

# E-Collaboration and Academic Performance of Lecturers: Evidence From a Jordanian University

Bilal Ahmad Ali Al-Khateeb, Department of Business Administration, College of Business, Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Saudi Arabia\*

 <https://orcid.org/0000-0001-8708-0709>

## ABSTRACT

Electronic collaboration is increasingly becoming more popular among both the practitioners and the academics; however, the practitioners have taken more advantage of it than the academics. Despite the importance of e-collaboration to the education sector over the years, there appears to have been a dearth in literature. Academic literature is yet to be explored more deeply. Only a few studies on e-collaboration are still considered a crucial feature in collaboration research in the academic domain. The correlation analysis result revealed that e-collaboration has positive strongly correlation with both teaching and research performance at  $p > 0.01$ . Also, the hypothesis testing result revealed that there is a significant relationship between e-collaboration and teaching performance, and between e-collaboration and research performance at  $p < 0.05$  respectively. Based on this, the study therefore concluded that e-collaboration has a positive significant relationship with both teaching and research performance. The study offered limitations and suggestions for future studies.

## KEYWORDS

Academic Performance, Collaboration, Electronic Collaboration, Jordan, Lecturers

## INTRODUCTION

The practice of e-collaboration is becoming increasingly popular among practitioners and academics; however, practitioners have taken more advantage of it than academics (Cassivi et al., 2004; Iyer, 2014; Razmerita & Kirchner, 2015; Saks et al., 2024). Razmerita and Kirchner (2015) acknowledged that collaboration, in general, as a concept, would continue to attract attention and become more important for learning and working in the 21st century, particularly in student-centered academic environments rather than teacher-centered ones. They noted that collaboration, including collaborative technologies, has become natural to adopt in different forms, including co-creation. Organizations such as the Bible Broadcasting Network (BBN; now GTE Internet-Working) have a long history of supporting educational collaboration online. It has played a major role in an e-collaboration system that has helped educators develop new pedagogical models, share their learning, and collaborate over the net

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\*Corresponding Author

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to support school reform. It advocates the use of communications technology, such as e-collaboration, to support educators who are implementing new state curriculum standards (Onifade et al., 2015).

Two major issues are relevant for this study to address. First is a deficiency in the study of electronic collaboration in developing countries. For example, while developed countries such as the USA and the UK appear to have gone far with e-collaboration, it is saddening that e-collaboration is yet to be effectively explored in developing countries such as Jordan, as many academics still favor traditional face-to-face collaboration. Besides this, opportunities for collaboration do not always exist within a school. Electronic collaboration allows teachers to connect to a new set of colleagues. In other words, there is a paucity of studies on e-collaboration in developing countries, particularly when compared with that of the developed countries highlighted above.

Despite the importance of e-collaboration to the education sector over the past years, there appears to have been a dearth of literature in this area (Atkinson et al., 2007; Vangrieken et al., 2015; Zascerska & Ahrens, 2009). It is yet to be explored in academic research as deeply as other concepts. Only a few studies on e-collaboration are still considered a crucial feature in collaboration research, e.g., Koufman-Frederick et al. (1999) and more recently, Habes et al. (2018), Iyer (2014), Razmerita and Kirchner (2015), and Shannak (2013). That gap makes this study imperative, particularly in a developing country such as Jordan, which places great importance on education. Thus, the paucity of research in the area of e-collaboration and academic performance has propelled the present study to investigate the relationship between e-collaboration and academic performance among academics in Jordan's higher institutions, with particular interest in Jordanian University. This would substantially contribute to the nascent literature and data in the sector.

Besides this, research has revealed that e-collaboration is a vital skill for 21<sup>st</sup>-century academics (Ronfelft et al., 2015; Irajpour et al., 2015; Ayenalem et al., 2022). Ayenalem et al. (2022) reported that both the government and many other organizations are pushing for collaboration in the education sector to make academics collaborate on instructions, research, and outreach services. Unfortunately, they argued that the extent to which academics collaborate in academic institutions for research, teaching, and outreach services is very rarely interrogated by researchers. They further observed that the level to which academics collaborate in information exchange and material sharing appears too weak and informal forms of collaboration that fall in the independence continuum.

Another major weakness and issue of concern that required the attention of this study is that of scope and area of coverage. For example, apart from the fact that much of the study on e-collaboration and performance is observed to be Western-based, it is clear that many of the studies are tailored toward one direction. It is observed that more of the studies focused on industries, supply chain performance, firms, organizational performances, and student perceptions rather than the performance of the academics (University's Teachers-Lecturers) in the universities. For example, Rosenzweig (2009) and Shannak (2013) only related e-collaboration and performance to manufacturing firms. In other words, the performance of the employees who were mainly working in the manufacturing firms was measured. Similarly, Cassivi et al. (2004) limited their study to e-collaboration tools and firm performance with no reference to the academic performance of the university's teachers. Iyer (2014) examined the operational impact of collaboration and resource specificity within the technological context, and this has no directional relationship with the present study.

Razmerita and Kirchner (2015) related e-collaboration to student group performance without consideration of the academic performance of the teachers who are considered very important and relevant to the education system. In Jordan, it appears that only Habes et al. (2018) attempted to explore e-collaboration but only related collaborative education to social media among students in selected Jordanian universities, thus limiting the scope and coverage of the study. The present study deviates from this direction by examining e-collaboration and academic performance of lecturers in Jordanian University with particular reference to Jordanian University. Thus, the major objective of this study is to examine the relationship between e-collaboration and the academic performance of university teachers at Jordanian University, Jordan.

## LITERATURE REVIEW

### The Concept of Electronic Collaboration

Generally, *e-collaboration*, or *electronic collaboration*, refers to the use of electronic communication and technology to facilitate collaboration and teamwork between individuals or groups, and *collaboration* is a process by which people work together on intellectual, academic, or practical endeavors (Bozeman & Gaughan, 2011; Huang & Xiong, 2023). Electronic collaboration is a modern way of collaborating that connects individuals electronically via the Internet using tools such as email or and the World Wide Web (Le Dinh et al., 2013). According to Koufman-Frederick et al. (1999), Onifade et al. (2015), and Eddy Spicer and Dede (2006), collaboration is a process by which people work together on an intellectual, academic, or practical endeavor. In the past, that has meant in person, by letter, or on the telephone, while electronic collaboration, on the other hand, connects individuals electronically via the Internet using tools such as mail and other teamwork collaboration (e.g., videoconferencing through services like Skype and GoToMeeting), or through access to sites on the World Wide Web (Al-khateeb, 2020; Drinka & Yen, 2003; Munkvold & Zigurs, 2007; A. Oliveira et al., 2015).

Internet-based work allows collaborators to communicate anytime, from anywhere to any place. People from different parts of a building, state, country, or continent can exchange information, collaborate on shared documents and ideas, study together, or reflect on their own practices. Electronic collaboration could assume different forms, such as discussion groups (e.g., open-ended and unmoderated, structured groups), data collection and organization, teachers participate in online courses or workshops to learn something new, and synchronous communication activities such as Internet chat and video conferencing. In this extension e-collaboration context, several definitions have been proposed (see Table 1).

These definitions show that e-collaboration is a complicated phenomenon that can be defined in several ways. There is a definite need to shape e-interactions to avoid chaos and failure in virtual teams. The shaping of e-interaction in order to support e-collaboration involves not only technological considerations but also economics, online social networks, education, psychology, and other considerations.

### Electronic Collaboration and Performance: Empirical Views

Many past studies attempt to relate e-collaboration with performance rather than on academic performance. For example, the most recent study by Saks et al. (2024) examined collaboration from a wider perspective. For the first time, both national and international collaborations were mentioned, and they were related to the medical domain. They looked into how collaboration can be used to advance research into vascular contributions to cognitive decline. The study noted that vascular contributions to cognitive impairment and dementia (VCID) research is increasingly global collaborative enterprise which bodes well for rapid advances in this field, suggesting the importance of collaboration in achieving a desired outcome. The study uncovered the relationship between physiology and phenotype for both clinical manifestations of cerebral small vessel disease (cSVD) and cognitive decline (Saks et al., 2024). However, the study suffered from the underrepresentation of participants and researchers from diverse backgrounds, particularly African and Asian countries.

Bozeman and Gaughan (2011) attempted to address the issue of how men and women differ in research collaborations. The study analyzed the collaborative motives and strategies of academic researchers. Hence, it focused on the sex-based differences in research collaboration. The study believed that many variables could mitigate the relationship between sex and collaboration, and this is one good reason why this study examined how men and women academic faculty differ in their research collaboration patterns and strategies. This result correlates with some other studies that showed that men and women differ in situational factors that could be presumed to relate to collaboration patterns.

**Table 1. Definitions of electronic collaboration**

Source	Definition
Koufman-Frederick et al. (1999)	process by which people work together on an intellectual, academic, or practical endeavor
Le Dinh et al. (2013)	uses a computerized system or software which is designed to help individuals and organizations involved in a common task in order to achieve specific goals
Kock et al. (2001)	collaboration using electronic technologies among different individuals to accomplish a common task
Biuk-Aghai (2003)	collaboration, which is conducted without face-to-face interaction, enabled by technology
Switzer and Hartman (2010)	collaboration, which is conducted without face-to-face interaction among individuals or members of virtual teams engaged in a common task using information and communication technologies.
Vossen (2009)	assume user participation as well as socialization
Kock and Nosek (2005)	collaboration among individuals engaged in a common task using electronic technologies
Chong et al. (2009)	business-to-business interactions facilitated by the use of internet technologies
Johnson and Whang (2002)	E business-to-business interactions facilitated by the use of web technology
Teufel et al. (1995)	characterized by shared goals (working towards the same goal) and the work on shared objects, such as documents
Bouras et al. (2008)	collaboration, which is conducted without face-to-face interaction among individuals or members of virtual teams engaged in a common task using information and communication technologies
Shannak (2013)	communication process between different parties through electronic devices to accomplish work goals
Mohammadjafari (2015)	being capable of removing geographical barriers and significantly facilitating information exchange within and beyond organizations

Regression analysis revealed that having a coherent collaborator choice strategy predicts the number of collaborators for both men and women.

In a related development, Huang and Xiong (2023) related knowledge production of university-industry to collaboration. It adopted Hoffman’s framework, and, coupled with the experience of River City in Guangdong Province – Hong Kong – Macao Greater Bay Area, the study analyzed the ontological, epistemological, and applicative knowledge practices of both industry and academia. First parties in this research concur that there is inherent uncertainty in knowledge production while risk discourse for knowledge practices reflects influences of market-like logic on industry–academia collaboration. Parties in the study tended to take a common stand on knowledge outcomes by putting outside ontological discussions of knowledge, conceding epistemological issues, and imagining applied consensus. On the contrary, these acts hardly achieve the desired goal of knowledge advancement and create obstacles to the knowledge circuit. In essence, the study demonstrated that collaboration would lead to knowledge production in university–industry collaboration. However, the impact of collaboration on the performance of academia appeared not to be captured in this research work.

Al-Omoush et al. (2023) saw collaboration from a different perspective by relating collaboration to supply chain agility and value co-creation. In their study, they found that e-supply chain collaboration significantly influences collaborative innovation, supply chain agility, and value co-creation. The finding further revealed that both collaborative innovation and corporate sustainability are significantly related to value co-creation. This study offered a unique perspective of collaboration based on its direction, which established the relationships between e-supply chain collaboration, collaborative

innovation, supply chain agility, and value co-creation, yet how collaboration affects the performance of the academics was not included in the study.

Ayenalem et al. (2022) adopted both quantitative and qualitative approaches with both questionnaire and semi-structured interviews and found that the collaboration between senior and junior staff faculty members is too weak and limited to information exchange and material-sharing practices. Accordingly, it revealed that the predictor variables, which include gender and level of qualification, failed to affect senior and junior staff collaboration, but on the contrary, age and teaching experience did significantly affect senior- and junior-staff collaboration. This study provided an insight into collaboration among academics, yet how collaboration affects their performance appears not to be considered. How collaboration affects academics is very pertinent because it would go a long way to encourage more collaboration among them.

Alkhannani (2021) examined the effectiveness of collaborative teaching and learning (CTL) strategies in increasing student satisfaction with learning outcomes, experiences, and achievements with a focus on how to engage students as partners in the CTL. It argued that engaging learners and teachers concurrently in English language teaching is arguably one of the most important issues facing higher education in the 21<sup>st</sup> century. Although making students as partners' principles and approaches maybe very pertinent; however, it is not seen as a new idea, particularly in the Western world; it is just that countries in Asia and the Middle East have yet to adopt it. The author demonstrated that student engagement is strongly correlated to positive learning experiences and outcomes for students. Thus, an effective learning outcome is a function of an effective CLT. It alleges that CTL may help to overcome or partially mitigate some of the above challenges that Saudi Arabian learners of English face. The paper emphasized the importance of collaboration in learning but only presented a theoretical argument, which may not be sufficient to make a meaningful conclusion on collaboration. In the actual sense, effective collaboration would lead to better outcomes among the positive learning experiences and outcomes for students.

Other studies examined student behavior in higher education institutions in developing countries and its effect on their learning experiences and outcomes regarding academic performance, satisfaction, and collaboration (Al-khateeb, 2021; Bawack & Kamdjoug, 2020). For example, Mohammadjafari (2015), Rosenzweig (2009), and DeGroote and Marx (2013) investigated e-collaboration and performance in manufacturing using a contingent view and found that e-collaboration is related to better operational and business performance. Also, it was demonstrated that the strength of the relationship between e-collaboration and operational performance diminishes as environmental munificence increases. It was also discovered that there was no moderating effect concerning the level of product complexity or market variability.

Koufman-Frederick et al. (1999) extensively studied electronic collaboration to provide a practical guide for educators. In their study, the correlated electronic collaboration with teachers out of isolation, provision of time for reflection, thinking and talking about teaching and learning with colleagues, convenience communication, and above all provides educators the potential to communicate with educators from all over the world provides a pool of resources and professional companions that teachers might not find within their own school walls. It can also provide them with a sense of belonging and a sense of identity within a larger community.

According to Alsaad et al. (2018), Al-jawazneh (2012), and Horvath (2001), using electronic collaborative technologies to generate value in the supply chain can be very sensitive to the nature and scale of collaboration between trading partners. While this conjecture seems reasonable, limited research has been conducted to investigate how IT-mediated collaborative activities can be a source of value creation. Cassivi et al. (2004) and Lefebvre et al. (2003) studied the impact of e-collaboration tools on firms' performance, attempting to establish how e-collaboration tools impact the performance of individual firms positioned along the supply chain using an exploratory approach. They examined the whole supply chain of one large telecommunication (OEM) with analysis in two consecutive phases, namely a detailed case study and an electronic survey. Identifying and assessing supply chain

execution and planning e-collaboration tools revealed a link between e-collaboration configurations and key performance dimensions. This study is completely based on firm performance rather than academic performance.

Razmerita and Kirchner (2014) and Oliveira et al. (2011) studied online collaboration or e-collaboration as a form of computer-mediated collaborative learning within the classroom, including multi-level interaction, sharing of resources, and development of competencies in real-world situations. Social media incorporating Web 2.0 technologies supports synergistic communication between personal and collective knowledge, which may lead to knowledge creation and innovation within teams and organizations (Razmerita & Kirchner, 2014). Razmerita and Kirchner (2015) studied collaboration and e-collaboration to understand student perceptions of collaboration and how ICT supports collaboration and is important for its efficient use in the classroom. Additionally, the study assessed the impact of technology on student satisfaction with collaboration outcomes. Gender and place of origin as variables were found to be significantly related to collaboration, and e-collaboration is believed to be factors that influence students' group performance. It was equally established that there are gender and cultural differences concerning the perception of e-collaboration. Thus, both collaboration and e-collaboration are significantly related to performance.

Iyer (2014) investigated the operational impact of collaboration and resource specificity to determine the moderating role of technology context. The study tried to enhance knowledge of the sources of relational rents in supply chains and their relationships with performance. The study untied the relational view framework and contingency perspective to develop a model and hypotheses to understand the nature of the relationships of collaboration and resource specificity with operational performance under technology context contingencies. For this purpose, 115 responses from a wide variety of manufacturing firms where it was found that conventional wisdom is related to collaboration and operational improvements. Additionally, technological turbulence was found to have a differential interactive influence on collaboration and resource specificity in predicting operational performance.

The study by Shannak (2013) on the impact of using e-collaboration tools on company performance examined the relative efficiency of electronic collaboration tools and assessed their impacts on the performance of an individual organization positioned along its supply chain. The study found that e-collaboration tools such as strategy, capacity planning, projected shortage, and replenishment tools affect performance, but replenishment tools had the strongest effect on business performance. The direction of this study is parallel with the direction of this present study as the present study focused on lecturer performance.

In other to substantiate the argument on e-collaboration and how it affects performance, Lefebvre et al. (2003) proposed that examine the impacts of these tools on the innovativeness and performance of individual firms positioned along an industry-specific single supply chain. For this purpose, the study generated data from both the upstream and downstream perspectives for firms positioned at different points of one supply chain, suggesting that e-collaboration and its impacts create a one-sided benefit for the upstream side of the supply chain: first, the overall relative efficiency of e-collaboration tools is higher and, second, the impacts of e-collaboration are more beneficial when used with suppliers than when used with customers. It was found that the efficiency level is higher for e-collaboration tools that support more operational than strategic activities (procurement vs. capacity planning), particularly when given a stage model for implementing collaboration tools in a supply chain. The finding also suggests that e-collaboration is directly linked with the supply chain, which is traceable to organizational performance. However, the study dwelled on the supply chain rather than on the performance of the academics.

Al-Rahmi and Zeki (2017) investigated the use of social media as a means of promoting collaborative learning in the context of studying the Quran and Hadith and found that various factors, both direct and indirect, significantly enhance collaborative learning when using social media, potentially leading to improved learner performance in Malaysian higher education. Onifade et al. (2015) examined e-collaboration for research and development at Nigeria University with a

particular focus on the sources of information available for Science and Technology research activities, determined the extent of academia utilizing e-collaboration networks, and examined the advantages of e-collaboration networks. The study involved 150 researchers from three educational and research institutions. It employed a survey questionnaire approach with a descriptive analysis technique. The study found that about 77% of the researchers collaborate with research groups on the Internet and this is done at least occasionally and, in some situations, very often. This study is descriptive in nature and does not establish any form of relationship between e-collaboration and performance.

Habes et al. (2018) studied collaborative education, emphasizing social media for collaborative learning, between researchers in two Jordanian universities. The study proposed a framework based on constructivist theory. From the framework, a significant result was recorded, showing significant correlations for the interaction with the student, interaction with teachers, engagement, the use of social media in education interaction, and behavioral intention to use social media for collaborative learning among university students. Unfortunately, the study was limited to the students, excluding university teachers.

H1: Electronic collaboration is not positively and significantly related to the academic performance (i.e., teaching performance and research performance) of lecturers.

## **METHOD**

### **Research Design**

The study employed a cross-sectional survey design with a quantitative technique, which enabled the researcher to have a more complete understanding of the research problem. Sekaran and Borgie (2009) recommended this research design when studying issues of this nature.

### **Population of the Study**

The study population covers all the academic staff of Jordanian University, Jordan. The specific population for the study is 300 academic staff (from the university's Registry Unit). Thus, the study's target population was 300 academic staff working at Jordanian University, Jordan.

### **Sample Size and Sampling Technique**

The sample size was determined using the formula by Krejcie & Morgan (1970), which is stated as follows:

- $S = x^2NP(1 - P)$
- $d^2(N - 1) + x^2 P(1 - P)$

Sekaran and Borgie (2009) stated that a population of 300 requires a sample size of 169. A simple random sampling technique was now used to select 170 academic staff, following Sekaran and Bougie (2016), from the population that participated in the study. Apart from that, previous knowledge of e-collaboration of academic staff was equally used as a criterion to be included in the study.

### **Data Collection**

The study data were collected through a survey questionnaire prepared with the aid of Google Forms, using email. The study gathered information through a survey that was distributed throughout the academic staff at Jordanian University. This survey was conducted from February 2023 to January 2023. The study employed the back-translation procedure, which involved writing the original survey instrument in English and translating it from English to Arabic. This process ensures the accuracy and compatibility of the language employed, as well as the preservation of each item's meaning,

via the translation phase (Brislin, 1980). As a result, three academics rewrote the questionnaire instrument twice.

## Data Analysis

The data analysis was conducted using both descriptive and regression analysis techniques. The descriptive analysis summarized the profiles of the respondents in terms of their age, marital status, years of experience, and the various departments they belong to in the university, while the regression analysis determined the relationship between e-collaboration, teaching performance, and research performance. In other words, the hypotheses were tested using the regression analysis through the Statistical Package for Social Science (SPSS) version 21.

## RESULTS

### Descriptive Analysis Result

Table 2 depicts that 55% of the respondents were males, representing 57.9%, while the other 40 were females—42.1%, with a mean of 1.42 and a standard deviation of .496. Also, 56 of them were 41 years and above in terms of age, and the other 39 of them were 36–40 years old, accounting for both 58.9% and 41.1%, respectively. Regarding marital status, 75 were married, and 20 were single, accounting for 78.9% and 21.1%, respectively, with a mean of 1.79 and a standard deviation of .410. The experience of the respondents shows that 45 of them had 6–10 years of experience, 21 of them had 11–15 years, 19 of them had 1–5 years of experience, and the remaining 10 of them have 16 years and above experience, accounting for 47.4%, 22.1%, 20.0%, and 10.5%, respectively. The table shows the department of the respondents. First, it shows that three respondents are from the art department, comprising 3.2%, 54 were in the management department (56.8%), and 38 were in the science department (40%), with a mean of 2.37 and a standard deviation of .547. Their position in the organization revealed that the majority of them, about 61, are assistant professors, 14 of them are associate professors, while the other 20 fell into other groups, such as academic staff. The academic qualification shows that 77 were PhD holders, while the remaining 18 possessed master's degrees, accounting for 81.1% and 18.9%, respectively.

### Validity, Reliability, and Correlation

First, the research items were subjected to construct validity in order to determine whether the items measured what they intended to measure. For this purpose, the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) with a threshold of 0.6 and above was used to judge the validity of the instruments. As depicted in Table 3, it is revealed that the loaded items were valid as they met the threshold of 0.6 and above. For e-collaboration, teaching performance, and research performance, they yielded KMOs of .858, .905, and .815, respectively. Also, the reliability, which measures the consistency of the instrument through the Cronbach's alpha coefficient value of 0.6 and above, revealed that all items are reliable as they met the 0.6 threshold, yielding .920, .976, and .894 for e-collaboration, teaching performance, and research performance, respectively.

The correlation analysis determined the direction of the associations among e-collaboration, teaching performance, and research performance. As depicted in Table 3, there was a positive significant association between e-collaboration and teaching performance at  $r = .860^{**}$  with  $p > 0.01$ : correlation is significant at the 0.01 level (2-tailed), suggesting that e-collaboration is highly correlated with teaching performance. Similarly, there was also a positive significant association between e-collaboration and research performance at  $r = .776^{**}$  with  $p > 0.01$ : Correlation is significant at the 0.01 level (two-tailed), suggesting that e-collaboration is highly correlated with research performance.

**Table 2. Demographic variables of the respondents**

Variables	Frequency	Percentage	<i>M</i>	<i>SD</i>
Gender				
Male	55	57.9		
Female	40	42.1	1.42	0.496
Age				
36–40	39	41.1		
41 and older	56	58.9	3.59	0.495
Marital status				
Single	20	21.1		
Married	75	78.9	1.79	0.41
Position				
Associate professor	14	14.7		
Assistant professor	61	64.2	3.06	0.598
Others	20	21.1		
Highest academic qualification				
Masters	18	18.9	2.81	0.394
PhD	77	81.1		
Years of experience				
1–5 years	19	20	2.23	0.893
6–10 years	45	47.4		
11–15 years	21	22.1		
16 years and more	10	10.5		
Department				
Art	3	3.2	2.37	0.547
Management	54	56.8		
Science	38	40		

**Table 3. Validity, reliability, and correlation analysis test results**

Variables	Validity (KMO)	Reliability (Cronbach's Alpha)	Correlation
e-Collaboration	.858	.920	
Teaching Performance	.905	.976	.860**
Research Performance	.815	.894	.776**

Note. \*\* Correlation is significant at the 0.01 level (two-tailed)

### Testing of the Hypotheses Result

First and foremost, the result of hypothesis one revealed that there is a significant relationship between e-collaboration and teaching performance, with an  $R^2$  value of .739, accounting for a 73.9% variance in the dependent variable. It also shows a positive Beta (.860 or 86%,  $p < 0.05$ ). Furthermore, it was

Table 4. Hypothesis testing result

Hypothesis	Relationships	R <sup>2</sup>	F statistics	Beta	t	Sig.	p value
H1	e-collaboration → teaching performance	.739	263.075	.860	16.220	.000	< 0.05
H2	e-collaboration → research performance	.602	140.507	.776	11.854	.000	< 0.05

Note. Dependent variables: teaching performance, research performance

revealed in Hypothesis 2 results that e-collaboration is statistically significantly related to research performance with an  $R^2$  value of .602, accounting for a 60.2% variance in the dependent variable. It shows .776 for Beta with  $p < 0.05$ , suggesting that e-collaboration is significantly related to research performance.

## DISCUSSION

The major objective of this study is to investigate the relationship between e-collaboration and academic performance. It examined specifically how e-collaboration affects both teaching performance and research performance among the lecturers at Jordanian University. The study used the correlation analysis to confirm the hypothesis, which then revealed that e-collaboration is positively significant to both teaching performance ( $r = .860^{**}$ ) and research performance ( $r = .860^{**}$ ), meaning that e-collaboration is strongly and positively associated with teaching performance and research performance.

The hypothesis testing shows that e-collaboration is statistically significant with the teaching performance of the lecturers at Jordanian University. This implies that e-collaboration is strongly related to teaching performance. It is a significant predictor of teaching performance. Similar findings by other researchers affirmed that e-collaboration is generally related to performance. For example, Rosenzweig (2009) found that e-collaboration is related to better operational and business performance. The study demonstrated that the strength of the relationship between e-collaboration and operational performance diminishes as the level of environmental munificence increases. Also, Cassivi et al. (2004) affirmed that there is a link between e-collaboration and key performance dimensions. It demonstrates that thinking and talking about teaching and learning with colleagues, convenient communication, and, above all, providing educators the potential to communicate with educators from all over the world provides a pool of resources and professional companions that teachers might not find within their own school walls.

Furthermore, it was found that e-collaboration is equally statistically significant related to the research performance of the lecturers at Jordanian University, meaning that e-collaboration significantly affects the research performance of the lecturers ( $p < 0.05$ ). It shows that e-collaboration significantly affects the research performance of the participants. With e-collaboration, academics can now conduct quality research with wider generalization of findings. Shannak (2013) asserted that e-collaboration plays a major role in achieving sustainable performance. The study claimed that e-collaboration tools mostly impact business strategy, capacity planning, projected shortage, and replenishment, and all of these impact business performance, with the replenishment tools having the strongest effect on business performance. The study also observed that e-collaboration improves the general performance of the organization by creating an effective supply chain that helps increase the performance of the organization.

E-collaboration, video conferencing, email, chat sessions, and distributed use of group support systems are made possible such that lecturers can view and cite research works from other searchers around the world. By so doing, academics become more effective and efficient in their teaching jobs as well as in their research work. Also, Cassivi et al. (2004) affirmed that collaboration tools bring

about higher efficiency and support more operational than strategic activities, which consequently leads to higher performance. From the findings, it shows that lecturers increasingly rely on e-collaboration tools to optimize their performance either teaching or researcher performance.

Dev et al. (2020) claimed that collaboration between academic educators and preceptors through joint teaching and assessments in clinical or simulated settings is highly significant and needs to be further strengthened, suggesting that e-collaboration strengthens the performance of the lecturers. In a different perspective, Al-Omouh et al. (2023) found that collaboration significantly affects e-supply chain collaboration and significantly influences collaborative innovation, supply chain agility, and value co-creation. The finding further revealed that both collaborative innovation and corporate sustainability are significantly related to value co-creation, suggesting that collaboration affects every aspect of human endeavors.

## **CONCLUSION**

The major concern of this study is to examine how e-collaboration affects the general performance of the academic lecturers in the university. As earlier stated, e-collaboration tools represent a multifaceted concept, which includes many types of information exchange tools, from simple e-mail systems to more complex interactive computer-aided design (CAD) systems, used to exchange product information and specifications. Several conclusions about e-collaboration and performance have been drawn in literature from many other academic researchers; however, this study presents unique conclusions. First and foremost, the study classified the performance of the lecturers into teaching performance and research performance. It is on this basis that the study draws its conclusions. It therefore concluded that e-collaboration plays a significant role in the teaching performance of the lecturers. For example, they are about to learn new things from their colleagues who are far off, and that which they learned is used to impart to the students. Secondly, the study concluded that e-collaboration is a significant tool for better academic research output. Academics are now opportune to consult with their foreign colleagues to resolve issues and get better research outputs. Issues that are believed to be difficult are better resolved among them. This research strongly concluded that e-collaboration, including its tools, has a positive and significant direct relationship with both the teaching and the research performance of the academics at Jordanian University.

## **LIMITATIONS AND FUTURE WORK**

The study approached all academic levels within the university under investigation; however, many academic levels, such as professors and assistant lecturers, were not captured, as they did not respond to questionnaires. Hence, they failed to participate in the study. This is undoubtedly a major limitation of this study, which subsequent studies in this area must try to address for additional robust findings that could be widely generalized. Also, the data size needed to be increased beyond the scope of this study. The data size of this study is believed to be relatively sized, which could or may have influenced the findings. Researchers believed that the larger the data size or data set, the better the findings obtained. Besides this, including other universities or tertiary institutions in the environment could offer more insight into this issue being investigated. Thus, this study suggests the inclusion of more universities or tertiary institutions in subsequent attempts to investigate the issue of this nature.

## **CONFLICTS OF INTEREST**

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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## **CORRESPONDING AUTHOR**

Correspondence should be addressed to Bilal Al-khateeb; [bilalw83@gmail.com](mailto:bilalw83@gmail.com)

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*Bilal A. A. Al-khateeb is an Associate Professor in the Department of Business Administration, college of Business, Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Saudi Arabia. He received his B.A degree in Business Administration specialization (MIS) from Sindh University in 2007, his M.B.A degree in Business Administration specialization (MIS) from Sindh University in 2007, and his PhD degree in Management Information System from Universiti Utara Malaysia, Kedah, Malaysia in 2015. His research interest includes information sources and information channels, personal and situational characteristics, information choice strategies, information sharing, Blockchain.*