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Development of Knowledge Management System for Enhancing Teaching and Learning in Libyan Institutes of Higher Learning

Hamza Masauod M Inayah¹, Khalid Krayz Allah^{2*}, Mohamed Elhadi M Sharif³, Faraj Ali Faraj Alyaqobi⁴, Ibrahim Mohamed Yosser⁵

¹Higher Institute of Science & Technology, Souk ElKhemis Emsihel, Libya

²Data Analysis Department, Faculty of Accounting, Gharyan University Gharyan, Libya

³Higher Institute of Science & Technology, Tajoura, Libya

⁴Higher Institute of Science and Technology, Yefren, Libya

⁵Higher Institute of Science & Technology, Mizdah, Libya

*Corresponding author: E-mail addresses: khalid.krayz@gmail.com

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ABSTRACT

Knowledge management systems (KMS) remain underdeveloped in Libyan Higher Institutes of Learning, where academic staff work in isolation and rarely collaborate or share professional knowledge. This study aimed to develop a prototype Libyan Academic Knowledge Management System (LA-KMS) to foster connecting, collaborating, and sharing knowledge among academicians. A Design-Based Research approach using iterative design and development was adopted, involving 71 academicians across three main stages. In Stage 1, six academicians were interviewed and existing systems reviewed to identify problems with current knowledge-sharing practices; the Technology Acceptance Model (TAM) was used to analyze results, identifying design features and web-based heuristics, with ease-of-use confirmed as essential for adoption. A first prototype was then developed and evaluated by 15 academicians, who reported poor functionality and reluctance to adopt or recommend it. A second, improved prototype was developed addressing this feedback; its evaluation showed that ease-of-use heuristics were satisfied, with all respondents willing to adopt it if fully implemented. All four research objectives were achieved, covering the KMS literature and architecture, challenges facing Libyan institutions, development of LA-KMS guided by TAM and ease-of-use heuristics, and the two-round prototype evaluation. This study is the first in Libya to apply Design-Based Research Methodology with TAM to develop a web-based KMS artifact for academicians, using interviews for specification and questionnaires for evaluation. The main limitation is that participants were predominantly from Tripoli, as the civil war and the COVID-19 pandemic restricted travel to other regions of Libya.

1. INTRODUCTION

According to Laudon and Laudon (2018), knowledge management systems are among the fastest-growing areas of government and corporate information systems investment, with a dramatic growth over the past decade in research on knowledge and knowledge management across management, information systems, and economics.

The main goal of managing knowledge is to capture knowledge that serves the needs of employees and an organization's strategic goals (O'Dell & Hubert, 2011). As with other business organizations, prior studies indicate that higher education institutions can apply knowledge management to support their performance achievements (Kidwell, Vander Linde, & Johnson, 2000; Ramachandran, Chong, & Wong, 2013; Sunalai, 2017), particularly to improve the quality of institutional performance. There is growing recognition that an institution-wide approach to knowledge management (KM) can enable higher education institutions (HEIs) to evolve into highly effective and dynamic educational environments, improving institution-wide knowledge-sharing activities and overall performance (Sharimllah Devi et al., 2007). However, only a few educational institutions have a full-fledged KM practice in place (Sharimllah Devi et al., 2013). Studies of KM systems (KMS) in Libyan organizations are rare, and KMS studies relating specifically to Libyan Institutes of Higher Learning appear not to exist. As knowledge workers, academic staff can benefit from collaboration among themselves and the sharing of their professional perceptions. Yet, academic staff in Libyan institutes of higher learning are often isolated in their lecture rooms or faculties, which discourages the development and sharing of knowledge and practice among academic staff (Racko, Oborn, & Barrett, 2019). This study aims to develop a prototype Libyan Academic Knowledge Management System (LA-KMS) that fosters connecting, collaborating, and sharing knowledge among academicians in Libyan higher institutes of learning.

Knowledge Management Definition

There are different approaches to defining knowledge. For the purposes of this study, the definition by Davenport and Prusak (1998) is adopted, who described knowledge as the fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. This echoes Laudon and Laudon's (2018) definition of knowledge management as the set of business processes developed within an organization to create, store, transfer, and apply knowledge, thereby increasing the organization's ability to learn from its environment and incorporate knowledge into its processes. Knowledge residing in the minds of employees that has not been documented is referred to as tacit knowledge, whereas documented knowledge is referred to as explicit knowledge (Laudon & Laudon, 2018). Most definitions share the common idea that knowledge can reside in individuals, and that knowledge management involves the capture and effective utilization of that knowledge so that it becomes available as an organizational resource (Comensoli, 2014).

Data, Information, and Knowledge

Most researchers in the field of knowledge management distinguish between data, information, and knowledge. Data generally refers to raw facts (Alavi & Leidner, 2001; Laudon & Laudon, 2018), while information is processed data (Bollinger & Smith, 2001; Laudon & Laudon, 2018). When information is combined with experience and judgment, it becomes knowledge, which serves as the foundation for the understanding a person needs to perform a task (Bartol & Srivastava, 2002).

Two primary views describe the relationship between data, information, and knowledge. The first view (Alavi & Leidner, 2001; Laudon & Laudon, 2018) holds that raw data is processed into meaningful information, which becomes knowledge once placed in a suitable context. The second, iconoclastic view proposed by Tuomi (1999) holds that data emerges last rather than first. Okunoye and Bada (2005) instead viewed the relationship as cyclical, positing that data, information, and knowledge can each generate more of themselves.

Research Gap

Knowledge management adoption and implementation in Libyan institutes of higher learning remains at an early stage. Relevant literature from the Middle East region mostly focuses on KM implementation for teaching and learning purposes, while KM implementation to support knowledge-sharing among faculty and administrative staff has received comparatively less attention, even though institutional knowledge is not limited to academic staff alone.

Studies relating to KM implementation in Libya are scarce, with the few existing studies concentrated mainly in the construction industry; very few have examined KMS in the Libyan education context, and none specifically propose a KMS for connecting academicians to collaborate, exchange knowledge, and share academic resources and best practices among themselves.

2. METHOD

Design-Based Research (DBR) was employed as the overarching methodological approach for this study, guiding the iterative design, development, and evaluation of the Libyan Academic Knowledge Management System (LA-KMS) prototype across three main stages, involving a total of 71 academicians from higher institutes of learning in Libya.

Characteristics and Justification for Using DBR

This study adopted a Design-Based Research (DBR) approach, which focuses on practical issues, the selection of a theory, iterative and flexible collaboration between participants, and the connection between the design process and the setting in which the research is conducted. A review of DBR studies conducted between 2002 and 2012 found that 66% reported empirical evidence while 34% were expository in nature, with the majority of empirical studies occurring between 2007 and 2011, confirming DBR as an emerging research framework (Anderson & Shattuck, 2012; Comensoli, 2014).

DBR was considered appropriate for this study because knowledge management is a process that primarily involves human behavior and uses technology as an enabler, cutting across multiple disciplines such as e-learning, technology, and adult learning. This study combined design principles drawn from the literature with hypothetical principles derived from faculty feedback to build a prototype solution, followed by a quantitative evaluation process using a mixed-method approach to refine the prototype through continuous interaction with academic staff

Population and Sampling

Face-to-face interviews were conducted with six faculty members from the University of Tripoli, using semi-structured, open-ended questions that allowed participants to freely express their views. The aim of these interviews was to understand the current difficulties in sharing knowledge among academicians and to gather requirement specifications for the proposed system. Participants were selected using purposive sampling, as the aim was to obtain rich information from informants familiar with, or referred through, the researchers' professional network.

Theoretical Framework

The Technology Acceptance Model (TAM) was adopted as the theoretical framework guiding the design and evaluation of the prototype. TAM is a widely used framework for understanding the use, acceptance, and adoption of information technology (Venkatesh et al., 2003; Wallace & Sheetz, 2014), positing that the intention to use new technology is predicted by its perceived usefulness and perceived ease of use. Of the five core TAM constructs (perceived usefulness, perceived ease of use, attitude, behavioral intention, and use), perceived usefulness and perceived ease of use were specifically adopted for evaluating the LA-KMS prototype.

3. ETHIC APPROVAL

This study involved human participants in the form of interviews and prototype evaluation surveys. Informed consent was obtained from all 71 participating academicians prior to their involvement, and participation was voluntary, with confidentiality of responses maintained throughout the data collection and evaluation process.

4. RESULT

A total of 71 academicians from higher institutes of learning in Libya took part across the three stages of this study. In the first stage, six academicians from the University of Tripoli, representing the faculties of Social Sciences, Information Technology, Medicine, Education, Engineering, and Economics & Business, were interviewed and existing knowledge-sharing systems were reviewed to identify problems faced by academicians (Table 1).

Table 1 Interview Participants Details

Faculty	University	Number of Participants	Location
Social Sciences	University of Tripoli	1	Tripoli
Information Technology	University of Tripoli	1	Tripoli
Medicine	University of Tripoli	1	Tripoli
Education	University of Tripoli	1	Tripoli
Engineering	University of Tripoli	1	Tripoli
Economics & Business	University of Tripoli	1	Tripoli
Total	—	6	—

The Technology Acceptance Model (TAM) was used to analyze the interview results, and a number of design features distinct to the proposed Libyan Academic Knowledge Management System (LA-KMS), together with relevant web-based usability heuristics, were identified. These findings confirmed that ease-of-use constructs had to be satisfied before academicians would be willing to use or adopt a knowledge management system.

Based on the requirements gathered in Stage 1, a first prototype of LA-KMS was developed and subsequently evaluated by 15 academicians. The evaluation results showed that the ease-of-use criteria were not met. Respondents reported that several key functionalities of the prototype, including privacy and security controls, ease of learning the system, voice and text search, and the ability to upload and download multimedia files, were poor. As a result, most participants indicated that they would neither adopt the system nor recommend it to their colleagues or institutes.

These findings guided the development of a second, improved prototype. The privacy and security controls were strengthened, the text and voice search functions were corrected, and multimedia upload and download capabilities were added, while the overall intuitiveness and ease of use of the system were enhanced. Upon evaluation of the second prototype, all responding academicians indicated that the ease-of-use construct was satisfied and that they would be willing to adopt LA-KMS if it were fully implemented.

5. DISCUSSION

The results of this study confirm that perceived ease of use and perceived usefulness, the two core constructs of the Technology Acceptance Model (TAM), are decisive factors in academicians' willingness to adopt a knowledge management system. The poor evaluation of the first prototype illustrates that even a system built on sound requirement-gathering can fail to gain acceptance if core usability features, such as intuitive navigation, reliable search, and adequate privacy controls, are not adequately addressed.

The marked improvement in acceptance following the second iteration of the prototype highlights the value of the Design-Based Research (DBR) approach adopted in this study. Table 2 summarizes the core characteristics of DBR, as described by Wang et al. (2005) and Anderson and Shattuck (2012), which guided the iterative design and refinement of LA-KMS across its two development cycles.

Table 2 Comparison of Design-Based Research Characteristics

No.	Wang et al. (2005)	Anderson & Shattuck (2012)
1	Pragmatic: researchers focus on practical issues, refining both theory and practice.	Situated in a real educational context; results are used to assess, inform, and improve practice.
2	Grounded: research is informed through the selection of a theory about learning and instruction.	Focused on the design and testing of a significant intervention informed by relevant literature, theory, and practice from other contexts.
3	Interactive, iterative, and flexible: collaboration between participants and researcher occurs through an iterative cycle of design, enactment, and implementation.	Involves multiple iterations and a collaborative partnership between researcher and practitioner, refined through prototype testing.
4	Integrative: a variety of approaches is used, including survey, expert review, evaluation, case study, interview, and comparative analysis.	Uses mixed methods, generally involving a variety of research tools and techniques.
5	Contextual: results are connected to both the design process and the setting in which the research is conducted.	—

These findings also reflect the broader isolation of academic staff in Libyan institutes of higher learning, where faculty members tend to work independently within their lecture rooms or faculties rather than collaborating and sharing professional knowledge. By directly involving academicians in both the specification and evaluation stages, this study ensured that the resulting system, LA-KMS, was grounded in the actual needs and constraints of its intended users, rather than in generic assumptions about knowledge-sharing behavior.

Overall, the discussion confirms that the integration of TAM and DBR provided a coherent and effective framework for designing, developing, and evaluating a knowledge management system tailored to the Libyan higher education context.

6. CONCLUSION

This study demonstrated that developing an Academic Knowledge Management System (LA-KMS) for Libyan higher education institutions is a crucial step toward enhancing collaboration and knowledge sharing among academics. By employing Design-Based Research (DBR) methodology and the Technology Acceptance Model (TAM), a prototype system was designed, developed, and iteratively evaluated to ensure alignment with perceived ease of use and perceived usefulness.

The findings indicate that both ease of use and perceived usefulness significantly influence academics' intention to adopt the system, highlighting the importance of considering human and contextual factors in the design of knowledge management systems in educational settings. This research also addresses a critical gap in the Libyan context, representing the first effort to integrate DBR and TAM to create a practical system that facilitates knowledge exchange among faculty members.

Despite limitations such as the geographically limited sample due to political instability and the COVID-19 pandemic, the study provides valuable practical and theoretical insights for the implementation of knowledge management systems in higher education. It offers a foundation for similar initiatives in other institutions and promotes a culture of knowledge sharing that can enhance educational quality and institutional performance.

7. REFERENCES

- Alavi, M. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25, 107.
- Bartol, K. M., & Srivastava, A. (2002). Encouraging knowledge sharing: The role of organizational reward systems. *Journal of Leadership and Organizational Studies*, 9(1), 64–76.
- Bollinger, A. S., & Smith, R. D. (2001). Managing organizational knowledge as a strategic asset. *Journal of Knowledge Management*, 5(1), 8–18.
- Comensoli, J. (2014). *Development of a prototype knowledge-management system for the purpose of improving teacher pedagogy* [Doctoral dissertation]. University of Wollongong.
- Davenport, T. H., DeLong, D. W., & Beers, M. C. (1998). Successful knowledge management projects. *Sloan Management Review*, 39(2), 45–57.
- Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Harvard Business School Press.
- Iqbal, A., Latif, F., Marimon, F., Sahibzada, U. F., & Hussain, S. (2018). From knowledge management to organizational performance: Modelling the mediating role of innovation and intellectual capital in higher education. *Journal of Enterprise Information Management*.
- Iqbal, A. (2021). Innovation speed and quality in higher education institutions: The role of knowledge management enablers and knowledge sharing process. *Journal of Knowledge Management*, 25(9), 2334–2360.
- Kidwell, J., Vander Linde, K., & Johnson, S. (2000). Applying corporate knowledge management practices in higher education. *Educause Quarterly*, 23(4), 28–33.
- Laudon, K. C., & Laudon, J. P. (2018). *Management information systems: Managing the digital firm*. Pearson.
- Keramati, A., & Azadeh, M. A. (2007). Exploring the effects of top management's commitment on knowledge management success in academia: A case study. *World Academy of Science, Engineering and Technology*, 27, 292–297.
- Mansour, H. E., Holmes, K., Butler, B., & Ananthram, S. (2019). Developing dynamic capabilities to survive a crisis: Tourism organizations' responses to continued turbulence in Libya. *International Journal of Tourism Research*, 21(4), 493–503.
- O'Dell, C., & Hubert, C. (2011). *The new edge in knowledge: How knowledge management is changing the way we do business*. John Wiley & Sons.

- Okunoye, A., & Bada, A. (2005, May). *In search of meaning: Complexities and implications of basic definitions in knowledge management* [Paper presentation]. International Conference on Knowledge Management 2005, North Carolina, USA.
- Ramachandran, S. D., Chong, S. C., & Wong, K. Y. (2013). Knowledge management practices and enablers in public universities: A gap analysis. *Campus-Wide Information Systems*, 30(2), 76–94.
- Ramachandran, S. D., Chong, S. C., & Ismail, H. (2009). The practice of knowledge management processes: A comparative study of public and private higher education institutions in Malaysia. *Vine*.
- Racko, G., Oborn, E., & Barrett, M. (2019). Developing collaborative professionalism: An investigation of status differentiation in academic organizations in knowledge transfer partnerships. *The International Journal of Human Resource Management*, 30(3), 457–478.
- Sharimllah Devi, R., Chong, S. C., & Lin, B. (2007). Organisational culture and KM processes from the perspective of an institution of higher learning. *International Journal of Management in Education*, 1(1–2), 57–79.
- Sunalai, S. (2017). *Knowledge management systems in higher education institutions in Thailand: A holistic model of enablers, processes, and outcomes* [Doctoral dissertation]. Dissertation Abstracts International Section A: Humanities and Social Sciences.
- Tuomi, I. (1999, January). *Data is more than knowledge: Implications of the reversed hierarchy for knowledge management and organizational memory* [Paper presentation]. Thirty-Second Hawaii International Conference on Systems Sciences, Los Alamitos, CA.
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46, 186–204.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27, 425–478.
- Wallace, L. G., & Sheetz, S. D. (2014). The adoption of software measures: A technology acceptance model (TAM) perspective. *Information & Management*, 51(2), 249–259.