harmony; *Soci = social influence.

Table 3. Means, standard deviation, correlations, and Cronbach’s alpha (N = 202).

Variables	Mean	SD	1	2	3	4
Behavior (Use of ChatGPT)	4.42	1.4	(0.91)			
Harmony	5.15	1.5	0.629 **	(0.94)		
Performnace	4.86	1.4	0.742 **	0.744 **	(0.91)	
Social Influence	3.94	1.6	0.577 **	0.471 **	0.549 **	(0.91)

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

Hypothesis Testing

To test the proposed direct relationships in hypotheses 1 to 3, we conducted a regression analysis. Due to the factor analysis results that generated three factors instead of four, we utilized the three factors in our current analysis. We combined the effort expectation and facilitating condition into one factor named “Harmony”. Thus, the relationships presented in H2 and H4 were combined. All the relationships proposed in H1, H2, and H3 were significant. Performance expectation is significantly related to the utilization of ChatGPT ($\beta = 0.51, p < 0.001$), thus supporting H1. Harmony (effort expectation and facilitating conditions) is significantly related to the utilization of ChatGPT ($\beta = 0.14, p < 0.03$). Social influence is significantly related to the utilization of ChatGPT ($\beta = 0.23, p < 0.001$), thus supporting H3.

To examine the moderating effect of gender on the proposed relationship, we used the Hayes process model. We utilized Model 1 to test the moderating effect of gender on the three relationships. The findings indicated that gender moderates only the relationship between performance expectations and the utilization of ChatGPT. It was found that the relationship between performance expectations and the utilization of ChatGPT was stronger for females than for males. In a culture that is recognized to be male culture, females identify the need to succeed and perform, while males recognize that it is a given that they are capable of succeeding and performing. Regarding the moderating results related to the other dimensions, gender was not found to be a moderator of the relationships among social influence, harmony, and the utilization of ChatGPT. Table 4 provides the significant results of the moderation effect.

Table 4. Gender as a significant moderator on the relationship between performance expectations and utilization of ChatGPT (N = 202).

Model Summary						
R	R-sq	MSE	F	df1	df2	p
0.7517	0.5651	1.2656	85.7495	3.0000	198.0000	0.0000
Model						
	coeff	se	t	p	LLCI	ULCI
constant	4.4244	0.0792	55.8923	0.0000	4.2683	4.5805
PerExpec	0.8535	0.0536	15.9249	0.0000	0.7478	0.9592
Gender	−0.2395	0.1638	−1.4619	0.1454	−0.5626	0.0836
Int_1	0.2356	0.1087	2.1664	0.0315	0.0211	0.4500

Dependent variable = Utilization of ChatGPT (Behavior); R2-chng = 0.0103, p = 0.031.

5. Discussion and Implications

Technology and the advancement of technology have brought about significant transformations in our society, profoundly influencing our daily lives. Today, the growth of the usage of artificial intelligence (AI) continues to grow in shaping our society. By investigating the cultural upbringing disparities between men and women in the Middle East and examining how these differences influence the utilization of ChatGPT, this research can contribute to a deeper understanding of the gendered dynamics of technology adoption, specifically the trendy use of ChatGPT. The findings of our study from a non-western society re-emphasize the importance of the four dimensions of UTAUT in predicting the utilization of AI-based technology. Our significant relationships are consistent with previous studies’

findings (Venkatesh et al. 2012). Individuals are more likely to adopt technology if they believe it will improve their performance (Camilleri and Camilleri 2023; Davis et al. 1989; Venkatesh et al. 2012). The availability of resources and technical support positively affect adoption (Paul et al. 2015; Venkatesh et al. 2012). The findings can inform policymakers, educators, and technology developers in promoting more inclusive and equitable access to and the utilization of AI-based technologies in the Middle Eastern countries.

The findings of this study on cultural upbringing between Men and Women in the Middle East and how they utilize ChatGPT offer potential insights for all people living in the Middle East area, specifically including higher education stakeholders, policymakers, and gender advocate organizations. For instance, higher education stakeholders can benefit from the different artificial intelligence tools by adapting instructions to different learners' needs (Aad and Hardey 2024; Cakir and Korkmaz 2019; Kamaghe et al. 2020) and predicting academic success (Çağataylı and Çelebi 2022). Our findings of the hypothesized direct relationships provide higher education stakeholders the direction for students to use artificial intelligence tools to accomplish their tasks. Similar to previous studies (Çağataylı and Çelebi 2022), the findings help educators understand how artificial intelligence in education can be applied in higher education. Moreover, Kim (2023) discussed the impact of students' attitude regarding AI, emphasizing the significance of educational strategies in influencing perspectives. Thus, the findings of our study provide a foundation for comprehending the use of AI in the Middle East and how educational tactics may affect perceptions across various groups, including possible gender inequalities. Particularly in the Middle East, the integration of AI specifically in education has the potential to influence perceptions across different groups mainly concerning gender inequalities. As stated by Balamoune-Lutz and McGillivray (2015), gender inequality remains a pressing issue despite many initiatives that tried to reduce the gap between male and female education disparities. Gender significantly influences students' perceptions and the usage of AI tools in educational contexts, suggesting that women may feel less empowered or familiar with these technologies (Ofosu-Ampong 2023). This aligns with our findings and underscores the necessity of educational policies.

Policymakers could encourage and support the development of extra-curricular activities that provide opportunities for students at a disadvantage to develop tech skills, such as the use of AI, coding, and other resources. Universities could establish partnerships with companies and organizations to offer internships and other work-based tech learning opportunities that allow female students to gain relevant tech know how.

Building on Social Role Theory (Eagly et al. 2012), which posits that individuals internalize societal expectations associated with their social roles, our findings offer a nuanced perspective on gender and ChatGPT use. While we identified a significant moderating effect of gender, the specific relationship suggests a potential effort-justification phenomenon. Our research indicates that females, who may face greater societal pressures to demonstrate their capabilities, might utilize ChatGPT strategically to enhance their academic performance. These findings highlight the importance of gender-inclusive practices within educational technology.

6. Limitations and Future Research

The limitations of our study provide further opportunities for other scholars interested in the topic. While we show that gender moderates only the relationship between performance expectations and the utilization of ChatGPT, the study results need to be interpreted with caution due to sample characteristics. Our study opens doors for further investigation. Future research could employ a more diverse sample across academic levels and genders, collect data from faculty and higher education stakeholders to gain a broader perspective, and conduct research across multiple countries within the Middle East to account for regional variations. The primary limitation of this study is the use of convenience sampling, which may limit the generalizability of the findings to the broader population of Middle Eastern university students. Future research could employ different sampling techniques,

such as stratified sampling or snowball sampling, to enhance the representativeness of the sample.

Additionally, the cross-sectional nature of this study precludes causal inferences. Longitudinal studies could be conducted to examine the evolution of ChatGPT usage over time and the factors influencing its adoption.

7. Conclusions

This study explored the complex interplay among cultural upbringing, gender, and how university students in the Middle East utilize ChatGPT. Our findings support the continued relevance of the UTAUT model in predicting technology adoption within this non-Western context. Performance expectancy, the belief that technology will improve performance, emerged as a key driver of ChatGPT use. Additionally, a newly identified factor, “Harmony”, combining effort expectancy and facilitating conditions, also positively influenced utilization. Social influence, reflecting the impact of peers and social norms, further supported technology adoption. Interestingly, gender moderated the relationship between performance expectations and ChatGPT use. This suggests that females, who might face pressures to excel academically, strategically utilize ChatGPT to enhance their results. These findings offer valuable insights for policymakers, universities, and technology developers. Our findings highlight the potential influence of existing gender norms on technology adoption within the Middle Eastern context. While some level of support for ChatGPT use may exist, it appears to be contingent on individual factors, rather than formally established practices. This underscores the importance of considering gendered dynamics when examining technology adoption in the Middle East. Specifically, we suggest that women navigating stereotypical gender attitudes might encounter challenges related to integrating ChatGPT into their workflows due to the prevailing structures and expectations surrounding technology use.

Promoting gender equity in technology education through initiatives, like knowledge portals and mentorship programs, is crucial. Universities can foster inclusive learning environments and develop ethical standards alongside industry partners. Technology developers can design tools catering to diverse needs and bridge the gender gap through their approach. Future research should explore these themes further, utilizing a more diverse sample and incorporating data from various stakeholders across the Middle East’s unique regional landscape. While the Middle East undergoes significant change, gender inequalities persist. Highlighting the importance of inclusive educational practices and promoting equitable access to technology are crucial steps towards a future where everyone can benefit from advancements, like ChatGPT.

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