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A Model for Utilizing Artificial Intelligence to Achieve Knowledge Management Goals in Higher Education

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Abstract

Purpose: A synergistic interaction exists between Knowledge Management (KM) and Artificial Intelligence (AI), where AI provides tools for creating and expanding the scope of organizational knowledge. This research aims to develop a model for leveraging AI to achieve KM objectives in universities.

Methodology: This study is applied and developmental in purpose and qualitative in nature, employing a Fuzzy Cognitive Mapping (FCM) strategy. Data were collected through semi-structured interviews. Participants consisted of faculty members from Arak University, selected via snowball sampling, resulting in 13 interviews. Modeling was performed using the Mental Modeler software.

Findings: The FCM model identified "intelligent assistants and chatbots" (with an impact rating of 2.2) as having the greatest direct influence on achieving KM goals. "Expanding the knowledge-based space in the organization" (impact rating: 2.42) was found to exert the strongest influence on the KM process. In terms of centrality within the network, "developing the knowledge capacity of individuals" (centrality: 3.96) and "expanding the knowledge-based space in the organization" (centrality: 3.75) emerged as the most pivotal components.

Conclusion: To effectively integrate AI for KM, the study recommends: providing adequate infrastructure for AI applications in universities; organizing workshops and up-to-date training programs to familiarize faculty and students with AI tools; incentivizing faculty to incorporate AI into teaching and research activities; and proactively addressing associated ethical challenges and considerations.

Value: This research offers organizations novel insights into the potential relationship between AI and KM, advocating for the use of advanced technologies to transform traditional KM systems into dynamic frameworks governed by specific rules and adaptive regulations.

Keywords: ***Artificial Intelligence, Knowledge Management, Higher Education, Fuzzy Cognitive Mapping (FCM)***

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Extended Abstract

Introduction: Knowledge management is the continuous process of recognizing, acquiring, analyzing, organizing, disseminating, creating value, applying, and creating knowledge to advance organizational goals, a process which requires intelligent processing and communication technologies. Furthermore, the increasing trends of globalization and customer orientation have heightened the significance of knowledge management and underscore the need to utilize artificial intelligence in decision-making and in achieving knowledge management objectives. Today's workplace is evolving with the advent of advanced technology, where artificial intelligence can extract new insights from large volumes of data and visualize complex relationships to serve as a basis for human decision-making. A close interaction exists between knowledge management and artificial intelligence; this interaction facilitates the comprehension of knowledge and provides tools for generating new knowledge and expanding the scope of its application. Recent advances in artificial intelligence can furnish new foundations for transforming knowledge management within organizations and create opportunities to generate greater added value. Therefore, given the pressing need for emerging technologies to implement knowledge management processes effectively, organizations require a renewed perspective on the potential relationship between artificial intelligence and knowledge management. It is imperative to consider the potential impacts of artificial intelligence systems in supporting knowledge management activities and, by leveraging new technologies, to transform traditional knowledge management frameworks based on specific rules and regulations.

Purpose: The integration of technology into higher education is a complex and challenging endeavor. On one hand, institutions face multifaceted challenges, including financial pressures, rapid technological advancement, evolving employee roles, competitive pressures, and the need for continuous adaptation. On the other hand, they must steadfastly pursue their fundamental missions of education, research, and service to society. A clear, actionable model for leveraging technology—specifically for implementing knowledge management—is currently lacking for university leaders and administrators to adopt. Therefore, the aim of this study is to develop a model that elucidates the various dimensions of artificial intelligence capabilities in achieving knowledge management objectives within universities.

Methodology: This study is applied and developmental in purpose, qualitative in the nature of its data, and descriptive in its data collection approach. The study was conducted during the Winter of 2024 and Spring of 2025. Data were collected through semi-structured, guided interviews. The participants in this study were faculty members of Arak University. A snowball sampling method was employed, resulting in a total of 13 faculty member interviews. To discover the relationships between the extracted factors, this research utilized the Fuzzy Cognitive Mapping (FCM) strategy—a method within the domain of soft operations research. The Mental Modeler software tool was used for conducting the modeling.

Findings: The initial step in fuzzy cognitive mapping involves the identification of nodes. Accordingly, the primary requirement was to identify the components related to utilizing artificial intelligence in knowledge management activities, as well as the goals of knowledge management in higher education. In this study, the relevant factors were identified through a careful examination and review of the existing

literature. Subsequently, during in-person meetings with faculty members, a final synthesis was conducted, and the components were categorized into three general groups: (1) Applications of Artificial Intelligence in Knowledge Management, (2) Knowledge Management Goals, and (3) The Knowledge Management Process. The second step in fuzzy cognitive mapping entails determining the causal relationships between nodes. The degree of influence among nodes is presented in Table 1.

Table 1. Fuzzy Cognitive Map Weight Matrix: Influence of AI Tools on Knowledge Management Components

Influencing Factor (From) →	improving and enriching	expanding the knowledge-based	utilizing technology in	improving access to knowledge	developing the knowledge	application	publication	storage	creation
Intelligent assistants and chatbots	0	0.7	0	0.69	0.81	0	0	0	0
Knowledge graphs	0.41	0	0	0	0	0	0	0	0
Artificial neural networks	0	0	0	0	0.58	0	0	0	0
Code generation tools	0	0	0.72	0	0	0	0	0	0
Machine learning	0.47	0	0	0	0.64	0	0	0	0
Simulation	0	0	0.77	0	0	0	0	0	0
Natural language processing	0.45	0	0	0	0.59	0	0	0	0
Expert systems	0.47	0.63	0	0.42	0	0	0	0	0
Improving and enriching knowledge	0	0	0	0	0	0	0	0.58	0.52
expanding the knowledge-based space in the organization	0	0	0	0	0	0.75	0.67	0.41	0.59
utilizing technology in problem solving	0	0	0	0	0	0.78	0	0	0
improving access to knowledge resources	0	0	0	0	0	0	0.73	0	0.66
developing the knowledge capacity of individuals	0	0	0	0	0	0.53	0	0	0.81

The third step involved constructing the fuzzy cognitive map based on the causal weight matrix (Table 1) and the corresponding edge values, which was accomplished using the online Mental Modeler tool. The resulting map is presented in Figure 1.

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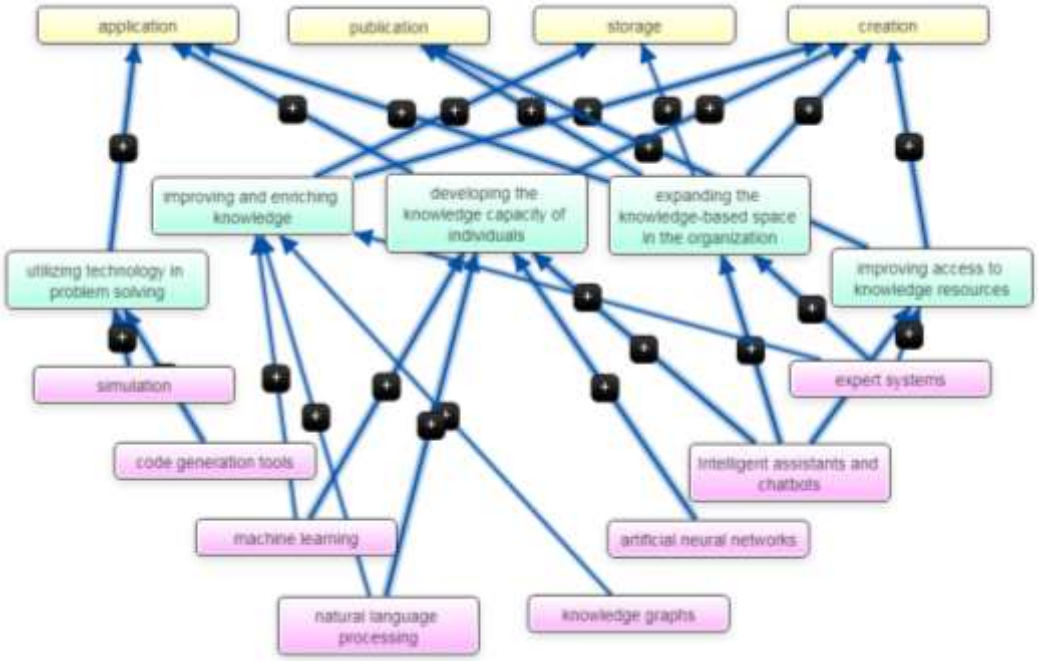

Figure 1. The derived fuzzy cognitive map: Modeling the use of artificial intelligence to achieve knowledge management goals in a university context.

Conclusion: The analysis reveals that intelligent assistants and chatbots, with an impact rating of 2.2, exert the greatest direct influence on achieving diverse knowledge management (KM) goals in higher education. Conversely, the goal of "developing individuals' knowledge capacity" (impact rating: 2.62) is most significantly influenced by artificial intelligence (AI) applications.

Within the KM process, the goal of "expanding the knowledge-based space in the organization" (impact rating: 2.42) has the strongest overall impact. Furthermore, the "knowledge creation" stage (impact rating: 2.58) most substantially affects the attainment of broader KM goals.

In terms of structural importance within the derived model, "developing the knowledge capacity of individuals" (centrality score: 3.96) and "expanding the knowledge-based space in the organization" (centrality score: 3.75) emerged as the most central components in the pattern of utilizing AI to achieve KM objectives in a university setting.

Based on these findings, the following recommendations are proposed: Provide adequate infrastructure to support key AI applications for KM in universities, Plan strategic investments in AI technologies, Organize workshops and up-to-date training courses to familiarize faculty and students with AI applications in academia, Incentivize faculty to integrate AI tools into teaching and research activities, Incorporate the use of new technologies into academic and research evaluation criteria, Develop comprehensive training modules on various AI tools.

While the potential benefits of AI for KM are considerable, the ethical challenges and considerations associated with its adoption in universities are equally critical. To effectively leverage AI as a collaborative partner in KM, individuals must enhance their understanding, skills, and knowledge, while proactively addressing the risks associated with automation.

Value: Given the urgent need for emerging technologies in implementing knowledge management processes, organizations require a new perspective on the

potential relationship between artificial intelligence and knowledge management. It is essential to consider the potential impacts of artificial intelligence systems in supporting knowledge management activities and, through the utilization of new technologies, to transform traditional knowledge management frameworks based on specific rules and regulations.

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