QASSIM UNIVERSITY GRADUATE STUDENTS' USE OF GENERATIVE ARTIFICIAL INTELLIGENCE TOOLS IN SCIENTIFIC RESEARCH: A FIELD STUDY

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Abstract

Intelligencee tools are witnessing artificial Generative tremendously evolution in various aspects of our lives, which has brought about unprecedented fundamental changes in all educational fields, especially the field of scientific research, and based on that, the current research aimed to reveal the most important fields of scientific research in which students of Qassim University in the Kingdom of Saudi Arabia use generative artificial intelligence tools , and the rates of their use according to each field, and determine the extent of their awareness of the positives and negatives of their use of them from their point of view , and clarify the most important requirements in light of which Qassim University students can use these tools in scientific research effectively and responsibly from the experts' point of view. To achieve this, the research relied on the descriptive survey approach through a questionnaire applied to a sample of graduate students in the dissertation stage at Qassim University; To reveal the extent to which they use generative AI tools in scientific research, particularly in the most important areas, and their awareness of the pros and cons of their use, the research relied on a prospective approach using the Delphi method. Delphi questionnaires were administered in three rounds to a sample of educational technology experts with scientific output in generative AI. In the third round, the sample numbered 12 experts. The study concluded that the degree of use of generative AI tools by graduate students in scientific research is weak , and that their awareness of the pros and cons of their use of these tools is average. The results of the Delphi rounds revealed a number of requirements that experts considered necessary to achieve the effective and responsible use of generative AI tools by graduate students at Qassim University in scientific research. These requirements were divided into requirements related to graduate studies management, requirements related to faculty members, and requirements related to students. In light of these results, the researchers presented a set of recommendations that, if activated, would achieve the effective and responsible use of generative AI tools by graduate students at Qassim University in scientific research.

Keywords: Generative AI tools - Graduate students - Qassim University

1.-Introduction to the study

Witness Techniques and intelligence tools artificial development It is a tremendous and accelerating change in various areas of human life: economic, educational, political, social, cultural, and others, which has brought about unprecedented fundamental changes in all its areas , and it is on its way to more inevitable, successive, radical changes , from which no human society has been spared , no matter how isolated it is , especially in the areas of

cybersecurity , education, and research. Scientific , medical, legal, engineering , project management and human resources And accounting , and accounting , and became engine Main For innovation and growth in various The fields, and its repercussions are still flowing on societies, its individuals, institutions and groups , and are increasing in depth and breadth with the growth and spread of these technologies and tools, at an unprecedented rate . This has contributed strongly to modifying the tools, methods, means and education systems, and the way in which we teach and research, and in which our students learn and research (Al- :Massiter, Al-Sisi, 2025). In this, he mentions Schwab that artificial (2017)intelligence technologies , which constitute the digitalspace that It surrounds us , it immerses us , with its . vast applications that flow like robots Robots Virtual ,Reality Augmented Reality , IntelligentTutoring Systems , Smart Content, Virtual Facilitators, Smart Evaluation, Expert Systems, .and others

Generative AI is one of the most prominent of these technologies, aiming to create an interactive dialogue environment between humans and these applications; to answer inquiries through a text, audio, or visual interface, and using natural languageprocessing(NLP) algorithms to understand the context of the research inquiry and respond to it in a way that mimics the human mind(Adamopoulou & Moussiades, 2020) These technologies provide natural language processing capabilities, forming large language models (LLMs) capable of generating sentences and phrases based on simulating statistical patterns of language in massive databases of human texts collected from texts of books, research, articles, and websites across a wide range of specialized and related research fields. Researchers can use these technologies and tools to help organize their thoughts, provide feedback on their writing, assist in writing code, and summarize research literature(Hutson et al., 2022)

The field of scientific research is considered one of the modern fields in which these tools are used to generate new research ideas, review published literature, explain complex scientific terms, summarize, translate, refine research questions, rephrase phrases, and form hypotheses (Salvagno et al., 2023). Rather, he sees it BaHammam (2023) as having revolutionized, and continues to revolutionize, scientific research methods and academic writing, reshaping how research is conducted and published, enriching scientific knowledge by integrating other research information published in different languages into research, supporting research collaboration, and promoting multidisciplinary approach, in addition to its ability to collect data from diverse sources, process it using advanced algorithms, and then identify patterns and relationships between them, which is difficult for the human mind to know without it; which helps save the time and effort needed to analyze the available data manually, and extract important information from it, which increases the productivity, quality, and speed of completion of scientific research(Kooli, 2023).

Given the great importance of generative artificial intelligence in scientific research, especially its generative tools, it has been the subject of various scientific disciplines and multiple methodological studies , the most important of which is the study by Al-Omari and Al-Harbi (2025), which aimed to conduct an analysis of modern research trends, targeted educational levels, used research methods, and the responses of the educational community to these generative artificial intelligence techniques through a comprehensive systematic review of research published between 2022 and 2024 on the applications of generative artificial intelligence in education. The study of Abu Safi and Al-Qudat (2025) aimed to identify the degree of awareness of Jordanian university students of the role of chatbots based on generative artificial intelligence in higher education from their point of view. The study of Fan et al (2025) aimed to reveal: the effects of generative artificial intelligence tools, specifically on theChatGPT tool learning motivations of university students, processes, and , performance. The study of Andijani (2025) sought to reveal the factors influencing the use of

generative artificial intelligence applications from the point of vie of female undergraduate students at female graduate students at universities in the Riyad region towards the use of generative artificial intelligence applicationsChatGPT in higher education, in terms of advantages and obstacles. The study of Ashour and Hani (2025) aimed to reveal the ethical challenges in the use of generative artificial intelligence in higher education at Yarmouk .University from the point of view of experts from faculty members

Al-Shahrani's study (2025) attempted to uncover the reality of graduate students' use of generative AI applications in developing scientific research skills in curricula and teaching methods departments at Saudi universities. Al-Shammari's study (2025) aimed to conduct an in-depth review of generative AI applications in education, explore their transformative potential to improve the educational process, analyze the associated ethical and technical challenges , and present practical strategies for integrating them fairly and responsibly into (2024) .educational systemsGuriro Vavekanand, to analyze the multiple impacts of AI on students in educational settings, while discussing ethical issues associated with its use, such as privacy, bias, fairness, and increasing educational inequality gap. Al-Shaibi's study (2024) attempted to identify the requirements for employing some generative AI applications in university teaching from the perspective of faculty members at Umm Al-Qura University. Al-Muharraq's study (2024) aimed to explore the level of use of generative AI by graduate students at King Abdulaziz University in scientific research and understand their perceptions of it. Muhammad's study (2024) sought to identify the most popular generative AI tools in the field of literature review, analyze the nature of their work, monitor the nature of their funding, availability and pricing features, study their capabilities and functions, and anticipate future features of their employment in the academic environment, especially in the field of scientific .writingGhimire et al.'s study (2024) attempted to determine the awareness of faculty) members in higher education of generative AI tools, especially large language modelsLLMs their feelings towards them, and the factors that influence their adoption or rejection. It also ,(addresses the opportunities and challenges educators identify when using it in education. Al-Mutairi's (2024) study sought to identify the implications of using generative AI applications, particularly theChatGPT model on academic publishing. Abu Safi and Al-Qudah's (2024) , study aimed to identify the challenges of using AI and identify guidelines thatstudy aimed to explore the potential benefits and challenges associated with usingChatGPT in higher education, focusing on its impact on teaching, learning, research, and student assessment, as .well as discussing issues of academic integrity, ethics, and regulationsOravec's (2023) study sought to analyze the impact of using generative AI systems such asChatGPT andBard on academic cheating, explore methods for responsible collaboration between humans and AI, .and present strategies for detecting cheating and pedagogical methods to reduce misuse

Many specialized scientific studies have recommended the necessity of making it available to researchers and graduate students at universities, including Saudi universities, by providing its technologies and tools, developing their skills and ethics, providing them with the necessary training to employ it in scientific research, and directing them towards its use (Al-Sayyad and Al-Salem, 2023), and developing a comprehensive strategy for using artificial intelligence and its applications in scientific research, which includes a training plan basedon international standards to develop and enhance their skills in using it (Ahmed, Hussein ,2023) and raising their awareness of their rights in using it, its ethics (Ayada, Udaybat ,2023), and how to employ it in graduate studies, especially in the fields of scientific research (Al-Shammari, 2024), and even developing the necessary plans and programs to integrate artificial intelligence applications into higher education in the Kingdom of Saudi Arabia, its curricula, and its activities (Al-Qahtani, 2025).

2- The:study problem

Thus, it is clear from the above that artificial intelligence tools are capable of generating broad, rapid, and effective responses in many fields, including academic writing and creative writing, due to their increasing ability to access large amounts of data related to scientific research, and to process it efficiently, and in terms of their ability to create automated content, .translate and review language, and in terms of their ability to process natural language and ...

creating coherent, logical, and contextually relevant natural language responses (Huang & Tan, 2023)which contributed to the rapid spread of these tools among researchers and , graduate students in the academic environment, as the results of studies and statistics indicate the increasing use of researchers of artificial intelligence and its tools in education and scientific research. Among these studies is the studyGillespie et al (2025) which included A , sample of 48,237 participants from 47 countries across 6 continents, including Saudi Arabia. The results showed that university students are among the groups that use AI technologies the most, and the use of AI technologies in education was among the highest areas among users, with the volume of student use reaching four out of every five students, at a rate of 80%, most of whom are higher education students. The study results also indicate that 61% of the participants in the study sample did not receive formal training in the use of AI technologies. The report issued byGartner a company specializing in information technology research and , consulting, indicated that the use of intelligent chatbots and generative AI applications (exceeded 85% of interactions between customers and companiesGartner.Inc, 2023)The . opinion poll conducted by theStatistic website indicated that 80% of those surveyed prefer to interact with chatbots. and generative AI tools In the field of education and research, unlike traditional search engines, which survey participants see as often providing fixed and unrelated results(Hassan,2024) .

Despite the importance of researchers and graduate students using generative AI techniques in scientific research, the extent of their use, and the continued growth in their use, there are indicators that point to a knowledge gap related to the weak use of AI by graduate students in scientific research, their lack of knowledge of the pros and cons of its use, and the lack of training and awareness programs related to it and its ethics. The most important of these :indicators are the following

tools by graduate students . The results of the study by Al-Sayyad and Al-Salem (2023) indicated the possibility that the use of generative AI by female students at King Saud University might deviate from its academic objectives, and that students lack confidence in using its applications in scientific research, due to its inhumane nature. The results of the study by Al-Ibrahim (2024) demonstrated the need to adopt policies for the optimal and acceptable use of generative AI applications by graduate students at King Saud University in scientific research, and to teach them the skills and ethics of using them to accomplish creative tasks. The study by Al-Qahtani (2025) concluded that there are obstacles preventing graduate students in the Kingdom of Saudi Arabia from using generative AI applications in scientific research, most notably a lack of knowledge of its advantages and disadvantages, and a lack of financial and moral support provided to students to enable its use. The study Gillespie et al. (2025) which was conducted on a sample of 47 countries from 6 continents , around the world, including the Kingdom of Saudi Arabia, confirmed the existence of a gap to between the increasing use of artificial intelligence applications and the training provided users. It recommended the need to eradicate illiteracy in artificial intelligence and its applications, invest in training and education, enact clear legislation for its use, and enhance transparency and accountability related to this. The study by Al-Shabi (2024) recommended the need to hold seminars, conferences, and training courses to spread awareness of the importance of using artificial intelligence tools in scientific research. Abdul Karim's study

concluded that there are risks involved in graduate students' use of artificial (2024) using of Saudi university students' use of artificial intelligence applications in educresearch, it recommended the need to enhance education and training in The fiel of artificial intelligence . for researchers, with a focus on ethics and the use of modern tools

The results of the survey conducted by the researchers on a sample of 52 participants from Qassim University students. A questionnaire was administered to them, and the results :showed the following

The reality of the use of generative AI tools by graduate students at Qassim University in - generative AI tools, in descending order, were: searching for sources and references 38%, rephrasing 37%, machine translation of texts 34%, graphics and presentations 28%, statistical .analysis of data 24%, and scientific publication of research 21%

Despite the many scientific studies that have targeted the use of artificial intelligence, Its - has applications and tools in scientific research, there is no specialized scientific study that addressed it in terms of employing its tools and awareness of the pros and cons of using them .in scientific research at Qassim University

Based on this, and in light of the experience of researchers in university education for postgraduate students in the Kingdom of Saudi Arabia in general, and at Qassim University in particular, and based on the fact that Qassim University in the Kingdom of Saudi Arabia includes more than 38 colleges, offers more than 30 doctoral programs, 70 master's programs, and 120 bachelor's and diploma programs, and the number of students at Qassim University is more than 50,000 students; the second largest Saudi university in terms of the number of students, and that it is the first Saudi university to achieve the highest rating (5 stars plus) from the internationalQS organization (https://www.qu.edu.sa) the problem of the current ; research can be defined in the following questions:

- To what extent do students at Qassim University in the Kingdom of Saudi Arabia use generative artificial intelligence tools in scientific research ?

- How aware are students at Qassim University in Saudi Arabia of the benefits of using generative AI tools in scientific research ?

- How aware are students at Qassim University in Saudi Arabia of the downsides of using generative AI tools in scientific research ?

- What are the requirements for students at Qassim University in the Kingdom of Saudi Arabia to use generative artificial intelligence tools in scientific research, from an expert perspective ?

Study objectives

The current research aims to reveal the degree of use of artificial intelligence tools by students of Qassim University in the Kingdom of Saudi Arabia. Generative tools in scientific research fields , their use rates according to each field, determining their awareness of the positives and negatives of their use from their point of view, and clarifying the most important requirements in light of which Qassim University students can use these tools in scientific .research effectively and responsibly from the point of view of experts

4- **:The importance of the study**

The importance of the current study is highlighted by its targeting of the intelligence variable . Generative Artificial Intelligence and its application in scientific research is one of the variables that has imposed itself strongly on the global arena in all societies , and has led to changing lifestyles in them, and is still doing so, and is expected to continue for a long time , which requires the development of technical and creative skills among university students, to suit the changing demands of life and work imposed by its applications and tools, which has a radical and fundamental impact, directly and indirectly, on the research process, now and in

the future . What increases the importance of the current research is that it addresses artificial intelligence, its applications and tools in terms of their employment in developing scientific research, and striving to enhance the use of its tools Use it effectively and maximize its benefits. And reduce Mistakes that may Researchers are required to adhere to integrity controls . Scientific , and scientific research ethics , With the aim of improving the quality and efficiency of research , and achieving results Desirable Moreover, it addresses the use of generative artificial intelligence in scientific research at Qassim University, a variable that has not been scientifically studied before . The results of the current research can also benefit officials in drawing up educational plans and setting the necessary policies to integrate artificial intelligence applications into university education, especially postgraduate studies , while ensuring the fair and responsible use of its applications in scientific research , spreading the culture of its ethical use, and rehabilitating researchers and providing them with the .knowledge and skills to understand artificial intelligence and deal with it ethically

5 -Limits of the study

:The current study is limited by several limitations

 Objective boundaries represented by generative AI tools such as -ChatGPT ,Google Bard , Claude ,POE ,Microsoft Bing ,GPTGO ,Poe AI and ,Bing Chatbot and their use in , specialized scientific research areas at the postgraduate level, and the extent of cognitive awareness of the pros and cons of their use in scientific research; cognitive awareness is one of the most important levels of awareness. Spatial boundaries represented by the colleges of Qassim University at the university's main campus, excluding its branches located outside the city of Buraidah, as there are no postgraduate programs.Human borders include graduate students at the master's and doctoral levels from colleges of theoretical sciences, such as colleges of Sharia, Arabic language, education, and others, and colleges of practical sciences, such as colleges of medicine of all kinds, colleges of science and agriculture, and others, who are at the dissertation level.

6 - Study terms

Generative (AI) is defined as an artificial intelligenceAI technology that belongs to a class of advanced and focused AI algorithms that uses deep neural networks to generate new and innovative content of various types in response to written prompts in natural language conversational interfaces automatically, based on huge databases collected from web pages, social media conversations, and other media (Sadaia, 2025). The use of generative AI tools by Qassim University graduate students in scientific research can be defined as employing generative AI tools such asChatGPT ,Google Bard ,Claude ,POE ,Microsoft Bing , GPTGO ,Poe AI ,Bing Chatbot and others to create and generate new and innovative , content through written prompts in natural language conversational interfaces automatically, in various forms: written texts, images, audio or video clips, digital panels, animations, program codes, etc.; to improve scientific research and increase its productivity by proposing new research ideas, reviewing literature, or writing Introductions, defining the research problem, formulating questions and hypotheses, translating texts and summarizing research, analyzing the results quantitatively and qualitatively, and interpreting them, leading to the formulation of research recommendations and proposals**.**

7- Theoretical framework and previous studies

7-1 Historical Overview :

The history of generative artificial intelligence in its simple and relatively limited models in terms of capabilities and tasks extends for some decades (Al-Khalifa, 2023), and with the rapid growth and tremendous development of modern technologies during the past decade, the models have become Modern Generative artificial intelligence is more advanced and capable of producing many different outputs in a sophisticated and innovative way, which

reached an unprecedented level of innovation in 2022 AD, which witnessed a revolution. A new technology represented by the emergence of models and tools of generative artificial intelligence techniques Which allows the creation of creative content such as texts, audio clips and videos , and these technologies have spread widely. It is broad in view of the possibilities and broad horizons it offers for use and innovation in various fields (UNESCO, 2024), and the beginning was with the launch of the toolChatGPT which became the fastest-growing , AI in history , was followed by a flurry of generative intelligence tools that created a huge buzz with their ability to simulate human tasks in producing diverse outputs at a very high speed. Such as texts, images , video clips , and program codes , which are used by millions of people and institutions in their daily lives ; given the unlimited potential of these tools in .various areas of life (Sadaya, 2025)

7-2   The concept of generative artificialintelligence:

Generative AI refers to (Generative AI)for short (GenAI) to artificial intelligence technologyAI New belongs to a category of Advanced and focused AI algorithms , It relies on existing data and content collected from web pages, social media conversations , and other online media in massive databases, b Generate new and innovative content ; respond to written prompts in Natural language conversational interfaces , of various types , can appear in formats that include all symbolic representations of human thought: texts written in natural language and images in their various styles, including photographs, digital paintings, and drawings. Animations , video clips , music, and software codes and symbols , and others like shapes 3D , chemical compositions , and protein sequences (Dergaa, Chamari, Zmijewski & Saad, 2023), (UNESCO, 2024) , (SDAIA, 2025),

7-3 The relationship between artificial intelligence   AI   and generative artificial intelligence   GenAI

Generative Artificial IntelligenceGAI is an advanced level of artificial intelligence. Generative AI refers to a type of artificial intelligence that uses technologies Machine learning and neural networks to generate and produce new and innovative content automatically , such as texts , images in all their forms, videos , codes, etc. , while the term artificial intelligenceAI refers to the broader field that includes all applications and tools of artificial intelligence, including generative artificial intelligence (Al-Khalifa, 2023). By tracing the origin and development of artificial intelligence, it becomes clear that it emerged as a field that focuses on building systems capable of Performing simple and complex tasks that typically require superior human intelligence , Such as learning, reasoning, and self-development , then to the stage of machine learning as a branch of artificial intelligence that is concerned with By learning different patterns of data , it soon developed into deep learning, a branch of machine learning used for learning. Artificial neural networks with a number of Hidden layers , until it reached the level of generative artificial intelligence as a field of artificial intelligence , uses deep neural networks to generate data in its various forms from the huge databases that have been collected (Sedaya, 2025), and thus generative artificial intelligence is a part of artificial intelligence, or an advanced level of it.

7-4 :Generative AI Tools

Generative AI tools have become widely used since the launch of OpenAI. Chat application ChatGPTIn 2022, countries and companies across various fields became increasingly interested in Generative Artificial Intelligence(GenAI) technologies, understanding how to benefit from them, especially with their ease of use and wide-ranging applicability . Various Generative AI tools were subsequently launched, and their use expanded in the field of education, as Generative AI tools provide innovative solutions to enhance research, teaching , learning, and administrative processes , especially since they revolutionized the way researchers access information and generate new knowledge . Below , the two researchers

present the most prominent Generative AI tools, their uses in scientific research, and the pros and cons of their use :

7-4-1 ChatGPT :

T appeared toolChatGPT at the end of February 2022 is Abbreviation forChat Generative Per-Trained Transformer produced by ,AI OpenIt is a language generation application that uses theTransformer architectureAnd he was trained On a large group of Information and . data ; to understand natural language and produce reasonable and understandable answers in different contexts , This model has With tremendous capabilities in conducting Conversations ; and answers User inquiries In a way similar to dealing with HumansIt is also distinguished by its ability to Writing, authorship, and translation And writing articles, and emails, and other uses Other (Lund & Wang,2023), ChatGPT can help with all the steps of writing a scientific paper , starting from providing an overview of the topic , creating an outline for the research paper , asking research questions or hypotheses , and creating custom text for each paragraph in the research paper , Review texts and ensure their accuracy , check grammar and spelling , and verify the accuracy of facts to provide recommendations and proposals for the research paper (Richter, 2023). **7-4-2 Google Bard**

The first edition of appeared This tool was launched in March 2023 to compete with the ChatGPT model which is an interactive chatbot based on the language model. Modern , PaLM2 from the company Google, which is designed to understand conversations in languages Multiple, and has the ability to Share responses with others And archive it so that it can be Return to it and return Use it again. It has been The form was recently updated. To support images in responses So that it helps to understand Answer in the form Best (Siad, 2023) and Bard is considered From Google 's large language models Google based language - model systems for conversational applicationsLaMDA , developed by Google ,aims to provide answers Consistent and more interactive in conversations, the Paths Language Model 2PaLM 2 which enables immediate access to the Internet , enabling it to provide up-to-date , information (UNESCO, 2024), It is considered a toolGoogle BardAn effective tool for generating texts and answering questions. Questions , and the creation of creative content , and it is distinguished by the fact that it works in an integrated manner with VariousGoogle tools such as search tools , and its ability to use informationGoogle search in His answers are A , B, and C. Web-related results , code syntax , and snippet summarization The video : provides information and suggestions related to the problem, effectively and accurately. One of its features is that it supports Arabic and other languages (GoogleAI Blog, 2023).

7-4-3 : Litmaps

It is a tool Litmaps is a visual tool released in 2023 that displays the relationships between different concepts and ideas in a given body of literature. It enables researchers to gain insights into the development of their field of study and identify knowledge gaps that may require further research . Litmaps allows researchers to see how different topics relate to each other . and illustrates how the field of research has evolved over time , Which helps them to identify new research questions and design more effective research studies , as it effectively contributes to designing a graphic representation to review the related literature to track the growth of research studies in a specific field or topic. Web - based designed to simplify the process of compiling references , it is also It provides researchers with a central and visual means to classify, organize, and manage references for their research in various scientific disciplines . It also allows tracking the development of research articles, identifying key articles or authors, exploring citation patterns and their influences, and placing research in the context of current literature through visual representation (Sulisworo & Firina, 2023).

7-4-4 Claude

she An advanced artificial intelligence tool or model , launched byAnthropic in March 2023 ,
. and updated more than once. In July 2024 , version 16 was releasedAndroidAnd the
release ofiOS versionIn February 2025, it aims to provide smart and efficient solutions to 24 :
Claude uses modern AI technologies that enable it to deeply understand texts and images,
making it a powerful tool for interacting with users in a natural and seamless way . It can then
provide rich and comprehensive answers with information and data, generate creative texts,
integrate real-time web search within the chat interface, which facilitates the process of
accessing information, and advanced reasoning, where it can perform advanced cognitive
tasks, vision analysis, and support multilingualism (Jungco, 2025).

7-4-5 : GPTGO

free search engine and tool that features an innovative integration ofGooglesearch technology
and ChatGPT smart responses , has been launched. In March 2023. Uses This engine
technology Advanced Language Processing Natural to understand User inquiries , and users
can search in multiple languages, including: Arabic language which enhances User experience
provides accurate search results Closely related to the topic under ,studyIt also presents the .
results in Real time without the need To register on the site, with Ability to copy content (
inquiries/responses) and download it from the system It is essential to the computer, as well
as maintaining the user's privacy by not storing any personal data by hiding his identity and
and not storing or tracking his private information, and it is compatible across various devices
.browsers (Hassan, 2024).

7-4-6 : Poe Ai

It is consideredPoe Ai One of the tools of intelligence Artificial Generative , produced by
Quora Using ChatGPT-4 technology which is the latest Natural Language Processors ,
Powered , by OpenAIPoe provides access to powerful models and tools likeClaude ,GPT-
3.5-Turbo and ,GPT-4 from Anthropic and is characterized by Providing quick responses to ,
User inquiries Based on experience and experiments Others have the ability to process huge
amounts of data in record time , and it also allows By communicating with experts and
specialists who They can provide answers. Minute , about the questions under investigation,
using more than one language, including Arabic (Thu et al, 2024).

7-4-7 : Bing Chatbot

It is considered Bing Chatbot One of the smart conversation tools Produced by Microsoft. It
was released in early February 2023 and is powered by the same technologies as Works with
ChatGPT -4 It is distinguished by its ability to provide detailed responses , linked with
footnotes to the original sources of information , which gives an impression Positive , high
user confidence About the credibility of information Introduction , in addition It can be used
in writing. Creative, such as writing Poem, article or song (Rudolph et al, 2023).

7-4-8 : ChatPDF

It is considered ChatPDF is a valuable tool for students and researchers who need to work
with multiplePDF files at the same time. It was created by OpenAI.In November 2022 ,
summarize and answer Questions about submittedPDF documents (UNESCO, 2024) It is
characterized by providing a comprehensive summary of the document, clear and accurate
explanations of complex texts, information and data, and enables the user to retrieve
information more easily, by focusing on the data and information that the user needs,
especially with required files, and improves workflow by simplifying the process of
extracting data and information from files, and supports more than 75 languages around the
world, including Arabic, and enables the user to obtain relevant papers and documents (Safar,
(2024 .

7-4-9 : Perplexity

free search engine and chat tool launched in August 2022 by Produced byPerplexity AI American. It is based on large language models to synthesize answers and process queries, based on web search results . ThePerplexity tool uses a modelChatGPT-3 language from OpenAIto provide Accurate and comprehensive answers to User inquiries. It is distinguished by being designed to search in Web content in real time Actual, as links are provided For online search results, In addition to providing the feature Voice search(Ma, Liu, & Yi, 2023).

7-4-10 Elicit

It is an intelligent search tool that aims to automate parts of researchers' workflows, identify relevant papers, and summarize Basic information , allowing the user It brings together relevant sources in any field (UNESCO, 2024) , helps users understand and retain key data, information and ideas from research papers, articles, videos, citation management, and centralized research management of research and abstracts in one place, making them easily accessible and extracting key insights from them . Elicit is therefore an effective tool in improving research efficiency (Sadaia , 2025) .These are some examples of generative intelligence tools that some call models or applications, accompanied by their most important characteristics, to guide researchers and graduate students to benefit from them in completing their research, and raising its efficiency and quality, with the necessity of taking into account the restrictions imposed on each application, and some of the negatives that involve its use, noting that there are many other applications that can be viewed, some divide them into five main categories, which are (Safar , 2024) :Chatbots or automated chat tools. Scientific research, writing, and document interaction tools. Media creation tools. Design, presentation, and visual communication tools. Educational and teaching tools.Although the researcher in this research has limited the elements of each category, defined them, and mentioned the positives and negatives of each, this division is not prohibitive, as some tools of one category can be included under another category in terms of functions. However, it can be used as a guide and relied upon.

7-5 Areas of use of generative artificial intelligence tools in scientific research: their advantages and disadvantages:

Artificial intelligence applications and tools, especially its generative tools, have introduced significant changes in academia. It has revolutionized scientific research procedures , contributing greatly to providing innovative and comprehensive solutions to scientific, social and humanitarian problems , arriving at new discoveries, and predicting potential outcomes and future trends in Various academic fields , and this revolution included various aspects and procedures of scientific research , starting from proposing new ideas, through searching for and managing research sources and references, and understanding Academic content Post and summary To reach the points The mission , the essence of it, and understanding the texts Scientific in languages Different and translated, and presented Accurate analysis And useful , classifying, building, arbitrating and applying research tools, analyzing their results quantitatively and qualitatively, linguistic and spelling review , and Academic reformulation , extracting key insights from them, and devising solutions to research problems, all the way to choosing the appropriate journal for scientific publication. However, there are limitations imposed by the nature of generative AI tools, and the possibility of employing them in conducting scientific research and devising actual solutions for it. Up to the present moment, and by reviewing the results of specialized scientific research in this field, the effectiveness of these tools can be confirmed in the various steps and procedures of scientific research. However, they fall short of conducting complete and original scientific research, comprehensive and reliable evaluation of the quality of scientific articles and research , and

making decisions based on research information and critical thinking, in addition to many
.social and ethical controls for their use, as will be detailed

7-5-1 Areas of use of generative artificial intelligence tools in scientific research and the :advantages of using them

Generative AI tools are a smart assistant for graduate students and any researcher in completing their research at all stages, starting with the researcher adopting their idea, through analyzing and interpreting their research results, and ending with proposing solutions and recommendations, and publishing the research in scientific journals and periodicals. The :researchers present this in some detail below

7-5-1-1 : Searching for, understanding and exploring new research ideas

Generative AI tools contribute to exploring new topics, identifying research gaps in a scientific discipline and field, and identifying contemporary research trends through what is called "research network visualization." They also allow researchers to see the geographic scope and time periods in which their research topic was covered. One of the most important , of these tools isResearch Rabbit which contributes significantly and effectively to the process of exploring academic literature and helps researchers find new research papers relevant to their research topic by analyzing researchers' interests and suggesting tailored research papers based on those interests. It also enables them to explore the links between research papers and understand how they relate to each other, providing them with an effective and innovative way to navigate between scientific sources, explore knowledge gaps, and direct their research. These tools can then help researchers build their visions about their to studies and suggest topics based on the information they enter. This data can also be linked previous research related to their topic of study and variables that can serve their topic in order to define their study problem, formulate its questions, and build hypotheses. It is based) ,on a methodological foundation (Eid, 2024)https://researchrabbitapp.com and the ,(Litmaps tool which is distinguished by its ability to create visual maps of scientific research , in every field or scientific specialization, in which the relationships between research in every specialization are clear, which makes it easy for users to identify the main trends and explore research gaps, in addition to theHUMATA ,CHATPDF and ,SCISPACE tools Zaghbar,) (p. 139 ,2024.

7-5-1-2 :Find and manage sources and references

Although There are many search engines powered by artificial intelligence to search for and obtain references and research sources, and the search engine Google is considered , a major source in this field; as one of the most important and famous engines Research, especially search engines (Google Scholar) The engine for scientific literature The Academy, which provides researchers and graduate students with access to a wide range of Scientific sources, but there are tools for generative artificial intelligence, which have become at the forefront of the list when searching for sources and references , the most important of which are : ChatGPT Elicit Al Research, Bard.AI, (Ahmed, Hussein, 2024), as its role is not limited to searching for and collecting references, but rather goes beyond that, to organizing those references and sources in an automatic manner, and recording them more accurately and quickly (Eid, 2024), and even managing, organizing and arranging them in the way the user wants, whether according to the research topic, or according to the author, or the date of publication, or the publishing authority, and among the most famous of these tools are the Mendeley tool , and the Elicit tool It provides the researcher with multiple options, such as collecting all information from relevant studies and research and arranging them . In addition, it also helps the user obtain professional presentations, whether for seminars or discussions of scientific dissertations, with the utmost professionalism , with the possibility of providing some research usage plans for free, and some of them for a fee (Safar, 2024).

7-5-1-3 :Search within files and texts

The process of discovering and obtaining information relevant to the research topic within references takes a long time and effort, especially in light of the huge amount of previous studies and references, and especially when the references are large in size and numerous (Huang & Tan, 2023)There are generative artificial intelligence tools that allow the . possibility of searching within references and accessing phrases and paragraphs that benefit the user in his research writings (Ahmed, Hussein, 2023). Through them, it is possible to read and summarize research and references, identify the essential points in them with regard to the To .research topic, and the ability to retrieve important and useful information from references extract insights into research design or developing reliable and accurate methods and techniques for preparing drafts and versions of research and studies , or requirements for the most effective retrieval tools based on large generative languagesLLMs including ,Elicit Al Research ,Perplexity ,Research Rabbit ,ChatPDF, Glasp, LightPDF(,(Latrash, 2023,Zhang et al, 2023). The Scite generative artificial intelligence tool helps collect all scientific literature, research and references related to the research topic, which contain basic information, so the researcher will not need to read the entire study or research, to access the ,information related to his research (Safar, 2024),Salvagno, Taccone, & Gerli, 2023) .

7-5-1-4 : Automatic translation of content and texts from and into Arabic:

Generative AI tools do not stop at generating content, nor at detecting linguistic and scientific errors, structural errors such as repetition, misalignment, inconsistency, and content rephrasing and re-editing. They also extend to translating content and texts between languages, using natural language processing (NLP) models and machine translation tools for texts and content that use artificial intelligence and machine learning techniques to automatically convert texts from one language to another. These tools use artificial intelligence to understand the meanings, contexts, and linguistic structures of texts, and then generate them in formats characterized by accurate translation that is not literal, but rather translation based on meaning and context, and speed and ease of implementation. There are many machine translation tools available, including: Papercup, Poe, Reverso, Seamless, Sider, Sonix. Afforai, AI Translate, ChatGPT, Claude, Alexa, Translations (Mc-farland, 2023, Hamid, 2024).

7 -5-1-5. : Academic writing and paraphrasing

There are generative AI tools that can be relied upon primarily in writing, scientific rephrasing of sentences, paragraphs and texts, converting complex sentences into clear and understandable sentences, eliminating typos with linguistic, grammatical and spelling checking, and creating citations. These tools receive basic search terms, write several articles about them, and allow the researcher the opportunity to choose the most appropriate ones (Safar, 2024). Examples of these tools areQuillBot ,Rytr ,Jenni and ,Hemingway Editor , which integrate seamlessly to rewrite and rephrase texts with clarity, confidence and accuracy, and improve them according to multiple languages (Safar, 2024, Latrash, 2024).

7-5-1-6 :Preparing and applying tools :

Generative AI tools contribute to preparing scientific research tools, whether they are questionnaires, psychological, educational, or social scales, opinion polls, interviews, or other research tools. They can also be applied and shared through generative AI tools or websites, or communication improvement tools(Amato, 2022), Eid (2024) conducted a study on tool arbitration, specifically on the questionnaire tool through generative AI tools: applying ChatGPT-4 as a model. In his study, he concluded that there is a high possibility of applying ChatGPT-4 in evaluating the initial questionnaire in terms of paragraph clarity, controlling formulation problems, the use of negative paragraphs, spelling and typographical errors, paragraphs that do not belong to the axis and are excluded, and complex paragraphs that need

to be separated into two paragraphs, and providing suggestions for adding axes and paragraphs to Initial questionnaire, and there is a high possibility of applyingChatGPT-4 in the exploratory automated classification of the initial questionnaire in human research, and among the famous sites in building scientific research tools isthe GPTForm.ai site (https://aitoolsbot.com/tool/GPT-for-forms and the site)Jotform (https://www.jotform.com/ar/ai/survey-generator .and others .

7-5-1-7 :Statistical analysis of data :

There are many generative intelligence tools available that contribute to the statistical analysis of data, which can be relied upon in various scientific disciplines (Ahmed, Hussein, 2023), and thus Speed up processing of large amounts of data and complete research efficiently, and increase Scientific productivity, whether using descriptive or inferential statistics. Examples :of these tools include Jasp, Jasper , Bing Chat, ChatGPT , RapidMiner, SAS (Hamid, 2024), These tools also contribute to analyzing the results, commenting on the tables in line with the research data, and providing theoretical and statistical explanations in a short time(Amato, 2022)The importance of generative artificial intelligence tools in data analysis is increasing . in the case of big data, as big data represents many challenges such as data inconsistency, scalability , immediate analysis, and tool selection . Although many solutions have been proposed for processing and analyzing big data , they are often limited in scope and effectiveness , especially in choosing the right tools to address each unique feature of big data, providing a structured approach to effectively manage these challenges . Examples of :efficient and effective tools for analyzing big data includeHadoop ,Apache Spark ,Apache Kafka ,Storm ,Flink ,Hive and Pig ,Mahout ,Presto (SHAHNAWAZ, KUMAR,2025).

7-5-1-8 :Qualitative data analysis :

Qualitative research, or mixed research, requires a systematic analysis of non-quantitative data, which includes words, descriptions, images, and symbols, which requires different methods and techniques to analyze them, with the aim of deepening understanding, deriving unbiased qualitative results, making accurate decisions, and proposing new insights. It is a complex process whose analysis and interpretation may differ from one person to another. Therefore, it requires special skills, and perhaps the most famous methods of qualitative analysis are: content analysis, narrative analysis, framework and context analysis, and relationships, in addition to the data analysis processes entailing the preparation of reports, modeling and graphic representation. Then, many generative artificial intelligence tools emerged that serve researchers and help them analyze qualitative data, quickly and accurately, and discover hidden patterns and trends that humans may not be able to easily notice, thus facilitating research procedures, accelerating their completion, improving them, and raising the efficiency of their scientific production. Among the most used tools in :qualitative data analysis areChatGPT ,Power BI (Hamed, 2024), and these also contribute to providing theoretical and statistical explanationsfor them in a short time (Amato, 2022).

7-5-1-9 :Generate mind maps, indicators, edit images, graphics, sounds and videos

There are many generative artificial intelligence tools that enable researchers to prepare mind maps, presentations, drawings of all kinds, and posters. They can also generate images, videos, or audio files, or convert written text into spoken speech and vice versa in other transformations, by understanding text commands and carrying out what the researcher needs. From improvements according to its variables, to achieve its goal, and examples of these tools :Jasper, Katteb , Copilot Designer ,ChatGPT ,Bing Image Creator ,Adobe Express , Narakeet ,Synthesia ,FlexClip ,Mishcal (Hamid, 2024).

7-5-1-10 :Creating citations and references and choosing the appropriate journal to :publish research

A number of generative AI tools help formulate reference citations. The automatic accompanying reference in the search results and the automatic generation of footnotes and references. These tools also help in determining the percentage of citation and the originality of the text, reviewing documentation and proofreading of different types, and then choosing the most appropriate journal for scientific publication, according to the scientific field and specialization. It provides statistics on journals, their characteristics, advantages and conditions for publication in them. Among the most important of these generative tools is the Zotero tool :which supports various citations and determines the source of citations such as , APA , MLA ,Chicago (Zaghbar, 2024), as well as theDustball and Essaytyper tools. Zotero, Mendeley, Quillbot, Refme (Hamed, 2024, Ahmed, Hussein, 2023), andElicit and Perplexity tools support .citation management and source identification (Safar, 2024)

Besides that, there are other uses for generative AI tools, perhaps the most important of which are:

- File merging and formatting tools such assmallpdf ,pdfgo(Ahmed, Hussein, 2023)

- Organizing research papers : Tools have emerged that help in organizing and writing scientific research and research papers completely, editing and correcting them , and formulating reference citations. Conducting a scientific review of relevant research and : literature , Examples of these tools areElicit , Perplexity , Quillbot , Copilot , Afforai , Connected Papers , ChatGPT ,SciSpace ,Paper Digest.(Hamed, 2024)

- Determine the percentage of plagiarism and originality of the text , and compare it with texts available on the web, includingithenticate ,plagiarisma ,essaytyper ,originality) .(Ibrahim, Al-Fadhli, 2023

Dealing with text files -PDF files , andExcel files , where artificial intelligence tools have emerged , usingNLP algorithms and natural language processing techniques and language generation. NaturalNLG To design and create text files, Generating answers to any inquiries ; about these files helps understand , process, and generate files and answers. Examples of :these tools include ChatDOC ,ChatGPT ,Gemini ,Elicit and tools for handling ,PDF files have also appeared , such asJenni.ai :Examples of these tools are . ChatGPT, ChatPDF, Claude Ai, Docx, Elicit and artificial intelligence tools have also emerged for the purposes , of designing , creating, and editingExcel files and converting text into tables, functions, , mathematical equations, and shapes. Graphics, data, data analysis and classification, and generating answers to any inquiry about it, to understand, process and generate content and : answers . Examples of these tools are Claude Ai, Copilot, Docx, Excel formula bot , Afforai Excel , Avidnote, ChatDoc, ChatGPT (Hamed, 2024).

7-5-2- Areas of use of generative artificial intelligence tools in scientific research and the :disadvantages of their use

The researchers discuss below the negatives of using AI tools for ethical issues , trust and reliability, and issues of: Privacy Data and information security, and bias And justice, And :others, and the following explains this in some detail

7-5-2-1 : Low confidence and reliability in the results of generative AI tools:

Many studies confirm that the outputs or content generated using generative artificial intelligence may not always be accurate or appropriate for the educational context (Sadaia, 2025), as the information may be biased, given that it is generated from a limited range of data used on which the tools were trained (Farrokhnia et al, 2023). Or relying on outdated data (Al-Qahtani, 2025), or linking and documenting it with non-existent, and sometimes unreal, references (Tlili, 2023), or generating content that simulates human responses without understanding their meaning or reaching their significance , which may give Inaccurate or illogical information , without real sources or supporting data (Sadaia, 2025) . These biases can affect the decision-making process at both the individual and institutional

levels , weakening confidence in the decisions and future predictions based on them (Jomaa, 2025). The presence of biases, errors , weak confidence, and imbalanced or incomplete training data may reduce the effectiveness of models' performance and the validity of their outputs. (Sadaya, 2025).

7-5-2-2 :Privacy violation and data leakage :

One of the risks of artificial intelligence is the ease with which privacy can be violated, as personal privacy becomes more difficult to protect and secure with the proliferation of artificial intelligence applications and tools . , so when Data leakage or any breaches can have significant repercussions for individuals or institutions (Jomaa, 2025 , p. 18). With regard to scientific research, There is great concern regarding the impact of generative AI tools on intellectual property rights , privacy , copyright, and related legal issues (Al-Qahtani, 2025); given that Generative AI tools use data they were trained on. from the web or databases , causing them to generate identical or similar content . For original works , even if such data is protected by copyright laws and regulations (SDAIA, 2025) .

7-5-2-3 :Doubts about academic and ethical integrity:

While there are definite concerns about the impact of generative AI tools on intellectual property rights, privacy, and copyright , there are also concerns about plagiarism. A or its unethical use , such as the use of these tools in academic cheating, and providing fake and unreal results(Rasul et al, 2023),and cheating in performing assignments, tests, and tasks , and thus the weakness of students ' acquisition of the targeted knowledge and skills, and the difficulty increases in light of the fact that the tools for detecting content produced by artificial intelligence tools are inaccurate and sometimes misleading (Al-Qahtani , 2025) , and it has been discovered that some artificial intelligence tools have the ability to Create highly realistic texts - most notablyChatGPT - Attributing it to non-existent authors ; therefore , these tools may provide the user with a text that has no scientific source and carries a fictitious title and author , and this casts doubt on its credibility and harms the results of . scientific researchCox et al, 2023 (Especially since the tools of artificial intelligence You are mindless And without a soul Feeling; and does not understand human feelings, moral principles and social values by which matters are weighed ; and he does not have a The ability to think causally, Or the skill of moral judgment on matters (Hamed, 2024) .

7-5-2-4 : Unfair availability:

One of the most significant drawbacks of using generative AI tools is the unfair availability, as researchers believe that unfair availability undermines the principle of equal educational . opportunities for students

:From two angles

First: Lack of infrastructure readiness, both inside and outside colleges, for students to use these tools, such as: Internet at an appropriate speed, the availability of operating devices for all, auxiliary software , required applications and tools, and computing resources. High-performance data processing and storage , training and operation of models and tools , as the poor availability of these material requirements negatively affects students' use of them, and thus the quality of scientific research outputs, and the quality of the skills and abilities of the students themselves, and as providing artificial intelligence tools is often expensive , and training, operating and developing generative artificial intelligence tools requires high financial costs, which are: Preparing, maintaining and managing appropriate infrastructure , storing data, and providing data specialists And generative artificial intelligence , which limits the possibility of researchers accessing it, especially in developing countries (Latrash, 2023,

p. 83), and thus the issue of achieving the principle of equal educational opportunities among graduate students becomes highly questionable.

Second: The weak ability of students to use artificial intelligence tools, due to the lack of skills in using these tools to achieve maximum benefit from them, such as skills such as : formulating claims, search terms, choosing the appropriate tool to achieve the required results and dealing with them, and the skill of evaluating and processing the apparent results (Al-Qahtani, 2025, Hamid, 2024).

This has resulted in a gap between those who have access to artificial intelligence tools and use them efficiently and those who do not, thus widening the gap between developing and developed countries. This in turn negatively affects the performance of graduate students in scientific research , and thus the ability to access information, create, share and apply it. This leads to a weakness in the practice of their interests. For some of their academic rights , and the fulfillment of the duties and responsibilities associated with them (Talab&Suleiman, 2019), it results in the ability of researchers with scientific competence and complete mastery of dealing with artificial intelligence tools to produce papers and complete many research projects in a short period of time; and that researchers with limited capabilities to use these tools in scientific research, their scientific productivity will decrease , which is considered a form of discrimination and inequality of opportunities between each category.

7-5-2-5 :Weakening innovation and higher-order thinking skills:

Students' excessive reliance on artificial intelligence tools weakens creativity and innovation . Their higher thinking skills and research skills , Therefore, it should not be relied upon completely, and its use should be regulated (Hamed, 2024). Its overuse by researchers to complete research procedures , such as literature review, preparation and application of tools, analysis and interpretation of results , and preparation of Scientific abstracts , the implementation of which requires time , effort, and original and basic research and intellectual skills, make every researcher intellectually lazy ; and it restricts creativity and development in scientific research (Sushama et al, 2022), and this was confirmed by the results of the study (Fan et al , 2025). who found that AI technologies like ChatGPT may enhance learners' reliance on technology , and may induce "metacognitive laziness , " Which may hinder their ability to self-regulate and deeply engage in learning , and may not promote intrinsic motivation and knowledge acquisition and transfer.

7-5-2-6 : Difficulties understanding context:

the drawbacks of using generative AI tools in scientific research is their inability to understand context . Although these tools have language processing models, Advanced understanding of the context and content of research and scientific sources , but may be unable to understand Some specialized scientific terms or complex sentence structures, and put them in context Correct in a way that mimics human logic, which may lead to interpretations or Incorrect conclusions(Cox et al., 2023) as understanding the meaning out of context is an incomplete understanding and has no basis .

7-5-2-7 : Weak communication and interaction between students and teachers:

The use of generative AI tools leads to weak emotional , affective and social communication between teachers . And their students, and among the students themselves together in the educational process , after the machine, and especially artificial intelligence tools, replaced this communication, Which makes the educational and research process more monotonous and boring, and leads to the absence of this interaction face to face. To confront the students and teachers and among them together to the educational climate devoid of the spirit of cooperation And harmony (Hamed, 2024).

8-Research methodology and procedures:

This section discusses the study methodology, its starting points, its sample and tools, and the statistical methods used in data analysis. The details are as follows:

8-1 Research methodology and philosophical starting point:

Since the aim of the current research is To reveal the most important areas of scientific research in which students at Qassim University in the Kingdom of Saudi Arabia use generative artificial intelligence applications, the rates of their use of them, and the extent of their awareness of the positives and negatives of using them , and to clarify the most important requirements in light of which this use can be controlled ; the researchers launch To address the research topic from a philosophical intellectual model (paradigm) Derived from social positivism, or post-positivism, which is based on rationalist empirical philosophy that sees the possibility of applying Post- positivist philosophy on the social world , which can be studied in the same way as the natural world. Through experimentation and measurement , in order to predict and control The phenomena that surround us (Makenzie, & Knipe, 2006) , reality - according to the principles of this philosophy - lies outside of ourselves, and knowledge of that reality can only be obtained through observation and measurement (Creswell& Plano,2011), Therefore, the research is based on the quantitative approach,   , which requires formulating honest statements that express the situation studied by the research in the form of objective and unbiased questions. Accordingly, the current research relied on the descriptive survey method , due to its suitability to the nature of the research and its objectives. It also relied on one of the methods of the prospective method, which is the Delphi method, through which the requirements for regulating the use of graduate students of by generative artificial intelligence tools in scientific research were predicted in the future exploring the viewpoints and opinions of a group of experts in The research topic is those who combine expertise in the subject of artificial intelligence, scientific research, and the ability to foresee the future.

8-2 Research community:

The research community consists of Of two categories:

8-2-1- Category First :

All male and female postgraduate students at Qassim University , whose number is (3308) (Qassim University, 1446 AH) . Some characteristics of the study community can be explained through the following table :

(1) Table

Characteristics of the research community in light of some variables

Variable name	Variable classes	number	percentage
Sex	Males	1356	%40.99
	females	1952	%59.01
	Total	3308	100
stage	Master's	2131	%64.42
	PhD	1177	%35.58
	Total	3308	100
Specialization	theoretical	2613	%78.99
	practical	695	%21.01
	Total	3308	100

8-2-2 : Second category: Experts and specialists in educational technology, who hold the rank of professor , associate professor, or assistant professor at Saudi universities , and who have scientific output in generative artificial intelligence in scientific research.

8 -3 :Research sample: The research sample consisted of two categories as well **, the first category** The category of male and female postgraduate students at Qassim University who are in the dissertation stage, consisting of (402), was chosen . In a random stratified manner , so that it would be representative of the original research community . The researcher sent the questionnaire . Electronically , for each of the sub-categories of the research community , they were selected using one of the random sampling methods . The number of individuals in the research sample was determined according to the method of the American Association for determining sample size , when the size of the complex reached and according to the sample criteria specified in the statistical tables at a significance ,(3308) .level of 0.01, the sample size reached at least 346 students.

(2) Table

Characteristics of the research sample according to Some variables

Variable name	Variable classes	number	percentage
Sex	Males	147	%36.6
	females	255	%63.4
	Total	402	100
stage	Master's	231	%57.5
	PhD	171	%42.5
	Total	402	100
Specialization	theoretical	240	%59.7
	practical	162	%40.3
	Total	402	100

While **the second category included** Expert category Specialists in educational technology , who hold the rank of professor, associate professor, or assistant professor at Saudi universities, and have scientific production in the use of generative artificial intelligence in scientific research, Their rank should not be less than assistant professor, and their experience in teaching graduate students should not be less than 10 years. Accordingly , a deliberate sample was selected from 10 Saudi universities , with a total of 12 experts at the end of the threeroundsThe number of experts in the first round of the research was 15 experts, and in . .the second round 13 experts, then they were reduced to 12 experts in the third round.

8-4 - Search tools :

The researcher relied on two tools to achieve the research objectives: a questionnaire to reveal the reality of the use of generative artificial intelligence tools by graduate students at Qassim University, the areas of their use in scientific research, and the negatives and positives of use, then Delphi -style surveys were used to explore the requirements for graduate students at Qassim University to use generative artificial intelligence tools in scientific research. The following explains how the study tools were constructed and the procedures followed to :verify their validity and reliability

8-4-1 The first questionnaire:

This is a questionnaire to explore the reality of graduate students at Qassim University's use of generative artificial intelligence tools in scientific research. In its final form, it consisted of :two parts

Part One: Initial data for sample members, including three variables: gender (male/female), .academic level (master's/doctorate), and specialization (theoretical/practical)

Part Two: It included three areas of the questionnaire, which are: Areas of use of generative artificial intelligence by graduate students at Qassim University in scientific research, which

included 24 statements, each statement expressing an area of scientific research, the positives of using generative artificial intelligence in scientific research, which included (11) statements, and the negatives of using generative artificial intelligence in scientific research, which included (12) statements. The response categories were determined in five alternatives, ,which are: always   often, sometimes, rarely, never for the first axis, and strongly agree, .agree, neutral, disagree, strongly disagree, for each of the second and third axes

Questionnaire validity:

To verify the apparent validity (reviewer validity) of the questionnaire, it was presented in its initial form to a group of education professors specializing in educational technology and educational principles from Saudi universities, numbering (9) members, 5 of them from educational technology and 4 from educational principles. They were asked to study the questionnaire and express their opinions on it in terms of the extent to which its axes included the research topic, the adequacy of the phrases of each axis, the extent to which each phrase was related to its axis, the degree of accuracy and clarity of each phrase, the soundness of its linguistic formulation and its suitability for achieving the goal for which it was developed, and to suggest ways to improve it. The necessary amendments were made to the final version of the questionnaire, based on the reviewers' comments.

The validity of the questionnaire was verified through the internal consistency of the questionnaire statements, using Pearson's correlation coefficient to calculate the correlation coefficients between the score of each questionnaire statement and the total score of the dimension to which the statement belongs, in order to ensure the degree of coherence and homogeneity of the statements of each dimension with each other. The correlation coefficients of the first axis ranged between 0.501 and 0.732, the correlation coefficients of the second axis ranged between 0.623 and 0.834, and the correlation coefficients of the third axis ranged between 0.573 and 0.869. It became clear from this that all the correlation coefficients between the statements of each axis and the total score of the axis in each of the three axes are all positive and statistically significant at a significance level of 0.01.

Questionnaire reliability:

To verify the reliability of the questionnaire axesCronbach's Alpha was calculated for the tool axes. The reliability coefficients for the three axes were 0.781, 0.823, and 0.792, respectively. These are significant coefficients at a significance level of 0.01, indicating that the questionnaire has a high degree of reliability, and therefore is suitable for application and achieving the objectives for which it was developed.

8-4-2 Delphi Rounds Questionnaires:

research relied on Delphi questionnaires of both open and closed types. In the firstroundan ، open question was asked to a sample of experts about the requirements for the use of generative artificial intelligence tools by graduate students at Qassim University in scientific research from their point of view. Then, two closed questionnaires were asked in the second and third rounds, after dividing the experts' responses into three axes: requirements related to graduate studies management, requirements related to faculty members, and requirements related to students . Each round was built on the results of the previous round. The individual opinions of the experts were combined to reach an acceptable level of agreement, and the opportunity was given to refine the opinions of the individual experts, with the aim of arriving at an acceptable collective solution.

8-5 :Data processing methods used in the research:

Many statistical methods have been used through the Statistical Package for the Social .Sciences (SPSS) programSPSS to achieve the study objectives, and these statistical ; methodsare:

- Pearson's correlation coefficient Pearson Correlation to ensure the internal consistency of the questionnaire's phrases and axes .

- Cronbach's alpha reliability coefficient Alpha to check the stability of the resolution .axes.

- Percentages, arithmeticmeans , and standard deviations wereused to reveal the reality of graduate students at Qassim University's use of generative artificial intelligence tools in scientific research, and to understand the pros and cons of their use .

- Percentages , arithmeticmeans , and standard deviationswere used to determine the degree of expert agreement on the requirements for graduate students at Qassim University to use generative artificial intelligence tools in scientific research .

8-6 Criteria for judging the sample members' responses to the axes and their components

The research relied on the sample members' responses to the three axes: reality and areas of use, awareness of the pros and cons of its use,   and its vocabulary based on the statistical criteria shown in the following table :

(3) Table

Statistical criteria for judging sample individuals' responses to the questionnaire's axes and items

Verification level	Arithmetic mean of the statement or weighted mean of the axis
very weak	Less than 1.8 0
weak	From0 to less than 2.60 1.8
middle	From 2.60 to less than 3.40
big	From 3.40 to less than 4.20
very big	From 4.20 and up

was based on the judgment on the responses of the sample of experts in judging the percentages of agreement on the criteria shown in the following table :

(4) Table

Statistical criteria on which the study relied in the Delphi results

Statistical range	Less than %60	From 60 to less than 70%	From 70 to less than 80%	From 80 to less than 90%	From 90 to 100%
Degree of agreement	very low	low	Medium	High	very high

An agreement rate of less than 80% was taken as a score for rejecting and deleting the statement , an agreement rate of 90% or more was taken as a score for accepting the statement, and an agreement rate of 80% to less than 90% was taken as a score for re- arbitrating the statement.

9- Discussion and interpretation of research results

that showed The statistical analysis of the information and data obtained by the researcher to the sample members resulted in a set of results, which are   questionnaire applying the presented according to several levels, which are:

-The level of each axis of the questionnaire dimensions .

- The level of each statement of the questionnaire axes .

 The following is a detailed explanation:

 9-1- The results regarding the reality of graduate students at Qassim University using research , and awareness of the scientific generative artificial intelligence tools in the fields of

cons of their use, from the point of view of sample members at the level of each axis.   and pros
 And his phrases:

 three axes the The following is a detailed breakdown of the results of each of:

The results regarding the reality of the use of generative artificial intelligence tools 1-1-9 the fields of scientific research, from the in by graduate students at Qassim University :point of view of sample members at the axis level. And his phrases

This can be explained through the following table :

:(5) Table

Results of sample members' responses regarding the reality of graduate students' use of generative artificial intelligence tools in scientific research fields at the axis level and its phrases

M	Areas of use for graduate students of artificial intelligence tools in scientific research	arithmetic mean	Standard deviation	Verification level	Arrangement
1	Find and obtain sources and .references	2.99	0.75	middle	1
2	Academic writing and .paraphrasing	2.61	0.69	middle	8
3	.Generate presentations	2.39	0.81	weak	16
4	Statistical analysis of data .and information	2.45	0.71	weak	13
5	Translation from and into .foreign texts	2.96	0.72	middle	2
6	Search within files and texts, to collect paragraphs and .phrases	2.67	0.73	middle	5
7	Proofreading and spelling	2.58	0.83	weak	9
8	File merging and formatting .tools	2.38	0.57	weak	17
9	Choosing the appropriate journal to publish the research	2.39	0.76	weak	15
10	Preparing and reviewing .research tools	2.31	1.02	weak	22
11	Peer and expert review and .arbitration of research	2.28	0.63	weak	23
12	Big data and information .management	2.40	0.51	weak	14
13	Get diverse perspectives on .a particular topic or idea	2.62	0.70	middle	7
14	Review of literature and .previous studies	2.66	0.65	middle	6
15	Explaining complex .scientific terms	2.88	0.72	middle	3
16	Writing scientific research .proposals	2.77	0.73	middle	4

M	Areas of use for graduate students of artificial intelligence tools in scientific research	arithmetic mean	Standard deviation	Verification level	Arrangement
17	Generate and edit images, graphics, and videos.	2.36	0.67	weak	19
18	Generate text from audio or video.	2.57	0.64	weak	10
19	Create visualizations, mind maps, and 3D materials from available data.	2.37	0.76	weak	18
20	Qualitative data analysis.	2.34	0.77	weak	21
21	Formulating reference citations for research papers.	2.47	0.68	weak	12
22	Determine the percentage of plagiarism and originality of research texts.	2.36	0.69	weak	20
23	Research paper design.	2.49	0.82	weak	11
24	Design of experiments and practical applications	2.27	0.66	weak	24
Overall results for students' use of generative artificial intelligence applications in scientific research		arithmetic mean	Weighted average	standard deviation	Verification level
60.38		2.53	0.77		

It is clear from the previous table No. (5) the following:

- The weighted average of the reality of graduate students' use of generative artificial intelligence applications in scientific research at the overall axis level was (2.53) , and the standard deviation was (0.77). Compared to the statistical criteria on which the research was based, it is clear that the reality of graduate students' use of generative artificial intelligence applications in scientific research at the overall axis level was weak , as the weighted average fell within the response range (weak), whose range extends from (1.80 to less than 2.60).

- It is also clear from the same previous table (5) that two-thirds of the axis's statements are achieved to a weak degree, while the other third of them are achieved to a medium degree, and this is consistent with the general result of the axis, which is also achieved to a weak degree.

The results of the study by Al-Sayyad and Al-Salem (2023) This result is consistent with which concluded that artificial intelligence interacted poorly with the research questions of female students at King Saud University, and their lack of reliance on it in translating references and research related to the topic of their research, and their rare use of it in detecting academic plagiarism, as well as in all other areas of scientific research specified in the study, and the results of the study by Al-Muharraq (2024) which concluded that the use of generative artificial intelligence tools by King Abdulaziz University students was limited, and that four out of every five students included in the sample do not use these tools at all in their research .

The low use of generative AI tools by graduate students in their research may be due to the high cost of using AI tools . Generative intelligence in scientific research and the cost of updating and maintaining it , this is at the institutional level, and at the individual level, its use requires an expensive subscription for students, especially since most of these tools require a

paid subscription that may not be within the capacity of many students, which makes the matter of making them available to all students uncertain, and in addition to that, the students' weak knowledge of these tools and their functions, and how to use them, and their loss of the most important skills to use them, prevents their use if they are available, and this is supported by what was indicated by the study of Muhammad (2024) that the use of some artificial intelligence tools in scientific research may require not insignificant costs to obtain licensing fees and training costs , which may be an obstacle for some students and researchers or which revealed that ,(2025) Academic institutions , and the results of Al-Mohseni's study there is a cognitive disparity between researchers from students of the faculties of arts and humanities at Saudi universities. in Dealing with artificial intelligence techniques and tools ; the category was registered Among them is their lack of knowledge in this field and lack of Their use of its applications, compared to another category that shows impulsiveness Towards its employment despite the limited accuracy of its results, which necessitates the development of methodological mechanisms to control scientific research that keeps pace with developments. Technology Also , what Al-Qahtani's study (2025) indicated was that the limited use of these tools is due to the weakness of the academic support allocated to help female students at the three largest Saudi universities, which are: Imam Muhammad ibn Saud Islamic University, Princess Noura University, and King Saud University in the Kingdom of Saudi Arabia On the effective use of these tools, especiallyChatGPT Therefore, the study of . Providing more AI applications and Al-Sayyad, Salem (2023) recommended the necessity of .tools to scientific research students, and training them on how to use them

- As it is clear from the same previous table No. (5), the highest field in which graduate students at Qassim University use generative artificial intelligence applications in scientific research is the field of "searching for and obtaining sources and references," which occupied first place with an arithmetic mean of (2.9 9), and a standard deviation of (0.75), followed by Translation from and into foreign texts", which ranked second with an the field of " and arithmetic mean of (2.96), and a standard deviation of (0.72). This may be due to the fact that searching for sources and references , and translating them, is one of the most important requirements for conducting scientific research in postgraduate studies, and is even a .condition for conducting it

As is clear from the same previous table No. (5), the least The areas in which graduate - students at Qassim University use generative AI applications in scientific research are " Experimental Design and Practical Applications," which ranked 24th with a mean of 2.27 and a standard deviation of 0.66 . This is followed by " Peer and Expert Review and Arbitration of Research," which ranked 23rd with a mean of 2.28 and a standard deviation of 0.63 . This can be attributed to the fact that designing scientific experiments and applications, and peer and expert review and arbitration thereof, require advanced skills in how to use generative AI tools, something many graduate students may lack due to their lack of sufficient training to use them efficiently in these two areas in particular.

9-1-2 Results of the awareness of graduate students at Qassim University (cognitive perception) of the advantages of using generative artificial intelligence tools in scientific research At the axis level, and its phrases: :

This can be explained through the following table :

(6) Table

Results of sample members' responses regarding the axis of graduate students' awareness at Qassim University of the positives of using generative artificial intelligence tools in scientific research at the axis level and its phrases.

M	Graduate students' awareness of the benefits of using artificial intelligence tools in scientific research	arithmetic mean	Standard deviation	Verification level	Arrangement
1	Enabling researchers to explore new research topics based on previous research topics in a specific field or specialty .	2.84	0.77	middle	7
2	Enabling researchers to summarize, edit, and critique texts with high accuracy.	2.97	0.87	middle	3
3	AI tools provide researchers with research content and research tools tailored to their needs and capabilities.	2.95	0.74	middle	4
4	AI tools enable immediate evaluation and feedback of a researcher's written work.	2.74	0.76	middle	11
5	It helps analyze big data, explore relationships between them, and use them to provide new and innovative insights.	2.82	0.71	middle	8
6	These tools provide immediate assistance and scientific advice to researchers around the clock.	2.94	0.74	middle	5
7	These tools help provide research, articles and various references related to the research topic.	3.10	0.76	middle	1
8	Generative AI tools help understand , classify, and summarize scientific texts in different languages , providing accurate and useful analyses.	2.99	0.75	middle	2
9	These tools help eliminate human errors that may affect the accuracy of scientific research.	2.77	0.79	middle	10
10	It increases researchers' ability to conduct conversations in natural language and in a convincing, human-like style.	2.88	0.81	middle	6
11	Contribute to research with photo and video clips. High resolution and clarity based on texts from those researches.	2.80	0.84	middle	9
The overall result of awareness (perception) (Cognitive) Postgraduate students at Qassim University are	arithmetic mean	Weighted average	standard deviation	Verification level	
	31.40	2.85	0.86	middle	

M	Graduate students' awareness of the benefits of using artificial intelligence tools in scientific research	arithmetic mean	Standard deviation	Verification level	Arrangement
	familiarized with the advantages of using generative artificial intelligence in scientific research.				

It is clear from the previous table No. (6) the following:

- The weighted average of the awareness of graduate students at Qassim University (cognitive awareness) of the positives of using generative artificial intelligence in scientific research at the overall axis level reached (2.85), and the standard deviation For the axis, it reached (0.86), and compared to the statistical criteria on which the research was based, it is clear that the awareness (cognitive perception) of graduate students at Qassim University of the positives of using generative artificial intelligence in scientific research. At the level of the axis as a whole, it was average , as the weighted average fell within the response range (average), whose range extends (from 2.60 to less than 3.40).

- As is clear from the same previous table (6), awareness Graduate students at Qassim University, with regard to the positives of using generative artificial intelligence in scientific research, all of the axis' statements were moderate, which is consistent with the overall result of the axis, which was also moderate.

- As it is clear from the same previous table (6), the field with the highest awareness among graduate students at Qassim University of the positives of using generative artificial intelligence applications in scientific research is the field of " These tools help in providing research, articles and various references related to the research topic", which ranked first with an arithmetic mean of (3.10) and a standard deviation of (0.77) , followed by the field of " Generative artificial intelligence tools help in understanding scientific texts in different languages and classifying them, summarizing them and providing accurate and useful analyses", which ranked second with an arithmetic mean of (2.99) and a standard deviation of (0.75) . This may be due to the fact that these two fields are among the fields that graduate students greatly need in their research.

- As is clear from the same previous table (6), A is less The areas of awareness by graduate students at Qassim University of the advantages of using generative artificial intelligence applications in scientific research are the field of "Artificial intelligence tools enable the immediate evaluation of the researcher's written work and provide feedback on it", which ranked eleventh and last with an arithmetic mean of (2.74) and a standard deviation of (0.76) , followed by the field of " These tools contribute to eliminating human errors that may affect the accuracy of scientific research", which ranked tenth and second to last with an arithmetic mean of (2.77) and a standard deviation of (0.79) . This can be explained by the fact that these two areas are among the areas that graduate students may not need to a high degree in their research , as they are accustomed to their professors' direct evaluation of their production, and because reviewing these tools is largely limited to linguistic review, without the ability to review the context in which they appeared, which is the most important in scientific research.

9-1-3 Results of the awareness of graduate students at Qassim University (cognitive perception) of the negatives of using generative artificial intelligence in scientific research At the axis level, and its phrases :

This can be explained through the following table:

Table (7):

Results of sample members' responses on the axis of awareness of graduate students at Qassim University (perception (Cognitive) to the negatives of using generative artificial intelligence in scientific research at the axis level and its expressions

M	Graduate students' awareness of the drawbacks of using artificial intelligence tools in scientific research	arithmetic mean	Standard deviation	Verification level	Arrangement
1	The limited ability of AI tools to understand complex scientific concepts and distinguish the nuances between them.	2.78	0.72	middle	11
2	These tools attribute texts and quotes to artificial authors and non-existent research.	3.16	0.76	middle	1
3	Generative AI tools provide biased and inaccurate information.	2.79	0.74	middle	10
4	The weak ability of researchers to distinguish between authentic and fake scientific texts.	2.95	0.86	middle	5
5	Decreased originality and creativity in academic writing due to the routine of writing.	2.85	0.81	middle	9
6	Lack of a full understanding of generative intelligence tools for the context and nuances of scientific writing.	3.11	0.69	middle	2
7	Some AI tools require significant financial commitments due to subscription fees, licensing fees, or training costs.	2.86	0.77	middle	8
8	Lack of skills of some researchers to use it.	2.92	0.84	middle	6
9	The use of generative AI tools is associated with negative behaviors related to ethics and societal values (such as scientific plagiarism and failure to adhere to intellectual property rights).	3.01	0.75	middle	4
10	The weakness of these tools in assessing the quality of	2.77	0.83	middle	12

M	Graduate students' awareness of the drawbacks of using artificial intelligence tools in scientific research	arithmetic mean	Standard deviation	Verification level	Arrangement
	.research production				
11	Lack of security and confidentiality of individual information.	3.08	0.79	middle	3
12	The limitations of these tools in data processing.	2.87	0.71	middle	7
The overall result of awareness (perception) (Cognitive) Postgraduate students at Qassim University are familiarized with the advantages of using generative artificial intelligence in scientific research.	arithmetic mean	Weighted average	standard deviation	Verification level	
	35.15	2.93	0.81	middle	

:It is clear from the previous table No. (7) the following

- The weighted average of awareness Qassim University graduate students (cognitive awareness) for negatives The use of generative artificial intelligence in scientific research at the axis level as a whole reached (2.93), and the standard deviation For the axis, it reached (and compared to the statistical criteria on which the research was based, it is clear that ,(0.81 the awareness (cognitive perception) of graduate students at Qassim University of the negatives of using generative artificial intelligence in scientific research. At the level of the axis as a whole, it was average , as the weighted average fell within the response range (average), whose range extends (from 2.60 to less than 3.40().

- Qassim University graduate   As is clear from the same previous table (7), awareness students' responses to the negatives of using generative artificial intelligence in scientific research on the axis's statements were all average, which is consistent with the overall result .of the axis, which was also average

- As it is clear from the same previous table (7), the field of highest awareness by graduate students at Qassim University of the negatives of using generative artificial intelligence applications in scientific research is the field of " attributing those tools texts and quotations to artificial authors and non-existent research", which ranked first with an arithmetic mean of and a standard deviation of (0.77) , followed by the field of " weakness of the full (3.16) understanding of generative intelligence tools for the context and nuances of scientific writing 0.69) which ranked second with an arithmetic mean of (3.11) and a standard deviation of ," This may be due to the sensitivity of the two fields and their connection to scientific . (integrity.

- As is clear from the same previous table (7), A is less The areas of awareness by graduate students at Qassim University of the negatives of using generative artificial intelligence applications in scientific research, is the field of "the weakness of the ability of these tools to evaluate the quality of research production", which occupied the twelfth and last place with an The " arithmetic mean of (2.77), and a standard deviation of (0.83), followed by the field of limited ability of AI tools to understand complex scientific concepts and distinguish the

nuances between them. ", which ranked eleventh and penultimate with an arithmetic mean of (and a standard deviation of (0.72) . This may be due to the limitations of these tools in (2.78 the comprehensive evaluation of scientific research, and their ability to explain complex . concepts and identify the essential and subtle differences between them is still limited to date overall result of the two axes of awareness of graduate students at Qassim University (cognitive perception) of the positives and negatives of using generative artificial intelligence in scientific research at the level of the two axes , and its phrases, is consistent with the result of Al-Muhsini (2025), Al-Mahraq (2024), and Al-Sayyad and Al-Salem (2023). , and can be interpreted as This low awareness of the average level is due to the lack of training and awareness necessary for graduate students on how to use generative artificial intelligence applications in scientific research, and explaining its most important advantages and positives, and its most prominent disadvantages and negatives. This was confirmed by the results of Al-Muhsini's study (2025), which revealed the urgent need for researchers to hold workshops. She conducted an applied study and specialized training programs on generative artificial intelligence tools, introducing them and the pros and cons of their use. She recommended the necessity of integrating technologies. Artificial Intelligence in Curricula Academics are considered a fundamental component of the curriculum, as they are an important means of spreading its culture and raising awareness of its applications and tools. This is supported by the results of the Al-Muharraq study (2024), which concluded that graduate students at King Abdulaziz University in the Kingdom of Saudi Arabia have limited awareness of the use of generative AI tools in scientific research, and that there is an urgent need for further training and awareness of generative AI. The results of the Al-Qahtani study (2025) also confirmed that the most prominent obstacles to the use of generative AI tools among female students at Imam Muhammad ibn Saud Islamic University, Princess Noura University, and King Saud University in the Kingdom of Saudi Arabia are the lack of knowledge of the capabilities of generative AI tools, their uses , advantages, and disadvantages .

9-2- Findings related to the requirements for graduate students at Qassim University to use generative artificial intelligence tools in scientific research , from the experts' perspective:

The final results of the Delphi method rounds and their discussion

The current research, after the end of the third round, reached a number of (35) requirements for the use of generative artificial intelligence tools by graduate students at Qassim University in the fields of scientific research, an effective and responsible use, including (13) requirements for the first axis: requirements related to the management of graduate studies, requirements for the second axis: requirements related to faculty members , and (10) (12) .requirements for the third axis: requirements related to graduate students

This can be explained through the following table**:**

(8) Table

Requirements for graduate students at Qassim University to use generative AI tools in scientific research, from an expert perspective:

Requirement	Weighted percentage	Consensus level
Axis 1: Requirements related to graduate studies management		

1-	Issuing legislation by the Deanship of Graduate Studies allowing students to use generative AI tools in assignments, research, and research projects.	%96.2	very high
2-	graduate studies policies and determine the appropriate way to integrate generative AI tools into scientific research, depending on the discipline.	%94.4	very high
3-	Enact laws and legislation related to postgraduate studies to regulate reliance on artificial intelligence tools in scientific research and combat unethical and irresponsible uses.	%95.6	very high
4-	Setting objective limits for students' use of generative AI tools in assignments, research, and research projects, consistent with the values of the educational institution.	%96.2	very high
5-	University leaders should adopt mechanisms to ensure that artificial intelligence tools are not used in a way that discriminates against certain categories of graduate students.	%95.6	very high
6-	Adopting a mechanism to provide security and ensure the confidentiality of students' information when using artificial intelligence tools.	%100	very high
7-	Developing the infrastructure and educational environment in higher education to interact with generative AI applications.	%96.2	very high
8-	Establish clear policies to combat plagiarism resulting from the use of applications.	%97.5	very high
9-	Preparing, managing, and maintaining the necessary infrastructure, data storage, and providing data and generative AI specialists needed to use AI for graduate students.	%100	very high
10-	Providing highly experienced specialists in the use of generative AI tools to teach students how to use these tools in an artistic manner and apply them correctly in scientific research.	%94.4	very high
11-	Strict ethical verification by graduate school administrators of generative AI tools before their use in research writing is approved.	%95.6	very high
12-	Providing the generative AI tools needed for scientific research and making them available to all students.	%96.2	very high
13-	The need to adopt integrated research and research projects that combine human capabilities in scientific research with the potential of generative artificial intelligence.	%97.5	very high
Overall axis average		%96.56	very high
axis : Requirements related to faculty members		Weighted percentage	Consensus level
14-	Developing a professional development strategy for faculty members in the field of artificial intelligence and its tools, to raise their performance level in accordance with international standards.	%100	very high
15-	Faculty members guide their students on how to use generative AI tools correctly and responsibly.	%96.2	very high

16-	Providing faculty members with the skills and knowledge associated with the use of generative AI tools.	%97.5	very high
17-	Training faculty members on how to use generative AI tools to detect plagiarism in their students' work.	%94.4	very high
18-	Developing faculty members' skills to use generative AI tools in academic supervision.	%95.6	very high
19-	Faculty members should educate their students on how to protect their privacy, preserve their personal data, and avoid using generative AI tools in ways that harm them.	%96.2	very high
20-	Developing faculty members' deep understanding of how AI tools work and how they execute commands, so they can interpret and formulate commands effectively. correct	%95.6	very high
21-	Raising faculty members' awareness of the types of data that generative AI tools may collect from them, how this data may be used, the impact it may have on their student teaching, and developing their research skills.	%97.5	very high
22-	Training faculty members on how to use strategies to protect their students from excessive use of generative AI tools , to the extent that they are deprived of opportunities to develop their cognitive abilities and social skills , and experiential practices such as practical experiments, interactive discussions with others, and independent reasoning.	%95.6	very high
23-	Train faculty members on how to recognize AI-generated content, or human-generated content, from their students.	%94.4	very high
24-	Provide guidance and training to faculty on generative AI tools to ensure they understand ethical issues such as biases in data classification and algorithms, and how to protect data privacy and intellectual property.	%92.5	very high
25-	Direct faculty members to integrate generative AI tools into student research design and projects.	%96.2	very high
Overall axis average		%95.98	very high
Axis III: Student Requirements		Weighted percentage	Consensus level
26-	Developing graduate students' capabilities to use generative AI tools efficiently and effectively.	%94.4	very high
27-	Training graduate students on how to verify the outputs generated by generative AI tools before relying on them, and to beware of overreliance.	%95.6	very high
28-	Training graduate students on how to incorporate AI tools into research introductions and methodologies as an authentic source of information.	%96.2	very high
29-	Implementing programs to develop graduate students' learning skills on how to formulate commands effectively to achieve the targeted results from generative intelligence tools.	%95.6	very high
30-	Incorporating ethical approaches to the use of generative AI tools into graduate student curricula.	%92.5	very high

31-	Employing educational activities in graduate programs to teach students the responsible use of generative AI tools.	%95.6	very high
32-	Establish mechanisms to ensure that graduate students are held responsible and accountable for the content of academic papers generated by AI tools they rely on.	%94.4	very high
33-	Holding seminars, workshops, and training courses for university graduate students to increase their awareness of the pros and cons of using generative AI tools in scientific research.	%96.2	very high
34-	Providing financial and moral academic support to encourage graduate students to effectively use generative artificial intelligence tools in academic writing.	%94.4	very high
35-	Disseminate and continuously update the controls and rules governing the use of generative artificial intelligence tools in scientific research to graduate students.	%100	very high
Overall axis average		%95.89	very high
Overall average of the three axes		%96.13	very high

It is clear from the previous table (8) that the general average of the weighted percentage of experts' agreement on the importance of " Requirements for the use of generative artificial intelligence tools by graduate students at Qassim University in scientific research fields "in general" reached 96.13%, and the percentage of agreement of the expert sample on the requirements of the three axes: requirements related to graduate studies management, requirements related to faculty members, and requirements related to graduate students reached: 96.56%, 95.98%, 95.89% respectively , which are all high approval rates, which supports the validity of their use to develop and control the use of generative artificial intelligence tools by graduate students in scientific research at Qassim University, using them correctly, responsibly, and effectively.

The high percentage of agreement among experts on the requirements for the use of generative artificial intelligence tools by graduate students at Qassim University in the fields of scientific research can be explained by the necessity of setting and activating a number of requirements to control the process of their use and employing them effectively and responsibly in scientific research, based on the experts' awareness of the importance of graduate students using generative artificial intelligence tools in scientific research , and this is what many scientific studies have confirmed, such as the studies of Al-Qahtani (2025), Al-Mohsini (2025), **Fan et al** 2025, Gillespie**(2025)**And Muhammad (2024) , Muharraq (2024), and Al-Sayyad and Al-Salem (2023).

10 - Research recommendations:

Based on the analyses of the theoretical framework of the research and its field results , the researchers recommend the following:

-        Forming a committee of stakeholders from various disciplines to formulate a policy on the use of generative AI in graduate studies and its ethics.

-        Establish a dedicated unit for artificial intelligence research and innovation, nurture outstanding and innovative individuals in this field, and provide them with adequate financial and moral support.

- Designing a scale to measure students' awareness and perceptions of the pros and cons of using artificial intelligence mechanisms in the research process.

- Educating graduate students about the pros and cons of using AI applications and tools, their controls, ethics, and the rules governing the use of generative AI tools in scientific research.

- Preparing, managing, and maintaining the necessary infrastructure, data storage, and providing specialists in the fields of data and generative AI to train graduate students on how to use generative AI tools, and providing them with financial and moral academic support.

- Training faculty members on how to use strategies to protect their students from the overuse of generative AI tools , and how to equip their students with the skills to design their research and research projects.

- Amending the policies of scientific journals to adopt the use of artificial intelligence tools in scientific research, in order to enhance transparency, accountability, and scientific integrity. It also allows the use of large language models**LLMs**.in writing scientific papers ( )

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