

Towards Introducing Knowledge Management Concept to Maritime Education & Training

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Abstract

Knowledge Management (KM) concept had been introduced to the world through the industrial domain, where it generated following a necessity to maintain knowledge and information within a certain border, driven from strong and fierce competition. The concept itself had evolved in a way that allowed the technology to affect the process of maintaining the knowledge to transform it to more sophisticated processes of information analysis, thus producing much more useful data, which lead to further usage of KM concept, such as categorization, gap analysis, and areas of which companies need to invest more in.

However, the KM concept in the educational domain was not properly used until the early 90s, not until the problem was raised by certain fields of education, where they found that their knowledge was not less vital than that in the industrial domain. But the technological solutions faced the problem of the type of knowledge used in the educational domain, which consists partly of an implicit nature, which raised the need to develop certain administrative and Technological solutions to tackle this challenge.

In the maritime education domain, the KM Concept had had an even later start and far weaker approach than other types of education, mainly because of its vocational nature, and several other reasons that will be discussed thoroughly in this paper.

This paper is a part of ongoing research by the authors on the history of KM and how it should properly be introduced to the maritime education domain. The research includes a case study and customization of a prototype KM software to fit the nature of Knowledge normally found in the maritime domain. The paper also displays the importance of KM to the Maritime

education and training entities, and how it affects its performance and helps with its sustainable development in general.

Keywords

Maritime Education and Training – Knowledge Management – Educational policies – Communities of Practice – Maritime Knowledge

1 Introduction

Knowledge is the backbone of any civilization. It affects, directly and indirectly, the building, development, and sustainability of the community in general. Nowadays, obtaining knowledge is an easy task, considering globalization and the availability/accessibility of information. The challenge is to sustain such knowledge to use it through various applications, in other words; manage your knowledge.

Knowledge Management (KM) concept had been a hot topic in the last few decades, it was found essential, especially in knowledge-intensive organizations. No doubt, knowledge is the main asset in any organization, which forces any management to start planning how to sustain such asset represented in the knowledge of their employees, and how to find a way to utilize and maintain such knowledge. KM concept is important to enhance the understanding of how an organization becomes skilled at creating, acquiring, and transferring knowledge to support sustainable development.

1.1 Aim

To Highlight the importance of Applying the KM Concept into MET and Suggesting a roadmap enabling the swift entry of KM into policies and Quality Standard Systems of MET.

1.2 Method

Analytical/Critical review of the current level of KM application in the MET domain. Data was collected Using Qualitative methods.

2 Background Studies & Literature Review

2.1 Knowledge Management

Abundance in the literature concerning KM concepts applied incorporates is clear, produced as early as the 1990s (Gupta & Govindarajan, 1991, Hedlund, 1994 & Wiig, 1997). With the

beginning of this century, the interest in applying KM concepts into education had been focused upon; it started with a trial to implement corporate-KM in education as did Kidwell et.al in 2000 & Bernbom in 2001. Then there was a huge studiousness surge into the matter when the Institute for the Study of Knowledge Management in Education (ISKME) was established in 2002. Since then, there has been serious literature on applying KM in education, like what (Sallis & Jones) & (Serban & Luan) wrote in 2002, followed by Petrides & Nodine in 2003 and Metcalfe in 2006. It is fair to say that KM in education literature surged after the establishment of ISKME.

Although education may be the same when it comes to philosophies and theories, the application may differ when it faces a special nature of education, like maritime education. Maritime education is a vocational education, derived largely from vocational knowledge and experience, which is reflected greatly in the scarcity of experienced maritime teachers.

The literature of applying KM in the maritime domain was greatly addressing the shipping industry either in running shipping companies like in articles and books of Fei in 2011 and 2013 or shipping logistics as written by Lee & Song in 2010 & 2015 and by Radhika in 2014.

On the other hand, a modest approach was made to the application of KM in MET institutes were found in a few paragraphs on an article by Raicu & Niță in 2008 in addition to a research done by Kitada, et al (2015) about the application of KM techniques to improve online MET.

The absence of literature describing a seriously long time testing of the application of KM concepts and techniques in MET institutes will be the derive and contribution of this research, trying to find an appropriate tool to be implemented in a case study on the employees of an existing Maritime Education and Training Facility in the Middle East.

3 Types of Knowledge

Literature divides knowledge into three main types:

3.1 Personal knowledge (conceptual knowledge)

Also, called conceptual knowledge (Walsh & Rastegari, 2015). It is the first phase of knowledge, where an individual collects information to be familiar with something., it does not necessarily transfer into behavioral changes. It is the base for the next level of knowledge. “Personal

knowledge relates to firsthand experience, idiosyncratic preferences, and autobiographical facts” (Henriques, 2013).

3.2 Procedural Knowledge (structural knowledge)

The next phase of knowledge is procedural knowledge when we learn the know-how of things. It is the process of gaining information to do something in particular. When an individual gain the skill of actually doing something is said that he/she had the procedural knowledge of this thing.

3.3 Propositional Knowledge

Propositional knowledge is the primary concern of epistemology (Theory of Knowledge, 2017). It is simply the type of knowledge that affects your judgment positively, that makes an individual wiser and more competent at his/her profession. One can claim that this type of knowledge is the most challenging type, either in obtaining it or transferring it to others.

4 Types of Knowledge in the Maritime Education & Training domain

Knowledge in METs is always being utilized by Educators (teachers/instructors) and learners (students/trainees). Cross (2013) once said, that finding a marine teacher is a very hard job, because of the non-ending claim that it takes a good seafarer to become a good teacher, and it takes a good teacher to become a good seafarer, so on and so forth.

The International Maritime Organization (IMO) regulated the maritime educational process in a convention named “International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers” (STCW). in the convention, there are specific requirements for maritime teachers, every administration (country) should have its Quality Management System (QMS) defining the qualifications of their maritime teachers. The only thing that the STCW mandated in this matter, was that the maritime teacher should at least carry the same level of the certificate that he/she teaches (IMO, 2017).

The maritime student on the other hand, as an undergraduate, undertakes the first type of knowledge (personal knowledge) which he/she need to pass the first level of assessment. This level requires teachers to have enough personal knowledge to go around. But because of the special nature of maritime education, there is a lot of procedural knowledge involved as well, especially after the transformation of the STCW from being knowledge-based to a competency-based

educational system (Cross, 2012). In the STCW there are a lot of competencies where it clearly says that the student should have the ability to perform certain tasks. To perform these tasks, he/she should be educated to do it. To do that, his/her teacher should have this type of knowledge (procedural knowledge).

Going on, the MET does not stop at the college level, it is a continuous educational process as long as the seafarer is in service, and as long as his/her license is valid. There are certain courses needed to be undertaken to revalidate the sea-going license of the seafarer. These mandatory courses are typically transferring new techniques in several matters, as mentioned in the STCW.

For management-level education and training, it is all about decision-making. In the tense nature of sea life, decision-making requires a lot of training and special capabilities, again the transfer of these abilities must be done through an experienced teacher who accommodates a certain level of propositional knowledge.

Lastly, to conclude, according to STCW, the level of the teacher is dependent on the level of education required for the trainee, undergraduate, operational level, management level, and mandatory revalidation courses. Where a mix of personal knowledge and procedural knowledge are needed at the undergraduate level and to obtain the operational level certificate, and a mixture of procedural and propositional knowledge is required in the latent two levels of education, managerial level certificate and the revalidation mandatory courses.

5 Implicit and Explicit Knowledge

As discussed, KM is all about sharing knowledge with others sharing the same interest, based on interactive and transmission processes between producers and consumers of knowledge. This knowledge is either implicit or explicit.

Schacter (1987) defines implicit memory as the limited control of conscious or intentional recollection of data. Reber (1993) on the other hand, defines implicit learning as “the acquisition of knowledge that takes place largely independently of conscious attempts to learn and largely in the absence of explicit knowledge about what was acquired”.

The difference between implicit and explicit was expressed by Dienes & Perner (1999) in an illustrative example “They didn’t say so explicitly; it was left implicit”. Furthermore, a formal differentiation between implicit and explicit knowledge is introduced by Polanyi (1966):

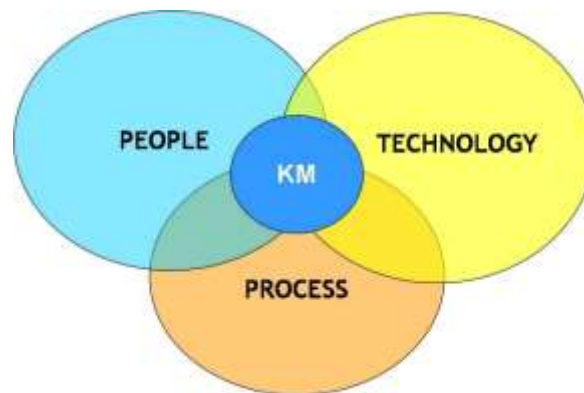
“Explicit knowledge is that which is stated in detail and leaves nothing merely implied. It is termed “codified” or “formal” knowledge because it can be recorded. Implicit knowledge is that which is understood, implied, and exists without being stated. It is informal, experiential, and difficult to capture or share. It is knowledge that cannot be expressed”

Because of that contradiction, Fei (2011) claims that different KM methods should be used to deal with different types of knowledge. IT, for example, has limited outcomes when implicit knowledge is transferred when a face-to-face approach should be facilitated for better results.

6 Knowledge Management Software

Searching for the history of KM tools, it was found that the need for an IT solution was evident following the boom in the application of KM in the industrial domain. The first few KM programs were introduced in the mid-90s, the first introduction of the same to Academia was in the 2000s. The actual booming into Academia took place when major universities started teaching KM in their majors, and several KM PhDs thesis were introduced (Dalkir & Liebowitz, 2011).

Fig. (1): The Three Pillars of KM. Lyke-Ho-Gland (2016) Want Better Process Management? Think Knowledge Management



6.1 Features Required for the Intended Software

To achieve the purpose of this research, the following features should be available in the KM software chosen to be used in the research process

1. Method to retain both implicit and explicit knowledge.

Able to handle all types of data; such as word, audio, and video in such a way that it can be easily stored and reached upon request.

2. Statistical output

Where the system can provide statistical data on the usage of the system for every user, time spent, and contribution. Also, the system needs to provide data regarding the availability of certain content and the number of users that holds such content, for example, if the user is looking for how many staff holds the knowledge of “ship stability”, the system should provide the percentage and information about these knowledge holders.

3. Content Management

The system should have the ability to categorize and catalog data in a certain retheme either designed by the higher management or customized by the user himself. This would lead to a quick search for information and easier access to required data. Also, searching capabilities should be available.

4. Personal accounts

Every user should have his/her account where he/she can contribute to the system, and at the same time, access the contribution of other users.

5. Sends Notification to Users

When any user updates the system with any kind of knowledge, other users should receive a notification. The notification may be set up according to “persons of choice” or “the subject of interest”.

6. Accessible from management

The hierarchy of staff members should be taken into consideration in the system, meaning that a department head should have access to the activities of his/her subordinates, either by full access to their accounts or by the availability of statistical reports of his/her activities. Using a master key-like password. This would ease the usage of the “rewards and punishment” principle.

7. Mobile Phone application

Nowadays, ease of access is a must, knowledge must be available at the tip of your fingers using mobile smartphones. The mobile application does not need to have all the features of the system, but at least the major features should be available.

8. Designed for educational purposes

The utilizing of a KM system initially designed for educational institutes well far more effective than being originally designed for industrial or customer service usage. albithe the data, information, and knowledge as concepts are still the same, but the utilizing capability is different.

9. Helps and support the establishment of communities of practice (COPs)

COPs had been identified as the heart and soul of any successful KM system, people of common interest share their experiences, one of the methods is through KM-Software. This should allow both official and un-official networking between colleagues, through chats, file sharing, commenting etc.

10. Repository of knowledge availability

Any kind of knowledge uploaded on the system should be stored and reached upon request. The entity may have its servers in case of the sensitivity of such information, or it could use web-based programs or cloud storage to build its repository.

11. Work with the organization's existing KM Technology

Most of the educational institutes have some level of KM in place, even if it is not up to the required level. Whatever the level of KM available, the nominated software should be able to absorb, work with, and upgrade it to a satisfactory level of KM implementation and build Capabilities over time.

12. Open-source

If the software is of an open-source nature, this will allow management to continually improve the software features. The necessity of change may surface over time, driven by the continuous development of the entity itself. In addition to customizing the software to meet the constantly changing needs of users.

13. Server Based

In the case of a Maritime Education Institute, the importance and the price of its knowledge will lead to the importance of having its private servers and storage facilities.

6.2 Market search for the intended software

The number of available KM programs on the market is huge, to understand the nature of such software, a thorough study was made on a limited number of programs, looking for their suitability to the intentions of this research.

To make the study more applicable and fruitful, a recommendation from “Captera” (2018), a virtual company that aims to help entities find suitable software for the nature of their work, where they recommended top 20 programs for the year 2018. The research will choose only the top 10 of the lists for this review, of which all will be examined to their suitability to the AASTMT in precise.

Table (1): the chosen KM programs compared to the availability of the research intended features

Feature	Availability											Feature Available
	Confluence	Inmagic presto	Zoho connec	Freshdesk	Bitrix24	eXo Platform	Mango Apps	iMeet Central	PHPKB	Auros	AASTMT Communi	
Retain implicit & explicit Kn.	Y	N	Y	N	Y	Y	Y	Y	N	Y	Y	73 %
Statistical output	N	N	Y	N	N	Y	N	N	Y	N	N	27 %
Content management	N	Y	N	N	Y	Y	Y	Y	Y	Y	N	64 %
Personal accounts	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100 %
Notifications to Users	Y	N	N	N	N	N	Y	N	N	N	N	18 %
Accessible from management	N	N	Y	N	N	Y	Y	N	N	N	N	27 %
Mobile application	Y	Y	N	N	Y	Y	Y	N	Y	N	N	55 %
Designed for educational use	N	N	N	N	N	N	N	N	N	N	Y	9 %
Communities of practice	Y	Y	Y	N	Y	Y	N	N	Y	Y	Y	73 %

Knowledge Repository	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100 %
Work with Org. existing KM	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	82 %
Open-source	N	N	N	N	N	Y	N	N	N	N	Y	18 %
Server-based	N	N	N	Y	Y	N	N	N	N	N	Y	27 %
Total Wight of Software	54 %	31 %	54 %	31 %	62 %	77 %	54 %	31 %	54 %	45 %	62 %	

From table (1), the sample programs were inspected for the availability of the features that serve the purpose of this study. Giving that All features were given the same weight for their equal importance and their strong correlation, the following remarks were found:

- The most suitable programs are *EXO Platform – AASTMT Community – Britrix24*.
- The least suitable programs are *Inmagic Presto – FreshDesk – iMeetCentral*.
- The three features that are almost available in all programs are *Personal accounts – knowledge raspatory -Work with the organization’s Existing KM*.
- The features that are less available in most programs are *Notifications to Users - Designed for educational use - Open source*.
- The only software that is designed for educational purposes is the *AASTMT Community*.

From the above findings, this research will use the *AASTMT community* software for the following reasons:

- The program came second from eleven programs analyzed by the researcher.
- The software is the only program on the list that is designed specifically to serve the purpose of an educational institute.
- The research will be conducted on some of the AASTMT educational departments, and the AASTMT is the maker and the owner of the software, this will overcome a lot of logistical and security problems that may arise.
- Staff members that will participate in this research already have personal accounts on the program.

- The software is of an open-source nature and can be developed to add all missing features with the aid of its maker.

7 Interviews

To legitimize the research, gain credibility, validate the research problem, and know how deep the problem has reached into the Maritime educational system. Also, to conciliate the practicality/suitability of the proposed solution and obtain an overview of the expectation of its outputs.

Several interviews had been carried out over a long period, some of the interviews were made in a highly scientific/professional method, and some were less formal, and some were carried in a non-formal manner, depending on the time available and the circumstances of the interview.

The names and the identities of the interviewers will not be revealed because of privacy disclosures, but the researcher is free to declare that the professional positions of the staff members interviewed can reflect on the overall subject, either to identify the problem or to evaluate the solution. (detailed information is available for authentication upon request).

The pool of interviewers is from different sectors of Academia, policymakers, educational deans, heads of departments, research and development, researchers, quality assurance personnel, undergraduate studies administrators, postgraduate studies executives, student affairs, senior and junior lecturers.

7.1 Interview discussion points and feedback

- **What is KM and how well it is embedded in our Maritime educational system**

All of the Higher managerial positions interviewed had a very clear understanding of KM as a concept, the same understanding of the concept was not available at the majority of the non-managerial and junior staff members. After the concept had been introduced to those who were not familiar, they all appreciated the vital role that KM plays in delivering maritime education.

On the other hand, when asked about whether the KM is implemented in the current educational system or not, they all agreed that they cannot admit that there is any official KM tool being used

to apply the concept, except few shy personal initiatives from individuals that will soon demolish eventually, as a result of an absence of a fathering policy.

- **How would you suggest an action plan to apply/improve KM in your department/deanery?**

The researcher received some suggestions in this debate, varying from using computer software, data collection portal, content management system, to human-centered systems, like the communities of practice, scheduled meetings, non-formal gatherings, shadowing, etc.

some may not have used the scientific name of the tool but at least they describe it well enough to reflect that they have a fair understanding of the concept and the deep will to contribute in case of adopting.

- **Do you think that KM as a practice should be a self-driven initiative from employees or an institute policy-driven from higher management?**

This was the single discussion item that all participants agreed upon. For the KM to flourish it must be a policy-driven concept, following the “rights and liabilities” code. Personal initiatives will not live long in the absence of strong commitment from higher management. Of course, this does not relieve the employees from their responsibility towards the KM system, but in the presence of rules and regulations, the application could be formally supervised and monitored through legitimate channels.

- **Do you believe that the roadmap proposed by the researcher will help resolve the problem (if any), and how well do you think the proposed solution will perform?**

Optimist interviewers saw that the road map proposed by the researcher as a solution to the lack of proper KM absence will most probably succeed, but will need great support from policymakers and some training on the software. Some had doubts about the ability of software engineers to achieve the level of required results, given the complicated nature of the scientific content of the maritime education

The pessimistic participants, on the other hand, didn’t have much to say on the platform but had very strong doubts about the ability of personnel to adapt to the system and take a role in its

application, even in the presence of strong compulsory requirements from the administration. in their point of view, people have always ways to override the system.

Finally, all agreed that if we could overcome the technical challenge and were able to find a way to ensure people docility, the system will achieve its goal and KM will positively affect the quality of Maritime Education and Training

8 Findings

- General Lack of defining KM.
- Lack of identifying the importance of KM, and naturally, failed to anticipate its effect.
- Strong wellness of policymakers and employees to contribute to the process of adding KM systems to the MET Domain. After being convinced of its essentiality.
- The practicality of the roadmap of implementation introduced by the research.

9 Conclusion

In conclusion, knowledge management systems are an essential managerial tool used in any knowledge-intensive organization. Believing that the knowledge of its employees is the most important asset in any successful competitive organization; top management should always utilize its resources most beneficially. To do that, this paper had illustrated different aspects of knowledge management and its subsidiary theories. Also, discussed Nonaka & Takeuchi's theory on the flow of organizational knowledge and how this theory would successfully be integrated throughout the educational system backed by strong formal and non-formal Communities of Practice (COPs) and a powerful functional Content Management System (CMS).

Therefore, this research recommends that all Maritime Education and Training Institutes shall construct/develop a Knowledge management model/system and implant it in its quality standard system where all employees would obligatorily contribute in. In this way, knowledge will be retained within the institution, and the overall performance of the Institute would surely magnify.

For further research, the complete design of a knowledge management platform will need to take place and be introduced to a sample of participants. On that ground, quantitative methods shall be used to measure the effectiveness of the tool concerning the quality of Maritime Education and Training.

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