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Chapter 5. Artificial Intelligence-Driven Chatbots and Intelligent Agents for Monitoring, Evaluation, and Organisational Learning: A Review of Techniques and Trends

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Abstract

Artificial Intelligence (AI)-driven chatbots and intelligent agents are increasingly deployed to support monitoring, evaluation, and organisational learning. Advances in large language models, retrieval-augmented generation, and multi-agent architectures have expanded conversational AI. Despite growing adoption, existing research remains fragmented across technical, educational, and organisational domains, limiting holistic understanding of their design, impact, and governance. This gap creates challenges for organisations seeking evidence-based guidance for implementation. The purpose of this study is to examine and synthesise existing literature on the design, adoption, and impact of AI-based chatbots and intelligent agents within the contexts of monitoring, evaluation, and internal organisational operations. This study presents a systematic literature review and bibliometric analysis of peer-reviewed studies (2021-2025). The review analyses publication trends, core techniques, and application areas of AI-driven chatbots and intelligent agents. Findings reveal rapid growth and increasing focus on organisational learning and evaluation use cases. The study contributes a consolidated synthesis of techniques, benefits, and challenges, identifies research gaps, and offers directions for future research and evidence-based adoption of conversational AI in organisational environments.

Keywords: artificial intelligence-driven chatbots, intelligent agents, artificial intelligence, ChatGPT, organisational learning.

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Introduction

Artificial intelligence (AI) has rapidly transformed human-computer interaction through advances in machine learning, deep learning, and natural language processing, leading to the emergence of sophisticated conversational systems such as chatbots and intelligent agents (Lee & Li, 2023; Martins et al., 2022). Initially developed as rule-based question-answering tools, these systems have evolved into adaptive and context-aware agents capable of supporting decision-making, learning, and complex organisational tasks (Marroquin & Senadji, 2025).

In recent years, organisations have increasingly integrated AI-driven chatbots into monitoring and evaluation (M&E) and organisational learning processes to enable real-time data interpretation, automated reporting, feedback generation, and continuous improvement (Chen & Gasco-Hernandez, 2024; Hutson & Plate, 2023). The introduction of large language models (LLMs), retrieval-augmented generation (RAG), and multi-agent architectures has further enhanced the ability of conversational AI to support personalised learning, adaptive assessments, and evidence-based organisational decision-making (Marroquin & Senadji, 2025; Burov et al., 2025).

Despite these advances, existing research remains fragmented across technical, educational, and organisational perspectives, offering limited integrated insight into the design, evaluation, governance, and long-term impact of conversational AI systems (Al-Sharafi et al., 2023; Gkinko & Elbanna, 2023). Many organisations adopt chatbots without a comprehensive understanding of ethical risks, performance alignment, and sustainability within organisational learning ecosystems (Bartosiak & Modlinski, 2022; Melnyk & Pypenko, 2025; Qiao et al., 2022). Therefore, this study systematically synthesises the literature on AI-driven chatbots and intelligent agents to clarify their roles, impacts, and challenges in monitoring, evaluation, customer support, and organisational learning contexts. The study is guided by the following objectives:

- To examine and synthesise existing literature on the design, adoption, and application of AI-driven chatbots and intelligent agents in monitoring, evaluation, customer support, and organisational learning contexts.
- To analyse research trends and patterns using bibliometric techniques to identify publication growth, collaboration networks, dominant sources, and key application domains related to conversational AI.
- To identify gaps, challenges, and future research directions to inform the development of integrated, ethical, and effective conversational AI frameworks for organisational monitoring, evaluation, and continuous learning.

Related Work

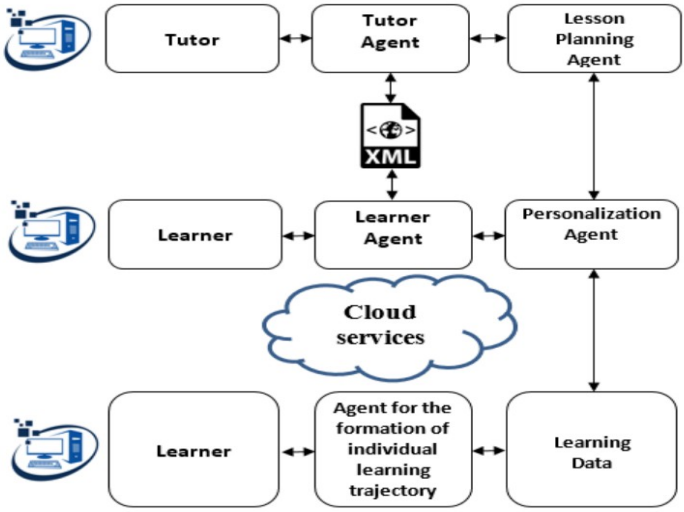
Recent scholarship shows AI-driven chatbots and intelligent agents are moving from “Q&A tools” to organisational infrastructure for continuous learning, monitoring, and evaluation. Marroquin and Senadji (2025) frame generative

conversational agents as workplace learning technologies, highlighting their value for on-demand, contextual support, while noting gaps in peer learning, learning tracking, and integration with performance systems key requirements for monitoring and evaluations.

A strong architectural strand is multi-agent learning environments. Burov et al. (2025) proposes intelligent agent-managers for personal learning environments, where tutor/learner agents interact with planning and personalisation services (as illustrated in the attached framework). Conceptually, it can be summarised as shown in Figure 5.1.

Figure 5.1

Architecture of Distance Learning Multi-Agent Management



Note. From "Using intelligent agent-managers to build personal learning environments in the e-learning system", by O. Yu. Burov et al., 2025, *Proceedings of the 7th International Workshop on Augmented Reality in Education*, p. 127 (https://ceur-ws.org/Vol-3918/).

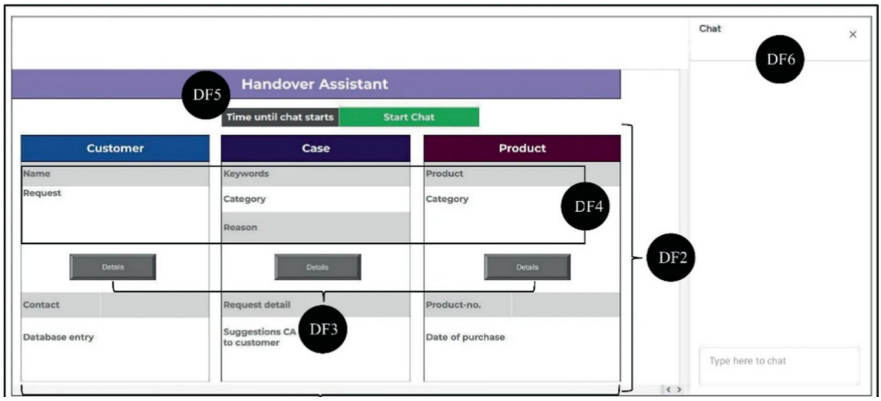
For embedding conversational AI into organisational workflows, Klievtsova et al. (2023) synthesise "conversational process modelling," showing how dialogue interfaces can capture, adapt, and operationalise business processes useful for monitoring compliance and performance. Extending this, Klievtsova et al. (2025) advance conversationally actionable process model creation, enabling process models that can be executed and queried through conversation, supporting auditable evaluation cycles.

Governance, adoption, and human factors are equally prominent. Gkinko and Elbanna (2023) provide a taxonomy of workplace chatbot users, demonstrating that outcomes depend on both design (e.g., social presence) and organisational context, shaping user emotions and appropriation patterns critical for sustained M&E uptake. In education, Al-Sharafi et al. (2023) show that knowledge-management factors strongly influence sustainable chatbot use, implying that organisational learning benefits require deliberate support for knowledge acquisition and application, not only chatbot capability.

Operationally, hybrid service designs matter. Poser et al. (2022) propose effective handover from conversational agents to human employees, addressing service failures and ensuring continuity an essential control mechanism when chatbots support monitoring/reporting:

Figure 5.2

Web-Based Handover Assistant Chatbot



Note. From "Don't throw it over the fence! Toward effective handover from conversational agents to service employees", by M. Poser et al., 2022, *Human-Computer Interaction. User Experience and Behavior. HCII 2022. Lecture Notes in Computer Science, 13304* (https://doi.org/10.1007/978-3-031-05412-9_36). Copyright 2022 by Springer Nature Switzerland AG.

Despite extensive research on AI-driven chatbots and intelligent agents, the literature reveals limited empirical evidence on their integrated use for M&E and continuous organisational learning. Existing studies often focus on technical design, user experience, or isolated learning outcomes, with insufficient attention to longitudinal impact, governance, ethical oversight, and alignment with organisational performance systems. Therefore, the purpose of this study is to examine and synthesise existing literature on the design, adoption, and impact of AI-based chatbots and intelligent agents within the contexts of monitoring, evaluation, customer support, and internal organisational operations.

Methodology

The study follows a dual approach, systematic literature reviews (SLR) and bibliometric analysis. SLR seek to identify publications that contain material of relevance to a research question or objectives and synthesise the outcomes of those publications, while bibliometric analysis focus on measurable publication patterns (e.g., publication counts, keyword co-occurrence, co-authorship trends, relevant sources). A PRISMA framework (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) is applied to improve the reporting quality, maintain transparency, reduce bias and improve the documentation of review protocol (Munn et al., 2018).

Eligibility Criteria

The eligibility criteria were set as studies and reports published in the last 5 years, from 2021 to 2025. The restrictions applied included, peer review journal articles, and conference papers. Only articles reported in the English language and in final publication stage were eligible for inclusion.

Information Sources and Search

AI and chatbot technologies are applied across multiple disciplines, and research on these topics is published and indexed in multidisciplinary databases. SCOPUS and Web of Science capture studies from a wide range of fields and are fully compatible with Biblioshiny used for bibliometric analysis. Therefore, both databases were used reducing the risk of database-specific bias and improving the completeness of the literature capture. The search string below was applied to both databases, and the retrieved records were subsequently merged, deduplicated, and screened to identify eligible publications for inclusion in the study: (“AI-driven chatbots” OR “intelligent agents” OR “conversational agents”) AND (“organisational learning” OR “organizational learning”) AND PUBYEAR > 2020 AND PUBYEAR < 2026 AND (LIMIT-TO (DOCTYPE, “ar”) OR LIMIT-TO (DOCTYPE, “cp”)) AND (LIMIT-TO (LANGUAGE, “English”)) AND (LIMIT-TO (PUBSTAGE, “final”)).

Data Extraction

The initial search yielded 215 publications, which formed the dataset for the bibliometric analysis. During this process, all records meeting the basic inclusion criteria (peer-reviewed articles and conference papers, English language, relevance to AI/chatbots and intelligent systems) were retained to map publication trends, sources, and themes using Biblioshiny.

Afterwards a rigorous screening and eligibility process was applied to identify studies suitable for in-depth qualitative analysis. The PRISMA process is summarised in the Figure 5.3.

Figure 5.3
Data Extraction Process

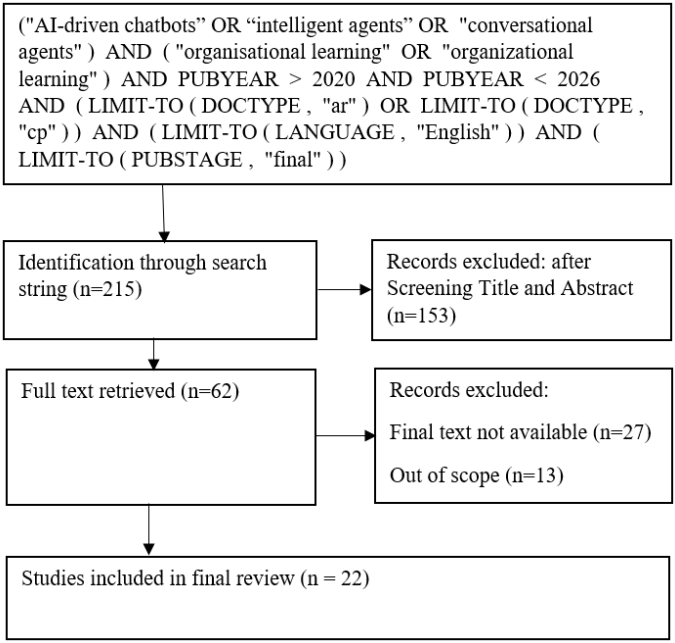


Table 5.1
Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion criteria
Peer-reviewed publications	Non-Peer-reviewed publications
Publications published after December 2020	Studies published before 2021
Full text Journal and Conference articles	Non-English studies
Studies in their final stage of publications	
Studies in English	

Quality Assessment Criteria

According to García-Peñalvo (2022), it is important to evaluate the quality of the articles chosen for review. This study used the criteria presented in Table 5.2 to evaluate the quality of all the articles included in the review.

The evaluation was performed independently by the researchers. All the QA questions are measured with a rating of 1–3 (0 - Not good, 0.5 - Good, and 1 - Very good).

Table 5.2

Quality Assessment Criteria

Quality Assessment	Criteria
QA1	Inclusion and Exclusion criteria (Does the study meet it?)
QA2	Credible source (Is the study published in a recognised source?)
QA3	Relevant to research aim/question (Does the study involve AI-driven chatbots or intelligent agents?)
QA4	Evaluation (does the paper presents experimental or simulation-based performance evaluation and quantitatively/qualitatively analysed?)
QA5	Outcomes (Are the outcomes of the study aligned with it aim)

Reporting on the Evaluation Process

The purpose of the review process is to establish whether each publication is appropriate for the systematic review or not. The pre-defined checklist was designed to check the relevant aspects of the selected publication. With regards to QA2, articles published in journals were scored 1, while conference papers scored 0.5.

Table 5.3

Results after Quality Assessment

Publication	Type	QA1	QA2	QA3	QA4	QA5	Score
Marroquin & Senadji, 2025	Article	1	1	0.5	0.5	1	4
Burov et al., 2025	Conf. paper	1	0.5	1	0	0.5	3
Tsoi & Stronen, 2024	Conf. paper	1	1	1	0	0.5	3.5
Bartosiak & Modlinski, 2022	Article	1	1	1	1	1	5
Sachdeva et al., 2024	Article	1	1	0.5	0.5	1	4
Lee & Li, 2023	Article	1	1	1	1	1	5
Mukherjee & Chittipaka, 2022	Article	1	1	1	1	1	5
Al-Sharafi et al., 2023	Article	1	1	1	1	1	5
Chen & Gasco-Hernandez, 2024	Article	1	1	1	1	1	5
Poser et al., 2022	Article	1	1	1	0	1	4
Sofiyah et al., 2024	Article	1	1	1	1	1	5
Qiao et al., 2022	Conf. paper	1	0.5	1	1	1	4.5
Poser et al., 2022	Conf. paper	1	0.5	1	1	1	4.5
Flandrin et al., 2021	Conf. paper	1	0.5	1	1	1	4.5
Singh et al., 2021	Conf. paper	1	0.5	1	1	0.5	4
Alotaibi et al., 2022	Conf. paper	1	0.5	1	0	1	3.5
Huang et al., 2024	Article	1	1	1	1	1	5
Gkinko & Elbanna, 2023	Article	1	1	1	1	1	5
Martins et al., 2022	Article	1	1	1	0	1	4
Dube et al., 2024	Conf. paper	1	0.5	1	1	1	4.5
Terblanche & Tau, 2025	Article	1	1	1	1	1	5
Maragno et al., 2023	Article	1	1	1	0	1	4

Results and Discussion

This section provides the dataset results from bibliometric analysis. Table 5.4 provides an overview of the bibliometric characteristics of research on AI-driven chatbots and intelligent agents between 2021 and 2025. The dataset comprises 215 documents drawn from 150 sources, reflecting a broad and multidisciplinary research base (Flandrin et al., 2021; Huang et al., 2024; Maragno et al., 2023; Singh et al., 2021). An annual growth rate of 16.95% indicates rapid and sustained expansion of the field, while the low average document age (1.68 years) highlights its recent and evolving nature. The average of 20.27 citations per document suggests strong scholarly impact despite the field's youth. High keyword diversity (over 2,100 combined keywords) points to conceptual richness and thematic breadth. Authorship patterns show a highly collaborative research culture, with 733 authors, an average of 3.64 co-authors per document, and nearly 34% international collaboration. Journal articles dominate outputs, confirming the field's academic maturity.

Table 5.4

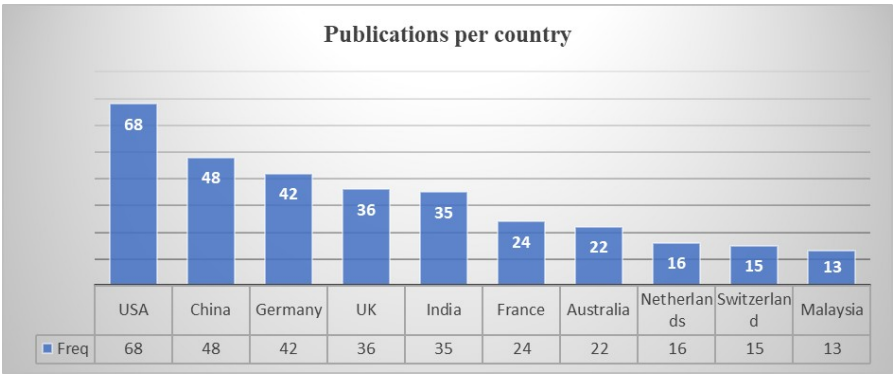
Main Information

Description	Results
Main information about data:	
Timespan	2021:2025
Sources (Journals, Books, etc.)	150
Documents	215
Annual growth rate, %	16.95
Document average age	1.68
Average citations per doc	20.27
References	1971
Document contents:	
Keywords plus (ID)	1174
Author's keywords (DE)	937
Authors:	
Authors	733
Authors of single-authored docs	13
Authors collaboration:	
Single-authored docs	13
Co-authors per doc	3.64
International co-authorships, %	33.95
Document types:	
Article	165
Conference paper	50

Figure 5.4 shows that research on AI-driven chatbots and intelligent agents is geographically diverse but dominated by leading countries.

Figure 5.4

Publication per Country



The United States leads with 68 publications, reflecting strong investment and research capacity in AI technologies. China and Germany follow, highlighting both rapid technological development and strong academic ecosystems. The United Kingdom and India also contribute substantially, indicating active engagement from both developed and emerging economies (Sachdeva et al., 2024). European countries such as France, the Netherlands, and Switzerland show consistent contributions, while Australia and Malaysia demonstrate growing regional participation. Overall, the distribution suggests global interest, with research activity concentrated in technologically advanced and innovation-driven countries.

Key Developments in AI-Driven Chatbot

Figure 5.5 illustrates the progressive evolution of AI-driven chatbots between 2021 and 2025, highlighting a shift from basic automation to intelligent, learning-oriented systems (Flandrin et al., 2021; Qiao et al., 2022). In 2021-2022, research focused on adaptive chatbot frameworks that supported business process learning and personalised learning analytics, positioning chatbots as cognitive tools rather than simple interfaces (Lee & Li, 2023; Mukherjee & Chittipaka, 2022; Wilkinson et al., 2017).

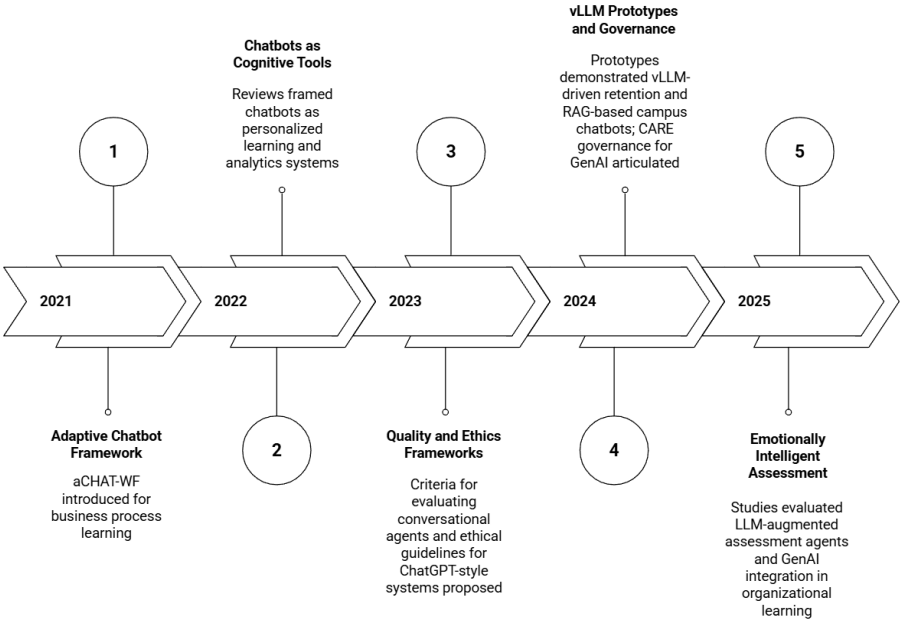
By 2023, increased attention was given to quality, ethics, and governance, with studies proposing evaluation criteria to address bias, transparency, and responsible AI use in conversational systems (Bartosiak & Modlinski, 2022; Gkinko & Elbanna, 2023).

The 2024 phase marks a technological leap, characterised by vLLM prototypes and Retrieval-Augmented Generation (RAG), enabling context-aware

monitoring, reporting, and evidence-based organisational learning (Chen & Gasco-Hernandez, 2024; Hutson & Plate, 2023; Sofiyah et al., 2024). By 2025, research converges on emotionally intelligent and LLM-augmented assessment agents integrated into organisational learning ecosystems, emphasising reflection, decision support, and continuous learning (Terblanche & Tau, 2025; Burov et al., 2025). The figure reflects increasing maturity, sophistication, and organisational embeddedness of conversational AI.

Figure 5.5

Key Developments in AI-Driven Chatbot (2021-2025)



Techniques in Building AI-Chatbots and Intelligent Agents

Table 5.5 summarizes core AI techniques, common architectures, and evaluation approaches used to build chatbots and agents for monitoring, evaluation, and organizational learning. It highlights the role of large language models, retrieval augmentation, dialogue management, agent modules, and evaluation frameworks.

Modern conversational AI systems combine core NLP and machine learning methods use aforementioned techniques to ground interactions in institutional documents and deliver reliable, domain-specific answers (Alotaibi et al., 2022; Singh et al., 2021). At the same time, advances in agent and conversational architectures separate dialogue flow, user modelling, and content

management, enabling adaptive interactions that can be configured by non-technical domain experts.

Table 5.5

Core Techniques in Building AI-Chatbots and Intelligent Agents

Technique	Role in M&E and Organisational learning
Large language models and vLLMs	Natural language understanding and generation for tutoring, question and answers (Q&A), and adaptive feedback (uses both generation and scoring) (Dube et al., 2024; Klievtsova et al., 2023).
Retrieval-Augmented Generation (RAG)	Domain grounding and factual response generation from organizational corpora for assessments and reporting (Hutson & Plate, 2023).
Dialogue management and intent classification	Multi-turn control, adaptive sequencing of learning items, and user modeling for assessments and learning paths (Chen, 2024).
Agent architectures and multi-agent systems	Autonomous monitoring, notifications, and personal learning environments with role separation (author/learner/manager) (Burov et al., 2025).
Planning, rollouts, and reinforcement approaches	Proactive response planning and progression-aware actions to optimize dialog outcomes and task success (Bartosiak & Modlinski, 2022).
Evaluation and benchmark frameworks	Specialized pedagogical benchmarks, lifecycle quality criteria, and automated self-play or bot-bot methods for scalable evaluation (Klievtsova et al., 2023).

Applications Use Cases and Benefits

Deployment of AI-driven chatbots in post training or continuous learning, the intelligent systems apply spaced repetition, adaptive question generation, and personalized revision to improve knowledge retention after training sessions. In educational organisations, they present opportunities for conversation based assessments that can be used to evaluate student responses, and deliver tailored feedback, consequently reducing the academics workload by automating question prompts and scoring assistance (Al-Sharafi et al., 2023; Pypenko, 2024).

Conversational tools are also able to convert organisation documents, or spreadsheets into interactive query-driven interfaces allowing institutional teams to engage more with data (Burov et al., 2025). Unlike before, where employees used manual filtering or analysis to create static reports, now they can ask natural-language questions to dynamically explore performance indicators, monitor trends, and generate evaluation metrics on demand.

Organisation Domain Teaching and Workflow Training

Adaptive chatbots can support domain-specific teaching and workflow training by guiding users through business processes step by step and sequencing learning content based on the user's role, experience level, and progress (Klievtsova et al., 2023, 2025). By dynamically adjusting explanations, examples, and prompts, AI-chatbots enable personalised, just-in-time learning while supporting non-technical authors to configure conversation styles and training flows without requiring programming skills. With regards to knowledge management and communities of practice, conversational AI, can be integrated to facilitate experience sharing and informal knowledge exchange among practitioners (Tsoi & Stronen, 2024). By enabling users to query organisational knowledge in context, such as policies, best practices, lessons learned, and expert insights, conversational tools help surface tacit and explicit knowledge at the point of need, strengthening collective learning and continuous improvement.

Conclusion, Limitations and Future Studies

The power of AI is augmenting the capabilities of existing technological tools, enabling them to perform more intelligent, adaptive, and context-aware tasks. Recently, chatbots have been widely deployed across various sectors, with functionalities extending beyond simple question-answering.

This review reveals deployments of AI chatbots and intelligent systems in performance assessments, institutional reporting, front line support, and knowledge management. With these deployments, organisations get to experience benefits include customization of responses, faster data to insight, and improved scalability, with opportunities of having intelligent personal assistance. The study acknowledges the following limitations, the review was limited to studies published in English and sourced from two peer-reviewed academic databases (Scopus and Web of Science), excluding relevant findings from other sources. Even though search strategy was used, selection bias may still exist due to variations in database indexing, leading to exclusion of relevant studies with inaccessible full texts.

Future reviews could address these limitations by incorporating additional databases and considering multilingual studies to provide a more comprehensive and representative synthesis of the evidence. Future research should focus on the following three directions. Firstly, the exploration of hybrid architectures combining vLLMs with deterministic retrieval and rule layers to improve factual accuracy and auditability for M&E tasks. Secondly, human centric governance frameworks (such as CARE) to balance automation with accountability, responsiveness, and empowerment of users. Lastly, empirical longitudinal studies on organizational decision-making improvements, and cost benefit across deployments to establish evidence of impact.

References

Al-Sharafi, M. A., Al-Emran, M., Iranmanesh, M., Al-Qaysi, N., Iahad, N. A., & Arpaci, I. (2023). Understanding the impact of knowledge management factors on the sustainable use of AI-based chatbots for educational purposes using a hybrid SEM-ANN. *Interactive Learning Environments, 31*(10), 7491–7510. https://doi.org/10.1080/10494820.2022.2075014

Alotaibi, M., Alotaibi, M., Alamri, L., Alkadi, D., Alsahali, S., Aljameel, S., & Youldash, M. (2022). CAPEs advisory: A conversational agent based on NLP techniques for professional examinations advisory. *Proceedings of the Future Technologies Conference, 1288,* 755–768. https://doi.org/10.1007/978-3-030-63128-4_56

Bartosiak, M. L., & Modlinski, A. (2022). Fired by an algorithm? Exploration of conformism with biased intelligent decision support systems in the context of workplace discipline. *Career Development International, 27*(6/7), 601–615. https://doi.org/10.1108/CDI-06-2022-0170

Burov, O.Yu., Pasko, N. B., Viunenko, O. B., Agadzhanova, S. V, & Ahadzhanov-Honsales, K. H. (2025). Using intelligent agent-managers to build personal learning environments in the e-learning system. *7th International Workshop on Augmented Reality in Education,* 125–133. https://ceur-ws.org/Vol-3918/paper296.pdf

Chen, T., & Gasco-Hernandez, M. (2024). Uncovering the results of AI chatbot use in the public sector: Evidence from US state governments. *Public Performance & Management Review, 48*(6), 1331–1356. https://doi.org/10.1080/15309576.2024.2389864

Chen, Y. (2024). Enhancing language acquisition: The role of AI in facilitating effective language learning. *3rd International Conference on Humanities, Wisdom Education and Service Management (HWESM 2024),* 593–600. https://doi.org/10.2991/978-2-38476-253-8_71

Dube, M., Mutunhu Ndlovu, B., & Dube, S. (2024). Factors influencing the adoption of AI chatbots by non-governmental organizations. In *7th European Industrial Engineering and Operations Management Conference* (pp. 639–651). https://doi.org/10.46254/EU07.20240155

Flandrin, P., Hellemans, C., Van Der Linden, J., & Van De Leemput, C. (2021). Smart technologies in hospitality: effects on activity, work design and employment. A case study about chatbot usage. *Proceedings of the 17th "Ergonomie et Informatique Avancée" Conference, 2,* 1–11. https://doi.org/10.1145/3486812.3486838

García-Peñalvo, F. J. (2022). Developing robust state-of-the-art reports: Systematic literature reviews. *Education in the Knowledge Society, 23,* Article E28600. https://doi.org/10.14201/eks.28600

Gkinko, L., & Elbanna, A. (2023). The appropriation of conversational AI in the workplace: A taxonomy of AI chatbot users. *International Journal of Information Management, 69,* Article 102568. https://doi.org/10.1016/J.IJINFOMGT.2022.102568

Huang, H. W., Teng, D. C. E., & Tiangco, J. A. N. Z. (2024). The impact of AI chatbot-supported guided discovery learning on pre-service teachers' learning performance and motivation. *Journal of Science Education and Technology,* 1–15. https://doi.org/10.1007/S10956-024-10179-9/TABLES/7

Hutson, J., & Plate, D. (2023). Enhancing institutional assessment and reporting through conversational technologies: Exploring the potential of AI-powered tools and natural language processing. *DS Journal of Artificial Intelligence and Robotics, 1*(1), 11–22. https://doi.org/10.59232/air-v1i1p102

Klievtsova, N., Benzin, J. V., Kampik, T., Mangler, J., & Rinderle-Ma, S. (2023). Conversational process modelling: State of the art, applications, and implications in practice. In Di Francescomarino, C., Burattin, A. (Eds.), *Lecture Notes in Business Information Processing, Vol. 490*. Springer. https://doi.org/10.1007/978-3-031-41623-1_19

Klievtsova, N., Kampik, T., Mangler, J., & Rinderle-Ma, S. (2025). Conversationally actionable process model creation. In Comuzzi, M., Grigori, D., Sellami, M. (Eds.), *Lecture Notes in Computer Science, Vol. 15506*. Springer. https://doi.org/10.1007/978-3-031-81375-7_3

Lee, K. W., & Li, C. Y. (2023). It is not merely a chat: Transforming chatbot affordances into dual identification and loyalty. *Journal of Retailing and Consumer Services, 74,* Article 103447. https://doi.org/10.1016/j.jretconser.2023.103447

Maragno, G., Tangi, L., Gastaldi, L., & Benedetti, M. (2023). AI as an organizational agent to nurture: effectively introducing chatbots in public entities. *Public Management Review, 25*(11), 2135–2165. https://doi.org/10.1080/14719037.2022.2063935

Marroquin, E. M., & Senadji, B. (2025). Activity theory as framework for analysis of workplace learning technologies: the case of generative AI conversational agents. *The International Journal of Information and Learning Technology, 42*(4), 353–365. https://doi.org/10.1108/IJILT-07-2024-0141

Martins, I., Andrade, D., & Tumelero, C. (2022). Increasing customer service efficiency through artificial intelligence chatbot. *Revista de Gestao, 29*(3), 238–251. https://doi.org/10.1108/REGE-07-2021-0120

Melnyk, Y. B., & Pypenko, I. S. (2025). Implementing of artificial intelligence in a higher educational ecosystem. *International Journal of Science Annals, 8*(1), 13–20. https://doi.org/10.26697/ijsa.2025.1.1

Mukherjee, S., & Chittipaka, V. (2022). Analysing the adoption of intelligent agent technology in food supply chain management: An empirical evidence. *FIIB Business Review, 11*(4), 438–454. https://doi.org/10.1177/23197145211059243

Munn, Z., Peters, M. D. J., Stern, C., Tufanaru, C., Mcarthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medivcal Research Methodology, 18*(141). https://doi.org/10.1186/s12874-018-0611-x

Poser, M., Hackbarth, T., & Bittner, E. A. C. (2022). Don't throw it over the fence! Toward effective handover from conversational agents to service employees. *International Conference on Human-Computer Interaction, 13304 LNCS,* 531–545. https://doi.org/10.1007/978-3-031-05412-9_36

Pypenko, I. S. (2024). Benefits and challenges of using artificial intelligence by stakeholders in higher education. *International Journal of Science Annals, 7*(2), 28–33. https://doi.org/10.26697/ijsa.2024.2.7

Qiao, Q., Wu, W., & Li, Y. (2022). Enhancing consumer usage of AI-chatbots: The role of perceived humanness, social presence, and social interactivity. *Proceedings of the 8th International Conference on Information Management,* 97–103. https://doi.org/10.1109/ICIM56520.2022.00025

Sachdeva, A., Kim, A., & Dennis, A. R. (2024). Taking the chat out of chatbot? Collecting user reviews with chatbots and web forms. *Journal of Management Information Systems, 41*(1), 146–177. https://doi.org/10.1080/07421222.2023.2301175

Singh, H., Cascini, G., & McComb, C. (2021). Comparing virtual and face-to-face team collaboration: Insights from an agent-based simulation. *Proceedings of the ASME Design Engineering Technical Conference, 6,* V006T06A022. https://doi.org/10.1115/DETC2021-66043

Sofiyah, F. R., Dilham, A., Hutagalun, A. Q., Yulinda, Y., Lubis, A. S., & Marpaung, J. L. (2024). The chatbot artificial intelligence as the alternative customer services strategic to improve the customer relationship management in real-time responses. *International Journal of Economics and Business Research, 27*(5). https://doi.org/10.1504/IJEBR.2024.10064925

Terblanche, N., & Tau, T. (2025). Article Industry and Higher Education. *Industry and Higher Education, 39*(3), 279–290. https://doi.org/10.1177/09504222241287090

Tsoi, J. C. H., & Strønen, F. (2024). Integration of conversational AI capabilities in knowledge management processes for higher education. *Proceedings of the European Conference on Knowledge Management, ECKM,* 2024-Septe, 1026–1033. https://doi.org/10.34190/eckm.25.1.2659

Wilkinson, A., Pettifor, A., Rosenberg, M., Halpern, C. T., Thirumurthy, H., Collinson, M. A., & Kahn, K. (2017). The employment environment for

youth in rural South Africa: A mixed-methods study. *Development Southern Africa, 34*(1), 17–32. https://doi.org/10.1080/0376835X.2016.1259986

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