

Steganographic Strategies for Enhancing English Communicative Competence in University Leaders A Qualitative Study in Iraqi Higher Education

Halah Kamal Saeed

halakamal.69@gmail.com

Al- Karkh Studies Centre

Abeer Hadi Salih

abeer.salih@aliraqia.edu.iq

College of Education for Women - Al Iraqia University

Norizan Abdul Razakb

norjef@ukm.edu.my

Faculty of Social Science and Humanities

University Kebangsaan Malaysia, Malaysia

استراتيجيات الإخفاء (الستيغانوغرافيا) لتعزيز الكفاءة التواصلية باللغة الإنجليزية لدى قادة

الجامعات: دراسة نوعية في التعليم العالي العراقي

هالة كمال سعيد مركز الكرخ للدراسات

عبيد هادي صالح كلية التربية للبنات الجامعة العراقية

نوريزان عبد الرزاق كلية العلوم الاجتماعية والإنسانية الجامعة الوطنية الماليزية (UKM) ، ماليزيا

الملخص

لا يقتصر الأمر على القادة الأكاديميين العراقيين في إتقان اللغة للتدريس فحسب، بل يتعداه إلى قدرتهم على التواصل الفعال كقادة. تناقش هذه الورقة مبادئ الإخفاء (الستيغانوغرافيا) في إطار مفاهيمي وتربوي لتعزيز الكفاءة التواصلية باللغة الإنجليزية في التعليم العالي العراقي للعالم الأكاديمي الرقمي الحديث متعدد اللغات، يواجه مسؤولو الجامعات باستمرار صعوبات في محاولة التواصل الاستراتيجي، كالمعمل في شركات دولية، وتبادل الأبحاث ونشرها، وإدارة المؤسسات بكفاءة. يقدم الإخفاء استعارة مناسبة للتواصل القيادي، فكما يمكن أن تكون لدينا رسالة مخفية داخل مظهر مفتوح، يميل القادة إلى تضمين معانٍ غير مباشرة في كلماتهم لتجنب الحساسيات الثقافية والمؤسسية والهرمية، وعلى غرار الرسائل المخفية، يقوم القادة بتشغيل لغتهم وطبقاتها وتوجيهها لإيصال المعنى المقصود إلى الجمهور المناسب دون التسبب في سوء الفهم والصراع، وتستخدم الورقة منهجاً نوعياً، وقد أجريت مقابلات شبه منظمة مع تسعة مسؤولين أكاديميين من جامعات مختلفة في العراق، تم اختيارهم باستخدام العينات الهادفة والتلجية، تم إجراء نسخ البيانات وتحليلها موضوعياً، تشير النتائج إلى أن الممارسات التي يمكن اعتبارها مرتبطة بالإخفاء، مثل تشغيل الرسالة سياقياً، وطبقات الرسالة، والتحفيز، فهي بالغة الأهمية في التواصل القيادي، تكمن أهمية هذه الورقة في أنها توضح كيف يمكن للإخفاء أن يخدم التواصل الاستراتيجي القائم على السياق، وأهمية الجوانب التي تؤثر في الكفاءة التواصلية، وتقدم دروساً عملية لبرامج تطوير القيادات، وقد يتضمن البحث المستقبلي تجربة نماذج تربوية أخرى، وجعل التفكير الإخفائي جزءاً أكثر مركزية في تعليم القيادة، والنظر في استراتيجيات التواصل

في الوقت الفعلي في سياق التعلم الرقمي متعدد اللغات. الكلمات المفتاحية: الإخفاء (الستيغانوغرافيا)، الكفاءة التواصلية، القيادة الأكاديمية، المعرفة الرقمية، التعليم العالي العراقي، التواصل الاستراتيجي، التواصل بين الثقافات.

ABSTRACT

To Iraqi academic leaders, not only do they have to master a language to teach, but also to be able to communicate well as a leader. This paper discusses the steganographic principles in the form of a conceptual and pedagogical framework to promote English communicative competence in Iraqi higher education. In the modern digital and multilingual scholarly world, university administrators constantly have difficulties trying to communicate strategically, such as working in collaboration with international partners, exchanging and publishing research, and operating institutions with efficiency. Steganography provides a good metaphor to leadership communication: like we can have a message disguised in an open envelope, leaders tend to insert oblique meaning into words so as to avoid cultural, institutional and hierarchical sensibilities. Similar to hidden messages, leaders encode, layer, and manipulate their language to get their intended meaning to the appropriate audience without being misunderstood and creating conflict. The paper employs a qualitative design and does semi-structured interviews with nine academic administrators of various universities in Iraq who are sampled using purposive and snowball sampling. The transcription and thematic analysis of data were performed. Results indicate that practices that can be considered as related to steganography, e.g., encoding the message contextually, laying messages, and discretion, are highly important in leadership communication. This paper is significant in that it demonstrates how steganography may serve strategic, context-based communication, the importance of aspects that affect communicative competence, and provides practical lessons on leadership development programs. Further research might involve trying other pedagogical models, making steganographic thinking a more central part of leadership education, and considering the strategies of real-time communication in the context of multilingual, digital learning. **Keywords:** Steganography, Communicative Competence, Academic Leadership, Digital Literacy, Iraqi Higher Education, Strategic Communication, Cross-Cultural Communication

INTRODUCTION

The necessity of effective cross-cultural and cross-linguistic communication is particularly urgent and difficult in an ever more digital and multi-lingual academic setting in Iraq. Although in that situation, English is the foreign language, it is still needed in the leadership of the international academic networks, publications, and academic cooperation. The issue of the attainment and its manifestation in those situations, in particular, among academic leaders, is urgent and complex. Canale and Swain (1980) coined the term communicative competence to refer to the capacity of academic leaders to communicate effectively within English in the realms of grammatical, sociolinguistic, discourse, and strategic dimensions. This is an essential skill that leaders need to be able to express institutional aspirations, collaborate with faculty, and establish valuable partnerships on the local and global level. Nevertheless, very little research has been conducted on the same, particularly among Iraqi academic leaders. This is the gap that this study will address. This can be filled in the form of specific training and leadership development programmes. Moreover, the growing importance of digital technology has established new possibilities of better communication. Steganography is one of these advances - concealing information in other media (Zhang, 2024). Historically associated with the field of digital security, steganography is discussed here as a potential metaphor and a potential method that would assist academic leaders to become more responsive, tactical and situational communication practitioners and foster the belief in creative approaches to challenging issues. According to recent studies, the key idea is to include digital literacy and communication technology in training in leadership (Eden et al., 2024). Such tools as steganography, used not to the full extent, can be useful in the educational leadership setting by providing significant opportunities in terms of teaching what leaders can do to learn the peculiarities of communication, especially in a high-context culture where the meaning is frequently implied instead of being told (Badawy et al., 2024). Careful and deliberate communication will allow academic leaders to monitor the institutional relations more effectively, safeguard confidentiality of information, and increase creativity in teaching and management (Ruben et al., 2023). Although such skills are quite significant, there is a lack of empirical studies of the communicative competence of Iraqi academic leaders, which proves the necessity of this study to stimulate the further investigation and advancements in the sphere of leadership communication. The core research question of this work is as follows: What impact has the communicative ability of Iraqi academic leaders, and how can steganography improve their communication skills? This paper contributes to the literature on communicative competence and higher education leadership in three main ways. The first one is the re-conceptualisation of

steganography, which is traditionally studied in the context of digital research on security as a leadership communication framework that describes how academic leaders strategically conceal a meaning in a multilingual and multicultural environment. Second, using qualitative evidence of the Iraqi higher education, the study empowers the communicative competence research by providing empirically-based evidence on communication of leadership in the Global South. Third, the paper pinpoints and maps seven factors with affect on the communicative competence of academic leaders onto the principles of steganography and, thus, suggests a generalisable analytical framework to be used in informing leadership development programmes and inform future empirical studies.

THEORETICAL FRAMEWORK

The paper discusses the process through which Iraqi academic leaders enhance their communication abilities in digitally changing settings with a focus on steganography. It combines three perspectives that are complementary in order to emphasize strategic, context-sensitive and digitally informed communication. Communicative Competence Theory offers the ground of efficient communication on grammatical, sociolinguistic, discourse, and strategic levels (Hymes, 1972; Canale and Swain, 1980), and digital and intercultural adaptations support the theory in reference to academic leadership (Jing et al., 2025). Leadership Communication Theories focus on adaptive, respondent-oriented, and situational communication, and it is needed to direct teams, promote collaboration, and overcome complicated academic networks (McClelland, 1973; Clark, 2016). Steganographic Principles provide a theoretical and practical means of placing covert messages. Embedding capacity, imperceptibility, robustness, security, and recovery are a few of the principles that facilitate strategic, discrete, and contextually relevant communication (Zhang, 2024). Collectively, the two frameworks imply that steganographic thinking contributes to the strategic communicative competence, and leaders should be in a position to deliver multi-layered messages in a competent and responsible manner.

METHOD

In this qualitative research, semi-structured interviews were used to address the question of the ways in which Iraqi academic leaders build communicative competence in a progressively digital and multi-lingual academic setting. Participants were recruited using two non-probability sampling techniques of purposive and snowball sampling (Creswell, 2012). A sample of 9 academic leaders working in different universities in Iraq with the experience of not less than 3 years as lecturers or administrators was chosen. Purposive sampling has allowed the researchers to select on purpose people who were pertinent in the area of focus of the study, especially those that were actively involved in academic leadership and online communication. Snowball sampling also enhanced the recruitment of the sample through requesting the first responders of the study to recommend other colleagues who fitted into the study criteria. These approaches were suitable considering the purpose of the study to collect deep, context-driven information among the experienced people. According to Creswell and Poth (2016), such methods enable a researcher to apply an informed judgment in selecting information-rich cases. The interviews led the participants to be acquainted with steganography as a metaphor and approach to strategic, discreet, and context awareness communication. Interpretation of the data of the interviews was performed through thematic analysis to detect the factors that impact communicative competence and the possible contribution of digital instruments, especially steganographic principles, in the process of leadership.

Data Collection and Data Analysis

In order to explore the potential of the principles of steganography in assisting the cultivation of communicative competence in the Iraqi academic leaders, information were gathered using semi-structured online interviews, on nine participants of different universities in Iraq. Purposive and snowball sampling was used to pick these academic leaders, who have not less than 3 years of leadership or instructional experience. The idea of steganography as a digital tool and a metaphor of communication was presented to the participants during the interviews. They were asked to consider their experience in digital communication, strategic communication and difficult situations in leadership. Interpretation of the interviews was done through audio-recorded, transcribed interviews and the analysis was done using Hatch typological and thematic analysis methods (Hatch, 2002). Early typologies were developed with references to theoretical concepts such as digital discretion, audience awareness and strategic communication. The coding was done using these typologies whereby the data chunks were marked and coded to identify patterns in the responses of the participants. New concepts such as the importance of digital literacy, context-sensitive communication, and the ability of steganographic thinking to be pedagogical were also reported. This method of analysis made the study reveal the role of communicative competence construction in digitally mediated academic settings and how steganographic principles could be used to improve leadership communication in multilingual and sensitive situations.

FINDINGS

This research shows that the role of communicative competence within the context of the Iraqi academic leaders is becoming highly dependent on the digital settings and strategic, context-specific communicative requirements. Nine interviews with leaders in universities showed similar themes: leaders adjust messages based on the audience and context, especially in culturally or politically sensitive settings. Upon learning of the notion of steganography, as a traditional means of data security, subjects came to appreciate the metaphorical applicability of such procedures to their lives, wherein it was noted that restaurants hid messages behind their walls, employed indirect language, and encoded the signification in accordance to institutional and interpersonal dynamics. The advent of digital literacy became a necessity in order to operate emails, message platforms, and academic networks, where the tone, clarity, and framing are critical. The results might indicate that the principles of steganography discretion, strategic encoding, and audience awareness may be used as a means of communication and as a method to learn how to become a leader.

Key Factors and Themes

Thematic analysis identified **seven interconnected factors** shaping communicative competence: **knowledge sharing, research innovation, international interaction, collaboration, publication, staff management, and salary motivation**. Across these factors, communicative competence was shown to be **practical, adaptive, and culturally sensitive**, aligning closely with steganographic principles.

Knowledge Sharing as Contextual Embedding.

One of the most important sites where communicative competence was developed according to the participants was knowledge-sharing activities, including lectures, academic discussion, and informal peer interactions. Through these interactions it was possible to entrench various layers of meaning into typical academic interactions. The reason why R9 explained, My communicative ability, assists more communication and interaction with colleagues (R9) is that English was utilized not only to pass information but also control relationships and position within the academic. This echoes the contextual embedding, which is a modification of communicative strategies in relation to the audience, setting and institutional demands (Hymes, 1972; Canale and Swain, 1980).

Research Innovation through Strategic Encoding

The communication that involved research turned out to be a domain where strategic encoding and decoding of meaning was needed. The participants variously associated English competence with innovation in the form of workshops, academic writing, teaching, and in general interaction. This is possible through workshops, sharing of research of writing academic writing, English course, teaching, and everyday conversation as mentioned by R2 (R2, transcript B, 4 February 2021, line 13). On the same note, R8 noted that English allowed access to knowledge in other parts of the world, and it was important in the identification of the relevant books, references and up to date issues. Such descriptions reveal that research communication entails the deciphering and incorporation of complicated scholarly meanings into the acceptable scholarly discourse, which is similar to the steganographic encoding pattern (Zhang, 2024).

International Interaction and Audience Adaptation

Communicative adaptation that was not based on language precision was needed to engage with international colleagues and students. Participants pointed out the need to change the tone, the formality and the purpose of communicating in cross-cultural settings. According to R6, communicative ability allowed me to effectively interact with my foreign colleagues and international students (R6, transcript F, 23 June 2021, line 13). This is a form of cultural adaptation and messages are inserted in culturally suitable forms of language to warrant understanding as well as maintain the intended meanings (Celce-Murcia, 2007).

Collaboration and Ethical Messaging

Teamwork was closely related to ethical consciousness and communicative discretion. Respondents cited that successful collaboration meant that one knew how to frame ideas, disagreements, and expectations in an implicit way. R3 introduced moral judgment as a fundamental part of competence and wrote, "Competent communicators are expected to know or judge what is right and what is wrong (R3, transcript C, 27 January 2021, line 12). R4 also observed that collaboration between researchers requires communication to maintain the relationship. These results indicate that some communicative decisions are ethical considerations, meaning that there is ethical embedding as a steganographic practice (Clark, 2016).

Publication as Academic Coding

Academic publishing was found to be one of the fields that should be mastered in terms of implicit disciplinary and journal-specific conventions. The participants reported that they needed to adjust language, form and

argumentation to respond to unwritten rules of the international journals. This entailed the implication of local research issues into globally accepted scholarly formats, which is a form of academic coding, and that would fit the concept of steganography (Jabbar Al Aliet al., 2026).

Staff Management through Layered Communication

The communication needed to be complex in managing academic staff and teaching activities. The participants mentioned English as a tool to give instructions, offer guidance, and encourage staff and students. R8 (who used English to give orders, suggestions, explain ideas, etc.) stated that she used English in such a situation (R8, transcript H, 5 June 2021, line 8), and R9 emphasized that it is important to use English in controlling lectures and training the communicative skills of students. These results show stratified communication with authority, support, and instruction being entrenched differently in different situations and to the different audience (McClelland, 1973).

Motivation and Career Advancement as Strategic Signaling

Career promotion and remunerations became the driving forces behind enhancement of communicative competence. R1 directly connected English skills to employment opportunities since he said, My communicative competence helped me secure a well-paid job (R1, transcript A, 27 January 2021, line 17). The respondents proposed that competence development was usually done in secluded situations via self-directed learning, where skills were unveiled in a strategic manner in the workplace. This is a sign of strategic signaling whereby communicative competence is cultivated privately and is under selective display (Hymes, 1972).

Table 1. Factors and Corresponding Steganographic Principles

Steganography-Informed Factors and Principles

Communication Factor	Communication	Steganographic Principle	Communication
Knowledge Sharing	Collaborative teaching and peer interaction	Visual Embedding	Giving explanations to colleagues'
Innovation	Presenting research ideas strategically	Encoding/Decoding	Linking global research for local use
Social Interaction	Cultural engagement	Adaptation	Using tone and politeness strategically
Interaction	Research and networking	Embedding	Addressing disagreements implicitly
Publication	Academic writing and dissemination	Steganographic Coding	Adhering to journal conventions
Management	Supervising faculty and teaching	Communication	Issuing instructions for staff and students
Motivation	Personal mobility and incentives	Strategic Signaling	Private skill development, selective display

In general, Effective communication with academic leaders in Iraq goes beyond the simple language skills in the English language. This reflection shows that effective leaders use a type of steganographic communication as a tactical skill of coding hidden messages, acute awareness of ethics, and responsiveness to the situation. This cultural competency enables them to negotiate among complicated power relations and the cross-cultural relations. The most important lesson to learn is that leadership development programs ought to go beyond the traditional language training to develop these advanced and contextualized forms of communication to promote organizational performance.

The Essential Conclusion: Communication as embedded Intelligence.

The Iraqi academic leaders' communicative competence is not merely a question of vocabulary or grammar. Instead, it is:

Connection: Deeply embedded in the context of particular cultural, hierarchical, and institutional factors.

- Adaptive: Incessantly changing depending on the audience and directing toward the senate of the ministry or faculty, or international relations.

- Audience-Sensitive: The priority of information is given to the view of the receiver, his/her status, and expectations rather than to the actual delivery of information.

This is in contrast to the completely "linguistic model" of perfect language use, in that it puts emphasis into effective message delivery and relationship maintaining message delivery.

The Mechanism: The Practices of Steganography.

The metaphorical use of the word steganography (literally, covered writing) is to refer to how those in authority mask their true intent or meaning in the most obvious way possible, and it is up to the audience to unravel the message according to the shared cultural context. This is represented in three major practices:

Subtle Message Encoding: In a bid to preserve harmony and face, the leaders usually convey their messages indirectly. One of the critiques can be made in the form of a general observation, or a directive can be given as a suggestion. The actual message is hidden in the tone, words used, non-verbal communication, such that the message can be delivered without embarrassment.

- **Ethical Awareness:** This encoding is in no way deceptive, it is an ethical practice with a sense of respect, hierarchy (duty to superiors and concern towards subordinates) and social cohesion. Leaders are highly conscious of the ethical burden of their utterances and they select the phrasing in a manner that reinforces dignity and mutual values.
- **Contextual Adaptation-** The style of communication of a leader is very dynamic. The familiarity with a long time co-worker becomes deference with a government worker. English is never a standard, but is modified, simplified, or framed in a certain cultural context, to make sure that the message is received effectively by the various multilingual audiences.
- **The Function: Finding a Way around Power and Culture.** These are not practices that are selected by style, but are practices that are the keys to institutional survival and success. They enable leaders to:
- **Managing Power and Hierarchy:** Leaders reinforce the social order by speaking so as to recognize status (i.e. being deferential up the hierarchy, and using power lightly down the hierarchy) without compromising their own power.
- **Navigation:** in an academic setting that is multilingual, these skills play an essential role in the narrowing of the gap between local culture and international academic requirements. Leaders are cultural brokers, which means that they will collaborate well with other foreign universities and researchers.
- **Leadership Development Implications.** This discussion has some specific practical implications in terms of improving institutions of higher learning. The training programs must also shift off the conventional English as a Second Language (ESL) training to encompass:

- **Steganography-Inspired Strategies:** How to train academic leaders to send message and to in indirect communication, interpretation of non-verbal communication, and reading between the lines of professional communication.
- **Cross-Cultural Pragmatics:** Pay attention to the point of the language and culture intersection. Adaptive skills should be built in workshops through simulating complex situations where there is hierarchy (e.g., disagreeing with a superior) or cross-cultural negotiation.
- **Contextual Intelligence Development:** Iraqi academia case studies are used to encourage the leaders examine the communication failures and successes to develop the capacity to evaluate an audience and modify their approach dynamically.

Through the incorporation of these strategies, the institutions will be able to empower leaders in order to improve collaboration, eliminate conflict, and eventually facilitate improved performance in the entire institution in the globalized academic world.

DISCUSSION

The results of the given research indicate that steganographic principles, used both metaphorically and practically, can increase communicative competence of academic leaders functioning in a multilingual and multicultural setting like the one that can be observed in the academic sphere in Iraq. Steganography is traditionally applied in the context of cybersecurity to conceal messages inside other data; however, it provides a new model of how such communication may be made strategic and discreet in a sensitive academic environment (Bamanga, M. A., Babando, A. K., and Mayer, J., 2024).

The members of this study stressed the importance of workshops, seminars, and leadership training as the way of enhancing communication, which reflects the research on communicative competence as the key to leadership effectiveness (Nasif, S. M., 2025). Nevertheless, through infusing steganographic reasoning in such practices, the leaders can be trained on overlaying their messages with cultural sensitivity, discretion, and strategic ambiguity, which are very essential in politically sensitive or hierarchical organizations.

Canale and Swain (1980) discussed these three types of communicative competence namely; grammatical, sociolinguistic, and strategic competence. Steganography fits especially well with strategic competence, the use of language in a specific context, purpose, and audience. As an illustration, Iraqi scholars explained that they used coded language and implicit signals to direct academic employees, cooperate on the international level, and present research work, which are the behaviours that resembled the steganographic method of concealing the meaning behind the visible one.

Besides, steganography may strengthen non-verbal communication by supporting minor signs of tone, timing, and physical signs, which is a primary focus in conventional leadership training (Nasif, S. M., 2025). This paper confirms the previous results that successful leaders employ a variety of communicative strategies to maneuver about a complex social world (Gottfredson, R., and Crane, B., 2025).

Moreover, discretion of language that is guided by steganographic way of thinking can also assist the academic leaders to avoid confronting situations, keep face and create trust among groups of people of various races and ideologies. According to the commentators, indirect expression and ethical communication can be more effective than confrontation when it comes to collaborative research and academic management (R3, R4). Lastly, the performance outcomes that are influenced by the communicative competence working in liaison with steganographic strategies include higher publication, innovation, and internationalization. This is in accordance with the reports given by Owusu (2021), who found out that strategic and participative communication improves transparency, motivation, and creativity within academic institutions.

CONCLUSION

According to the results and the analysis discussed in the previous section, it is concluded that communicative competence is a tool as well as a strategic resource in academic leadership. It helps leaders articulate ideas among diverse backgrounds, adjust to changing circumstances and treat academic personnel with respect and sensitivity. This research shows a great desire by the Iraqi academic leaders to work on their English language communication, as they understand the influence of the English language on effective leadership. The command of English would enable them to handle staff relationships at one on one and group levels, to encourage transparency, inclusion, and professionalism within the academic environment. Moreover, effective communication through listening, responsiveness, and care will help in good interpersonal relationship and credibility of leadership. Notably, this research presents a steganographic approach, applied in this case as an analogy of hidden, coded, and contextual communication. Similarly to steganography, where a message is hidden behind the seemingly trivial message, academic leaders usually provide a subtle meaning to their speeches and texts to negotiate about delicate issues, institutional frameworks or cross-cultural relations. This type of communication helps them to find the balance between openness and confidentiality, have authority but not to conflict, diversity but not to misunderstand. Through this, communicative competence is transformed into a stratified skill where the more regular levels facilitate the surface fluency.

REFERENCES

- ZHANG, G. (2024). Cryptographic Techniques in Digital Media Security: Current Practices and Future Directions. *International Journal of Advanced Computer Science & Applications*, 15(8).
- Driss, M., Berriche, L., Atitallah, S. B., & Rekik, S. (2025). Steganography in IoT: A Comprehensive Survey on Approaches, Challenges, and Future Directions. *IEEE Access*.
- Yang, Z., Wang, Z., & Zhang, X. (2023). A general steganographic framework for neural network models. *Information Sciences*, 643, 119250.
- Eden, C. A., Chisom, O. N., & Adeniyi, I. S. (2024). Promoting digital literacy and social equity in education: Lessons from successful initiatives. *International Journal of Management & Entrepreneurship Research*, 6(3), 687–696.
- Badawy, H. R., Al Ali, F. M., Khan, A. G. Y., Dashti, S. H., & Al Katheeri, S. A. (2024). Transforming education through technology and school leadership. In *Cutting-edge innovations in teaching, leadership, technology, and assessment* (pp. 182–194). IGI Global Scientific Publishing.
- Ruben, B. D., De Lisi, R., & Gigliotti, R. A. (2023). *A guide for leaders in higher education: Concepts, competencies, and tools*. Taylor & Francis.
- Bamanga, M. A., Babando, A. K., & Mayer, J. (2024). Recent advances in steganography (p. 23). *IntechOpen*.
- Nasif, S. M. (2025). *Fostering communication, leadership, and problem-solving: student perspectives from education and psychology faculties at the University of Oulu and Universidade Católica Portuguesa* (Master's thesis, SM Nasif).
- Gottfredson, R., & Crane, B. (2025). Navigating complex environments requires complex leaders—Business Horizons.
- Owusu-Agyeman, Y. (2021). Transformational leadership and innovation in higher education: A participative process approach. *International Journal of Leadership in Education*, 24(5), 694-716.
- Jabbar Al Ali, I. A., & Abdulazeez, Z. A. (2026). JPEG-Resistant DCT Steganography for Secure Communication. *Fusion: Practice & Applications*, 21(1).

Jing, M., Guo, Z., Wu, X., Yang, Z., & Wang, X. (2025). Higher education digital academic leadership: Perceptions and practices from Chinese University Leaders. Education Sciences, 15(5), 606.