

REVIEW ARTICLE

Knowledge Management at Schools

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Abstract

The basic philosophy of education is the production and information use. Therefore, schools should continue to develop existing business models and understand the processes of searching, storing, duplication, and implementing to obtain the necessary information. Schools should use information technology and school members should find ways to understand knowledge management more deeply. Schools should also take lessons from the active feedback coming from their members on knowledge management to improve administrative performance. It is important for the school to have a shared vision in the school and to create a motivating force for the employees to take part in the goals set in this vision in order to make knowledge management effective. In this research, it was tried to find answers to the following questions. (i) What is Knowledge Management?, (ii) What is the Importance of Knowledge Management?, (iii) How Does the Knowledge Management Process Work? (iv) How is Knowledge Management Used in Schools? (v) What are the Knowledge Management Platforms Used in the Schools? In the research, the information was obtained through the literature review on knowledge management and its use in schools.

Keywords: *Knowledge Management, Knowledge Management Process, Knowledge Management at Schools.*

Introduction

With the introduction of the digital age, people started to search and use information by using the internet. Information technology practices increase the effectiveness of applying knowledge management and information in groups (Dagli and Uzunboylu, 2009). Today, members of the organization can easily place, organize, store, transfer, share, implement, and create information

(McAndrew, Clow, Taylor and Aczel, 2004). Members of the organization can transfer and share the information they collect over network platforms by using communication technology, (Rampai and Sopeerak, 2011). Therefore, the diffusion and innovation of information can increase in an atmosphere of sharing and collaboration (Lee, Lou, Shih and Tseng, 2011). School management needs to encourage teachers to collaborate among themselves. It is also important that the school management can evaluate the opportunities that arise to develop information communication technologies within the school.

Due to the new age of Web 2.0 and the impact of emerging interactive online information technologies, the internal management and information implementation processes of schools have begun to get complicated. Therefore, previous studies reveal how to assist knowledge management processes in schools and the needs of knowledge management system (Richard, 2001; David, 1999; Kuo, 2003; McKenzie et al., 2001: from: Lee, Lu, Yang, and Hou, 2010). Schools should also take lessons from their members' active feedback on knowledge management to improve administrative performance. In this research, it was tried to find answers to the following questions. (i) What is Knowledge Management?, (ii) What is the Importance of Knowledge Management?, (iii) How Does the Knowledge Management Process Work? (iv) How is Knowledge Management Used in Schools? (v) Which Knowledge Management Platforms are Used in Schools? In the research, the information was obtained through the literature review on knowledge management and its use in schools.

Concept of Knowledge Management

Knowledge management is a discipline that advances the organization's description, management, and sharing of information asset, which includes the experience and expertise of its employees. In other words, knowledge management is to take advantage of information. Knowledge management includes the description and analysis of the necessary information, and planning and control of the actions required to improve the information existence. It also improves the use of organizational information for organizational learning and thus forms a combination of knowledge management, communication, and human resources (Kim, 1999). Knowledge management is "the production, archiving and sharing of valuable information, expertise and the view of people and organizations with common interests and needs" (Thambi and O'Toole, 2012). However, it is also seen as the process of identifying, buying, organizing and spreading intellectual assets that are critical for the long-term performance of the organization (Thambi and O'Toole, 2012). Lavergne and Earl (2006) distinguish between the concrete information view such as information technologies and the implicit approach of organizational learning view that includes behavioral and implicit information. Becerra-Fernandez and Stevenson (2001) added an economic focus to this situation: "Knowledge management is the new organizational strategy to take advantage of intellectual gain and management innovation." Knowledge management also supports information sharing in order to put the information into practice in increasing the organizational effectiveness of the members (Zhao, 2010). Choi (2000) mentioned the importance of knowledge management of many organizations in terms of organizational performance, and stated that senior management is critical for the success of knowledge management.

Knowledge Management Processes

Knowledge management uses systematic approaches to collect, analyze, understand information and to establish new and more valuable information. Moreover, it can be divided into information acquisition, accumulation, dissemination, sharing, transfer, and creation (Zhao, 2010). Lee, Lou, Shih, and Tseng (2011) have used in their research the AHP (Analytical Hierarchy Process) to evaluate the weights of network knowledge management platforms and procedures such as problem definition, setting goals, selecting model factors, designing models, using surveys to gather expert opinions. It addressed three aspects of knowledge management in order to manage information using information technologies: information creation, information sharing, and information transfer. They have developed them in response to the idea of what can be done in a technological environment.

Information creation is the process of uniting individuals and organizations through environmental information transformation and dynamic interaction (Nonaka and Toyama, 2007). In creating information, “responding to others' articles” is a basic model for publishing creativity. Creative information becomes clear when members of the organization interact directly with organizational information, respond to organizational information, and publish it (Lee, Lou, Shih, and Tseng, 2011). By information transfer, students can easily and directly receive and use group information. This reduces barriers in information transfer and increases organizational information transfer (Lee, Lou, Shih and Tseng, 2011). Among the information transfer behavior for the knowledge management platform, storing related articles is the best way for organizational information to be transferred from a platform to the individual network platform information bank. This bank makes it easier for individuals to use information and transfer effective information (Lee, Lou, Shih, and Tseng, 2011). At this point, it is explained that information should be stored in educational organizations. School archives can be given as an example. If there is a structure for teacher development within the Ministry of National Education, a dynamic informatics database can be created with a forum interface, where teachers can participate, enter with their ID numbers. By adding related topics to the teachers in all branches, materials can be developed by these teachers. A system can be created in which the presented materials can be open to the opinions and comments of other teachers and on which other teachers can study, send and receive files. The purpose of these applications is to provide information to the people in need within the organization. In practice, control can be website registrations. In these applications, teachers' contributions can be monitored by analyzing the statistics of the websites. Using reporting for this job, teachers can then be evaluated and rewarded for their contribution to the website. Thus, professional development of teachers will be provided. By checking that every information is not entered there, the site administrator can review the information entered on the site. In this case, for example, if a geography teacher manages the information sharing of geography teachers, false or incomplete information sharing can be prevented. A system can be made according to the click rate of the information and it can be ensured that the non-clicked information is located in the information pool in the background. It is important to reward the information shared by teachers according to the click through rate. Depending on how much information is shared, for what purpose, and the status of sharing, that information can be brought to the fore. A structure that is self-renewable, dynamic, and each step can be controlled numerically. Apart from this, it can be ensured that teachers share their experiences in such a

system, and experts can join the system and add information to the system that will provide the professional development of teachers. In this system, teachers can also be evaluated according to their comments, expressing opinions, and asking questions. For example, a platform for high school mathematics teachers can be created to track the teacher's work here based on their entry and questioning status. Traces can be made to answer the questions of how long they stayed, how many questions have been asked, how many have been answered, and how they have affected their experience. How far the information received by the teacher was put into practice should be evaluated. All this is a resource for the teacher to improve himself or herself. In this system, the teacher does not necessarily learn something. Asking questions and adding this to their life is also a learning tool. Even if they asked questions, got the answer, applied it and stated that they could not find the solution, this should be seen and evaluated as a learning tool and an experience for the teacher. This system is an experience both for the self-development of the teacher and for the teacher to convey current information to the students. An example of this is the Education Information Network (EBA). EBA is a platform where teachers can effectively communicate with their students, share information and students can carry out their work on the system. This is a cognitive dimension of learning, not an affective dimension. An example of the affective dimension is the addition of a video to the teacher about what to do in an emergency situation in the classroom. However, the teacher cannot be taught a skill in this system because there is no practical training here. From an evaluation point of view, these activities of teachers need to be adjusted so that the principal and the ministry can see them. At the end of each month, these practices and studies should be evaluated by the ministry. The results should be delivered to the teacher in terms of seeing the teacher's own ranking and where he is in that ranking, and should be delivered to the school administration and the ministry for evaluation and rewarding. Thus, the teacher will know the areas that he is missing. They will be able to discover where their place is among the teachers who ask and share the most questions. If this ranking gives the teacher in-service training points, the implementation will be more effective. On the other hand, the necessary technological tools (computer, browser, internet) for school administrators to store information should be available. An electronic database must be created for the information to be stored. It should be ensured that information can be reached at school through in-school networks. School teacher activities and studies should be shared on school websites, and school administrators should supervise the continual updates of school information. In order to provide up-to-date information to stakeholders, regular updates of school websites should be followed. Information meetings should be held regularly in order to inform the employees about the new legislative changes or new situations.

However, interactive information sharing helps students grow and develop and provides the basis for communication necessary for structuring information. Demonstration and sharing of information is possible only through the internalization of information in a correct and open organizational environment. A culture must be created that enables employees to share what they know. In addition to information sharing, they should also share how they acquired the information. It increases the sharing of relevant topics and information application resources in information sharing and reporting organizations (Lee, Lou, Shih and Tseng, 2011).

Use of Knowledge Management in Schools

There have been various research conducted on the use of knowledge management in the schools. In their study, Lee, Lu, Yang, and Hou (2010) examined and discussed the difficulties and limitations of knowledge management's application to school organizational cultures. Theories of knowledge management models are summarized and a process-based knowledge management model suitable for schools is proposed. In order to establish a process-based knowledge management system in schools, a low-priced open-source software development structure (PKMSS) has been implemented. In addition, a 30-day experimental observation method and questionnaire was applied in a secondary school in Taiwan. This case study includes a questionnaire and unstructured interview to explore the progress, performance, and limitations of the PKMSS implementation. As a result of the study, it was determined that PKMSS is important for the advancement of knowledge management of schools. This not only helps in the arrival and consolidation of information, but also helps to achieve the goals of information sharing effectively and to advance the interaction between members.

In their study, Lee, Lou, Shih, and Tseng (2011) use the Analytical Hierarchy Process (AHP) to measure key knowledge management behaviors and to analyze the point weights of primary school students' information transfer, sharing and formation behaviors. This study, based on expert selection analysis and validity and reliability tests, defined weighted scores in 4 important information transfer behavior, 3 information sharing behavior and 4 information generation behavior. "Storing related articles", "providing reports" and "responding to others' articles" have the highest scores. These behaviors were later used to evaluate networks' knowledge management platform. In some schools, organizational structure can be applied even if it is limited with practices such as collaborative group studies, professional development programs, shared goals, contribution to development, horizontal networks in the information flow, open culture, teacher leadership (Schechter and Qadach, 2012). School administrators related to knowledge management have an important role at this point. Necessary time and environment should be created for sharing information in schools. Knowledge management will be facilitated in the organization if an information-sharing environment is provided to the employees in schools such as seminars, conferences, in-service training, information meetings, discussion groups. Useful boards, information announcement walls, or useful links can be used on the web page for information sharing in schools.

The level of knowledge that teachers have affects the quality of work and processes in schools. Associating teachers' knowledge with school management is an important tool for the school to achieve its goals. According to quantitative and qualitative data, teachers have a low level of knowledge about school management positions and associations (Uğurlu, 2013). It is difficult to implement effective knowledge management in schools. Limitations on this are the difficulty in deciding the goals of knowledge sharing and the lack of interactive knowledge sharing behavior in teachers' organizational culture (Carroll, Choo, Dunlap, Isenhour, Kerr, MacLean and Rosson, 2003). Information and ideas in schools can come from different sources, such as individual knowledge, information from experts and experiences of other schools, and information created by school members (McCharen, Song, and Marten, 2011). Sharing information requires connections in the organization.

Simulations, scenario techniques, and evaluation of new suggestions that will enable learning by doing in the information development process support the information creation process. Consultancy services and comparison between organizations are among the sources of information. External networks, databases, electronic forums, internet networks such as electronic newsgroups and customers are external information source tools (Akçakaza, 2009). Other outsourcing information in school settings can be libraries and information centers in other schools. In order for the knowledge management to function effectively in schools, a rich library infrastructure should be established and educational journals should be examined. In addition, those who need it should be able to be directed to information centers as a source of information. Since different organizational cultures affect intra-organizational information sharing differently (Yang, 2007), knowledge management strategies and process models in the business world may not be suitable for educational organizations (Lee, Lu, Yang, and Hou, 2010).

Effective Knowledge Management Application Ways in Schools

In order for knowledge management to be effective in schools, there must be a shared vision in the school and there must be a motivating force for employees to take part in the goals set in this vision. At this point, school leaders have important duties. Bringing the organization together for this purpose and employing it has become one of the most important duties of the organization leader. A process management-based knowledge management system environment will motivate school members to set up and share information documents with the aim of achieving their rising school performance goals (Lee, Lu, Yang, and Hou, 2010).

In Ainissyifa's (2012) study, it was aimed to discuss the impact of human resources on the application of knowledge management to formal education in secondary schools. In terms of information sharing, it has been concluded that active participation increases the quality of education of human resources development through individual learning and innovation.

Thambi and O'Toole (2012) investigated the relationship between knowledge management's collaborative taxonomy and secondary schools and the adaptability of institutional-based knowledge management taxonomy to secondary schools. The study examines the categories of Michael Earl's enterprise-based knowledge management taxonomy and determines the degree of applicability in secondary schools. As a result of the research, it was concluded that most of the categories are related to schools, and they are also already used in secondary schools. Thambi and O'Toole (2012) state that knowledge management is a new area for secondary school principals. Sallis and Jones (2002) argue that institutions do not have their own strategies for knowledge management and what happens is not in the education sector. This situation is supported by the researchers' later researches.

Tammets, Pata, and Laanpere (2012) used the knowledge-building model (LKB model) of Figure 1 to provide detailed learning and support to Nonaka and Takeuchi to universities and schools. In the research, the components of the LKB model were examined in terms of teacher professional development. 10 stakeholders were interviewed within the scope of qualitative research. The results of the research determined that the difficulties of LKB model in terms of teacher development are: teacher sensitivity, technical issues, and organizational obstacles. In

terms of teacher development, knowledge management stages table and knowledge management technical support for teacher development are included.

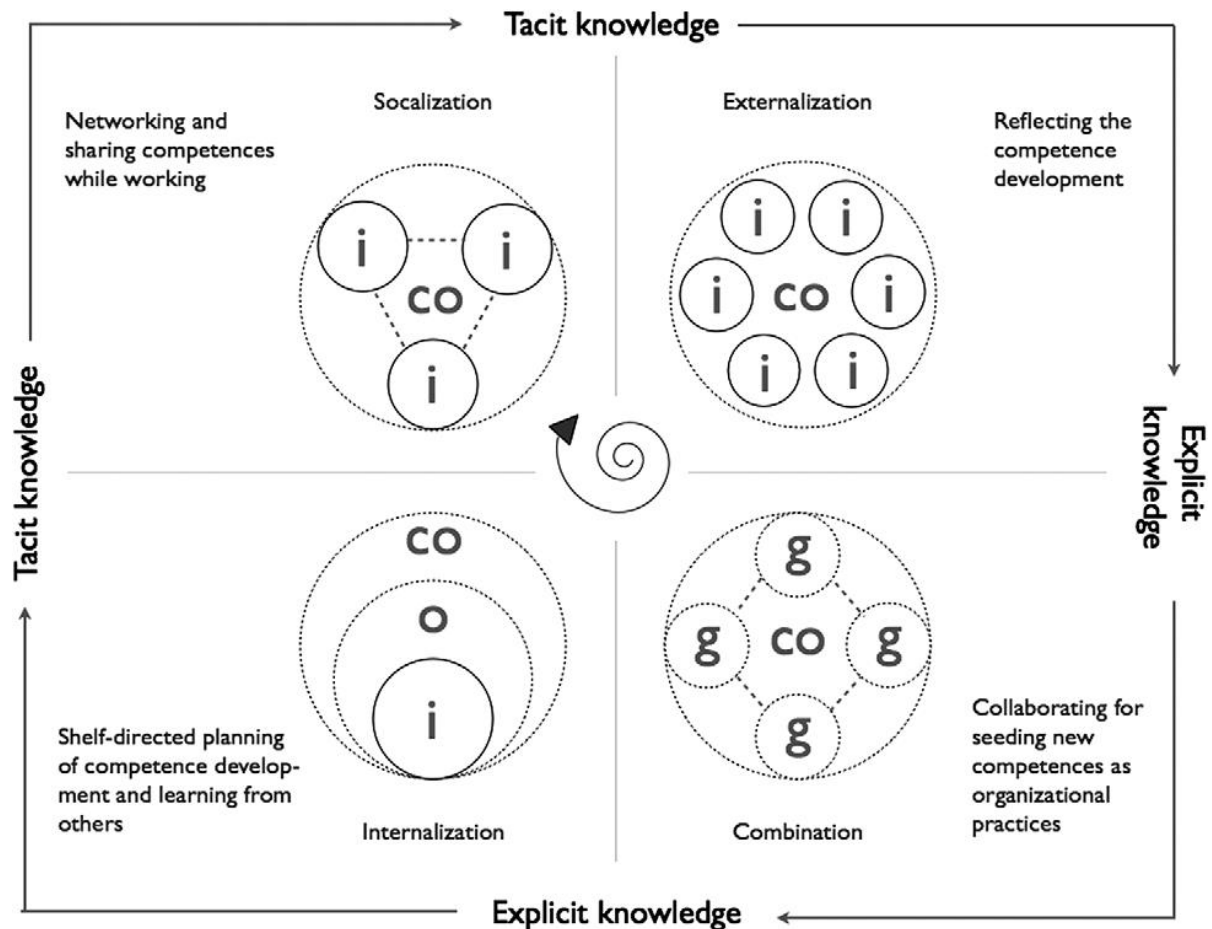


Figure 1. LKB model (Source: Tammets, Pata and Laanpere, 2012)*

Various examples can be given about the formation of knowledge management in schools. In this sense, the areas where information technology can be used are:

1. Forums: Interactive discussion environments where sharing of information in the internet environment can be done in a controlled manner, comments can be written and answered, files can be exchanged, and private messaging can be made in addition to open messaging.
2. Portals: These are environments where access to information is provided through systems such as the Internet, intranet.
3. School digital archives: The importance of storing the information in the schools or backing up the information on the school site in the storage media such as CD, DVD, external disk can be a source of search.

* 'i' represents the individual teacher, the 'o' organization (school or university), the 'g' group (in-service teachers or group of mathematics teachers), and 'co' cross-organizational (cross-organization) LKB activities.

4. There should be an accurate filing and categorization system regarding the information in the school. Thus, when the information is searched, questions such as where, who is the information and how to reach it can be found more quickly.
5. Schools should have a system of specialization of teachers. In MEB (Turkish Ministry of National Education), there are in-service trainings, courses and certificates taken by teachers and schools completed by MEBBİS (Ministry Of National Education Data Processing Systems). This information can be used. This system needs further development.
6. School administrations need to encourage teachers and administrators to use groupware software (icq, net Meeting, Messenger and e-mail) among themselves and create situations that require them to use the software.
7. School organizations should also be able to master scientific developments by following journals and current publications related to education and science.

Professional Development of Teachers

The theme of teacher empowerment through participatory decision-making becomes more associated with learning in organizations (McCharen, Song and Marten, 2011). Concepts of teacher empowerment and organizational learning are not new (Marks and Louis, 1997). School administrations should take care to write the opinions of the teachers directly to the minutes as they are at official meetings and they should support the participation of teachers in the decisions by giving value to the opinions of the teachers. School management should also enable teachers to express their opinions about the school. In addition, the school administration has duties to create environments in which teachers can express their views freely. It should be open to criticism and suggestions about how things should work in school. On this occasion, suggestions and information sharing should be included frequently in the chat environment with school employees and stakeholders. In the literature, there is a relationship between teacher empowerment and school organizational capacity (McCharen, Song and Marten, 2011). In addition, this relationship has been studied as part of research on the impact of learning organizations on organizational performance, innovation and performance improvement (Song, 2008). School administrations need to ensure that employees can reach all results in order to monitor and analyze performance indicators. School administrations should make the necessary arrangements for the training of candidates who are new to the profession, the development of the teachers and the in-service training activities that teachers participate in should be recorded. This is done in MEBBİS. It is important that this data can be used by school administrators in deciding who should do what during teacher assignments at school. In order to effectively implement knowledge management practices in the school, the teachers should be encouraged to share their experiences as well as to acquire knowledge and experience. School administrators should evaluate teachers' interests and abilities in internal assignments, teachers should follow the concepts and developments related to their fields and develop themselves in this sense. Individual creativity and efforts of teachers in the school should be supported. School administrations should ensure that employees receive training in this area in order to improve their knowledge and use, and should provide resources or guidance. Courses and trainings should be organized to ensure the development of teachers and

other employees at the points missing. An example of this is the development of EBA content for the smart board.

Knowledge Management Platforms Used in Schools

Network information platforms enable information transfer, synchronous and asynchronous communication. Network knowledge management platforms enable members to interact and learn implicit information at any time and place. Open behaviors use the knowledge management platform network to increase selection and absorption of information about student collection of articles, article selection, document and attachment download and header links to increase the transfer of open network information. Knowledge management platforms also enable students to report articles, recommend and share articles, and tag and classify article descriptions. These tools increase the impact by making network information sharing more comfortable (Lee, Lou, Shih and Tseng, 2011).

It is possible to exchange information with students through interaction with knowledge management platforms and to integrate individual information with organizational group information. In addition, the interaction function of network knowledge management further enhances information transfer and sharing. For example, “downloading attachments” makes it easier for members to find the information they need on the platform. This helps to transfer organizational information to individuals. In order to speed up the transfer of organizational information to individuals and to increase the transfer of information content, web articles and links are required in the category of “choosing header links”. Label determination makes it easier for organizations to share information, while article suggestion strengthens the sharing of team work (Lee, Lou, Shih, and Tseng, 2011). What is meant to be explained in the concept of labeling: Information should be thrown into the pool with a keyword and stored. An example of label identification while putting information in the pool is a system established for teachers and the definition of the areas and sub-areas needed in the structure. If the defined sub-area is not clicked, it should be thrown into the pool.

Dialogue-based and practice-based sites created by knowledge management platforms enable students to create and publish information (Nonaka, Toyama, and Konno, 2000). For example, students can create new articles, upload personal files, add relevant information links, and reply to articles published by others. Thus, the interaction of implicit knowledge, the acquisition of new information, the effectiveness of creative knowledge and knowledge formation will increase (Lee, Lou, Shih, and Tseng, 2011).

Bain and Swan (2011) conducted a research on the difficulties experienced in the establishment and implementation of feedback mechanisms for the efforts and reform of school reform and development initiatives. It is necessary to draw attention to effective feedback mechanisms for the development of educational organizations. The purpose of the research is to explain the application of the educational design metaphor to create the knowledge management system that provides teachers with constructive feedback on their own practices. This system includes the structure of professional knowledge, class grouping, finding-based practice and classroom management, providing feedback for the institutional practices of the structure that provides multiple stakeholders (teachers, students and administrators). The use of this approach is

considered as a pilot study practice in a school where knowledge management is used as a tool for the development of feedback in school reform and development.

School administrations should effort to share and transfer the practices that can be used in school for knowledge management among teachers.

Many studies have been done on the limitation of categorizing information (Golder and Huberman, 2006; Rivadeneira, Gruen, Muller, and Millen, 2007; Lee, Lu, Yang, and Hou, 2010). Open, cross-campus educational platforms (eg teacher blogs) are growing so that members of the organization can view their information documents in a system integrated with other sources. The interaction of connecting information documents with information documents from different community platforms and schools can be the future trend of uncovering and gathering information (Lee, Lu, Yang, and Hou, 2010). Mechanisms such as evaluation module, e-bulletins and forums increase the information interaction of the community. It provides practical resources such as interactions, information documents, e-bulletins and discussions. These resources will help teachers whose organizational culture is isolated (Tyack and Cuban, 1995). In order to obtain and share information in schools, e-government, e-school etc. applications are available. These practices eliminate management practice differences between the province and district, and it is known that these practices are understood and used in the same way everywhere (Almıř, 2010).

Conclusion

School leaders have important duties in order to create knowledge management in schools. One of the most important innovations in the use of knowledge management in schools, together with our era, is that it can be done in electronic environment such as sharing information, choosing the information to be shared, searching, finding, and discussing the information, and it is quite easy to obtain the information that is on-site and timely at school.

Therefore, technological-based systems can be used in schools to make knowledge management more effective. In this sense, there are studies to design a process-based knowledge management model suitable for school needs (Nonaka and Takeuchi, 1995; Shin, Holden and Schmidt, 2001; Hayes and Walsham, 2003; Nissen and Espino, 2000; Tiwana, 2002; Metaxiotis and Psarras, , 2003). Although there are some studies on knowledge management systems in education (Sallis and Jones, 2002; Spector, 2002), these studies mostly focus on proposing an knowledge management system framework, not developing an actual knowledge management process model-based educational knowledge management system. With these systems, it can be suggested that all employees at the school can see the part of the teachers, school administrators, and even the ministry related to them from the shared information. School leaders have very important duties regarding the use of this information sharing system. Leaders should, above all, motivate school employees about knowledge management in order to improve the school's knowledge management. This motivation may be rewarding the teacher or earning points; however, awarding the teacher based on their contribution to knowledge management will be effective in promoting sharing (Bain and Swan, 2011). It should be evaluated how far the information received by the teacher was put into practice. All this can be a resource for the teachers to improve themselves. In this system, the teacher does not necessarily has to learn anything. Asking questions and adding this to their life is also a learning tool. Even if they asked questions, got the answer, applied it and

stated that they could not find a solution, this should be seen and evaluated as a learning tool and an experience for the teacher.

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