Aleksandar Bulajić, Tamara Nikolić, Cristina C. Vieira (Eds.)

Navigating through Contemporary World with Adult Education Research and Practice

Institute for Pedagogy and Andragogy, Faculty of Philosophy, University of Belgrade, Serbia
ESREA - European Society for Research on the Education of Adults
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THE WORK-RELATED USAGE OF INFORMATIONAL COMMUNICATION TECHNOLOGY AND THE LEARNING OF EMPLOYEES

Abstract

This mixed methods research was aimed to explore the relationship between the work-related usage of informational communication technology and the learning of employees. To foster deeper understandings in research of this relationship, we applied explanatory sequential design using nested samples for the quantitative and qualitative components. In the quantitative component, data were obtained with scales, and analyzed from 483 employees in different companies in Serbia, while for qualitative component semi-structured interviews were conducted with 35 respondents from the same sample. In the first component the collected data were subjected to a few common (frequencies, std. deviation, means, etc.) and more complex statistical proceedings (canonical correlation analysis), while in the second component data were subjected to the qualitative content analysis. The results obtained in the both components of research indicate very complex interaction: two groups of distinctive relations are derived, one that explain organizations that views ICT merely as a tool for work-related learning with potential for enhancing organizational performance, and another that views ICT merely as a tool for improving performance.

Keywords: work-related learning of employees, informational communication technology, andragogical interventions, mixed methods research

Problem statement

Learning in organization is a complex set of differentiated forms and activities of learning, diverse in content, quality, goals and outcomes, context specific, that are realized at the individual, group or organization level, encouraged by

various andragogical interventions usually aimed to improve work-related activities at the individual level through the development of capacity for change and adaptation and developing opportunities for team and organizational learning (Ovesni, 2019). It can take place as "a reproductive process (knowledge acquisition, repetition, exercise) and as a fully productive and interactive process of discovering, sharing and individually searching for meaning and understanding (where the final form is internalization and self-construction of reality" (Despotović, 2010, p. 81). Learning in organization is a complex interrelationship between people, their activities, symbols, and processes in the organization (Schwandt & Marquardt, 1999).

The work-related learning of employees is the group/collective phenomena and organizational process that drives development of the new knowledge or new insights that could influence changes in behavior at the individual, group, or organizational levels. The work-related learning is a comprehensive term that embraces different types of creation and dissemination of the work-related knowledge through learning, training, and education activities at the workplace.

Employees usually learn in the workplace through interactions with others in their daily work environments (working context) when they need to learn (Marsick, & Watkins, 2015). The basic characteristic of this type of learning is its focus on obtaining and/or development of the work-related knowledge and skills or on solving problems inseparable from the work process (Brandenburg & Ellinger, 2003). Three key factors affect work-related learning: (1) engagement in everyday work tasks, (2) direct guidance from co-workers, and (3) indirect guidance provided by the workplace itself and others in the workplace (Billett, 2001).

Changes in work-related learning can be viewed from different perspectives. On the one hand, they are particularly influenced by globalization, business diversification, increased competitiveness and intense market changes, the usage of modern technologies, and increased demands for quick profits and achieving optimal or improving existing performance. The effects of these influences are reflected in changes in the "meaning of work", an increase in "intellectual capital", changes in organization, career redefinition, transition of traditional forms of work into the domain of "virtual jobs", and the requirements of employees for just-in-time learning (Brandenburg & Ellinger, 2003; Short, Brandenburg, May, & Bierema, 2002).

Accordingly, organizations are expected to gain knowledge of how to progress and how to respond to a range of changes. To cope with this task successfully organizations need learning that will equip them with the ability to acquire new skills, information, knowledge to adapt to change" (Savićević, 2007, p. 193). That kind of strategic orientation toward the work-related learning is a combination of different elements of knowledge that enable improvement or preservation of existing performance while developing the critical capacity of an organization to cope with change, and constitutive element of the process of shaping, protect-

ing, and maintaining organizational advantage (Garavan, Shanahan, Carbery, & Watson, 2016; Gilley, Callahan, & Bierema, 2003).

Until recently, the learning environment for employees was planned and organized according to the capabilities and intentions of the implementers and planners, usually outside the organization or outside the workplace. Such an understanding is today abandoned as andragogically unfounded, ineffective, inefficient and economically unjustified because "the new corporate reality is that managers and employees demand critical information to be available immediately when they need it, at or near their job site" (Jones, 2001, p. 482). In this context, technology-enhanced learning in organization, and especially just-in-time learning is an "evolutionary response to the demands of a knowledge-driven and speed-oriented marketplace" (Brandenburg & Ellinger, 2003, p. 311). This type of learning is a sublimation of the strategic gaining of the competitive advantage of an organization as it enables the rapid acquisition of the necessary knowledge and the timely transfer of learned through all organizational components (Poell, 2017).

The common activities of non-formal and informal workplace learning through interactions with others are project work (that emphasizes teamwork and shared decision making), meetings, interaction with product/service users, supervision, mentorship, adjusting to changes, communication with co-workers, different kind of on-the-job or off-the-job trainings, inquiry, documenting, job performance, visits to different locations, etc.

The information and communication technology (ICT) support different kinds of learning of employees as a tool that help them not only in the processes of non-formal and informal work-related education and learning, but also in the related processes of knowledge sharing, transfer, feedback, regardless of the scope and mode of them. Burgess and Russell (2003, p. 294) recorded some of the benefits an organization has from work-related learning supported by ICT: a fast, effective way to train employees, the opportunity to use the best instructors and provide high-quality courses, a high rate of course completion and knowledge retention, updated information, enhanced responsibility of learners, an increased impact of investments in learning programs, reduction in travel costs, possibility for often mass training, possibility for short learning sessions that are easier to schedule and coordinate, the delivery of a consistent message to all employees, possibility for provision for real-time updates and just-in-time information access, possibility for convenient to employees, possibility for group learning, possibility to use learner-centered programs, easier access to learning resources and experts. Otherwise, some researchers found some disadvantages in usage of ICT in the workplace. Eastin, Glynn and Griffiths (2007) discussed limitations identified by organization, e.g. usage of emails, instant messages, and gaming for personal reasons, other than work-related reasons as a limitations, while Day, Scott and Kevin Kelloway (2010) discussed limitations

identified by employees: ICT malfunctions, usage of multiple incompatible ICT, increased demands due to ICT security precautions, and increased demands related to the new ICT.

The common activities of non-formal and informal workplace learning supported by ICT are instant messaging, email, access to different web-sites, blogging, social networking, participation in chat-rooms, in online forums, photo and video sharing, participation on web conferences, participation on webinars, participation in virtual reality environments, etc. Although learning at work is usually a social rather than an individual activity, some of the activities that are supported by ICT could be performed through interaction with others, but the indirect, asynchronous interactions are common, too; for that we consider ICT as a mediator between different stakeholders involved in the work-related learning process (Rosenberg, 2001).

The new generation of ICT used to shape work-related learning are aligned with business needs as they enable integrated information sharing between groups of employees, individuals, teams and communities, and access to a variety of databases (Brandenburg & Ellinger, 2003). Although nowadays ICT play a significant role in shaping workplace learning, primarily through supporting team/group collaboration, knowledge sharing, modularization and individualization (Goggins & Jahnke, 2013; Schaaf, 1990, in Short et al., 2002), the concept of ICT supported workplace learning is extensive because it has "significant social and organizational consequences" (Brandenburg, & Ellinger, 2003, p. 310).

Research questions

The relationship between different aspects of work-related usage of informational communication technology and the learning of employees were explored through the following research questions:

1. How activities of learning of employees in organization relate to the work-related usage of informational communication technology?
2. How organizations address ICT regarding to the work performance?
3. How organizations address ICT regarding to the work-related learning?

Methods

Considering that this mixed methods research was aimed to explore the relationship between the work-related usage of informational communication technology and the learning of employees, we decided to apply explanatory sequential design using nested samples for the quantitative and qualitative components to foster deeper understandings in research of relationship between these

two phenomena. The study involves an explanatory sequential design; accordingly, we first employed quantitative, followed by qualitative component, where quantitative component has priority in the study (Creswell, & Plano Clark, 2011).

In the quantitative component, data were obtained with scales, and analyzed from 483 employees in different companies in Serbia, while for qualitative component semi-structured interviews were conducted with 35 respondents from the same sample.

Sample

The population for this study were employees from different companies in Serbia; they participate in the study voluntary and anonymously. We opted for sequential design using nested samples for the quantitative and qualitative components of the study (Matović, 2013; Onwuegbuzie & Collins, 2007). By using random sampling, data for quantitative analyses were collected from employees in different organizations from 10 cities in Serbia (Nqn=483). The on–line questionnaires were distributed to 542 respondents. We received total of 483 completed surveys, with a response rate of 89.1%. The demographic variables included age, gender, employees' overall tenure, tenure with current employer, level of education, number of employees in organization, and industry type.

The age of the participants ranged from 18 to 66 years, with a mean age near 39 years and 6 months. Female participants (n=319; 66.0%) outnumbered male participants (n=164; 34.0%). Average tenure ranged from 6 months to over 45 years, where a mean of overall tenure was near 14 years and 6 months, whereas mean of tenure with current employer were near 8 years and 6 months. The most of respondents, i.e. 28.8% had a four–year university degree, bachelor or college degree had 18.6% respondents, 16.9% finished vocational/craft schools, while master's degree or higher had 16.4% respondents. The gymnasiums or professional schools finished 9.9% of respondents, professional master's degree hold 4.6%, 4.3% of respondents hold a doctorate/PhD, while 0.4% finished only primary school. Most of the respondents (61.5%) were engaged on various consulting positions, 15.5% were engaged as technicians, 10.8% were engaged on managerial positions, 8.5% as manual laborers, while 3.7% were engaged as researchers, university professors or university associates. Among them, 57.3% are full–time employees, 24.2% have fixed–term contracts, 8.7% are re–employed pensioners, 5.6% are freelancers, while 4.1% are volunteers.

Most of companies in which respondents are employed have less than 500 employees (71.6%), 13.3% have 501–1000 employees, 8.9% have 1001–5000 employees, 5.0% have more than 10000 employees and 1.2% have 5001–10000 employees. 77.6% organizations that employed respondents are wholesale and distribution companies, 16.1% companies are in production and the distribution of goods and services, while 6.2% of them are production companies. 19.5%

respondents are employed in the education and science, 15.3% in public services, 10.2% in communication and telecommunication, 8.3% in retail, 7.9% in art and culture, 5.4% in construction services, 5.2% are employed in health care, 5.0% in lodging/food/tourism, 4.8% in police, 4.6% in automotive industry, 3.5% in energy & natural resources, 2.3% in banking, 2.1% in transportation, while 6.2% are employed in other industries and services.

The present study employed stratified purposeful sampling based on respondent's tenure for the qualitative component, because some authors suggest "purposive sampling of particular cases combined with random sampling for survey to maximize both discovery and generalizability" (Greene, Caracelli, & Graham, 1989, p. 268). From the sample for quantitative component, we selected 36 respondents for the qualitative component of the study, with different length of tenure (Nql=36). Correspondingly, the sample for qualitative component of the study included 12 randomly selected respondents with less than five years of tenure, from six to thirty years of tenure (12 interviewees), more than thirty years of tenure (12 interviewees).

The average length of tenure for respondents were 15 years and 9 months, while the average tenure with current employer were 9 years and 7 months. The sample included 19 female and 17 male respondents. The average age of the participants were 43 years and 6 months. Among the interviewees, most of them (61.1%) had a four–year university degree, 25.0% finished high schools, master's degree had 8.3%, while 5.6% had bachelor or college degree. Most of the respondents (41.7%) were engaged on various consulting positions, 19.4% were engaged on managerial positions, 19.4% were engaged as technicians, 16.7% were engaged on middle–range administrative positions, while 2.8% were engaged as laborers.

Most interviewees (13.9%) are employed in communication and telecommunication, and in the automotive industry (13.9%), in public services (11.1%), in lodging/food/tourism (11.1%), 8.3% in energy & natural resources, 8.3% in the field of education, 5.6% of them are employed in construction industry, 5.6% in retail, 5.6% are employed in health care, while 16.7% are employed in other industries and services.

Instruments

To conduct the quantitative component of this empirical research few instruments were prepared and adapted. Instruments development involved several stages. First, we developed a pool of items for each construct using a deductive approach, based on lists of common activities of learning of employees in organization (Ovesni, Matović, & Luković, 2017; Ovesni, 2019). This first stage's content validity was assessed using survey research through independent cross-checking by six experts in andragogy. Based on their suggestions the list of questions was shortened, and to assure accuracy of the items the correction of text

translated from English to Serbian were performed. The internal reliability coefficient, Cronbach's α for both instruments used for collecting data for quantitative component of the study was moderately high: for the first instrument, for measuring activities of learning of employees in organization Cronbach's α was 0.837, while for the second instrument, for measuring work-related usage of informational communication technology Cronbach's α was 0.857.

To measure *different aspects of organized activities of learning of employees in organization* (ALE) was measured a three–point frequency rating scale (18–items) with anchors ranging from 1 ("never"), 2 ("rarely"), to 3 ("often") was used. To measure *work-related usage of informational communication technology* (WRICT) we used a three–point frequency rating scale (27–items); each item had the response options to three choices, i.e. "1 = almost always", "2 = to a considerable degree" or "3 = seldom".

The interview protocol included seven open-ended questions. All questions were pilot tested for clarity with the group six experts in andragogy. The interviewees were informed that the interview will be anonymous, audio-recorded by interviewer, and transcribed verbatim. Participants were labeled by random names. Interview length were 10 to 25 minutes. The interviews were transcribed. All transcribed interviews were independently reviewed by three researchers (OK, NM and SJ). Among them, there was agreement that all transcript should be included into the further analysis, and the key themes were identified.

Data analyses techniques

The collected data were subjected (in the first component) to a few common (frequencies, std. deviation, means, etc. with IBM SPSS Statistics 23) and more complex statistical proceedings (canonical correlation analysis with Dell Software STATISTICA 12.5). To supplement them, for the data collected by interviews, we used qualitative content analysis, with the primary purpose to register different explanations of experience and interviewees' opinion about achievement of their engagement in workplace learning activities and about their work-related usage of informational communication technology. Two topics, with two kind of narratives were identified.

Analysis and discussion

Quantitative data

Results of canonical correlation test for relationship between activities of learning of employees in organization and work-related usage of informational communication technology of employees (Table 1) showed that five canonical correlations are significant. By using the cutoff correlation of 0.3 to select vari-

ables for each variable set, the variables in the set of WRICT related to the organizations that use diversified systems of mentorship to support differentiated usage of informational communication technology for work-related learning of their employees, correlated with the first canonical variate were: social networking, blogging, photo and video sharing, participation on web conferences, webinars, online forums, etc. Taken as a pair, these variates suggest that the more differentiated ICT of new generation is used in the organization, the more complex andragogical interventions are applied.

Table 1.
Results from Canonical correlation test for relationship between the work-related learning of employees and the work-related usage of ICT

Root Removed	Chi-Square Tests with Successive Roots Removed					
	Canonicl r	Canonicl r2	Chi-sqr.	df	Sig.	λ
0	0.478341	0.228810	371.6653	120	0.000000	0.453874
1	0.403153	0.162533	249.4197	99	0.000000	0.588537
2	0.316752	0.100332	165.9658	80	0.000000	0.702757
3	0.266417	0.070978	116.2203	63	0.000053	0.781129
4	0.258510	0.066827	81.5806	48	0.001799	0.840809

The second canonical variate included the variables in the set of WRICT related to the organizations that provide traditionally oriented on-the-job trainings to their employees (for personal skills, communication, or similar ones); to them traditionally oriented usage of informational communication technology (they support participation of their employees in webinars, discussion forums, and usage of e-mails) correspond. This pair of canonical variates reveal that to limited usage of traditional ICT correspond to a traditional, narrow range of andragogical interventions.

Next canonical variate included the variables in the set of WRICT related to the organizations that provide participation in conferences, seminars, symposiums, or in courses, lectures and other forms of structured education activities to their employees correspond to rejection of usage of informational communication technology for work-related learning. This pair of canonical variates suggest that organization that spent a lot of resources to perform structured work-related activities other than ICT related ones, express conservativism, i.e. resistance to changes, especially those that opens possibility to employees to obtain information related to innovation in their job in any other way except through prescribed activities.

The fourth canonical variate included the variables in the set of WRICT related to the organizations that do not provide learning possibilities for their employees (except those for obtaining necessary skills), and organizations that support only learning of employees through direct communication with their managers that correspond to absence of support to their employees to use informational communication technology for any work-related learning activity, both indoors and outdoors. This pair of canonical variates suggest that organizations that do not consider learning as an investment reject any kind of technology-enhanced learning in organization.

The last canonical variate included the variables in the set of WRICT related to the organizations that do not provide learning possibilities and that are indifferent regarding knowledge exchange, employees express tendency to use informational communication technology for work-related learning at home through social networking, participation on web conferences, webinars, discussion forums, etc. Although without organized andragogical interventions, employees in these organizations express one of the main characteristics of adult learners – self-directedness: in the absence of organized learning activities in the collective, employees undertake a self–organizing strategy for work related learning.

The findings of the quantitative component of the research show that organizations use ICT in a multiple of ways. The first group of organizations, described by the first two canonical variates, views ICT merely as a tool for work-related learning that could enhance organizational performance. In those organizations andragogical interventions are customary, they are relied on all of benefits provided by ICT. The two variants of relationship between work-related learning of employees and the work-related usage of ICT could be derived – the more advanced relationship in which organization act as a typical learning organization, and merely traditional relationship supported by familiar forms of learning and ICT. In both derived variants, work-related learning takes place in all available ways, often as ICT enhanced learning.

The second group of organizations described by the last three canonical variates, views ICT merely as a tool for improving performance, while three variants of relationship between work-related learning of employees and the work-related usage of ICT could be derived: (a) traditional approach to work-related learning combined with rejection of ICT as a valid learning tool, (b) lack of any kind of work-related learning in organization, including ICT enhanced learning, (c) lack of any kind of work-related learning in organization, while employees self-organize ICT enhanced learning activities. In these variants' ICT enhanced work-related learning could be rejected, ignored, or adopted as the only available source of knowledge.

Qualitative Data

The qualitative data revealed deeper meaning of these connections –– that quality of relationship between the work-related usage of informational communication technology and the learning of employees depends on management and understanding the role of learning in organizations. Two major tendencies are evident – in some organizations informational communication technology is seen dominantly as a tool for work performance, while other organizations view informational communication technology as a tool for work-related learning.

For the first topic, informational communication technology as a tool for work performance, two kinds of narratives are typical:

- In some organizations, work is dependent on ICT (typical narrative for four employees):

  John (30 years, college degree, associate): For me, it is impossible to imagine one day at the job without ICT.
- In another group of organizations, it is not common that employees use ICT (typical narrative for two employees):

  Daniel (49 years, college degree, manager): We do not use even e-mail in our company. Some of my co-workers do not know what Google is... I hope that something will change there...

For the second topic, informational communication technology as a tool for work-related learning, five kinds of narratives are typical:

- Some employees use ICT for work-related learning at home (typical narrative for eleven employees):

  Maria (33 years, four–year university degree, tehnician): At home, I am used to reading from the Internet about changes in my job, and then at the workplace I use this knowlege.
- Some employees use ICT for work-related learning on the job and at home (typical narrative for nine employees):

  Brendon (34 years, college degree, associate): When I have pause at the job, I'm learning about some new software. At home, I research about my job on Internet by myself. If you put some effort into own development, you can obtain better position.
- Some employees use basic form of just-in-time learning supported by ICT to solve issues related to their job (typical narrative for twelve employees):

  Jack (47 years, four–year high school, tehnician): We try to solve all problems immediately. If it is not possible, we contact managers via e-mail or cellphone, or we search for solution on Internet. We cannot work without ICT.

- In some organizations learning supported by ICT is an extension of collaborative learning (typical narrative for five employees):

  Stella (52 years, four–year university degree, manager): For problem solving I often use social networks to obtain some solution or opinion from my colleagues from other organizations.
- In some organizations just-in-time learning supported by ICT is one of the main learning strategies, because it provides fast solutions, that could circulate in organization (typical narrative for seven employees):

  Marissa (47 years, four–year high school, tehnician): We do not have time for individual training in company, so we use social networks, Viber, Whatsupp... We have own app, Ticketing system, that helps us to perform job. Also, if we are in trouble, we use Google to find solutions.

Employees emphasize work-related learning supported by ICT as very important learning activities that they undertake. ICT-based learning is often used in organizations: to communicate and inform employees, to find an adequate solution to the current problem as soon as possible. In the case that learning supported by ICT is a part of the organization's strategy, it could enable the rapid acquisition and timely circulation of knowledge across all organizational units. This kind of learning is characterized by a focus on knowledge, skills and solutions and inseparability from the work process. Work-related learning supported by ICT offers a variety of content and activities that can be undertaken, it is highly individualized and provides the necessary information. By involvement of colleagues from other organizational units or organizations work-related learning supported by ICT could become an extension of collaborative learning in organization.

Adaptation to the changes in the organization is one of the leading challenges for employees. Without adequate structured learning activities, inability to ask colleagues for help because they face the same problems, employees embrace work-related learning supported by ICT as the easiest option to successfully solve specific problems. In some cases, work-related learning supported by ICT has a remedial role. For some employees, work-related learning supported by ICT is substitute for the lack of adequate formal educational preparation, customized induction into work, and structured learning activities in the organization.

Conclusion

Findings indicate that organizations differ in the work-related usage of ICT. Regarding to the usage of informational communication technology as a tool for work performance two different approaches are identified. While in some organization's ICT is viewed as necessary, in other organization's ICT is viewed as a restraint to the routine activities.

Furthermore, two groups of distinctive relations between work-related usage of ICT and learning of employees are obtained. In one of the derived groups, the dominant view is that ICT is a tool for work-related learning with potential for enhancing organizational performance. In one group of organizations work routines are firmly anchored to the usage of a wide range of new generation ICT, while in another group although ICT is viewed as an important tool for enhancement of performance, traditional and work-related learning supported by ICT are intertwined. In another group of organizations ICT is merely viewed as a tool for improving performance, while relation of ICT to the work-related learning is reflected in rejection or exclusion by organization, or in uncritical embracement of ICT as a learning tool by employees. These findings imply needs on the improvement of learning practice in organizations and point out a necessity for diversified approach to work-related usage of informational communication technology. Particularly, they indicate requirement of the andragogy-based learning activities design that encompass wide variety of ICT related work-related learning activities.

Also, findings indicate that some organizations try to limit usage of ICT both as a tool for improving performance and as a tool for work-related learning. Interpretation of organizational struggle to accept changes and adapt to them could be caused by many reasons (e.g. individual, at the level of management, organizational, regarding industry, etc.) and explain from variety of perspectives. Consequently, although we used complex, mixed methods research design, generalizability of obtained results could be improved by further studies about same research problem.

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