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Design Thinking Method Implementation in Personnel Certification Procedures

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Abstract

Personnel certification is one of the most effective tools for implementing human resources development processes and procedures. By certifying employees, either enterprises, institutions or organizations strive to expand their capabilities by acquiring new or improving already existing knowledge, skills, abilities and experience in order to improve the efficiency of performing professional duties.

The purpose of the article is theoretical and methodological justification, practical testing and evaluation of personnel certification processes using design thinking procedure.

The research goal is achieved by setting and solving the following tasks:

- to investigate the theoretical and methodological basis of design thinking procedure, to establish the possibilities and ways of its practical application in the processes of human resource development of the organization;

» to improve the implementation of international certification processes for professional drillers with the help of the prototyping tool;

» to develop recommendations and evaluate the influence on the certification procedures according to the international standards.

The draft study presupposes the analysis of the preparatory and final stage of international certification of oil and gas enterprises personnel, as well as the development of recommendations for their improvement, by using design thinking procedure. The study combines methods of quantitative and qualitative analysis. In particular, statistical analysis tools are used to study the results and evaluate the influence on personnel certification. Qualitative methods are used to establish intellectual, psychological and professional options of a person, by applying prototyping tools.

Based on the results of the study, it is planned to obtain:

» design thinking procedure integrated into the process of international personnel certification of oil and gas enterprises, which will increase the efficiency of human resources development;

» improved approach to the organization of international certification procedures for professional drillers, which is based on the use of prototyping tools;

» a list of influences on the certification procedures according to international standards and an approach to their evaluation.

KEYWORDS: personnel certification, design thinking, human resources development, formal education, non-formal education.

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Introduction

International personnel certification is an important component of the human resources development of drilling enterprises in the oil and gas industry. Specialists, certified according to international standards, get the opportunity to perform drilling operations both in Ukraine and abroad. For domestic enterprises that implement drilling processes, an important task is to have such specialists in their staff. In this case, business entities can expect an increase in the share of orders for providing works and services on the domestic and foreign markets. The acceleration and expansion of the processes in international integration of the state into the European and global economic space will have a positive effect for Ukraine (Zvirgzdina, Skadina & Vane, 2020; Briffaut & Saccone, 2002).

Personnel certification is, first of all, a short-term training result of a person, as well as receiving educational services by means of formal and non-formal education by him or her. The formal format of certification of an employee takes place when the activities specifics of business entities in a particular industry presupposes the availability of employees whose professional characteristics must be periodically updated and necessarily complied with national or international standards (Kis, et. al., 2020. a). Otherwise, the employee may not be allowed to perform certain types of work. Providers of formal educational services in the field of personnel certification can be both public and private organizations.

The main condition for their existing on the market is the availability of a permission (accreditation, license, etc.). The document states the possibility of conducting training and certification, and also confirms that the staff of the educational institution has certified teachers-trainers. The main goal of participating in a short-term curriculum, training, webinar, seminar, etc.in the format of non-formal education is not to obtain a certificate, but to master new or improve the level of proficiency in previously acquired skills (Kis, et. al., 2020. b).

Research problem

Training and certification of a person often becomes an impetus for drastic changes in their professional activities. In practice, certification processes are implemented within two formats. The first one is when the initiator and the customer of educational services is the enterprise. An employee applying for certification does not always show professional and psychological commitment to accept new knowledge. The second one is conscious and purposeful training and certification of a person at their own expense in order to develop and ensure changes in their professional activities.

A mandatory element of certification is the applicant's passing of qualification exams. Psychological, physical or professional unwillingness of a person to participate in this procedure may be one of the reasons for unsatisfactory results and non-receipt of a certificate. Therefore, an important problem that requires analysis, research and generalizations, is the search and justification of methodology in order to improve the academic performance and quality of the implementation of enterprise personnel certification processes. Academic performance is the efficiency indicator, that is, the ratio of the quantity of students who passed the exam and received certificates to the total number of applicants. The quality of certification is the number of specialists who received a high score based on the results of the qualification exam.(Maleka, et. al., 2020; Amakiri & Luke, 2015; Malynovska, et. al., 2020).

Novelty

The main novelty element of the proposed study will be the design thinking procedure, adapted for the first time to the processes of personnel international certification of domestic oil and gas enterprises as an effective tool for preventive impact on reducing the success of certification.

Aim

Taking into account the above, the purpose of the article is theoretical and methodological justification, practical testing and evaluation of personnel certification processes for design thinking procedure.

Main objectives

The research goal is implemented by setting and achieving the following **goals**:

- to investigate the theoretical and methodological basis of design thinking procedure, to establish the possibilities and ways of its practical application in the processes of human resource development of the organization;
- to improve the approach to the implementation of international certification procedures for specialists-drillers with the help of the prototyping tool;
- to demonstrate the practical feasibility, stages and procedures of using design thinking in the processes of international certification of oil and gas enterprises personnel;
- to develop recommendations and evaluate the influence on the certification procedures for drillers according to international standards.

Object

The object of the research is the processes of personnel certification of oil and gas enterprises according to international standards.

Research methods

The draft study presupposes the analysis of the preparatory and final stage of international certification of oil and gas enterprises personnel, as well as the development of recommendations for their improvement, by using design thinking procedure. The study combines methods of quantitative and qualitative analysis. In particular, statistical analysis tools are used to study the results and evaluate the influence on personnel certification. Qualitative methods are used to establish intellectual, psychological and professional options of a person, by applying prototyping tools.

Presentation of the main material

Modern conditions of economic and social development are characterized by the dominance of non-material factors. Together with traditional material resources they allow business entities to achieve significant competitive advantages on the market. The main role in the creation, usage and accumulation of non-material resources belongs to a person with an inherent level of intellectual development, professional knowledge, abilities, skills, experience that require constant improvement and development. One of the most effective means of providing the development of an employee's personality is education, that includes a fairly wide list of forms, methods and approaches today. Their selection and usage by HR management of business entities requires careful attention to the quality of educational services and offered educational products. An equally important component of the implementation of personnel development processes, in our opinion, is the preliminary identification of the needs and opportunities for the employee to acquire new knowledge, skills and abilities. It is also advisable to establish the need to use alternatives in the organization of training, both in form and content (Gama & Edoun, 2020; Dirani, 2012)., In our opinion, this approach will, firstly, allow to reduce the unproductive costs of an employee or enterprise associated with training, and secondly, to reduce the negative impact on the psychoemotional state of a person (Görgens-Ekermans & Roux, 2021), who for various reasons did not get the desired result from participating in training.

To solve the above problem, it is possible to use various procedures and approaches that allow us to conduct a preliminary analysis and make optimal management decisions based on its results (Kis, et. al., 2020. b; Malynovska, et. al., 2020). In our opinion, the results of analytical activities based on objective data about the employee will not be more informative, but a creative way to solve the problem might be. It is the creative approach that is the basis of the methodology of design thinking, which in modern socio-economic and political realities is increasingly becoming an effective tool for improving processes and procedures implemented by business entities, representatives of non-profit and state organizations (Brown, 2009; Buchanan, 1992; Dorst, 2011; Johansson-Sköldberg, Woodilla, & Çetinkaya, 2013; Nielsen & Christensen, 2014).

The offer of trainings, seminars, and webinars on issues related to the theory and practice of design thinking is available on the market of educational services. And it attracts the increasing attention number of interested participants from the business environment, representatives of educational institutions and public authorities. Theoretical, methodological and applied aspects of design thinking

procedure are currently addressed by increasing number of scientists from various scientific fields and industries (Cross, 2001; Chou, 2018; Garbuio, at. al., 2018; Kimbell, 2011; Tselepis & Lavelle, 2020).

The main characteristics that most often describe the procedure of design thinking are, first, the implementation of the accumulating ideas process, second - making risky decisions in the early stages of designing, third – understanding the goals, behavior, needs and inclinations of consumers, fourth – testing ideas and checking their perception by consumers, fifth – changing approaches to the perception of product value (Micheli, at. al., 2019; Lawson, 2006; Shilekhina, 2013).

Most scientific research publications or journalistic style ones presented on free information resources indicate that the use of Design Thinking methodology involves the implementation of certain stages. In our opinion, the most practice-oriented model is the classic five-stage model by the Hasso-Plattner Institute of Design at Stanford. It includes the following stages: Empathise, Define (the problem), Ideate, Prototype, and Test. Design Thinking involves the use of tools to ensure the effective implementation of each of the stages. Lidetka & Ogilvie (2015) scientists focus on such methods as Mind Mapping, Empathy mapping, Brainstorming, Rapid Prototyping, Customer co-creation, and others. Despite their popularity, these tools have not yet gained popularity among domestic business, non-profit and state organizations. Moreover, they are rarely used in the educational environment. In this regard, the Russian scientist noted that it is advisable to use Design Thinking and its tools for education, taking into account the implementation of procedures as elements of the business process or the traditional process of providing educational services by subjects (Ivanova, 2019). In the first case, three stakeholders should take part in modeling using Design Thinking procedures. They are an educational institution, business, non-profit, state organizations, and a client (consumer). In our opinion, as a result of three-way interaction, the probability of a positive solution to the previously formulated problem increases.

In most scientific publications and analytical and journalistic material (Dorst, 2011; Johansson-Sköldberg, Woodilla, & Çetinkaya, 2013; Nielsen & Christensen, 2014; Glen, at. al., 2015; Val, at. al., 2017; Weinberger, at. al., 2020), which relate to the characteristics and results of applying the Design Thinking procedures, authors focus on the main positive effect of the model. It is the quality improving of the product offered to the consumer, in particular, educational services. At the same time, the predicted and actually obtained quantitative characteristics from the implementation of the improvement process are missing or fragmentary represented. As a rule, its impact on changes in the psychoemotional state, motivation and behavior of the end user is not taken into account.

In our opinion, considering the process of providing educational services as a business process, it is necessary to understand that, in addition to qualitative effects, the use of Design Thinking as a methodology for improving a product (service) will allow us to obtain quantitative results. In particular, for the subject, customer of educational services, it is possible to predict the economic effect. This effect will manifest itself in cost savings or receiving the additional benefits. In the first case, it is reffered to reducing unproductive spendings on educational services, which occur . Preventive using of Design Thinking will allow to minimize them by making decisions about the feasibility and possibility of training employees. As for the additional benefits, the new knowledge, skills, abilities and experience of employees obtained and confirmed by the relevant document have impact on their labor productivity, which increases as a result of improving approaches to the implementation of certain processes of economic activity.

An equally important though not often mentioned in scientific and other sources qualitative effect of applying Design Thinking procedures to improve the educational process will be the improvement of the emotional and psychological state of the individual. As a result of successful completion of training, the level of its validity and readiness to apply new knowledge increases (Görgens-Ekermans & Roux, 2021; Boyatzis, 2018; Bakker, 2017; Kahn, 1990; Scheer, Noweski, & Meinel, 2012; Van Aalst, 2009; Weinberger, at. al., 2018).

It can be predicted that reducing the number of negative learning outcomes, increasing academic performance and quality will increase the market popularization level for educational institutions that form educational services. This also will contribute to the growth of the individuals and structures rating that directly implement educational services in form and content (Daniel, 2016; Ney & Meinel, 2019; Nielsen & Stovang, 2015; Scheer, Noweski, & Meinel 2012). The main effect of the above given consequences combination will be an increase in the volume of orders for Personnel Training Services. For an educational institution, this means additional income, an increase in its financial capabilities for material, technical and methodological support of the providing educational services process.

In order to demonstrate the practical feasibility and effectiveness of applying Design Thinking procedures in the educational environment, the authors of this study pay attention to the process of training and international certification of oil and gas enterprises personnel. This process is implemented in the Ivano-Frankivsk National Technical University of Oil and Gas (IFNTUOG) under the following programs: «Drilling Fluids According to the API (American Petroleum Institute) Standards» and «Well Condition Monitoring, Prevention and Elimination of Fluid Occurrences During Well Drilling In Accordance With IWCF (International Well Control Forum) Standards». As of the beginning of 2021, the authoritative international organization IWCF confirmed the authority of the Training Drilling Center (TDC) IFNTUOG as the primary structure that can carry out certification of oil and gas industry employees at all levels (IFNTUOG Training Drilling Center, 2021). The main customers of educational services in the above given aims of certification are public and private oil and gas well drilling enterprises, as well as oil and gas production ones.

IFNTUOG has been providing educational services under international certificate programs since 2004. During this period, more than 1,200 people were trained and certified according to IWCF standards, and more than 300 people were trained under API ones. The author's observations of the certification process during 2018-2020 made it possible to highlight the implementation of the following main procedures:

- selection of applicants for training and certification, which is carried out by specialists of the HR division of the enterprise that is the educational services customer;
- full-time or online applicants trainig, which in form and content meets the established international standards and is implemented by pre-certified teachers-trainers;
- conducting a qualification exam in compliance with the established requirements, the results of which confirm or do not confirm the success of training and grant the person the right to receive a certificate.

Actual data on the scope of training and certification of oil and gas companies in IFNTUOG according to IWCF and Ari standards (ifntung training drilling center, 2021; IFNTUNG 2021) during 2018-2020 allow us to establish the following trends in the proportion of individuals who have successfully completed training and received an international certificate:

- at the 2nd level according to IWCF standards – up to 90%;
- at the 4th level according to IWCF standards – up to 85%;
- under the program «Drilling Fluids According to the API (American Petroleum Institute) Standards» – up to 95%;

In general, the analysis of the results of international certification of oil and gas enterprises employees in IFNTUOG based on the available information allows us to draw the following conclusions:

1. The highest level of achievements based on the results of training is demonstrated by employees participating in the certificate program «Drilling Fluids Sccording to the API (American Petroleum Institute) Standards».

2 During 2018-2020, there can be observed an increasing trend in the proportion of staff members who have received positive results from the two qualification exams provided for by the IWCF curriculum.

3 The lowest achievemt rate is recorded in the IV-th level of certification, which is usually attended by individuals from among the personnel of the drilling crew or engineering and technical workers responsible for making decisions on ensuring trouble-free operation of the well.

4 Taking into account the cost of educational services in two areas of certification, as well as other additional expenses of enterprises to ensure the participation of one employee in training events, it can be assumed that direct average annual financial losses for business entities during 2018-2020 were to 10-15% of the amount of funds provided by the budget of enterprises for professional development of personnel.

Thus, an obvious problem at the final stage of the process of international certification of oil and gas industry specialists is that individual employees receive negative (below the established standards) results when passing final exams. Without denying the effectiveness of the efforts made by all stakeholders to achieve maximum quantitative equality between applicants and actually certified individuals , we consider it necessary to demonstrate additional opportunities for improving certification procedures by applying Design Thinking procedures.

First of all, the authors of the study interviewed two instructors of the IFNTUOG TDC, who are full-time employees of the University and have experience in the certification according to IWCF standards. Currently, both highschool teachers have been certified and have the status of authorized representatives of an international organization. They are asked to answer the following question: «In your opinion, what are the key factors influencing the results of qualification exams of individuals applying for an international certificate according to IWCF standards?». At the same time, it is noted that it is necessary to assign an appropriate rating to each selected factor and establish its proportion in the formation of the overall result. Based on the results of the survey, it is possible to form a list of personal and professional characteristics that, according to respondents, should be inherent in applicants for successful participation in international certification (Table1):

Table 1

Summary results of the interviews with the instructors of IFNTUNG training drilling center

Factors (characteristics) that affect the results of qualifying exams	Rating	Share in the formation of the overall result, %
Age	4	10
Work experience	9	5
Direction of preliminary qualification (compliance of the received education with professional functions)	10	5
Place of basic professional education (educational institution)	11	5
Psychoemotional and physical state during participation in training and passing qualification exams	1	25
Participation in similar training events, previous training and certification experience	2	15
Experience in practical application of theoretical provisions provided for in the international curriculum	3	10
Skills in working with computer equipment	5	10
Level of proficiency in basic mathematical tools	6	5
Skills in working with geological information	8	5
Degree of responsibility for making decisions on the organization of the production process	7	5
Total amount	X	100

Source:
Authors' own study

Thus, the summarized results of interviews with IFNTUOG TDC instructors shown in Table 1 allow us to draw the following conclusions about the priority of factors that influence the success of participation of oil and gas company personnel in international certification:

1. The most important thing for successful certification is the psychoemotional and physical condition of the individuals, who study and then pass the qualification exam. Expanding the content of this factor through clarifying questions allowed us to establish that, first of all, it is talked about the internal experiences of a individuals , their fear through the belief in the inability to master the scope of new information and get a positive result. It is also talked about an excitement for the perception of a negative result by colleagues and management. It is worth noting that this result is supported by the results of a study by a number of authors (Boyatzis, 2018; Görgens-Ekermans & Roux, 2021; Bakker, 2017; Kahn, 1990; Judge & Picollo, 2004; Cheung & Wong, 2011; Seymour & Geldenhuys, 2018). In addition, an important component is the physical or health condition of a person during training and at the time of passing the qualification exam, which affects concentration.
2. The second in the list of factors is the previous participation of individuals in various certification programs, including the lowest level, which are provided for by the international certification according to IWCF standards. Almost 100% of those who have completed preliminary training and certification in the 2nd level or previously participated in similar training programs successfully pass the qualification exams.
3. A person with production experience related to the direct use of tools and technologies, the study of which is provided for in the curriculum, perceives and processes theoretical material faster, and solves practical problems more confidently.
4. Based on many years of experience in conducting training sessions, IWCF instructors assume that the best results are shown by people aged 25-40 years who belong to the basic working age group. This is mainly due to the best skills in computer equipment and technology.
5. With respect to all the other factors that affect the successful implementation of certification procedures, it is advisable to note that the four above listed factors together make up 50% and this confirms their belonging to the priority category.

The next stage of solving the problem of using design thinking methodology was a survey of people who have been trained and certified according to IWCF standards. The survey was held in 2020 by offering 50 respondents a questionnaire. The content and technology of filling it out provided for assigning a point score to pre-defined factors that, in our opinion, the procedures associated with conducting training sessions characterize. Thus, former students are asked to answer the following question: "Evaluate the proposed factors for the importance of their impact on the results of your training (1 point – "very important", 2 points – "important", 3 points – "not important")." The form and content of the questionnaire, as well as the results of a generalized analysis of respondents' answers, are shown in Table 2.

Thus, the results of the survey show that more than 90% of people consider the most important factors influencing the results of their training to be:

- availability of constant contact and feedback with teachers-instructors,
- maximum focus of educational technologies on solving typical tasks for the qualification exam.

It should be noted that in the instructions proposed by IWCF for preparing students for international certification, Accredited Certification Centers are primarily recommended to pay attention to ensuring close interaction between "student–teacher–instructor". In addition, it is necessary to adapt the theoretical and practical educational material to the questions of the upcoming qualification exam

Factors	The value of importance
Availability of handouts during training that reflect the content of theoretical and practical courses	2
Use of multimedia presentations by teachers-instructors	3
Providing constant feedback between teachers-instructors and students during classes	1
Solving tasks typical for the qualification exam during classes	1
Demonstration of the equipment and technologies operation principles of the real production process during classes	2

Table 2
Questionnaire to determine the importance of factors that affect learning outcomes

Source:
Authors' own study

as much as possible. In our opinion, other factors contained in the questionnaire, despite the lower results of respondents' assessments of the importance degree, should be taken into account in the implementation of the training procedure. Teachers-instructors, when discussing the results of the survey, agreed with the opinion that the availability of handouts, multimedia presentations, imitation of technological processes and demonstration of equipment are mandatory elements of the educational process, which strengthen the role of the main factors. It should be noted that the importance of establishing positive psychoemotional contact with teachers-instructors and training supervisors is confirmed by the results of research by a number of scientists, and regardless of whether this training takes place in person Maertz at. al., 2007; Gentry at. al., 2007; Monteiro de Castro at. al., 2016; Mathur & Prasad, 2014; Kahn, 1990), or online (Beinicke & Kyndt, 2020; Alemdag, Gul Cevikbas & Baran, 2020; Billett & Choy, 2013; Eraut, 2004; Francisco, 2020).

The conducted interviews and questionnaires allowed us to move on to the prototyping stage, which is provided for by the procedures of design thinking. In our case, the objects of prototyping will be the procedures for selecting, training and conducting a qualification exam with applicants for international certification.

At the stage of selecting applicants for training, specialists of the HR division of the enterprise, that is the customers of educational services, in our opinion, are advisable to take into account objective factors-characteristics of employees as a priority. The list of such characteristics includes the experience of their previous training and certification, as well as the practical application of theoretical provisions provided for in the international curriculum. In addition, you need to pay attention to your computer skills. The timely and effective response of the applicant to situations that arise during the implementation of organizational and educational procedures, as well as procedures related to passing the qualification exam, depending on the level of their exam assessment. This approach will allow to create an optimal current sample of students for training with a high probability of their further certification. On the part of both individual employees and the enterprise, we can expect to step up actions to achieve compliance of the objective characteristics of the individual with the factors defined in Table 2.

In accordance with the foregoing ideas, the main improvements in the implementation of training procedures for students should be an increase in study time for solving typical tasks. Teachers-instructors are recommended to increase the duration of training of students in the format of a dialogue.

A new type of qualification exam procedure, the technology of which is clearly regulated by IWCF, is focused exclusively on the need for early normalization of the psychoemotional and physical state of a person.

During January-February 2021, the effectiveness of applying improved approaches to the implementation of international certification procedures for personnel of oil and gas enterprises in IFNTUOG was checked. In particular, the ratio of the number of people who successfully passed the qualification exams (114 people) and the total number of participants (120 people) is 95%.

Conclusion

Prototyping the procedures of the certification process and its implementation in accordance with the proposed approaches will allow obtaining both economic (reduction of unproductive costs for Personnel Training by enterprises) and social effects. The essence of the latter is to reduce the level of demotivation of employees who, as of a certain period of time, did not pass certification based on the results of preliminary selection, to increase the productivity of teachers-instructors and the level of prestige of an educational institution in the market of educational services.

The results of the study make it possible to:

1. Confirm the importance and necessity of applying design thinking methodology to improve the efficiency of implementing human resource development processes of Ukrainian oil and gas enterprises. Quantitative and qualitative growth of certified drillers according to the international standards will accelerate the processes of European and global integration of the Ukrainian oil and gas industry. Domestic enterprises and specialists will be able to be competitive in foreign markets of oil and gas services and labor.
2. Adapt the procedures of design thinking to solve the problems of improving the process and procedures efficiency of international certification of domestic oil and gas enterprises personnel.
3. Prove the practical feasibility and effectiveness of using design thinking procedures with the involvement of all interested parties that take part in the certification processes of oil and gas industry personnel according to international standards.

Taking into account the achieved scientific and practical results of the research, we witness the need for their expanded use to improve other educational and scientific processes that are implemented in IFNTUOG. (International Charitable Foundation "International Fund for Social Adaptation", 2021).

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