

## Role of Peer Assist in Nuclear Knowledge Management

**Sanda Pleslić, Eda Jovičić**

University of Zagreb, Faculty of Electrical Engineering and Computing

Unska 3, 10000 Zagreb, Croatia

[sanda.pleslic@fer.hr](mailto:sanda.pleslic@fer.hr), [eda.jovicic@fer.hr](mailto:eda.jovicic@fer.hr)

### ABSTRACT

The uniqueness of nuclear knowledge is manifested in several ways: it is complex, requires significant financial resources and state support, must be acquired, developed, shared and transferred through several generations continuously and with equally high intensity. The combination of personal knowledge, skills, and experience needed to turn collected nuclear information into useful nuclear knowledge is particularly scarce. A sustainable safety culture is imperative for the nuclear sector. Therefore, the acquisition of nuclear knowledge goes through the process of long-term accumulation, which is related to the long-life cycle of plant operation. Issues of security, non-proliferation and safety, as well as all international obligations, are linked to nuclear knowledge. The biggest problem is that a large critical mass of knowledge in basic nuclear science is needed to support practical applications. Nuclear Knowledge Management (NKM) supports the creation, collection, sharing, transfer, maintenance, preservation and ultimately, most importantly, the use of knowledge required to develop and maintain competence and expertise in nuclear science and technology. Institutions that use nuclear knowledge face a loss of knowledge or a knowledge gap. Therefore, they must use the most modern knowledge management technologies that include numerous techniques and tools: KM analysis tools, knowledge capture techniques, social interactions and knowledge sharing techniques and different IT tools. Peer Assist (PA) is a technique used to share knowledge. It is a face-to-face or virtual meeting or workshop where colleagues from different teams or organizations gather to share their experiences, insights and knowledge with the team that asked for help related to the problem they are solving. PA is focused on a specific technical, strategic, mission or business challenge, provides help and insight from people outside the team, identifies possible approaches and new lines of inquiry, strongly promotes learning and knowledge sharing, and develops a strong network of all participants. The paper will present the role of peer assist in nuclear knowledge management.

**Keywords:** *nuclear knowledge, nuclear knowledge management, peer assist*

### 1 INTRODUCTION

An asset is something that has value, such as characteristics or property, or something that is owned by people, companies, or organizations. An asset is considered like any positive feature that gives an advantage over others. Priceless as a term is used to describe something of such high value that its price cannot be calculated, especially because it is rare. The adjective 'priceless' is also used to describe a skill or quality that has a high value because it is very useful [1]. The wisdom of older people is a priceless asset (Times, Sunday Times, 2016). Two priceless assets of any team or organization are knowing how to win and knowing how not to lose (The Sun, 2012).

Organizational knowledge is an organizational asset. It contains data, information, collective expertise and intellectual property. These assets can include all forms of explicit knowledge

(documentation, patents, trade secrets, databases, research results, etc.) and tacit knowledge possessed by all employees in the organization, regardless of their positions and workplaces.

Knowledge assets such as own technologies, patents, expert know-how ensure an advantage over competitors on the market. Knowledge assets are the driving fuel for stimulating and introducing innovation because they provide fundamental information, knowledge and insights that are necessary for the development of new products and services. Constant innovation introducing is essential for long-term growth and survival in a rapidly changing market. Effective use of knowledge assets such as best practices, historical data and professional insights increases operational efficiency and performance, simplifies processes and reduces errors. Knowledge assets help in risk management by being used in identifying, understanding, mitigating, preventing and minimizing risks. Investing in knowledge assets contributes to the development of human resources of the organization by ensuring the learning process before, during and after, and by encouraging an organizational culture of continuous progress. Knowledge assets help organizations to understand better the needs of customers or clients, resulting in improved customer experience, loyalty and long-term relationships [2].

Making decisions, taking actions, encouraging cooperation among employees in the organization and accelerating the process of innovating services and products is related to effective knowledge management and the use of knowledge as an asset. The imperatives of today's business are business process optimization, continuous progress and maintaining a strategic advantage on the market. With a systematic approach to knowledge as an asset, organizations achieve their strategically set goals, and at the same time, the overall value of the organization itself increases.

## **2 NUCLEAR KNOWLEDGE MANAGEMENT**

Nuclear knowledge is characterized as complex on a micro and macro level, expensive to create and maintain, a long-time scale from initial creation to final use, and requires a high degree of cooperation from all involved [3].

Knowledge management supports the creation, collection, sharing, transfer, maintenance, preservation and use of knowledge. However, due to the specificity of nuclear knowledge, nuclear knowledge management must be carried out with particular attention. Complexity and issues of security, safety and non-proliferation are always linked to nuclear knowledge, which requires a developed and sustainable safety culture. The biggest problem is the huge critical mass of knowledge in basic nuclear sciences that is needed to support practical applications in the power sector, nuclear technology, nuclear medicine, etc. The acquisition, development, sharing and transfer of nuclear knowledge go first through formal education, and then through work and experience, which in terms of time means several generations and continuously. Facing the risks of losing nuclear knowledge as well as bridging the knowledge gap is much more difficult and complex. Therefore, the most modern knowledge management technologies are used in nuclear knowledge management, which include numerous techniques and tools (Table 1) [4].

## **3 NUCLEAR KNOWLEDGE SHARING**

Organizations that use nuclear knowledge are increasingly connected not only at the national but also at the international level. Such strategic alliances require the sharing of personnel and their explicit and tacit knowledge. The involvement of public institutions, government, universities and industry requires the use of nuclear knowledge management and all knowledge management tools and techniques available for knowledge sharing. The aging of the nuclear force and the decrease in the number of younger employees entering the system raises concerns about the availability of the expertise and skills needed to successfully use nuclear science and technology. Reducing, limiting or terminating nuclear programs affect the process of creating, improving, sharing and transferring

nuclear knowledge [5, 6]. Knowledge sharing techniques are Community of Practice (CoP), Peer Assist, Knowledge Marketplace, After Action Review (AAR) and Knowledge Café. One of the most commonly used is peer assist because it promotes the sharing of knowledge and learning and connects experts inside and outside the nuclear organization in a strong network on a global level.

Table 1: Knowledge Management techniques and tools

<b>Knowledge Management Analysis Tools</b>	<b>Knowledge Capture Techniques</b>	<b>Social Interactions &amp; Knowledge Sharing Techniques</b>	<b>IT Tools</b>
KM Maturity Self-Assessment	Interview Techniques	Community of Practice (CoP)	Document & Content Management Systems
Knowledge Loss Risk Assessment	Concept Mapping	Peer Assist	Explicit Knowledge Search/Retrieval
Identification of Critical Knowledge	Process Mapping	Knowledge Marketplace	Knowledge Base Systems
Rapid Evidence Review	Observation	After Action Review (AAR)	Portals
	Constrained Tasks	Knowledge Café	Collaboration & Social Networking Tools
	Concept Sorting		Skills/Competency Management Systems

#### 4 PEER ASSIST

Asking for help from peers is certainly not something new, but the formal use of this process as a knowledge management technique and the formal name 'peer assist' was introduced by British Petroleum (BP) [7]. Peer assist differs from peer review in all categories: goal, purpose, task, participants, roles, nature and reporting. That is why it is important to define what we want to have: peer assist or peer review. It is a face-to-face or virtual meeting or workshop where colleagues from different teams or organizations gather to share their experiences, insights and knowledge with the team that asked for help related to the problem they are solving. Peer assist is focused on a specific technical, strategic, mission or business challenge, provides help and insight from people outside the team or organization, identifies possible approaches and new lines of inquiry, strongly promotes learning and knowledge sharing, and develops a strong network of all participants. In some industries and fields of activity, it can only be used at the end of the process, in the last phase of the project when some decisions need to be made. Peers allow us to be sure that we have taken all the relevant facts into account and that our tests can be repeated before moving on to the next stage of the process [8].

Benchmarking is information usually collected by a third party, and it measures business achievements and process performance. Benchmarking gives us insight into what has already been achieved elsewhere and usually comes together with 'best practices', i.e. a record of the process that represents the best achievement. The focus is generally on practice or process. It often happens that this best practice is simply not transferable to another environment or situation. It is difficult to adopt, and sometimes leads to worse achievements than the existing ones. Peer assist concentrates on sharing experiences in different contexts, and then using only parts of other people's experiences to develop a solution that perfectly fits one's own context. That's why we say that the purpose of a peer assist is collaborative [9].

It is good to use peer assist when we are facing challenges that we have never experienced before, where knowledge and experience from peers really help, and when the potential benefits exceed the cost of gathering for a meeting or workshop.

The peer assist concept is simple and represents more than just sharing good practices. Every explicit or tacit knowledge is acquired in a particular situation or context. The dependence of knowledge on the context means that it is not easily transferable to another context or situation. All experiences, both good and bad, are shared, the context will already be contained in those experiences. After that, only what fits from all the practices is taken and a new solution is developed that will fit the new context.

There is no easy right way to plan peer assist, but there are often methods that can be used with different initial settings and in different environments. It is definitely a good idea to first participate in a peer assist organized by someone else before starting to organize a peer assist workshop or meeting yourself, because on that way you can go through the entire process. The steps in peer assist planning are shown in Figure 1.

Figure 1: The steps in peer assist planning.

At the beginning of the peer assist, it is important to present everything related to one's own context, while not forcing the presentation of one's own practice. We don't even know if it is the best practice because we haven't tried to solve the problem in any other way. After that, others shared everything they know, but from their own context, which is different from ours. Together, new knowledge is gained, which can later be used on a third party, either by adapting the practice to work in a new context or by creating something new from the good parts of other people's experiences.

One doesn't adopt someone else's practice in a different context, but one adapts someone else's solution and makes a choice related to one's own context. Finally, one can continue to act together or separately, but everyone leaves a peer assist workshop or meeting with new ideas on how to do something differently, even those who just came to help. By taking new actions, we create new knowledge, test a new approach and learn from this experience.

## 5 CONCLUSION

The field of nuclear sciences and technologies often faces specific problems that are not present in other technologies because of the unique properties of nuclear knowledge. Initially, it is important to define the specific problem for which help is requested, to see if that problem has already been solved elsewhere, and to make a list of participants with different skills, competences and experiences. You should also clearly articulate the goals of peer assist, and at the same time be ready to reshape everything if the need arises. During peer assist, it is important to ensure that the argument is focused on the activity rather than the person, encouraging participants to consider alternative solutions. The expert team called in a process of peer assist will not offer a simple solution that can be implemented immediately. These will be more flashes of inspiration on how to solve a specific problem after considering good and bad experiences and some different contexts. Learning and acquaintance new things as part of peer assist will not be one-way because experts will also learn some new things that they have not faced before. Nuclear knowledge management is critical for ensuring sustainability and encouraging innovation, guaranteeing safety and security and ensuring that the benefits of nuclear applications remain available to future generations. Therefore, it is important to have a developed international network of nuclear experts who can be involved in peer assist. Reusing nuclear knowledge is a smart way to avoid duplicating efforts to make or solve something.

## REFERENCES

- [1] Cambridge Dictionary <https://dictionary.cambridge.org/dictionary/english/>
- [2] Phoenix NAP Global IT Services <https://phoenixnap.com/glossary/>
- [3] Y.L. Yanev, Nuclear Knowledge Management, *International Journal of Nuclear Knowledge Management*, Vol. 3, No. 2, pp. 1-11, 2009.
- [4] INTERNATIONAL ATOMIC ENERGY AGENCY, Knowledge Management for Nuclear Research and Development Organizations, *IAEA-TECDOC-1675*, IAEA, Vienna, 2012.
- [5] INTERNATIONAL ATOMIC ENERGY AGENCY, Knowledge Management and Its Implementation in Nuclear Organizations, *IAEA Nuclear Energy Series* No. NG-T-6.10, IAEA, Vienna, 2016.
- [6] T. Karseka, Y.L. Yanev, Building and maintaining a knowledge sharing culture for nuclear knowledge transfer, *International Journal of Nuclear Knowledge Management*, Vol. 3, No. 4, pp. 355-364, 2009.
- [7] O. Serrat, Conducting Peer Assist, *Knowledge Solutions*, pp. 1-6, 2008.
- [8] K.A. Greenes, Peer Assist: Learning Before Doing, *ASK Magazine Insight*, pp. 42-45, 1999.
- [9] C. Collison, G. Parcell, Learning to Fly, Capstone Publishing Limited, J. Wiley & Sons, 2004.

