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EPSS – METHOD AND TOOLS FOR IMPROVING THE COMPETENCE IN THE XXI CENTURY

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Abstract. *The paper discusses the features and usability of Electronic Performance Support Systems (EPSS) in education and improving the competence of adults. It is a serious problem for enterprises to search for employees (definite period, employment of students) for work that requires the use of business software. Learning (training) in the performance of tasks in such environment is an investment (requires time and expense). EPSS have been designed as tools to reduce the number of hours of training involving a trainer (human). These systems are coached - supported by people who use business software in their work on an ongoing basis. In the research we present how to implement them and in which way their popularization can help in hiring people without special pre-preparation, and only with the basic computer skills.*
Keywords: *EPSS, Learning management, Learning-by-doing, Problem based management.*

Introduction

Ensuring the satisfactory competencies of employees in the face of contemporary conditions of competition becomes the key challenge for organizations managements (Kunasz, 2016). Therefore, there are sought the methods and approaches that would allow to shorten the time of employees preparation for fully efficient work in the positions equipped with the office software. It would seem that people with directional education (secondary or academic) and with the experience in computer using should not have any problem with the efficient use of the software. However, it turns out that the more the activities of enterprises depend on the work performed on computer-equipped workstations, the problem of training in the efficient use of the software is more important. According to the study on the relationship between training and work performance of employees, there is a positive correlation between training and

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employee performance (for example, Farooq and Khan based on their research have determined a correlation of r = 0.233 (Farooq & Khan, 2011) and the Sultana, Irum, Ahmed and Mehmood teams (2012), based on their research, estimated that the source of 50.1 % of changes in work efficiency are training programs (their content and manner of conducting Organizations allocate the noticeable budgets for trainings. The problem, however, is that such trainings are expected, thanks to which the employee will be fully prepared to perform the duties and not an increasing number of training hours.

The purpose of the article is to identify a spectrum of possible organizational solutions for training aimed at improving work efficiency at office positions equipped with office software. The starting point for considerations is the idea of providing knowledge necessary to complete the task. This idea is exemplified by Electronic Performance Support System (EPSS) systems. The concept of EPSS systems is not new. Assumptions for EPSS systems were presented already in the 90s by Gloria Gery (Gery, 1989, 1991).

For the purposes of these considerations, it was assumed that the efficiency of job training is understood as the time after which the employee is fully independent, i.e.:

- knows and understands the procedures that apply to him,
- correctly uses business applications supporting his work,
- does not make mistakes when registering data,
- handles transactions at a rate of action acceptable at a given position.

The training is not satisfactorily effective if after its finishing the employee is not able to perform correctly all the procedures in force at his position, looks for information in documentation, asks questions to colleagues (superiors) or there appear the mistakes that result from his actions.

It is worth mentioning that the effectiveness of training is of interest not only to trainers who provide this type of value, but it is also the subject of scientific studies that give guidelines for practicing. An example is the approach known in the literature as the Kirkpatrik model. The approach adopted above to assess the effectiveness of training can be referred to the IV level in the Kirkpatrika model, which suggests assessing the effectiveness of training by measuring the parameters adopted before the training. It is emphasized that the weakness of the Kirkpatrick model is the high costs of obtaining information about the effects of the training, because the effects can be evaluated after a long time (Rae, 2004). As it seems, it is not the model that is the source of this problem but the way of conducting training and the process of acquiring the received knowledge. The employee receives extensive knowledge during the training and the fact of obtaining it is not yet a success at the workplace. It must take time to translate the acquired knowledge into the practice of performing duties at a particular

employee's job position. It is also not accurate to ask in the IV phase of the model the question whether the trainees are using what they had learned at work. The purpose of the training is to prepare employees to perform specific tasks at the position and the training is expected to allow them to undertake these duties in the possible shortest time. Otherwise, it is inefficient from the point of view of the company.

Research on the subject of training effectiveness in the world is conducted systematically, which is reflected in many contemporary publications. The Polish-language literature query helped to identify the use of EPSS class systems in e-learning studies (Dąbrowski, 2008; Różański, 2012) and a chapter devoted to this subject in the publication of Hyla (2007). This means that this term is not popular in Poland. Surprisingly, the Polish tradition is the scientific interest in work efficiency and the search for factors to improve it. Currently, this interest should also include office work supported by IT tools. It is not true that IT tools dedicated to supporting work are excellent and provide a level of support acceptable by managers. In addition, personnel fluctuation means that new employees must be trained in the performance of work in the conditions of a specific company. Both of these factors (software imperfection and the need to gain experience at the workplace) result in unsatisfactory productivity in companies.

This article is an attempt to identify the situation. The article discusses the ideas that are recommended in the literature as remedial actions for the problem of employee position improvement as well as the idea that led to the development of EPSS class information systems.

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Improving the efficiency and Learning-by-doing

The starting point for considerations is the concept of efficiency, understood as a measure for the operating activity of the enterprise. Measurement and assessment of work efficiency in management is a measure of effectiveness (Piętowska-Laska, 2012; Wierzbicka, 2013). Efficiency is considered in the literature in technical terms as the ratio of the achieved production results to the inputs used to obtain them and as a measure of progress (socio-economic) achieved through the implementation of projects aimed at improving the efficiency of the organization (Kosieradzka, 2012).

On the basis of comparative studies on labour productivity, Jarmołowicz and Knapińska (2014) state that clearly there is a large difference between the level of unit productivity in Poland and EU-27. This means that it is necessary to ensure the productivity of human resources, for example through education, lifelong

learning, adaptation of modern technologies from countries where this productivity is significantly higher.

The problem of improving productivity concerns employees of enterprises, adults, which usually finished the formal education process. However, such persons must constantly supplement their competences in the organizations where they work. It is necessary to perform efficiently the tasks resulting from the duties assigned to them in the work environment. At the same time, in each organization the working environment (equipping the position in the software) and the duties assigned to the position are different. Adult education is a challenge that should be understood by offering the forms of information providing that improves their work performance. These issues are dealt with by andragogy. The main features that distinguish adults' approach to further education compared to youth education are (Merriam, 2001):

- self-concept: being an independent person after a period called the dependent personality,
- the pool of experience becomes the foundation for further learning (the young only gathers different experiences),
- learning readiness: after the learning stage for learning within adults, there is an orientation on the development tasks of their own social roles,
- change in the perspective of using the knowledge: after the stage of deferred application of knowledge (orientation on the school/academic subject) a stage of direct application of knowledge takes place (problem orientation),
- source of motivation to learning: after a period of external motivation domination (often imposed), mature internal motivation develops.

In the course of research a number of models describing the process of effective adult education were developed. One of them is Kolba model, where the following stages were distinguished: experience, reflection, generalization and application (Kolb & Kolb, 2008). In a slightly more extensive model, Gibbs (1988) distinguished: description of the situation, accompanying emotions and thoughts, consideration of causes and consequences, analysis of positive and negative aspects of the problem, reflexive inference and action plan. Both quoted models of adult education are based on reflection from experience and indicate the direction of learning resulting from the needs of the situation and the action plan.

The concept of learning-by-doing understood as improving the competences through the regular repetition of performed activities appeared in economics in the 60s of last century (Gery, 1991). In the management the researches on learning-by-doing led to the development of a model of experience curve (70s of

the last century). It is used to illustrate the relationship between the amount of time needed to complete a single task and the amount of time resulting from performing all such tasks in the entire history of the company, sector, market, etc. The increase in employee experience is therefore a factor directly affecting the efficiency of management.

The complement to considerations regarding the effectiveness of training is the increasingly accented "knowledge on demand" approach (Od push, 2017). Knowledge on demand - is the use of specific portions of knowledge just before using it in practice. The traditional way of learning - the transfer of large portions of knowledge here and now with the intention that this knowledge will be used in the undefined future - is ineffective. The research shows that within a few weeks we forget up to 90 % of new information. The new generation of people entering the labour market forces a departure from the formalized approach to education and taking the challenge referred to as "street view" (E-learning na nowo, 2017). Its characteristic feature is the "on-demand" attitude, i.e. reaching for knowledge and enriching skills on demand, at the time and place where these competences are necessary and in a form appropriate to the situation. The method and tools of the EPSS type are fully in line with this expectation, allowing to reach for such elements of information that are needed while performing the specific task.

Demand for the position trainings

The work consisting in the implementation of repetitive transactions in positions equipped with a computer requires the efficient use of the software. Business software, regardless of its complexity, is a working tool and the employer expects the work will be carried out efficiently with the help of this software. In the practice of enterprises, depending on the situation, the user uses not one but many applications. The implementation of work processes requires employees to know how to proceed in each case resulting from the characteristics of a given business transaction (e.g. registering a new telephone operator customer service). Making changes in the used software causes the additional necessity to educate not only the new employees but all those who are affected by such a change. As results from the research, the key factors affecting the achievement the values from implementation of the IT system are: effective adaptation of users to changes in the work environment (70 %), organizational changes taking into account the changes in work sequences (16 %), matching processes to conditions and equipment in which they are supported (13 %) and application functionality (1 %) (Achieving Enterprise Software, 2008). The survey also showed that the key factor in improving work efficiency is to ensure the effective use of software in the enterprise.

According to the Meta Group specialists, the current trainings and support programs do not bring the desired effect of productivity growth in the workplace. According to them, 76 % of users have problems with understanding the applications critical to the functioning of the company. This means that three out of four employees do not understand most of the critical mission systems of their employer. The study shows that only 11 % of users can be described as very competent at their job positions. This problem is particularly burdensome for achieving the assumed goals and levels of task implementation in the enterprises where operational activity is carried out only at workplaces equipped with computers with business software. An example are the call center companies, where the rotation of employees is a serious problem for managers. In the American entities of this group, it is at the level of 30-50 % per annum of exchanged employees. This generates not only the high recruitment costs but also training costs. These expenses in accounting terms (and thus directly resulting from source documents) do not take into account the lost productivity of the new employees (Batt et. al., 2005). The following statistics characterize the scale of the Polish call center problem: in about 160 enterprises operating in around 240 locations there are about 22,000 workplaces (Olszynka, 2015). Staff fluctuation in 2008 describes the statement that "45 % of people employed as consultants are novices with less than one year of traineeships" and in 2013, the rotation among the telephone sellers amounted to over 50 % per annum (Wolski & Szymańska, 2013). In other industries (eg insurance) and regardless of the industry in entities operating complex ERP software, the demand for training enabling users to work with software is also a problem. In own research carried out on a group of 1027 respondents, 90.94 % of them declared that they use business software (eg ERP system, CRM, etc.), 87.2 % (Kajrunajtys et al., 2017; Szeląg-Sikora & Cupiał, 2015). In the opinion of IT system users and managers, there is an urgent need to support work efficiency in positions equipped with a computer by providing knowledge necessary to the performed tasks (Lorenowicz et el., 2015). Knowledge should be (see Yakin & Yildirim, 2016):

- delivered in a way that does not distract employees from tasks,
- be associated with the tasks performed here and now,
- be tailored to the diverse capabilities of the recipients,
- given in a way that allows to share the experiences by employees, which is the fastest way to provide specific guidance to a person seeking information how to complete the task.

According to specialists, the overtraining syndrome is currently often observed, i.e. fatigue of participants with too many courses, which results in lower efficiency of acquiring competences. They emphasize that "the number of

trainings depends more on their quality and consistency with the company's goals" (Mrug, 2017).

EPSS - essence, goals and destiny

Works on the idea of the Electronic Performance Support System (EPSS) were initiated in the second half of the last century (Gery, 1995; Gal & Nachmias, 2011). The following three factors contributed to the fact that today we can use EPSS (Bielawski & Metcalf, 2003):

- increasing complexity of work, including the increase of technical information volume necessary to perform complex business tasks,
- pressure to increase the productivity of employees and entire organizations to meet the competition requirements,
- fast IT development: both the productivity of devices and the ability to develop and deliver application software.

Literature provides many definitions of EPSS. The authors generally agree that EPSS is software that directly supports a given employee, improving its performance whenever and wherever it is needed (Hung-Wen & Ching-Hsiang, 2006). Raybould (2000) also indicates that EPSS provides access to integrated information, advice and learning experiences during the work to improve work performance. Van Schaik and team emphasizes that EPSS facilitates the acquisition of skills and knowledge in a given field (van Schaik, Pearson, & Barker, 2002). EPSS is an integrated environment shared with employees. It is organized to provide an immediate (just-in-need) and personalized online access to the full range of information, tips, advice and help to enable to do your work with the minimum support and intervention of others (Clark, 1992).

Gloria Gery (1991) emphasizes that the EPSS system is an integrated electronic environment available to every employee that aims to provide immediate, personalized on-line access to the full range of information, software, advice and assistance, data, images, tools and monitoring systems to enable work with minimal support and intervention of the others. Two opposing approaches can be distinguished in the idea of EPSS (Gal & Nachmias, 2011):

- the provided support reduces the need to learn - EPSS aims to reduce or even eliminate the need to learn, because job skills are acquired through the interaction of the employee with the system, and in particular the initial preparation for work can be very limited,
- the provided help leads to learning at work - the idea of EPSS results directly from the recommendations of adult education, where it refers to methods of education based on a practical context and reflection.

By providing the support to employees, EPSS allows to reduce the total cost of necessary education while increasing employee productivity. Often EPSS

allows the employees to start tasks without or with minimal training or coaching. New employees are able to complete their tasks faster and more accurately. They can also learn a lot about their work (thanks to the built-in social tools), which contributes to the transfer the knowledge and learning of the organization (Bielawski & Metcalf, 2003). More and more companies perceive the EPSS system as an attractive and valuable support for the implementation process for the work of each new person without prior training (Gery, 1995). Managers expect that novice users will be fully productive on the first day they start using the system. They also expect that such a system will gradually lead the trainee to higher performance levels than those achieved by traditional training sessions (Winslow & Bramer, 1994).

The support methods provided by EPSS are very diverse, they can be distinguished among them (Bielawski & Metcalf 2003): mentoring (one-on-one coaching), training in the course of work, on-line help, EPSS database (EPSS repository), built-in context help, group discussion, live chat help online. The results of research conducted by Chang indicate that the greatest value of EPSS systems is the information base and a module oriented to support in solving the work problems (Chang, 2004).

Gery formulated a list of attributes and behaviours of EPSS, which she recognized as distinctive among information delivery tools. These are the following features (Gery, 1995): it creates and works in the context of work, helps in setting the goal, has the structure of the work process, reflects the natural work flow, enables alternative insight into data, information and knowledge, provides contextual information feedback, provides help resources without breaking the task context, embeds knowledge in the interface, provides access to logic and automates the tasks.

Research carried out by the team of Mosher (Mosher, 2010) allowed us to work out a model of the relationship between the achieved level of work efficiency as a function of time and the use (or not) of EPSS tools. In the course of the training lasting about 30 minutes, participants remembered about 58 % of the information they learned, with the passage of time this figure decreased. The use of EPSS tools has resulted in a noticeable increase in the work efficiency of these people.

Every organization must constantly update the knowledge. It is important that users during the learning to share it. To update primary knowledge resources, EPSS can record user knowledge and activity. By immediately registering any input information generated at work, it is possible to increase the organization's ability to effectively use of all collected know-how. Therefore, the organization's knowledge is constantly refreshed and can be shared with others. (McManus & Snyder, 2003).

Summary

Currently, many IT systems are offered on the market, which their creators claim to perform functions resulting from the definition of EPSS. The contextual support offered by the above tools is always available when the user uses a computer. Some of these tools automatically identify in which application and to which fields the user enters the information. In each application, displaying of useful training contents in a given context requires user initiation (no mechanisms allowing for connection between the state of the application and the user's situation). Positional education and operational support for users of application requires providing the substantive content that fits in the supported person's work environment. Summing up, the EPSS class systems can be said to be a solution that:

- it can be used in various client infrastructures,
- radically improves the optimization of human (user) activity, which receives knowledge always current and in the required time,
- affects the ergonomics of use by providing information (training content) exactly in the place and time of user activity - the user does not waste time searching for contextual information,
- ensures IT security through the lack of possibility to interfere in applications and database systems supported on the users' positions.

The idea and implementations of EPSS will evolve. The development of EPSS should provide the practical ways of sharing the knowledge by the best contractors or experts, wherever and whenever this knowledge is registered. Active knowledge management will be able to provide a real competitive advantage for the organization. This approach to knowledge sharing across the organization allows to evaluate and improve processes in the organization, ultimately providing an efficient and effective strategy without duplication of efforts.

Literature studies show that EPSS information systems have a great potential to effectively support the work efficiency of people using business software and thus, a real opportunity to contribute to the improvement of the results of the work of entire organizations. Therefore, there is a need to conduct scientific research aimed at empirical demonstration of the relationship between work efficiency and the use of EPSS systems in real conditions.

References

Achieving enterprise software "Success". Study of buyers and sellers of enterprise software. (2008). San Francisco: SandHill Group.

Batt, R., Doellgast, V., & Kwon, H. (2005). *U.S. call center industry report 2004 national benchmarking report strategy, HR practices & performance* (CAHRS Working Paper # 05-06). Ithaca, NY: Cornell University, School of Industrial and Labor Relations, Center for Advanced Human Resource Studies.

Bielawski, L., & Metcalf, D. S. (2003). *Blended Elearning: Integrating Knowledge, Performance, Support, and Online Learning*. Amherst: HRD Press Inc.

Chang, Ch. (2004). The relationship between the performance and the perceived benefits of using an electronic performance support system (EPSS). *Innovations in Education and Teaching International, 41 (3),* 343-364.

Clark, R. C. (1992). EPSS—look before you leap: Some cautions about applications of electronic performance support systems. *Performance Improvement Quarterly, 31 (5) May/June*, 22–25.

Dąbrowski, M. (2008). Analiza pomiaru efektywności kosztowej procesów e-learningowych. *E-mentor , 5 (27*).

E-learning na nowo. Retrieved from http://www.kadry.abc.com.pl/czytaj/-/artykul/e-learning-na-nowo.

Farooq, M., & Khan, M. A. (2011). Impact of Training and Feedback on Employee Performance. *Far East Journal of Psychology and Business, 5 (1),* 23-33.

Gal, E., & Nachmias, R. (2011). Implementing On-Line Learning and Performance Support Using an EPSS. *Interdisciplinary Journal of E-Learning and Learning Objects Volume 7,* 213-224.

Gery, G. (1995). Attributes and Behaviors of Performance-Centered Systems. *Performance Improvement Quarterly, 8 (1),* 47-93.

Gery, G. (1991). *Electronic Performance Support Systems: How and Why to Remake the Workplace through the Strategic Application of Technology*. Boston: Weingarten Publications.

Gery, G. (1989). Training vs. Performance Support: Inadequate Training is Now Insufficient. *Performance Improvement Quarterly*, 51-71.

Gibbs, G. (1988). *Learning by doing: a guide to teaching and learning methods*. Oxford: Further Education Unit, Oxford Polytechnic.

Hung-Wen, L., & Ching-Hsiang, L. (2006). The Role of Electronic Performance Systems in Improving Learning and Performance. *A Managerial Perspective, International Journal of management (Poole), 23 (2),* 632-639.

Hyla, M. (2007). *Przewodnik po e-learningu*. Kraków: ABC, Wolters Kluwer business.

Jarmołowicz, W., & Knapińska, M. (2014). Koszty i produktywność pracy w Polsce i Unii Europejskiej – elementy analizy porównawczej. *Studia Ekonomiczne UE, 196*, 9-20.

Kajrunajtys, D., Malik, G., & Gródek-Szostak, Z. (2017). Integracja systemów informatycznych – wnioski z badań pilotażowych. *Zeszyt Naukowy WSEI* w Krakowie, *13*, 118-135.

Kolb, A., & Kolb, D. (2008). Experiential Learning Theory: A Dynamic, Holistic Approach to Management Learning, Education and Development (pp. 43). In: Armstrong, S. J. Fukami, C. (Eds.) *Handbook of Management Learning, Education and Development*. London: Sage Publication.

Kosieradzka, A. (2012). *Zarządzanie produktywnością w przedsiębiorstwie*, Warszawa: Wydawnictwo C.H. Beck.

Kunasz, M. (2016). Wielkość przedsiębiorstwa a czynniki determinujące szanse na szkolenie w organizacji. *Organizacja i Kierowanie, 3 (173),* 121-139.

Lorenowicz, E., Koszel, M., Kocira, S., & Uziak, J. (2015). Changes in ICT use by polish students from life sciences university. *Procedia - Social and Behavioral Sciences, 176*, 17 – 123.

Merriam, S. B. (2001). *Qualitative Research and Case Study Applications in Education*. San Francisco: Jossey-Bass Publishers.

Mosher, B. (2010). *Performance Support And Learning at the Moment of need*. Retrieved from https://www.elearningguild.com/showfile.cfm?id=3923

McManus, D. J., & Snyder, Ch. A. (2003). Knowledge Management: The Role of EPSS. *Information Management, Vol. 12, Iss. 2*.

Mrug, M. (2017). *Szkolenie na 100 procent*. Retrieved from http://kadry.infor.pl/kadry/hrm/szkolenia_i_rozwoj/635360,Szkolenie-na-100 procent.html, *Od push do pull learningu* Retrieved from http://edu-trendy.pl/od_push_do_pull_learningu,36,p.html

Olszynka, S. (2015). *Rynek call i contact center w Polsce 2015*. Warszawa: Wydawnictwo PMR.

Piętowska-Laska, R. (2012). Doskonalenie produktywności we współczesnych przedsiębiorstwach, *Economy and Management*, 2.

Rae, L. (2004). *Ocena pracy szkoleniowca*. Kraków: Oficyna Ekonomiczna.

Raybould, B. (2000). Performance Support Engineering: Building Performance-Centered Web-based Systems, Information Systems, and Knowledge Management Systems in the 21st Century. *Performance Improvement, 39 (6).*

Różański, A. (2012). Dobór szkoleń pracowniczych w małych i średnich przedsiębiorstwach - analiza zjawiska. *E-mentor 5 (47).*

van Schaik, P., Pearson, R., & Barker, P. (2002). Designing electronic performance support systems to facilitate learning. *Innovations in Education & Teaching International, 39 (4),* 289-306.

Sultana, A., Irum, S., Ahmed, K., & Mehmood, N. (2012). Impact of training on employee performance: a study of telecommunication sector in Pakistan. *Interdisciplinary Journal of Contemporary Research in Business, 4 (6).*

Szeląg-Sikora, A., & Cupiał, M. (2015). Productivity of Farms in the Aspect of Various Activity Forms. *Agriculture and Agricultural Science Procedia*, *Volume 7*, 94–98.

Yakin, I., & Yildirim, S. (2016). Evaluating an electronic performance support system for crime scene investigation units in Turkey. *Information Development, 32 (4).*

Wolski, K., & Szymańska, M. (2013). *Branże narażone na wysoką fluktuację kadr*. Retrieved from http://www.rynekpracy.pl/artykul.php/typ.1/kategoria_glowna.8/wpis.646.

Wierzbicka, W. (2013). *Produktywność pracy przedsiębiorstw prywatnych w Polsce – ujęcie regionalne*, ZN UPH w Siedlcach, Seria: Administracja i Zarządzanie, nr 97.

Winslow, C. D., & Bramer, W. L. (1994). *FutureWork: Putting knowledge to work in the knowledge economy*. New York: The Free Press.