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CLOUD-BASED CORPORATE TRAINING MODEL BASED ON BPMN BUSINESS PROCESS DIAGRAMS

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The paper presents an attempt for corporate training using cloud infrastructure and business process models. A cloud-based corporate hierarchy model and an approach for designing and implementing corporate training with the possibility of partial or complete implementation of the organizational development strategy are proposed. The training is built on the basis of the business processes in the organization, for their visualization, diagrams using BPMN standard are developed. To organize comprehensive employee training, a training course using BPMN diagrams is also modeled.

Keywords: Corporate Training, Cloud Corporate Training, BPMN Business Process Modeling

ОБЛАЧЕН МОДЕЛ НА КОРПОРАТИВНО ОБУЧЕНИЕ, БАЗИРАН НА BPMN ДИАГРАМИ НА БИЗНЕС ПРОЦЕСИ

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Статията представя един опит за корпоративно обучение, използващо облачна инфраструктура и модели на бизнес процеси. Предложени са облачен модел на корпоративна йерархия и подход за проектиране и реализация на корпоративно обучение с възможности за частична или цялостна имплементация на организационната стратегия за развитие. Обучението е изградено на основата на бизнес процесите в организацията, за онагледяването на които се използват диаграми, разработени с BPMN стандарт. За организиране на цялостно обучение на служителите се предлага учебен курс също моделиран чрез BPMN диаграми.

Ключови думи: Корпоративно обучение, Корпоративно обучение в облака, BPMN моделиране на бизнес процеси

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1 Introduction

In today's dynamic professional life, corporations cannot rely on training their employees only from educational institutions, which are unable to offer the necessary specific training quickly and affordably [4]. This is the reason why corporate training is consolidating its positions and entering state institutions and the private sector.

Corporate learning is a term that refers to the process of training and developing human resources in an organization [6], taking into account the organizational context and using all opportunities for formal, informal and self-directed learning, so as to improve their overall performance in the workplace [1]. Organizations offering corporate training usually formulate topics of a general nature – induction training for newly hired employees, leadership development, marketing strategies, data analysis, cybersecurity, project management, conflict resolution, workplace ethics, etc. [13], and they do not have a mechanism for partial or complete implementation of the organizational strategy for personnel development. Corporate training programs must meet the specific needs of the organization, increasing its competitive advantage and be adapted to the profile and specificity of the organization.

There are a number of problems that need to be overcome when developing and conducting corporate training: corporations may be located in different geographical areas and time zones; employees are not experienced with software training platforms; and it is necessary to clearly define the goals of the training [11] by the management staff, and then to interpret them unambiguously by the trainees. In large organizations (corporations) with many employees, the unification of the performance of job activities is a difficult task. For many corporations, the style of employees' work is their trademark (branding identity), representing their corporate identity. The problem is provoked by the differences in the individual personality characteristics of employees, as a result of which they interpret the goals and vision of the organization differently [5]. It is necessary to find an approach that allows for unambiguity in interpreting the requirements for the employee's work performance, the sequence and style of performing work activities and the expected outcomes, which will ensure partial or complete implementation of the corporate development strategy.

The goal of this paper is to present a methodology and approach for designing and implementing a corporate learning environment that solves this problem. To achieve this goal, it is necessary to conduct a study of the approaches and methods for training personnel in large organizations, the tools used, good practices in training professionals, the possibilities for unifying training for related management levels, roles and professional groups in the organization.

Section 2 presents the existing approaches in implementing corporate training. Section 3 offers an approach for rapidly implementing a low-cost and customized corporate learning environment using cloud infrastructure and BPMN diagrams of business processes. The Conclusion emphasizes the contributions of the study.

2 State of the Art

Corporate training needs appropriate pedagogical techniques and tools namely online learning tools and systems, games and simulations, business skills development, course-

ware design and classroom tools and systems [4], to be adequately applied to achieve strategic organizational goals [10]. Organizations use various methods and software tools to implement corporate training for personnel [9]. There are several approaches for training employees in the organization based on: specialized software training systems, software systems developed according to individual requirements and specifications of the organization, and functionalities provided by cloud platforms.

The first approach, through specialized training systems, is based on software platforms such as Corporate Learning Management System (CLMS), Learning Management Systems (LMS), Content Management Systems (CMS), and Intelligent Tutoring Systems (ITS) [14]. All of them are software applications for administration, documentation, tracking, reporting and delivery of e-learning courses or training programs [7].

Representatives of this group are EdApp, TalentLMS, iSpring Learn, SuccessFactors Learning, AhaSlides, etc. [12], [6]. The advantages of these systems are: user friendly user interface; functionalities for creating learning content and learning activities, including templates for creating unified learning units; opportunities for structuring personalized learning paths; built as mobile and/or web applications, providing flexibility in terms of time and place for accessing learning content; opportunities for integration with other learning systems; usage of gamification for training; tracking the progress of the learner; and statistics on the success of training.

These systems also have a number of disadvantages such as: high purchase price, maintenance and customization, high level of technical literacy of users, necessary prior training of users to familiarize with the interface and their capabilities, limitation in functionalities specific to a particular professional field and insufficient volume of stored data when choosing a version with free or partially paid access.

The second approach, through specific training systems, is applied in large organizations that have their own IT departments and have resources for software development, maintenance and updating [8].

The advantages of this type of system are: narrowly specialized to the necessary corporate functionalities, constant and reliable support, timely update ensured, complete integration with the internal technological infrastructure, and full similarity with the corporate profile.

In addition, we should also note the following disadvantages: large financial investment and a long period for design, development and implementation, as well as the need for a highly qualified team for support and training of personnel to work with system functionalities, compared to purchasing a ready-made solution.

The third approach is based on cloud services that are free or on the principle of "pay only for what is used".

The approach has many advantages in terms of access and support of training: intuitive and easy access to training content, a short period for integration into the technological infrastructure of the organization, a faster and more effective way to implement training with minimal initial financial investment and a small or completely absent IT team. This approach allows the use of web resources of different types – multimedia content created with various software products, groups of professional communities in social networks, virtual classrooms for synchronous training, augmented and virtual reality, etc. Other advantages of this type of training are retaining the attention of learners with multiple multimedia and interactive learning activities; the possibility of rapid scalability

in terms of the number of users and the space used for learning resources; personalization and adaptability to the individual characteristics of the learner; ensuring an individual approach to training; and opportunities for asynchronous and synchronous communication between the trainer and learners.

Disadvantages of the third approach are: lack of specialized functionalities and interface reflecting the professional profile of the corporation; partial or complete lack of opportunities to adjust, change and adapt the learning paths and learning activities to the current training needs in the context of the professional field; and a relatively slow procedure for updating the learning path and training materials.

The most widely used systems based on cloud services are: Coursera, Udemy, EdEx, MOOC, Medium, Futurelearn, Udacity, Skillshare, NPTEL, Swayam, OpenEdu.ru, Class Central, Preply, etc.

The three approaches considered use an electronic environment for learning, which is a basic toolkit for corporate training. A significant drawback of software tools for corporate training, in all three approaches, is the lack of methodology and functionalities for implementing the organizational development strategy, part of which is personnel training and development. The currently existing e-learning systems do not offer functionalities and mechanisms for partial or complete implementation of this strategy.

3 Approach for Corporate Training in Cloud Environment

We consider the activity of the organization as a set of business processes performed in the organization. Each employee performs their job duties in a specific context of the workplace at different levels of the organizational hierarchy, which we will call a **role** (corporate role). The paper proposes an approach for representing business processes for the respective roles in a given corporation through standardized BPMN diagrams and their application for training employees in a cloud environment. Comprehensive training will be implemented through training courses, also presented through BPMN diagrams, which illustrate the learning paths of the trainees.

3.1 Corporate training design

The management team sets development goals, which arise the training tasks in line with the organizational strategy. The tasks are related to the quality improvement of the employee performance. Each task is associated with one or more business processes corresponding to it. An employee with management functions defines a model of each business process, illustrated by a BPMN diagram. The diagram allows for an unambiguous representation of the business process structure and the expected performance from its participants. The corporate hierarchy in a given organization is modeled by a tree structure of roles. One or more business processes are attached to each role. For each role, training is defined as a learning path, the components of which are related to the study of the attached business processes.

This approach to structuring training allows for partial or complete implementation of the development strategy, depending on the degree of detail of the business processes and the specifics of the organization.

Two types of training are conducted in organizations – horizontal and vertical. **Hor-**

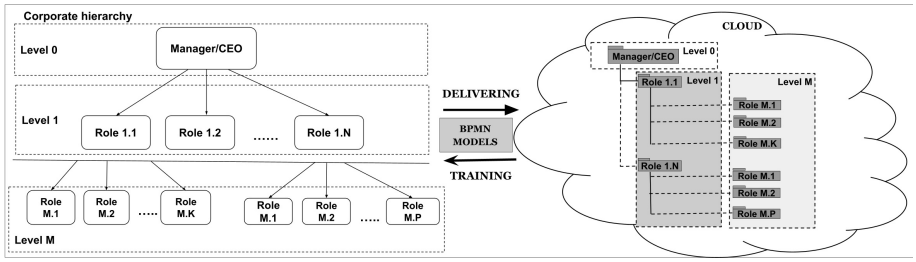

Figure 1: Corporate hierarchy implemented in the cloud

izontal training aims to develop the knowledge and skills of employees in their current role, so that they perform their work activities in accordance with the corporate strategy. This training is applied to newly hired employees and employees who are assigned new tasks.

Vertical training aims to support the career growth of "talented" employees in order to prepare them for a role at the next, higher level in the corporate hierarchy.

Horizontal training is the most often conducted, where each employee can train with learning resources attached to their role in the corporate hierarchy. If vertical training is required, selected learning resources corresponding to the higher-level role for which the employee needs to be trained, are additionally attached to the current learning resources.

3.2 Model of corporate hierarchy in the cloud

In the practical implementation of the proposed approach, the analogy of the tree-like corporate hierarchy with the hierarchy of folders and files in the cloud space is used. It is proposed to create a file hierarchy with learning resources that corresponds to the corporate one. The functionalities of cloud-based platforms, allowing the definition of rights for sharing, management and access to resources by analogy with the rights of different roles in the corporation, are used. Each employee, depending on their role and level in the organizational hierarchy, has different rights to access learning resources.

The manager of a given level creates learning resources for the roles located in the lower levels of the hierarchy and attaches the resources to them. The approach offers a concept according to which each manager will define and periodically update the structure and content of the business processes taking place in the level of the organization that he manages, ensuring their full compliance with the corporate strategy.

For experimental technical implementation, the Google Workspace cloud environment was used. Google Disc capabilities were used to create a hierarchy of folders and share resources with one or more users with different access rights to the information.

3.3 Learning approach based on business process modeling

A key point in achieving the set learning objectives in corporate training is a clear, unambiguous and correct understanding of the components by the learner that make up the business process. To achieve this clarity, it is important to find an explicit representation of the business process, which can then be illustrated through a graphical representation. In practice, various notations for visual representation of business processes are used.

For our purposes, the BPMN notation [3] was assessed as the most suitable, as it

has a number of advantages in representing business processes: BPMN is universal and standardized, allows the representation of all types of business processes – simple and complex; easy to read, because it is intended for business users, not IT specialists; has opportunities for understandable, simplified and unambiguous presentation of different levels of detail of business processes; each business process can be presented in a different aspect through a diagram, suitable for training the different employee roles; and the diagrams can be quickly and easily updated in sync with the changes undertaken in the corporate development strategy.

Corporate business process diagrams

Each role in the organization can participate in one or more business processes, which are modeled uniquely as BPMN diagrams. Each BPMN diagram represents the sequence of activities of a given corporate role, including in collaboration with other roles within or outside the organization. Thus, for each role in the organizational structure, a set of process diagrams (including subprocesses), which are interpreted as learning materials, is offered.

Diagrams as a learning path

For each role in the organization, learning resources are organized in a learning path, creating a complete learning course as a BPMN process diagram, composed of multiple subprocesses, each representing a business process related to the employee's role. The course diagram represents the appropriate order for studying these business processes.

Training through executable diagrams

BPMN diagrams can be used for training in a static or dynamic mode. In the static approach, the diagram is presented as an illustrative image that does not have interactive capabilities. In the dynamic approach, appropriate software, allowing interactive visualization of the workflow from the diagram, is integrated. The cloud-based tool bpmn.io [2] used in the study is a free project of Camunda and provides functionalities for easy and convenient creation and editing of BPMN diagrams, as well as for dynamic simulation of the workflow in the diagram. Such cloud platforms have built-in capabilities for integration into other web tools, which allows extreme flexibility in terms of use and adaptation to the specific professional profile of the company.

4 Conclusion

Corporate training is assessed as successful when it partially or fully implements the organizational development strategy. At present, there are no established good practices in this direction that offer a solution and satisfactory results. The paper examines three different approaches for corporate training, presenting their advantages and disadvantages in terms of their possibilities for implementing the corporate development strategy. The analysis outlines the need for an approach that offers a suitable solution. In this regard, a design (model and methodology) of corporate training based on the business processes taking place in the organization is proposed. To achieve an unambiguous explicit representation, BPMN diagrams which are interpreted as learning paths, are used. The organization is considered as a set of employees, each of whom has a specific workplace context, called a role. For each role in the organization, learning paths are attached, illustrating through diagrams the business processes in which the role participates. The visualization of process diagrams is in two modes – static and dynamic. The proposed

approach for corporate training is based on cloud infrastructure and the hierarchical representation of the corporation's structure, which makes it relatively inexpensive to use, quick to implement, and easy and convenient for employees to use.

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