Crimson Publishers
Wings to the Research

Mini Review

Productive Research Education for Industrial Development through Project Conveyor

Bryndin E*

Research center Nature Informatics, Russia

ISSN: 2694-4391

***Corresponding author:** Evgeniy Bryndin, Research center Nature Informatics, Russia

Submission: July 25, 2022

Published: September 13, 2022

Volume 3 - Issue 2

How to cite this article: Bryndin E. Productive Research Education for Industrial Development through Project Conveyor. Int J Conf Proc. 3(2). ICP. 000557. 2022.
DOI: 10.31031/ICP.2022.03.000557

Abstract

Industrial development is determined by the technological division of labor. The formation of any new activity takes several decades-at least it takes serial technological entrepreneurship to become a mass activity through the division of labor and specialization of many millions of people in the world. The purpose of the article is to show that research education is productive for the development of industry if it is related to practical projects and their pipelining. When students acquire knowledge, research competencies, practical skills and skills, as well as experience in bringing projects to markets. When the development of industry is carried out through the infrastructure industrial conveyor belt of high-tech quality projects, turning technological entrepreneurship into serial activity-into a conveyor belt for the production of innovations. The infrastructure industrial pipeline of high-tech quality projects reduces the time for their industrial implementation and introduction into industry, as well as contributes to the development of industry through the technological division of labor.

Keywords: Research education; Infrastructure project conveyor; Industrial development

Introduction

In modern conditions of high technologies, the role of creative activity of specialists is strengthened. All activities require specialists to have a high level of intelligence, professional competence, creative abilities and other personal qualities. The modern education system is designed to take into account these trends in the development of creative abilities of students by integrating of studies and research, production and marketing activities [1-5]. One of the approaches to solving the problem of the formation and development of creative abilities of students is research learning. The main feature of research training is the intensification of educational activities of students by involving them in the search work of a creative nature. With a research approach, the content of the training is based not only on educational information, but also on a series of problematic tasks, in the process of solving which students develop creativity. The student learns the concepts and approach to solving problems in the process of cognition.

Preparing a student for research activities, teaching his research skills and skills becomes the most important task of modern education. Training a specialist who can think creatively, independently find solutions in problem situations, navigate the information space is a priority in modern research education [6].

Research Education

The main goal of research training is to form the ability of the student to independently, creatively form new ways of activity in any field of human culture. One of the tasks of the modern educational process is to prepare a specialist in demand in the labor market, competent, responsible, fluent in his profession. For modern society, only the assimilation of

a certain amount of knowledge in various disciplines is clearly not enough. The development of students' independence and ability to organize themselves, sociability and tolerance, the formation of research skills and skills is the main goal of education. After all, it is research skills and skills that are necessary for a modern specialist to work effectively in a rapidly changing world. The level of readiness of a specialist for research activities depends on how research skills are formed in him. The main feature of research training is to intensify the educational work of students, giving it a research, creative character and, thus, transfer the initiative to students in organizing cognitive and research activities.

Scientific research is an activity aimed at comprehensively studying an object, process or phenomenon, their structure and connections, as well as obtaining and implementing useful results for humans. The student's study, as well as the study conducted by the scientist, inevitably includes the following elements:

A. Identification of the research subject, problem setting.

B. Definition of research objectives and objectives.

C. Development of hypotheses, identification and systematization of approaches to solving the problem.

D. Selection of research methods.

E. Development of the study procedure.

F. Implementation of the procedure or study plan (collection of material by studying the literature, application of the planned methods).

G. Analysis and generalization of the obtained data.

H. Preparation and protection of the final result

In research training, research is not just a set of methods and techniques of teaching, but is its content and meaning. Students, therefore, form an idea of research not just as a set of private cognitive tools that allow them to productively solve cognitive problems, but as a leading way of contacting the world around them and even more broadly - as a lifestyle. The main task of modern education is shifted from the translation of knowledge to the development of students' needs and abilities to extract this knowledge; - the student does not just consume information, but generates knowledge himself. An important role in acquiring the ability to generate new knowledge is played by research practice, conducting independent research by students and their implementation of creative projects.

A professional educational institution should provide training for specialists who can adapt to the conditions and requirements of the labor market, use new technical developments, apply their creative abilities, research skills and skills. These skills do not arise by themselves-they must be formed and developed during the performance of specially selected tasks and trainings. Specialists in any field are faced with increasingly stringent requirements for the ability to work on a personal computer, the practical use of information technologies. A number of studies today show that the readiness of a specialist is largely determined by the ability to use information technology in their professional activities.

Problem learning is one of the main methods that a teacher of computer science and information technology uses to form research skills and skills in students. Today, problem learning refers to such an organization of training sessions, which involves the creation under the guidance of a teacher of problem situations and the active independent activity of students to resolve them, as a result of which the creative mastery of professional knowledge, skills, skills and the development of thinking abilities takes place. Acquired knowledge is not as important as the development of thinking ability. The initial moment of the thought process is usually a problematic situation. This is a cognitive task that is characterized by a contradiction between the available knowledge, skills, relationships and the requirement. A person begins to think when he has a need to understand the problem. The problem forces you to search for and find the necessary information, to gain knowledge from various sources of information.

The problem learning system pays for itself many times over. The use of problematic learning in the educational process contributes to the formation of students' skills and skills in research search, the development of the ability to analyze, compare, prove, compare, systematize, justify their opinion, generalize, draw conclusions; speech skills and skills are formed (speech-monologue, dialogue-conversation for the purpose of information exchange, discussion with argumentation, justification of one's own point of view, expression of agreement or disagreement with the interlocutor's opinion, refutation of the opponent's point of view, etc.). Setting problematic situations in the training session helps to develop cognitive activity in students, ability to perform independently, solve certain logical and algorithmic problems, the ability to lead a discussion and find the key to a particular problem, promotes the development of the ability to think ahead, calculate all possible options, as well as the development of the ability to make a quickly optimal decision or, even the right solution, the ability to choose from many solutions the most necessary. That is, it contributes to the development of self-organization, self-education, self-determination, which in turn ensure the self-development of the person. And in modern society, these are the necessary conditions for a person to be successful.

Multi-inter-trans-disciplinary studies

Interdisciplinary research is carried out on the basis of the knowledge and skills of two or more different disciplines, which can range from the simple exchange of ideas to the mutual integration of concepts and methodologies to understand, substantiate and possibly manage the phenomena of super-complex systems.

Interdisciplinary research sets itself the task of overcoming the methodological and theoretical (including categorical) identity characteristic of the scientific disciplines involved in interaction to create a new, common conceptual framework and obtain innovative results with its help. It is with interdisciplinary research

that the successes of modern natural sciences are associated. The interdisciplinary approach is best suited to study complex, multilevel, heterogeneous, continuously changing institutional systems. Interdisciplinary studies of the theory of algorithms, programming, supercomputers and artificial intelligence made it possible to develop the theoretical positions of continuous processing of large programs by a supercomputer.

Trans disciplinary research aims to create a common axiom system for a particular set of disciplines and integrate disciplinary paradigms for collaborative research and knowledge unity. Trans disciplinary is understood as a study of the subject (more precisely, elements of the subject area) of one scientific discipline using the methods and terminology of another discipline; in other words, this is the study by representatives of one discipline of the subject by another. A trans disciplinary study of cognitive robotization, artificial intelligence, multi-agent systems and category theory made it possible to develop theoretical provisions for the formation of technological intelligence [7].

Training of personnel in demand by industry

The training of personnel in demand by the industry is carried out on the basis of research education and multi-disciplinary and interdisciplinary research, the formation of research communities on competencies and professionalism in solving current problems in communication mode. These are systematic processes through which competitive elements of intellectual capital are created, preserved, distributed and applied, leading to success, transforming all types of intellectual assets into best practices with higher productivity, efficiency and better quality based on existing knowledge and skills. Inter-and trans-disciplinary studies are carried out on the basis of the synergy of science, business and education [8]. Combining educational and scientific activities, their synergy is a factor and a real means of increasing the efficiency and competitiveness of innovative high-tech activities. Synergy of education and science is an indispensable condition for the development of high-tech industry.

The synergy of the integration of science and education gives an accelerated educational effect in the training of highly qualified researchers. The accelerated process of training highly qualified researchers is implemented by integrating higher education with advanced research basic science. Education and science, especially in their synergistic synthesis, are increasingly becoming the engine of technological progress, without which socio-economic progress is unthinkable. High-quality training of highly qualified researchers, based on an alliance with scientific activities, is a priority policy direction in all developed countries of the world, as well as a necessary component of the institutional structure of the high-tech industry.

The reproduction of highly qualified researchers who meet the requirements of high-tech industry and business has a high priority. Large corporations should invest enough in research and development in the field of high technologies, training specialists of the appropriate number and quality, and form a system of public-private partnership in the field of higher education. The creation of large educational complexes based on the joint activities of the university and the production sector is one of the most important areas of intersectoral interaction for the development of the high-tech industry [9]. The peculiarity of such education is that it is aimed at developing a constant need for creation, finding a new one, in accumulating intellectual potential and using it in practice. The synergy of science, business and education makes universities educational development institutions. Today, university education, business and science, their synergy are the main resource of innovation and high-tech industry [10].

Infrastructure Industrial Design Conveyor

At the current stage of industrial development, the role of the technological division of labor is significantly increasing. Today, the technological division of labor is expressed in the existence of separate industries characterized by a high level of specialization. With the development of industry and the technological division of labor, infrastructure is being improved. The development of infrastructure as an independent element of industry leads to a further deepening of the technological division of labor. The development of industrial sectors based on technological processes and the associated constant increase in labor productivity objectively requires high-tech infrastructure, such as an infrastructure design conveyor, so as not to divert a significant share of labor resources and significant capacity of the main production to auxiliary operations. The infrastructure project conveyor allows you to put the implementation of high-tech high-quality projects on stream in order to develop industry.

By using process management of project implementation, it is possible to achieve clarity of their implementation, that is, to ensure the operational execution of high-tech high-quality projects in general. The stages of the project change as a number of business processes are executed. The design conveyor ensures that the components are delivered on time, the performance of individual sections is synchronized, at the output - a serial product with an evolving quality standard.

By controlling the distribution of projects, you can track which projects are currently in the infrastructure pipeline. The fact that projects are distributed in stages as on the conveyor gives a transparent picture of organizations as a whole. Business processes make the execution of high-tech quality projects clear and specific. Any of the phases of the project is implemented using business processes. For example, it can be a standard budget reconciliation process for all projects.

If there has been a massive accumulation of projects at certain stages, this can be a bad sign and a signal for action, then there are “problem places” in the projects. This may indicate a possible downtime, resource congestion, etc. Then they delve into the situation and understand why this is happening. In this case, you can start business processes as needed directly from the project

master record. These are processes that are generally not related to the main project progress, such as requesting project budget enhancements, incident logging, unplanned equipment purchases, and so on. These processes can be started from the project page by any of the users who have rights to this or even from outside. For example, the incident handling process can be configured to start from an external system.

The infrastructure design pipeline is a technology platform. The technology platform is an innovative ecosystem and acts as a provider of knowledge and technologies of the future, concentrating around itself many companies, research centers, various technical and logistics services, and, most importantly, consumers. The technological platform is used as a way to organize interaction between various participants (business structures, universities, government agencies, independent experts) to solve super-complex problems. Technological platforms are created in industries related to the field of new knowledge (biomedicine, intellectual energy, nuclear industry, urban infrastructure, robotics, etc.). Universities in platforms often play the role of providers of scientific resources for research. In the context of rapid changes and uncertainty, the new generation of managers, engineers, economists will have to solve not only qualitatively different tasks, but also act ahead of the curve, which requires special competencies of personnel. The problem cannot be solved without a qualitative change in the content of educational products, training methods, and the prompt introduction of the results of scientific achievements into the educational process. There is a need to form specialized university technology platforms focused on the commercialization of research activities. The technology platform is not without the participation of universities, whose role increases sharply in solving poorly structured problems with a lack of necessary knowledge. Without cooperation with business, it is impossible to maintain high results in research activities, develop competencies, conduct a deep analysis of social and economic trends, improve education and focus on the commercialization of research results.

The system of commercialization of the results of scientific research, as well as the innovative system, is one of the types of open systems in which financial resources, material resources in the form of products, patents, articles, as well as human resource's function. It includes scientific organizations, universities, technology parks, business incubators, venture capital companies, enterprises and corporations. As well as structures providing regulatory, information and financial support.

To commercialize the results of scientific research, a digital platform of intelligent products is used. The digital platform of intelligent products is a constantly operating market platform on which, according to certain rules, transactions are made for the purchase and sale of intellectual products in the form of projects, developments of various degrees of readiness, laboratory and industrial samples and installations, patents, experimental industries, research results used in civil industries. The digital platform of intelligent products also acts as an organizational regulator of innovative processes. Platforms are created for contacts of developers and investors, an information hub of interests of the business community, the state and the intellectual community. The results of research and development are displayed on the digital platform of intelligent products in the form of developments of various degrees of readiness, laboratory and industrial samples and installations, patents, experimental industries, on the one hand. And the creation of technical and financial conditions for research and development - on the other hand (on the part of the customer).

It is easier for organizations to navigate the addressing of a development order with a market digital platform of intelligent products, in which a significant number of organizations in the country performing research and development participate. If a business or industry manages to formulate a task or order to create a technology, you can create a virtual team based on existing competencies that could implement this technology at the request of the industry. Conversely, when teams unite and offer innovative applied knowledge or technology for the industry of demanded competencies and targeted education.

For an infrastructure project pipeline to perform the functions of communication and commercialization of results, it must be focused on a market competitive environment. This requires a carefully developed marketing strategy, including not only market research, the creation of breakthrough technologies, but also a well-thought-out advertising campaign aimed at increasing the demand for innovation and increasing the prestige of scientific and engineering activities. In the context of globalization, breakthrough technologies created within the infrastructure project pipeline must successfully compete with the technologies and products of the world's leading manufacturers. For successful commercialization, the result of research activities must be a complete product in demand both by the Russian and world industry.

Digital Exchange of Demanded Competencies and Targeted Education

Universities should become a trend of changes in the region and support technological and industrial development by intensive interaction and participation with agents of the regional environment, according to the regional development roadmap. With the rapid development of technology, there is a need for a life-long education. The ability to learn, becomes a guarantee of social inclusion in the life of the region, and be in demand. Otherwise, a person risks being in a state of systematic lag.

The need to adequately respond to the growing volume of information, the development of high technologies and the new format of human-environmental relations determines the focus of education on the digital model. It allows you to create digital twins of the production process of manufacturing products and the technological process of equipment operation. Create digital twins by training neural network systems based on accumulated big data related to manufacturing for intelligent control of technological processes and equipment. Control the digital twin either in

consultation mode, or automatically, or control parameters. Intelligent production management of digital twins optimizes its work, increases labor productivity and competitiveness of products in terms of quality and price.

Rapid technological development leads to the creation of a digital exchange of demanded competencies and targeted education. The digital exchange of demanded competencies is based on a system of prompt search, preparation and selection of candidates for vacant positions for the development of the region's industry. The system combines requests and offers from a wide range of employers, applicants, as well as resources from educational organizations.

The digital exchange of demanded competencies and targeted education enables applicants to develop their professional and soft competencies to the requirements of employers for specially designed educational programs [11-14]. Targeted admission to the university and training is carried out at the expense of and in the direction of the state department or from the enterprise. The use of the target direction for training requires mutual fulfillment of obligations between the parties to the concluded contract.

Conclusion

Communication between universities, power and industry is increasingly intellectual, digital and flexible. At the current stage, it is important to create an open international technological platform for research education to form a wide coalition of universities in various countries in training personnel for industrial development based on the infrastructure industrial pipeline of high-tech high-quality projects. The international technology platform of research education will become a global navigator of the formation of demanded professional competencies for the development of the information, educational, scientific and scientific and production infrastructure of universities, experience and proposals for the commercialization of developed technologies and results of intellectual activity, as well as products produced using technologies and results of intellectual activity in the world.

References

1. Anastasia Makurina, Elena Teslya (2016) Developing client-oriented approach towards university publication activity: The Library's experience.
2. Makridakis S (2017) The forthcoming Artificial Intelligence (AI) revolution: Its impact on society and firms. Futures 90: 46-60.
3. Daugherty PR, Wilson HJ (2018) Human + machine: Reimagining work in the age of AI. Harvard Business Review Press, Massachusetts, USA.
4. Murugappan V, Mohanapriya, Pandey B, Arsalwad GP, Janahan SK, et al. (2017) Dragonfly-artificial neural network model for eLearning data analyses: Is future generation communication Model: Smart E-Learning system. International Journal of Science and Technology 10(10): 23-34.
5. Carrozza MC (2019) The robot and us: An 'Anti-disciplinary' perspective on the scientific and social impacts of robotics (Vol. 20). Cham: Springer.
6. Bryndin E (2018) Creative innovative higher education of researchers with flexible skills and synergy of cooperation. Scientific Journal of Research and Review 1(2): 1-5.
7. Bryndin E (2020) Formation of technological cognitive reason with artificial intelligence in virtual space. Britain International of Exact Sciences Journal 2(2): 450-461.
8. Bryndin EG (2019) Synergy of universities, high-tech business and institutions for managing the digital economy and innovative development, pp. 467-472.
9. Bryndin E (2020) Mission of universities in era of rapid technological development. Journal of Educational System Volume 4(1): 36-40.
10. Bryndin E (2021) Aspects of research training and commercialization research results. Science Journal of Education 9(1): 6-13.
11. (2014) Customer-oriented approach-a consequence of discipline. Loyp Agency, St. Petersburg, Russia
12. Nyashenko S, Zverev A, Golubtsova E, Ivanov G (2020) The impact of digilization on the client-oriented approach in the provision of public services to business entities. International Scientific Conference Digital Transformation on Manufacturing, Infrastructure and Service. St. Petersburg, Russia.
13. Bryndin E (2021) Client-project-oriented university education in era of rapid technological development and change of professions. Science Journal of Education 9(4): 124-130.
14. Grieve P (2021) Customer orientation guide: Definition, examples & 5 steps to become customer-oriented.