Designing an Artefact for Sharing and Reusing Teaching Practices in Higher Education Institutions: An Exploratory Study

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Abstract. Knowledge management (KM) is considered as a significant source of success in many organisations, specifically higher education institutions. Instructors generate a considerable amount of valuable teaching-related knowledge that should be identified and shared among communities of instructors to enhance informal learning and deliver better quality teaching. However, many universities are facing difficulties in documenting, sharing and applying the teaching experiences gained by instructors. In the field of KM, a vast amount of research exists focusing on the activities of sharing knowledge, disregarding the importance of knowledge application and reuse. This research aims to close this gap by designing a system enabling instructors to share and apply teaching experiences. Therefore, we have followed a design research approach to explore meta-requirements by conducting an investigative study with instructors who work in Saudi universities. Through our exploratory study, we identified three challenges that might prevent instructors from sharing and reusing knowledge using the current communication channels: lack of access to experts and expertise, lack of structured knowledge, and lack of motivation. To overcome these challenges, a new artefact will be designed based on the resulting meta-requirements to ensure effective sharing and reuse of teaching experiences.

Keywords: Design science research · Information systems ·
Knowledge management system · Knowledge reuse · Knowledge sharing ·
Teaching practices · Teaching experiences · Community of instructors ·
Higher education institution

1 Introduction

Teaching activities result in creating remarkable amounts of expertise that must be translated into course-related resources to produce learning activities that will fulfill students' needs [1, 2]. Therefore, teachers are encouraged to boost their knowledge and teaching skills to achieve effective and successful teaching. Higher education in Saudi Arabia has been going through a process of change to achieve Vision 2030 which requires instructors to keep updated with the developments in both their fields and educational technologies. However, university teachers are involved in many

responsibilities and tasks that prevent them from finding enough time for their continuing self-development and for sharing their accumulated teaching-related knowledge and experience with other instructors. Therefore, novice teachers are facing a critical challenge in teaching and delivering new subject knowledge.

Teaching experience of academics instructors, results from many years of teaching students. It includes both know-what and know-how knowledge about teaching a specific subject. The "know-what" knowledge represents the content knowledge about the actual subject matter that must be transferred to students. On the other hand, the "know-how" knowledge is the knowledge that resides in an academic's mind about instructional methods, cognitive skills, and the use educational technologies for delivering know-what knowledge. Faculty produce tremendous amounts of know-what and know-how knowledge as a result of teaching activities. Technology-enhanced learning tools and knowledge sources need to be combined to ensure the delivery of learning to students by supporting the sharing of course content among academics [3, 4]. However, the available technologies do not support the transmission of instructors' teaching methods and expertise. Uncodified knowledge may result in lower levels of teaching performance and achievement [5]. Therefore, it is vital to develop a web-based system that can enable academic instructors to capture, store, share, and reuse the know-what and know-how teaching practices. Exchanging teaching experiences enhances the teaching quality, and consequently the education output.

Therefore, this research aims to answer the following questions:

- **RQ1:** What are academics' perspectives regarding managing teaching experiences using a web-based system?
- **RQ2:** Which meta-requirements of a teaching experiences management system derived from the instructors would increase instructors' intention to record, share and reuse teaching experiences and knowledge?

This paper is organized as follows. Previous research relating to KM in higher education is reviewed in the Literature Review section. The Methodology section describes the qualitative methodology used in this research. Then the results of the interviews are presented in the Interview Results section. The final section presents conclusions and future research.

2 Literature Review

2.1 The Importance of Knowledge Management for Higher Education Institutions

Knowledge management (KM) is considered as one of the most influential practices for achieving competitive advantage in large organizations, including higher education institutions [6]. Author in [11] described higher education institutions as knowledge-intensive environments where faculty members work as the producers and the disseminators of knowledge. Accordingly, higher education institutions are becoming *knowledge-based societies* where there is a high demand for the institutions to focus more on the recording, storing, sharing and applying knowledge [6, 7]. However, the

literature reveals that KM practices and initiatives are not well established within universities [8–10], specifically in Saudi Arabian universities.

Author in [11] stressed the importance of and need for implementing KM practices in the higher education institutions of Saudi Arabia due to many challenges the Saudi higher education system is facing. Most Saudi universities have huge and dispersed campuses in both rural and urban areas. Accordingly, attending a meeting or sharing knowledge with others could lead academics to travel between different campuses. Furthermore, Saudi Arabia is a religious country, and the religion of Islam reflects the practice of education and the structure of universities, in which male and female academics are segregated in separate campuses. It is required to transfer knowledge between instructors in different departments (male and female) and among different campuses. Additionally, due to the issue of academic retirement, many years of experience in the teaching profession could be lost without being recorded. The valuable intellectual property that experienced academics hold would thus also be buried. Furthermore, the religion of Islam reflects the practice of education and the structure of universities, in which male and female academics are segregated by gender in separate campuses, who even might teach the same curriculum or be interested in the same research areas [25]. The segregation approach causes lack of teaching experience sharing between both genders, which then affects teaching quality.

Due to the noticeable recognition of the importance of KM in higher education as an enabler of an interactive environment, together with the challenges identified above that Saudi universities face and the absence of a reliable knowledge management system, this research considers the application of KM amongst academics in universities in Saudi Arabia.

Previous studies have acknowledged the vital role of information technology as a KM tool which can facilitate the sharing of knowledge between academics and support the creation of new knowledge [12]. Effective management of knowledge increases the overall quality of teaching [13], facilitating access to and searching for published knowledge sources [14], and speeding up research and innovation capability [15, 16].

3   Methodology

This research aims to develop an artefact-based solution for supporting the recording, sharing and reusing of teaching experiences among academics who work in Saudi Arabian universities. Therefore, a design science approach methodology is followed [17] to address the research questions. This research addresses the first stage of the design science methodology which focuses on the definition of the problem that concerns academics in Saudi Arabian Universities. After understanding the current situation, a set of meta-requirements [18] for the teaching experiences management system is developed.

3.1   Interview Design

Semi-structured interviews in several public Saudi Universities with novices and expert academics were conducted to create awareness of the problem by understanding

academics' current knowledge sharing practices, as well as the possibility of utilizing web technology for this activity. The results of the interviews are also used to identify patterns of academics' practices in managing their teaching experiences, their sharing methods, and the difficulties they face during sharing in order to capture the tool's meta-requirements and identify relevant problems [19]. The interview questions addressed the importance of managing teaching practices and the difficulties that prevent academics from managing knowledge using the current communication channels. This study was conducted with 22 academics (5 heads of departments, five assistant professors, eight lecturers, four teacher assistants). The sample covered the complete range of experience from novices to very experienced academics. It included faculty members who had PhD degrees, lecturers with Masters degrees and teaching assistants with Bachelor's degrees who work in different Saudi public universities.

3.2   Interview Procedures

An e-mail has been sent to each academic asking them to participate in this research. The e-mail included a brief explanation of the study and asked the academic to determine a date, time and location for the interview. At the beginning of the face-to-face interview, each participant was asked to read a participant information sheet and sign the consent form before starting the interview. The estimated duration of the interview was between 30 min to 60 min [20]. The interviews were recorded and then transcribed as text files. To maintain confidentiality, this research has replaced all the names of the people and the organization and used code names throughout the report.

The qualitative data resulted from the academics' responses were uploaded to MaxQDA software application and analyzed using thematic analysis.

4   Results of the Interview Study

4.1   The Importance of Sharing Academics' Knowledge

The analysis of the qualitative and quantitative data shows that all the academics in the study valued the importance of sharing knowledge, specifically teaching experiences, and most of them viewed sharing as an informal learning method. Sharing was seen as a way of improving classroom practices and academics' performance, which is supported by [21]. The majority of academics (n = 21) also strongly agreed that transferring knowledge between academics helps accomplish teaching tasks more quickly. For example, academic C indicated through his comments within the interviews: "*I would share my experience with other academics if I discovered a method that works well in my class and enhance the students' attention*".

Additionally, the respondents stressed the importance of sharing teaching experiences such as the methods for teaching a specific subject and subject resources. Academics would benefit from sharing effective pedagogical approaches that support their students and enhance quality teaching. Academics also agreed that "*transferring knowledge will help other academics, who are involved in designing course syllabi, in*

avoiding error occurrences that that might affect the quality of teaching outcomes" (Academic B).

Furthermore, the result shows that the majority of the respondents (n = 20) commented that novice academics are facing challenges without experts' teaching experiences. The work of [22] around intrinsic and extrinsic challenges helps identify some themes emerging from the qualitative analysis. A range of perceived difficulties is shown in Table 1 as reported by academics.

Table 1. Intrinsic and extrinsic challenges

Intrinsic	Extrinsic
Computing subject knowledge (content knowledge)	Assessment strategies
Approaches to teaching topics (pedagogical knowledge)	

Intrinsic Challenges. The results of academics' answers reveal that academics were concerned about their content (subject) knowledge. Academics expressed the worry that they *"daily spend more than four hours of own time on self-professional development to build their knowledge and skills"* (Academic R). Academics also show a lack of self-confidence in solving issues that students would face*: "At the moment it is my responsibility to find solutions to problems faced by students when using the system. Training and courses did not offer me the ability to solve these problems"* (Academic O).

Academics also expressed concern about the development of the pedagogical approaches about particular teaching practices that support their students' understanding. They express the challenge of encouraging problem-solving techniques and motivation strategies amongst the students they teach. One of the academics expressed their worry about *"… finding techniques to enhance students' critical and logical thinking while solving the lab sheet instead of asking for the tutors' assistance"* (Academic T).

Extrinsic Challenges. Preparing students for summative and formative assessment tasks was another concern pointed out by novice academics who struggled to find appropriate activities and resources for exams due to lack of shared resources: *"As a new lecturer, I am not confident the exam questions will be suitable for assessing students' understanding level."* (Academic S).

Therefore, it can be concluded that academics perceived sharing teaching experiences as an important and crucial activity that can help them enhance their quality teaching and overcome the previous challenges.

4.2   Current Knowledge Sharing Practices Among Academics

After analysing the qualitative data, it seems that universities do not currently have a formal communication channel for sharing teaching skills and practices. The majority of academics still use direct face-to-face conversations for sharing teaching experiences, despite the vast advancement in technology and systems, and the accessibility of Internet connections and private computers for each academic. The results also showed

that academics search for knowledge by asking experts directly. Academic O noted that they *"... do not have a specific platform where academics can share their teaching practices with others. The sharing is usually done on a one-to-one basis"* (Academic C). This implies that there is no specific system in Saudi universities for storing, sharing, and searching for teaching experiences.

However, although academics use a face-to-face approach for knowledge sharing, the analysis of the qualitative data led to four challenges that might prevent academics from using the current communication channels: lack of access to experts and expertise, lack of trust, and lack of motivation.

Lack of Access to Experts and Expertise. The most common issue that was mentioned by academics is the lack of access to experts due to experts' lack of time for social interaction and knowledge sharing. Academics expressed the worry that *"... it is hard to arrange meetings with experts to share knowledge with them as they are always busy"* (Academic L). These findings are consistent with [16] and [23] where time constraint was the main barrier that prevents academics and expert academics from sharing work-related knowledge [16, 24].

Lack of Trust. The findings revealed that more than half of the academics expressed their worry about the fear of losing their intellectual property when sharing knowledge through face-to-face interaction. Academic M confirmed this point by saying: "*my colleague referred my work to himself and was honoured, I prefer to keep silent rather than losing my work*". The result is consistent with previous studies which noted that a high level of trust would result in sharing knowledge [26].

Lack of Extrinsic Motivation. The results also reveal that a lack of motivation to share their teaching expertise with others was one of the challenges that prevent them from participating in knowledge sharing activities. They complained that they "*... do not share because they do not receive acknowledge in return for sharing of knowledge*" (Academic E). This result supports previous studies' findings which suggest that incentives and rewards are two of the strongest knowledge sharing predictors [27].

In summary, it can be concluded that when any of the factors mentioned above exists, knowledge sharing is unlikely to take place. Therefore, there is a need for new communication technologies to help academics share their knowledge by overcoming the previous barriers.

4.3   Academics' Need for Knowledge Sharing Tool

The results from the previous sections show that the current knowledge sharing approaches are not appropriate for knowledge sharing amongst academics. This indicates that there is a need to design a new communication channel to support academics' collaboration and knowledge sharing. The interviewed academics agreed that using a new platform would help them increase their productivity by accessing and exchanging knowledge in an easier and faster way instead of using printed materials or traditional methods. "… Experts will inspire novice academics, and that will enhance the overall teaching quality as well." (Academic R). "The designed platform can work as a knowledge repository full of previous experts' experiences" (Academic C).

Academics were asked in the interviews to specify what they need for managing their teaching experiences, in order to generate and understand the meta-requirements of the new knowledge sharing platform. Academics commented that the designed tool "*must be somewhere central so everybody can access it to save time searching for particular knowledge*" (Academic K) (**MR1**). Direct access to experts' information is also considered as "*an important function to overcome the location constraint*" (Academic J) (**MR2**).

Additionally, academics expressed their worry about having to understand different teaching experiences stored in various formats. Therefore, academics stressed the need for "*a template to help academics organize the structure of knowledge in the constant format*" (Academic L) (**MR3**).

Providing feedback to the knowledge provider is another vital function in a teaching experiences sharing platform. Academics stated that "*… if anyone says thank you for sharing your experience which helped me teaching the subject. I think this kind of recognition is incentive enough*" (Academic B) (**MR4**). In addition, rating knowledge providers for their engagement is considered as an important feature as they are "*… more likely to be motivated by the sense of pride that their knowledge is useful and shared by others*" (Academic D) (**MR5**). Taking into consideration providing feedback and reputation enhancement functions are likely to help enhance the level of social presence and subsequently improve knowledge sharing among instructors [28].

According to the above findings, it can be said that designing a specialized teaching experience management system for instructors who work in Saudi universities is likely to establish more effective sources for exchanging teaching experiences amongst academics. The meta-requirements are summarized in Table 2.

Table 2. Meta-requirements of the teaching experience management system

Subtopic	Meta-requirement	
Access	MR1:	Accessibility to central storage of a teaching expertise database for all academics
	MR2:	Access to experts
Structure	MR3:	Pre-structured template for easy access and completion
Motivation	MR4:	Feedback on documented teaching expertise
	MR5:	Reputation enhancement for the knowledge provider

5   Conclusion

This paper presents the work of developing a set of meta-requirements for a teaching experiences management system. Semi-structured interviews were conducted with academics who work in Saudi universities to explore current knowledge sharing activities. The results indicate that academics hold a positive perception about sharing their teaching experiences with others. Findings also highlight the importance of adopting the resulting meta-requirements when designing a teaching experiences management system, which include: easy access to experts and expertise, motivation

functions, and constant structure to the teaching experience. In future work, a new artefact will be designed by translating the meta-requirements into design decisions.

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