

# A Framework for Enhancing the Sharing of Teaching Practices among University Instructors

Nouf Almujaally<sup>1,2</sup>, Mike Joy<sup>1</sup>

<sup>1</sup>Department of Computer Science, University of Warwick, Coventry, UK  
{n.almujaally,m.s.joy}@warwick.ac.uk

<sup>2</sup>Department of Computer Science, Princess Nourah Bint Abdulrahman University, Riyadh, Saudi Arabia  
naalmujaally@pnu.edu.sa

**Abstract**— This research in progress paper describes a teaching practices management framework (TPMF) which strongly supports the sharing processes related to Teaching Practices (TPs) – those that can be performed with the help of an information system. Managing with respect to TPs, so that teachers' accumulated experience may be identified, shared and reused, can offer significant benefits, including the introduction of teaching innovations which lead to improvements in overall teaching quality, and the enhancement of academics' professional development efforts. In this paper, we aim to define a teaching practices management framework (TPMF) for enhancing the sharing processes relating to TPs. The development of this TPMF has been informed by semi-structured interviews conducted with 22 instructors working in two universities in Saudi Arabia; these interviews were undertaken in order to better understand the academics' actual knowledge sharing behaviors in relation to TPs and also to gain a systemic and overall perspective of current knowledge sharing approaches. An inductive coding approach was employed to help the researcher extract themes which were mentioned by the interviewees. It is believed that this framework may well be of great assistance to higher education sector institutions.

**Keywords**—*knowledge management system, knowledge sharing, higher education institutions, instructors, teaching practices*

## I. INTRODUCTION

Teaching activities result in a remarkable amount of teaching experiences which shape academics' expertise. In conducting this research, we have focused on teaching practices (TPs) that develop instructor capabilities and improve overall learning in higher education environments. Teaching practice (Ts) can be defined as representing the knowledge related to the delivery of curricula that has resulted from the accumulation of academics' experience gained through years of teaching in universities. TPs could include faculty teaching materials, teaching pedagogy, lessons learned, slides, previous question papers, assignments, solutions to problems, and references to teaching materials. Many authors have highlighted the potential benefits of managing the TPs. They mention that managing such teaching experiences has the capacity to facilitate access to published knowledge sources within the academic community, improve overall teaching quality, enhance the academics' professional development efforts, and reduce workloads [1, 2].

Although TPs can offer many benefits, many universities still face difficulties when attempting to improve the sharing of knowledge accumulated by instructors, due to geographical and social constraints. While current communication approaches –

such as face-to-face interaction, paper-based documents and emails – allow instructors to share TPs, there remains a risk that universities may fail in terms of the sharing process [3, 4]. These above-mentioned approaches are highly resource-intensive and time-consuming which require instructors to consume a great deal of time and effort to capture, retrieve and reuse TPs. In the e-learning field, most efforts have focused on the transmission of course content to learners, with very little attention given to transmitting instructors' expertise to other instructors. Additionally, the available technologies often fail in supporting the sharing process because they are limited to the solving of technical issues only and do not take into consideration the end-user requirements. So far, the technologies applied have not supported the sharing of instructors' TPs, which are not often easily expressed or communicated in visual or verbal terms.

Due to the absence of effective approach for managing the sharing of TPs among academics who teach the same or different subjects, there is a noteworthy duplication of effort in the educational sectors, resulting in the notable near duplication of materials across a great deal of written course-focused knowledge [5]. In order to resolve the above issue; and to enable people to share TPs, it is essential to develop an appropriate environment which saves instructors time and effort when they come to try to acquire the teaching-related knowledge and experience accumulated by other instructors.

Hence, our overall research aim is to answer the question of how HEIs instructors more effectively identify, share, and reuse their teaching practices. The terms 'Academic' or 'Instructor' used in this paper refer to those teaching in higher education institutions (HEIs). The research starts with an empirical analysis of the problem space, captured by our first research question (RQ): **RQ1**: What is the academics' actual knowledge sharing behaviour in relation to TPs?

Building on these empirical findings, we developed a framework which is the focus of the second research question: **RQ2**: What framework is required to build an effective teaching practices management system for university instructors?

## II. BACKGROUND

To effectively manage knowledge resources, it is necessary to have a framework which classifies the different activities needed to deal with all the knowledge-related issues within an organization. Numerous knowledge management frameworks have been developed by researchers over the last two decades. Many of these frameworks focus on the types of the KM

procedures involved, disregarding the way these procedures may be accomplished, as outlined in Table I.

TABLE I. KM LIFECYCLE FRAMEWORKS

Source	KM lifecycle
Wiig [6]	Creation, manifestation, use, and transfer
Meyer and Zack [7]	Acquisition, refinement, storage/retrieval, storage/retrieval distribution, and presentation
Evans, Dalkir and Bidian [8]	Identify/create, store, share, use, learn, and improve
Dalkir [9]	Knowledge capture and/or creation; knowledge acquisition and application; and knowledge sharing and dissemination

Although, clearly, each of these previously proposed frameworks introduce useful novel elements into the knowledge management process, the availability of so many frameworks can be a source of confusion when undertaking research [10] - because different processes are used in each framework. For instance, there are three stages in the Wiig [6] framework but six processes in Evans, Dalkir and Bidian [8]. Furthermore, the terminology used in these frameworks can also present a source of confusion, especially when the same things are designated differently. It has also been noted that in some frameworks, the processes follow a certain sequence [8] while in others, they do not follow any sequence [7]; this represents another source of confusion. Consequently, there is a need to develop a new and unified framework that is generally accepted for HEIs in order to help reduce the abovementioned confusion.

### III. RESEARCH METHODOLOGY AND PRELIMINARY RESULTS

#### A. Interviews and Analysis

First, we conducted a qualitative study with participant instructors who all worked in one or other of two universities in Saudi Arabia - in order to better understand the academics' actual knowledge sharing behaviour in relation to TPs and also to gain a systemic and overall perspective of the current knowledge sharing approaches. Face-to-face semi-structured interviews were conducted with 22 academics. Conducting the study across many different educational institutions would be prohibitively costly and time-consuming and it was felt that selecting the University of Princess Nourah and the King Saud University, only, as institutions supplying participants would assist in minimising the time and financial resources used, especially since the first author had access to information relating to study practices in both universities, such as details regarding the course materials, the e-learning system, the academic staff, the university structure, and the departments. The interviews consisted of a number of open-ended questions selected on a pragmatic basis in order to facilitate the interviewees' reflections on their knowledge sharing experience, as illustrated in Table II.

MaxQDA2018 was used to analyse the transcripts via an eclectic coding procedure [11]. An inductive coding approach was employed in order to help the researcher extract themes which were mentioned by the interviewees. According to Braun and Clarke [12], the researcher wrote, read and re-read the data about initial ideas to get familiar with the data in a general sense. Then, initial codes (open coding) were created and sorted into potential themes. Themes were then checked in relation to coded

extracts and the full data set. Themes were named and defined and finally data analysis and the results were reported.

TABLE II. INVESTIGATIVE STUDY INTERVIEW QUESTIONS DESIGN

Questions	Objectives
(Q1-Q4) Demographic questions	- Explore the academics' demographic information (Gender, Position rank, Experience in years, Faculty).
(Q5-Q10) Current knowledge sharing practices	- Explore how instructors are currently recording, storing, searching for, and evaluating TPs. - Investigate current challenges facing instructors without sharing TPs with others using current knowledge sharing approaches.

Table III gives details of the demographic characteristics of participants who were interviewed, such as gender, work experience teaching, education rank and faculties. These results indicate that both male and female academics whom their experience ranged between novice and experts and worked in various faculties and disciplines were involved in the investigative phase of the research to ensure the obtaining of accurate and comprehensive results for this study.

TABLE III. DEMOGRAPHIC CHARACTERISTICS OF THE INTERVIEW STUDY

demographic characteristics	Percentage
Gender	32% Male 68% Female
Academic Rank	37% Lecturer 18% Professors 18% Associate Professors 18% Assistant Teachers 9% Assistant Professor
Teaching Experience	32% More than 10 years 32% 2-5 years 27% 6-10 years 9% Less than 2 years

The majority of respondents (n=21) agreed that capturing and retrieving teaching practices is seen by instructors as important but often difficult to perform. Without the sharing of teaching practices among academics, the result of the interviews showed that novices are likely to struggle to teach their subjects. They expressed the challenge of developing, promoting and sustaining pedagogical approaches they need to support their students and classroom practices, as described in the following quotes.

*"I depend on my own knowledge to find solutions to problems that the students come across. I have enrolled in many training courses, but sometimes I end up doing nothing."*

*"...I daily spend more than four hours of my own time on building my knowledge skill by doing self-professional development to learn programming language and skills."*

The findings also revealed that the academic departments involved do not currently have a standardised method for sharing teaching practices. The current approaches for this, employed in universities are neither useful nor usable, from the academics' perspectives, as described in the following quotes.

*"Mostly, this is done in informal ways over coffee or during lunchtime. I don't think there are any specific forms that are used to exchange teaching knowledge within the department itself. I believe it is important that instructors talk about their teaching practices."*

“... At the end of each term, academics have to fill in forms for the Quality Assurance (QA) Department. The forms include submitting course syllabus and recording the teaching methods used during the terms. The forms are complex and designed to not fit with academics need. I sometimes avoid filling in the QA documents or ignore some fields in the forms.”

“... Accessing these documents is only restricted for quality assurance team, you need to send an email to them to get access for a specific document; this takes time and effort”. “It is really difficult to access experts who are located on a different campus. I need to go through a long process to obtain the knowledge I want, from sending an email to arrange a meeting to travelling to the campus to meet the expert”.

“I am not sure if the knowledge shared is credible, if it has been applied before or if it proves its usefulness to achieve a certain outcome”. “There is a lack of details about when, where, and how to reuse a teaching practice because the exchange of knowledge often occurs on the go”. “I do not share because I do not receive anything in return for sharing with others”. “I would share more if I become known amongst my co-workers as an active member.”

As a result, it is apparent that the majority of the respondents face significant challenges relating to the best means by which to capture, retrieve, evaluate and reuse knowledge in order to create value and enhance teaching quality.

### B. Framework Design

Building on the empirical findings of the interviews, we have developed a comprehensive Teaching Practice Management Framework (TPMF) which (among other things) illustrate a new approach to the facilitating of the sharing of teaching practices. The TPMF is grounded on the definition of (Socialization, Externalization, Combination, and Internalization (SECI)) knowledge conversion process [13] and the results from the qualitative study with real end-users (academicians). SECI model seems to be the best candidate since the knowledge creation model emphasizes collaborative learning [14]. Fig. 1 illustrates the structure of the proposed framework. The outer rectangle represents the domain of academics – this signifies that the framework is seated in Higher Education Institutions (HEIs) such as universities and colleges. The Socialization process of SECI model is supported by the inner rectangle, titled community of practice, which represents special groups of users working as communities and sharing expertise related to specific topics of interest. It has been established as the central element of a strategy for promoting the sharing of teaching practices between knowledge seekers and knowledge contributors – both will be instructors teaching specific disciplines. The success of a KM depends on people contributing content to populate it and also people seeking the knowledge contained therein [15]. The interaction between knowledge seekers and knowledge contributors is represented as a double-headed arrow.

There are five basic processes that are necessary for the effective sharing of teaching expertise. These components are knowledge acquisition, knowledge storage, knowledge retrieval, knowledge reuse, and knowledge evaluation. These processes are supported by motivational affordances that allow for the motivation of instructors to voluntarily share their teaching

expertise and to interact with their peers. The knowledge sharing processes do not follow a specific sequence; therefore, they are implemented within a life cycle in our framework in an attempt to stimulate what actually occurs inside a higher education institution.

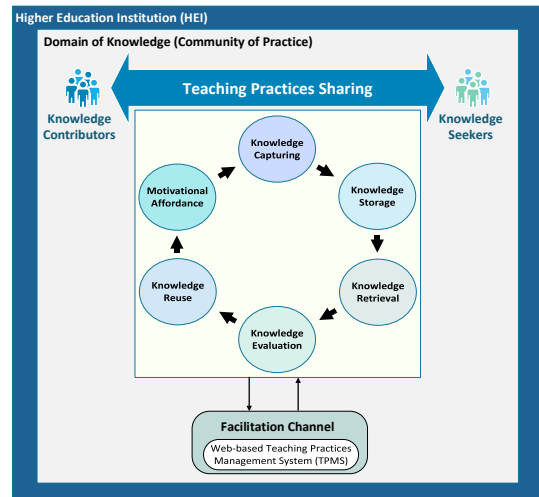


Fig. 1. Teaching Practices Management Framework (TPMF)

### C. Knowledge Acquisition

The respondents showed dissatisfaction with the documentation approach implemented by their quality assurance departments for recording teaching experiences (at the end of the academic year). They stated that these documents have various formats and various different text-based structures which require much effort to create. Owing to this complexity also, much effort is needed to find, understand and reuse key information from the resulting documented teaching practices. Therefore, academics reported the need for an easier to use tool for documenting their teaching practices.

The Externalization process of SECI model runs when instructors try to acquiring knowledge sources created in the socialization process to make it available for the community. Thus, a knowledge acquisition process is proposed in the framework which enables instructors to identify and input their teaching expertise to the knowledge repository. Knowledge acquisition is achieved by means of a three-step process: identification, capturing, and validation.

#### 1) Identification

In order to help instructors to recognize the TPs that add value to the learning process and can be reused by others, a set of guidelines is required to enable users to judge whether a proposed TP is worth sharing with others.

#### 2) Capturing

In order to overcome the issues which the current knowledge capturing approach has, the framework adopted a Teaching Practice Document Template (TPDT), the structure of which will be designed based on the instructors’ expressed requirements in relation to describing TPs in a detailed and systematic way. The Template aims to assist instructors in describing various TPs by controlling the type of information requested and providing a suitable approach to the capture of the user’s expertise.

### 3) *Validation*

From the qualitative study, academics reported that when asked to complete complex or comprehensive forms, they will tend to avoid filling-out some valuable part of the form, and here this might result in an incomplete version of the knowledge object being recorded, making it difficult to reuse by others. Therefore, a validation phase completes the knowledge acquisition process. At this step, the consistency and completeness of the TP will be checked in order to make the TP usable by others.

#### *D. Knowledge Storage*

Several instructors noted, in the interviews, that the existing recorded knowledge was often badly organized and almost inaccessible due to the absence of a central repository. Thus, a knowledge storage process is proposed in the framework because an instructor's knowledge acquired from many years of experience in the teaching profession may well be entirely lost if it is not recorded in sufficient detail, and especially if it remains implicit and held only by that instructor; this is due to the natural course of academic retirement. The value of institutional knowledge increases when it is made readily available in storage repositories for present and future use [16].

In the proposed framework, once a knowledge object has been deemed complete, as indicated by the validation assessment performed in the knowledge acquisition phases, it is stored as an active component of the organization's memory in an accessible knowledge base. The fact that knowledge is stored in a structured way will enable knowledge seekers (instructors in this case) to retrieve the required teaching practices efficiently, as described in the next section.

#### *E. Knowledge Retrieval*

When seeking knowledge using a face-to-face approach, several instructors noted that they had to expend considerable time and effort to find out the knowledge that they required, from the person who possessed it, due to geographical and social constraints. Therefore, a knowledge retrieval process is proposed in this framework as an essential component. The Internalization process of SECI model is facilitated by retrieving knowledge resources.

Powerful search and other capabilities allowing access to content and the people who provide it can be achieved through the implementation of direct access mechanisms; these can be classified into those which use 'push' and those which use 'pull' approaches. A push approach consists of (for instance) disseminating newly added content to potentially interested users. In contrast, a pull approach will consist of, for example, enabling knowledge seekers to search for the knowledge they require using a query-based approach.

It should be noted that the retrieval facilities of a TPMF can be seen as a bridge between the upstream knowledge 'acquisition and storage' and the downstream putting knowledge into practice 'reuse and evaluation'; the latter is described in the following sections.

#### *F. knowledge Reuse*

Several instructors noted, in the interviews, that they rarely reuse and apply knowledge obtained from their colleagues in

their classroom due to a lack of details about when, where, and how to apply a teaching practice. Consequently, they reported that they have spent several hours of their private time trying to upskill their knowledge of the subject they teach. Therefore, knowledge reuse is a valuable phase of a TPMF - as [17] conclude in their work by stating "no matter how much knowledge is shared among team members, it cannot enhance team performance unless it is effectively applied".

In order to support the reuse of teaching practices, the framework encourages instructors to specify (at the time of knowledge acquisition) where and how the TP can be reused in other contexts, and what the learning outcomes are of applying the TP. This information can then be searched for by knowledge seekers.

The importance of the knowledge reuse phase is that it provides the motivation for the evaluation of the stored knowledge (next phase detailed below) and the creation and capturing of more knowledge. When a retrieved TP is applied in a new context, it is refined and enhanced, and consequently, an additional, though related, TP is created. As a result, the knowledge repository is enriched, and the cycle repeats itself.

#### *G. Knowledge Evaluation*

The interview study revealed that instructors found it difficult to assess the quality of knowledge obtained from face-to-face interaction or from the available quality assurance documents, and consequently, they rarely reused others' knowledge. Therefore, an important aspect of KM as used in the teaching and learning process is knowledge evaluation which is adopted in the framework here to assess the usefulness and applicability of the knowledge acquired and ensure that the knowledge, as compiled and stored, is continuously maintained and evaluated. The evaluation TPs is based on three major dimensions which must be taken into account: social, usage, and contributor.

*The social quality indicators* are metrics that track the explicit feedback contributed by users, summarizing their perceptions concerning the usefulness of the TPs posted [18].

*The usage quality indicators* are metrics that track users' implicit feedback about other users; these are automatically acquired from user behaviours which are monitored in order to measure user's interest in, and their satisfaction level about, posted TPs [19].

*The contributor quality indicators* are metrics that measure the reliability and quality of content posted by knowledge contributors based on their past behaviour [20].

#### *H. Motivational Affordance*

As described in the results of the investigative study, instructors often considered that there was a lack of motivation to share their teaching expertise with others. Therefore, a motivational affordance has been proposed for the framework which will allow for the motivating of instructors to articulate their expertise in teaching and so to share this with their peers. The findings from the interviews revealed that knowledge contributors placed more weight on the social recognition they gained after sharing their knowledge than on any possible economic consequences such as monetary or other tangible

rewards. Being recognised by peers keeps instructors' spirits high, positively impacting their self-esteem, self-efficacy and sense of self-worth in terms of their ability to provide knowledge that is useful in solving teaching-related problems.

### I. Facilitation Channel

Supporting the above-mentioned knowledge sharing processes is an enabling technology we have termed the "Facilitation Channel." The proposed framework assumes automation: that is, the use of a web-based teaching practices management system that facilitates the flow of knowledge and connection between academic members to support knowledge acquisition, storage, retrieval, evaluation, motivation, and reuse.

## IV. CONCLUSION AND NEXT STEPS

The literature review highlighted the problem of ineffective knowledge sharing among higher education academics. Thus, a solution to the underlying issues was sought. It was discovered that the current knowledge sharing approaches are neither adequate nor effective. After reviewing various knowledge management frameworks, it was found that none of the existing, relevant frameworks have been designed specifically for this context, and so they do not provide solutions that fit instructors' specific needs. Hence, a new and practical framework is proposed in this research. We used a qualitative method to understand the current knowledge sharing practices and building on the SECI model processes we systematically generate our proposal for a TPMF to overcome the limitations discovered in the current knowledge sharing approaches.

The resultant framework provides a collaborative environment that promotes cooperation in knowledge construction and content sharing, resulting in maximizing the benefit from the intellectual capital of the academics. It includes facilities whereby instructors can capture, share, retrieve and reuse TPs. If the framework is executed and implemented in a proper manner, knowledge management is expected to cut down on duplication of effort, savings in terms of time and money, and encourage knowledge sharing. The proposed framework takes a holistic view of the knowledge sharing life cycle. It builds on previous frameworks but includes some novel knowledge sharing processes. The reuse and evaluation tie-in the value creation aspect of the knowledge life cycle more closely and provide more flexibility, allowing for the reuse of differing knowledge resources - all leading to a cycle supporting the continuous sharing of knowledge. Therefore, in terms of actual practice, the proposed framework may well be of great assistance to higher education sector institutions. Indeed, it is believed that this framework will become a guideline for developing systems aimed at improving TPs sharing among academics. It is also likely that it will help developers to avoid errors and excessive costs in terms of time, effort and money.

Although we have indeed derived helpful insights, here, we acknowledge that this study suffers from the following limitations (which also, of course, represent opportunities for future research). The sample used in the investigative study was relatively small ( $n=22$ ). Academics were found to be very busy people and involving them in a non-teaching study was not easy.

In order to validate the proposed framework, we now intend to design a new system based on our framework. Then, we plan

to perform several implementation iterations, between each of which we will evaluate the system to assess the academics' experiences of the system, employing a mixed-methods approach: an analysis of the user-interaction log files and interview sessions.

## REFERENCES

- [1] R. Fullwood, J. Rowley, and R. Delbridge, "Knowledge sharing amongst academics in UK universities," *Journal of Knowledge Management*, vol. 17, no. 1, pp. 123-136, 2013.
- [2] N. Samoilenko, and N. Nahar, "Knowledge sharing and application in complex software and systems development in globally distributed high-tech organizations using suitable IT tools." pp. 1280-1294.
- [3] A. J. Davies, and A. K. Kochhar, "Manufacturing best practice and performance studies: a critique," *International Journal of Operations & Production Management*, vol. 22, no. 3, pp. 289-305, 2002.
- [4] S. Devi Ramachandran, S.-C. Chong, and K.-Y. Wong, "Knowledge management practices and enablers in public universities: A gap analysis," *Campus-Wide Information Systems*, vol. 30, no. 2, pp. 76-94, 2013.
- [5] S. H. Usman, Ishaq, and O. Oyefolahan, "Determinants of Knowledge Sharing Using Web Technologies among Students in Higher Education," *Journal of Knowledge Management, Economics and Information Technology*, vol. IV, no. 2, pp. 1-22, 2014.
- [6] K. M. Wiig, *Knowledge management foundations: thinking about thinking, how people and organisations create, represent, and use knowledge*, Arlington: Schema Press, 1993.
- [7] M. Meyer, and M. Zack, "The design and implementation of information products," *Sloan Management Review*, vol. 37, no. 3, pp. 43-59, 1996.
- [8] M. Evans, K. Dalkir, and C. Bidian, "A holistic view of the knowledge life cycle: the knowledge management cycle (KMC) model," *The Electronic Journal of Knowledge Management*, vol. 12, no. 2, pp. 85-97, 2014.
- [9] K. Dalkir, *Knowledge management in theory and practice*: MIT press, 2017.
- [10] M. M. Shongwe, "An analysis of knowledge management lifecycle frameworks: Towards a unified framework," *Electronic Journal of Knowledge Management*, vol. 14, no. 3, pp. 140, 2016.
- [11] J. Saldaña, *The coding manual for qualitative researchers*: Sage, 2015.
- [12] V. Braun, and V. Clarke, "Using thematic analysis in psychology," *Qualitative research in psychology*, vol. 3, no. 2, pp. 77-101, 2006.
- [13] I. Nonaka, *The knowledge-creating company*: Harvard Business Review Press, 2008.
- [14] I. Nonaka, and H. Takeuchi, *The knowledge-creating company: How Japanese companies create the dynamics of innovation*: Oxford university press, 1995.
- [15] L. Chen, A. Baird, and D. Straub, "Why do participants continue to contribute? Evaluation of usefulness voting and commenting motivational affordances within an online knowledge community," *Decision Support Systems*, vol. 118, pp. 21-32, 2019.
- [16] S. M. Jasimuddin, N. Connell, and J. H. Klein, "What motivates organisational knowledge transfer? Some lessons from a UK-based multinational," *Journal of Information & Knowledge Management*, vol. 5, no. 02, pp. 165-171, 2006.
- [17] S. Y. Choi, H. Lee, and Y. J. M. q. Yoo, "The impact of information technology and transactive memory systems on knowledge sharing, application, and team performance: a field study," pp. 855-870, 2010.
- [18] G. Jawaheer, P. Weller, and P. Kostkova, "Modeling user preferences in recommender systems: A classification framework for explicit and implicit user feedback," *ACM Transactions on Interactive Intelligent Systems (TiiS)*, vol. 4, no. 2, pp. 1-26, 2014.
- [19] M. Claypool, P. Le, M. Wased, and D. Brown, "Implicit interest indicators." pp. 33-40.
- [20] A. Abdul-Rahman, and S. Hailes, "Supporting trust in virtual communities." p. 9 pp. vol. 1.