Knowledge Management System to Enhance Digital Transformation in Higher Education

Natalia V. Dneprovska

The transition from the industrial to the information era has caused a general awareness of knowledge as a priority asset for societal development. Knowledge management (KM) theory appeared in 1990 and absorbed the achievements of a variety of scientific areas, such as knowledge engineering, the psychology of creativity, innovation management, information systems and many other fields. KM started its journey to business practice at the period of the technological transformation due to the spread of IT and Internet.

KM is a methodology that brings together the technological, innovative, and managerial aspects into the process of transformation. KM offers a comprehensive approach to improve the intellectual activity of organizations at large.

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The digital transformation processes in higher education have accelerated during the COVID-19 pandemic and expanded around the world. The urgent transfer of educational, research, and administrative activities to the digital environment required huge resources for technical support. Meanwhile the managerial and methodical support of this transfer was ignored. As a result, remote learning and teaching received a lot of negative feedback from students, teachers, and society. They lost the advantages of both face-to-face and remote learning when the face-to-face methods and materials were moved online. Remote learning provides the potential to improve the learning and teaching experience if a training course is designed or adapted for online learning. Vera Queiroz rightly notes that digital transformation "is associated with the use of technology to increase the performance of the educational institution as a whole, improve pedagogical management and obtain better students' learning outcomes".

Knowledge management systems (KMS) open up a variety of opportunities for university development in conditions of dynamic changes in technologies and society at large. KMS can be a favorable environment for improving the activities of the university based on the introduction of modern IT. ISO 30401:2018 'Knowledge management systems – Requirements' presents KMS as a part of a management system with regard to knowledge, which includes the organization's knowledge management culture, structure, governance and leadership; roles and responsibilities; planning, technology, processes and operation. ISO considers knowledge as "a human or organizational asset enabling effective decisions and action in context". The previous experience of technological transformation, associated with e-learning technologies, showed the primary need for knowledge, expertise, and competencies. These components of success are required to create innovations, and they are the core of KM.

Digital technologies cause new ways of building business models, communication channels, and digital assets to produce new services and goods. The current transformation of university is the extraction of the potential of IT through innovations in educational and scientific activities. Despite the technological base of these changes, they rely on innovations in the management, culture, interactions, and other aspects that span the entire university.

Universities differ from business institutions by many features, such as governance with involvement of faculty and students; a wide coverage of areas for training and scientific activities; interactions with external communities and knowledge sources. Due to the specifics of university activity in many scientific

fields, training courses, and regions, it is hardly possible to effectively disseminate digital innovations through centralized digitization. As the staff involved in a special activity knows all its aspects, they can find a short way to improve it with cutting edge IT. The department operates as a digitization center and usually concentrates on IT infrastructure. Meanwhile the KMS operates as an environment to involve many university staff and provide them with abilities for co-creating innovations to increase university performance as a whole. The mechanisms of digitization center and KMS transfer the potential of IT in different manners, which can be illustrated on the principle of light passing through converging and diverging lenses.

So, a digitization center as a converging lens focuses all technological innovations on the IT-infrastructure development. The centralized digital transformation develops and upgrades the IT infrastructure, which is supposed to be full of innovations.

KMS, like a diverging lens, spread technological innovations to all types of university activities. KMS, through the involvement of university staff, provides the conditions for covering all university activities by creating digital innovations.

KMS and centralized digitization present approaches to the introduction of IT into higher education, however, they can complement each other rather than compete.

Association of Russian Professionals and Experts in Knowledge Management 'KM Allianz' (http://km-alliance.ru/) considers knowledge as a key asset of a university. The theoretical and practical issues of KM offer a wide range of forms and methods to introduce the KMS into academic and administrative activities and bring value to a university. 'KM Allianz' conducts research on KM during the digital transformation of higher education in Russia and the development of principles for KMS implementation.

The current findings show that:

1) The sequence of operations with knowledge and the combination of IT in KMS depends on the strategic goals of the university, its staff and IT capabilities.

2) During the digital transformation, it is important to remain the priority of teachers and students as actors of knowledge and knowledge itself over digital technologies.

3) The knowledge flow, besides its objective form as digital data, has a semantic dimension. Which acquires meaning and significance in the context of a person's or organization's activity. KMS in a university first has to provide teachers and other staff with the conditions for working with the semantic dimension of knowledge.

4) Any operations with knowledge, including its creation, storage, modification, distribution, sharing and use, should be a process managed with the help of IT. KMS for a university requires comprehensive solutions, including IT, organizational and methodological support as part of specific projects and university processes.

Currently, the intensive development and penetration of IT brings new potential to higher education along with new risks of reducing university performance. When a university introduces digital technologies to its activity, it has to act quickly and accurately to avoid the negative consequences of remote learning, as during the COVID-19 pandemic. The KMS is a digital environment to help staff to acquire new technologies and then introduce it into their activities.

Natalia V. Dneprovskaya
has PhD in management and IT. She is Associate Professor of Business Informatics Department at HSE University (Russia), and member of the expert council of Russian Association of Knowledge Management 'KM Allianz'

Academic Coordinator: Edison Spina

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