


Development of a personalised learning pathway on the basis of a competency-based approach

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Abstract

The aim of this study is to evaluate competency-based Education models objectively and provide guidance on designing personalized yet balanced learning pathways that foster adaptability, lifelong learning, and holistic development. The study analyses comparative approaches for mapping competencies to broader occupational categories and emerging topics to mitigate potential risks of narrow competency frameworks such as obsolescence and low transferability. The methodology of this paper is based on a combination of qualitative analysis of problematic aspects of the formation of an individual trajectory of modern Education, with an analytical study of the prospects for the implementation of a competence-oriented strategy to the practical resolution of all issues raised in the declared subject of scientific research. The primary results of this study should be considered the creation of a theoretical model of the personalised learning pathway based on the competence approach, as well as the theoretical definition of the conditions for creating the structure of the individual trajectory of Education based on the competence approach.

Keywords: Education System. Professional Competencies. Educational Institution. Personality Formation. Knowledge.

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Received: Nov. 17, 2023

Accepted: May 25, 2024

1 Introduction

The modern Education system is a dynamic and ever-evolving entity that aims to prepare students for the realities of today's workforce by providing them with learning experiences that are personalized, active, and integrated with technology. It aims to develop an individual's personality, analytical skills, and decision-making abilities while fostering essential life skills, critical thinking, and a positive approach towards diversity, inclusion, compassion, and responsibility. The modern Education system is more flexible and convenient than traditional Education, allowing for online and supplemental instruction through various media (Huretska, 2023). Competence is defined as the combination of an individual's knowledge, skills, abilities, and attitudes that they can effectively apply in various professional and personal situations (Leal-Rodriguez; Albort-Morant, 2019). It includes not only technical expertise but also interpersonal, communication, and problem-solving skills, as well as the ability to adapt to new challenges and engage in lifelong learning. Competence is a multidimensional concept that reflects an individual's capacity to perform tasks, make decisions, and navigate complex situations in a given field or context. The research emphasises the importance of a competency-based approach in Education. This approach focuses on developing and assessing comprehensive competencies to prepare individuals for the demands of the modern workforce and society.

The result in this context should be considered the achievement of a high level of professional and cultural competencies among the subjects of Education, their intensive socialisation and the development of individual qualities, which is necessary for full integration into modern society. The competency-based approach to the development of a personal pathway of a modern subject of Education involves the creation of a full range of opportunities to ensure the proper quality of training and compliance of young professionals with all the requirements of modern society (Holmboe; Durning; Hawkins, 2017). This is fully correlated with the urgent need of a modern personality to integrate qualitatively into a modern professional environment, as well as with the needs of society itself in the qualitative use of the personal potential of graduates of educational institutions of various levels (Sylenko, 2024). The individual trajectory of Education involves carrying out a complex of theoretical and practical scientific developments on the issues of its design and institutional support. The modern stage of society development is characterised by high rates of economic and socio-political development, high intensity of the information environment, as well as the need to form a high degree of responsibility for each decision made by the subject of Education. In such a situation, the

development of a personal pathway of Education is a significant aspect of the social and professional orientation of a modern personality, necessitating its high responsibility for the quality of its Education and subsequent socialisation (Yoder-Wise; Kowalski; Sportman, 2020).

Individual educational trajectories in the Education system presuppose the presence of a developed ability to work in a team that is heterogeneous from a professional point of view and at the same time significantly different in age. This means that the ability to self-organise, creativity, the ability to cooperate and find a common language are extremely important for success in the development of a personal pathway based on a competency-based approach. It should also be considered that the formation of readiness for individual activity in the field of Education implies an urgent need for so-called project training, which means a consistent organisation, implementation and coordinated construction of the learning process, the creation of its special, project trajectory (Matricano, 2019). Continuity in Education means following the requirements of continuous growth and improvement of educational potential, which is expressed in strengthening the professional and cultural competence of the individual throughout their life (Tiwen, 2023). In this context, the development of a personal pathway based on a competence approach requires significant efforts of the subject of Education throughout their life in order to maintain a high level of educational activity and the formation of the necessary competencies of all these types.

Continuous Education means the steady formation of positive attitudes towards continuous learning and assimilation of new knowledge and skills, as well as the steady motivation of the desire for professional and career development. It should also be considered mandatory to improve the competence of a specialist in narrow professional and personal plans, a constant search for opportunities for development and self-improvement (Tang, 2017). In addition, individual work is essential to ensure the social and professional preservation of a specialist, the creation and consistent implementation of new standards for one's professional development and norms of professional behaviour. Modern standards of the Education system presuppose the search for effective methods of self-development of the student, their constant, purposeful work in order to master the chosen profession and form the competencies essential for the proficient execution of one's occupational responsibilities (Giddens; Caputi; Rodgers, 2020). At the same time, the applied methods of self-organisation are not significant, since the cornerstone in this context should be the result, expressed in the creation of competencies necessary for the high-quality performance of their professional duties in real-life conditions. Therefore, the development of

a personal pathway of Education based on a competency-based approach is a particular task of a certain applicant for modern Education, on the timely and effective solution of which depends the success of their professional activities in the future.

The purpose of this research is to critically evaluate competency-based Education models by comparing them to future-oriented standards and identifying the potential risks of narrowness and obsolescence. Additionally, the study aims to analyse the design of personalized learning pathways within a competency framework that promotes transferable higher-order skills, adaptability, and a lifelong learning mindset. It also intends to examine opportunities for balancing personalized competency development with collaborative and socialized learning approaches to ensure a well-rounded Education. Furthermore, the research seeks to explore competency alignment approaches that go beyond present-day job tasks and instead map to broader occupational categories and emerging topics. The objective is to generate insights into dynamic and responsive competency model development and implementation through ongoing foresight. Ultimately, it aims to provide guidance on competency-based Education that mitigates risks, promotes holistic development, and aligns with the evolving needs of society.

2 Materials and Methods

This research utilized a blend of qualitative techniques including document analysis, semi-structured interviews, and observation. The research context is a public university in Kazakhstan, the L.N. Gumilyov Eurasian National University, which offers a free interdisciplinary Master's program titled "Smart City: New Technologies". This program aims to develop competencies related to smart city development, technologies, and solutions.

Document analysis was conducted on the program curriculum, course syllabi, and policy materials to understand the structure and objectives of the program. Relevant documents were identified through online research and consultations with university administrators. Qualitative document analysis methods were employed to identify themes and extract insights relevant to the research questions.

Semi-structured interviews were conducted with a small group of students enrolled in the Master's programme to gain insights into their perspectives on developing personalised educational pathways within the programme. The interviewees were selected using purposive sampling to represent a mix of backgrounds,

specialisations, and year levels within the programme. The study aimed to explore the students' goals, challenges, program feedback, and suggestions.

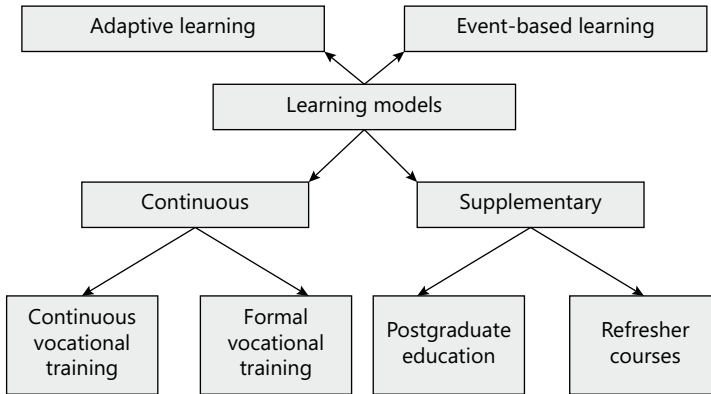
Non-participant observation was conducted to directly observe teaching methods and student engagement. Sessions were chosen to represent a variety of courses and instructors within the program. The sessions selected for non-participant observation were chosen to ensure a diverse representation of courses and instructors within the Smart City Master's programme. This approach aimed to capture a comprehensive view of teaching methods and student engagement across various aspects of the program. Detailed observation notes were taken regarding classroom dynamics, activities, instructor-student interactions, and student behaviours. Thematic analysis and coding were used as qualitative techniques to examine the data collected through document analysis, interviews, and observation. The methods used provided a detailed perspective on the modern Education context of the Smart City Master's programme and its dynamics related to personalised educational pathways.

The outcomes and subsequent conclusions of this study proficiently encapsulate the breadth of the investigation into the proposed research subject, laying a robust foundation for future scholarly pursuits in this domain.

3 Results

The formation of a personalized educational pathway on the basis of a competency-based approach involves a systematic study of the features and realities of the currently existing educational system, as well as the role and place of the subject of Education in it. In this context, the modern Education system acts as a field for constructing a conceptual model of the individual trajectory of Education of a single subject, taking into account all the features and possibilities of learning in modern realities. In the context of the contemporary educational framework, the competence strategy allows for the construction of its model, considering the unique aspects of crafting a personalised educational pathway for an individual learner. A diagram illustrating the model for evolving fundamental learning concepts within the educational system, based on a competence-oriented approach to developing a personalized learning path, is depicted in Figure 1.

Figure 1 - A framework illustrating the evolution of fundamental learning principles within the educational system, considering a competence-oriented strategy for crafting a personalised educational path



Source: Johnstone and Soares (2014)

From a perspective of evaluating the quality of training of students studying for a master's degree in the educational program "Smart City: New Technologies" of the L.N. Gumilyov Eurasian National University, the model of continuous learning, which includes continuous vocational training and formal vocational training, deserves special attention. From the point of view of the quality of the formation of an individual trajectory of Education, continuous training in a narrow professional orientation forms competencies that are mandatory for subsequent adaptation within the chosen profession, and presupposes the availability of opportunities for their steady development and improvement. In this context, it refers to the professional development of the individual within the chosen field of activity, which implies the sequential completion of all compulsory primary, secondary and Higher Education programmes, selected taking into account the student's specific professional background. In relation to the characteristics of the continuing Education of the group of students acting as an experimental object of research, a group of main factors should be highlighted that are relevant in terms of the educational programme they choose:

1. Definition of the concept of "smart technologies", in relation to the concept of "smart city". "Smart technologies" refers to advanced and innovative technologies that enable the development of smart cities and smart homes. A smart city is an urban area that uses various smart technologies to improve the

efficiency, sustainability, and quality of life for its residents. This can include transportation, energy, waste management, and public safety.

2. Prospects for the introduction of the technological concept of “smart home” from the point of view of a competence-oriented strategy in developing a personalised educational pathway. It involves integrating various devices and systems to automate, monitor, and control functions such as lighting, heating, and security. This concept is relevant to the educational program as it represents one of the possible applications of smart technologies within the context of a smart city.
3. Building a model of continuing Education within the framework of the educational programme “Smart City: New technologies”.

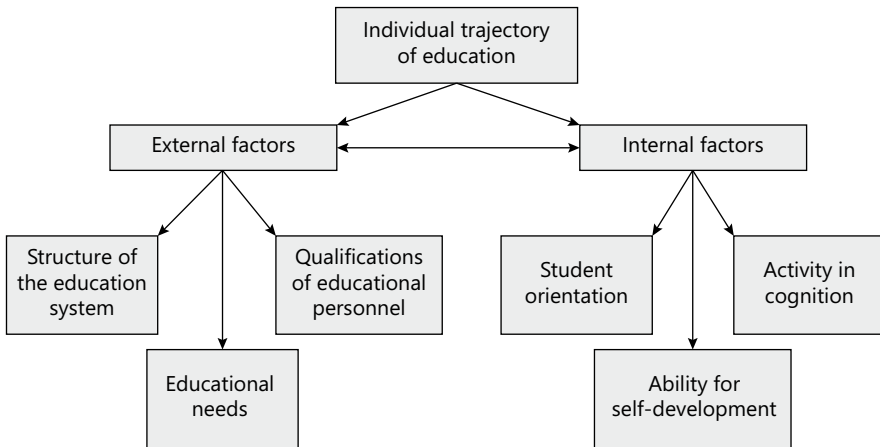
Formal vocational training involves the use of narrow-profile vocational Education programmes designed for a limited contingent of students in a brief span. This model promotes the expansion of narrowly focused skills within a particular profession and cannot be used on a massive scale. In relation to a group of students acting as an experimental object of research, the expansion of narrowly focused skills within the chosen profession should be carried out in the following directions:

- mastering the technological concept of “smart home” and understanding the foundational tenets of its hands-on application;
- formation of highly professional competencies in the scope determined by the principles of this concept;
- building a model of practical improvement of the formed competencies;
- development of the principles of “smart city” technology in real conditions.

The practice of postgraduate Education involves the possibility of studying in graduate school in order to obtain an academic degree and conduct subsequent scientific activities within a specific profession. In addition, this training model is closely related to advanced training courses, the direction of which is possible at any stage of vocational training and in any chosen form, as well as at any stage of professional activity. The model of auxiliary Education contributes to the expansion of existing ideas about the possibilities of professional self-realisation in the chosen type of activity, and is also aimed at improving narrow competencies in a particular profession. The choice of an individual trajectory of Education is

determined by the structure of personality building, one's target aspirations and abilities for self-realisation within the chosen profession. Within this framework, an individual's capability to constantly learn and improve professional skills is essential, which is expressed in the desire to learn and expand professional competencies. Figure 2 shows a scheme of the structural relationship of the main elements that directly influence the development of personalised educational pathways grounded in a competence-oriented strategy.

Figure 2 - The scheme of the structural relationship of the main elements that directly influence the development of personalised educational pathways grounded in a competence-oriented strategy



Source: Moral and De-Benito Crosseti (2022)

In the contemporary educational milieu, the competence-oriented paradigm necessitates a continual recalibration of the roles of educators and learners. This recalibration seeks to enhance the relational dynamics between these stakeholders, aiming to elevate the overall instructional efficacy and cultivate competencies vital for learners' subsequent societal integration. Evolving societal requisites mandate the relentless refinement of pedagogical techniques and immediate initiatives to bolster educators' professional skills and augment the motivational drivers towards enhancing students' educational quality. From a competence-centric vantage point in devising personalised educational pathways, there's an imperative shift required: transitioning from the conventional knowledge dissemination model, where educators are the primary conduits, towards the design and instatement of a knowledge governance framework. Within this paradigm, all educational

participants can garner requisite knowledge contextualised to their chosen vocations and refine pivotal professional competencies in alignment with their prospective occupational roles. This gradual pivot from the prevailing educational concept to a more forward-looking model ought to be cognizant of learners' unique educational aspirations, their vocational inclinations, and overarching trends shaping the educational sector.

The development of a personalised learning path on the basis of a competency-based approach, as applied to students studying in Master's degree programme "Smart City: New Technologies" at L.N. Gumilyov Eurasian National University, should be conducted considering the attributes of necessary competencies for the qualitative performance of professional duties within the activities after graduation from an educational institution. These include:

1. Understanding the principles of building a "smart home".
2. Formation of the ability to make timely changes to its structure, if necessary.
3. Formation of the skill of practical management of this technology and its variations.

The individual trajectory of Education of Master's students in the Smart City: New Technologies programme is formed in the process of direct mastering of the training programme and the application of the acquired skills in the practical field. Furthermore, the potential for crafting a personalised educational pathway implies that undergraduates can autonomously utilize accessible educational resources to acquire essential materials for their studies. In evaluating the aspects of developing a personal learning path based on the competency-based approach, one should take into account the fact that there is a close connection between the trajectories of professional formation of the subject of Education and the trajectories of Education as such. The formation of both takes place in the context of social and social changes that determine the trends of modern development of society as a whole and the place of an individual in society, in particular. In addition, a wide variety of currently available professional qualifications and activities significantly complicates the final choice of areas of professional development of the individual and creates conditions for uneven development of professional competencies in various activities. Many alternative options often interfere with professional self-determination and contribute to the clash of professional interests of various groups and fields of activity.

The present-day information and communication technologies within the evolving educational framework facilitate the conditions essential for in-depth professional development. This, in essence, sets the foundational prerequisites for sculpting a personalised educational pathway rooted in a competence-oriented strategy. Informational assistance of the modern educational process makes it possible to obtain the most complete information on any issue that concerns the prospects of mastering professional competencies necessary for social adaptation and further professional growth. The model of the modern Education system assumes the provision of opportunities for the student to choose the directions of the development of professional skills in the existing information and communication field. At the same time, the individual is responsible for their own choices and the quality of their subsequent Education and training, as well as their future professional life. Considering the quality of professional skills obtained and the selected path for professional growth, the subsequent primary competence levels are identified among contemporary Higher Education institution graduates:

- competence in the search for information necessary to deepen professional skills and search for answers to topical issues of a specific professional field;
- the skill of decision-making to determine the direction of subsequent professional development;
- the ability to constantly learn and improve oneself in the course of one's professional activities.

The learner's academic endeavours in terms of crafting a personalised educational pathway on the basis of a competency-based approach presupposes self-determination, both in terms of the chosen speciality and in terms of key aspects of its qualitative development. In modern market conditions, a specialist who is able to quickly and correctly make fundamental decisions on the choice of activities and in the prevailing professional situation, and who can quickly navigate changes in the environment has a qualitative advantage. Such qualities are acquired through the individual efforts of the applicant for Education and require not only an independent choice of an individual trajectory of Education in modern conditions, but also qualitative and, most importantly, sustained efforts towards achieving the required result. The design of the instructional journey following a personalised pathway of Education presupposes the personal participation of the student in all the subtleties of this process and the consistent development of all competencies necessary for subsequent social and professional self-realisation.

The analysis of qualitative data uncovered important findings about the Smart City Master's programme. The curriculum and competency framework of the programme are well aligned with the objectives of equipping students with the knowledge and skills required for smart city planning and technologies. The courses offered reflect the latest developments in relevant fields, such as urban planning, computer science, and environmental science. The program received positive feedback from students who expressed satisfaction with its ability to provide strong preparation for careers in smart city domains. They also highlighted the importance of developing specialised skills, particularly in areas such as smart home technology and practical urban planning projects. The program's instruction emphasizes both conceptual knowledge and practical skill application.

The university provides continuous learning opportunities through master's theses and capstone projects, as well as certificates and seminars for graduates to further advance their skills. However, some students have expressed a desire for more formal continuous learning pathways after graduation. The programme offers a customised learning experience, giving students the flexibility to choose electives and projects that align with their interests. Self-directed learning is encouraged, although some students may prefer more personalised guidance. The small size of the group allows for personalised support from professors. Technology integration is a key feature of the programme, with smart city tools such as data dashboards and urban modelling software being utilised. However, students have expressed a desire for improved digital platforms and resources to facilitate self-directed learning. Furthermore, they have shown interest in expanding virtual and hybrid learning options.

In summary, the analysis indicates that the program offers a solid basis in specialised smart city skills through its aligned curriculum, practical learning opportunities, and flexibility. There are also opportunities for personalised pathways through technology integration, individualised support and postgraduate continuing learning.

4 Discussion

In modern market conditions, there is a constant expansion of professional activities. The application of the competence approach in the modern Education system involves laying the foundation for the qualitative solution of the tasks of professional training of upcoming professionals in diverse areas of expertise, as well as the evaluation of the results obtained. The imperative to create new and refresh existing educational programmes within the competence approach determines the need to train qualified specialists of the Education system who are able to make timely decisions that are significant considering enhancing training

efficacy and devising novel models for the implementation of the competence-oriented strategy in Education (Nikitina; Pobirichenko, 2019). The Education system cannot function without its subjects acquiring practical experience in diverse areas that are, in some manner, associated with it. The educational journey ought to embrace contemporary technologies, which can bolster the effective realization of a profession-focused educational approach. The orientation of the competency-based approach to achieving certain results related to the achievement of strategic competencies in the chosen profession implies the need to carry out the educational journey adhering strictly to the norms of the educational framework adopted in the state (Fedorov, 2008).

Given the unpredictable nature of economic progress in the current phase of the industrial society, there's an imperative to identify efficient methods to enhance vocational Education quality. This influences facets of the contemporary educational system like bolstering the efficacy of Education by amplifying the autonomy of educational participants in decision-making related to vocational direction and seeking relevant educational content to optimally organize this process (Oberg; Ingvaldsen, 2016). The demand for lifelong learning, in light of current societal evolution, signals the need to discover potent strategies for structuring the learning experience rooted in a competence-centric approach within the prevailing educational framework. The educational trajectory should be considered, first of all, as a verified direction of development of the subject of Education. At the same time, the subject themselves design the direction of their own development within the framework of the competencies required for quality adaptation in the future in the social environment and within the realities of their chosen profession. The individual trajectory of Education determines the set sequence of activity of each participant in the learning process and the level of mastery of the elements of the taught academic disciplines (Boubaker *et al.*, 2019).

The relationship between the categories of the individual trajectory of Education and the established educational programme presupposes the existence of a strong relationship based on certain learning standards. This means that the final choice of the individual trajectory of Education is completely conscious and the students themselves are fully responsible for the final result. The self-directed development of a personalised learning path by a learner places the onus on them to achieve the desired outcome, reflected in attaining a particular degree of professional skills. Yet, such pathways can be executed through curricula tailored specifically for an individual student. The foundational blueprint for crafting a personalised learning journey is the competence matrix of an aspiring professional (Mestre; Ross, 2011).

Successful adaptation in the conditions of the modern social and economic situation acts as a determining criterion for the quality of the formation of the necessary competencies and a prerequisite for stating the fact of the correctness of the choice of the direction of implementation of the individual educational trajectory (Lee; Evans; Downen, 2020). Designing an individual trajectory of Education in the context of a competency-based approach is closely related to the influence of external and internal factors on this process, the special features of their formation and implementation. The mission of the educational institution, its objectives and development programme, if any, are relevant in this context. In addition, great importance should be paid to the quality of training of employees of the Education system, their professional competence and the ability to convey to students the instructional data essential for developing their professional expertise. In the current economic conditions and market system, there are a large number of vocational orientation options for graduates, within the framework of the professions they choose when enrolling (Boshuizen; Marambe, 2020). This situation stems from the pronounced diversification of the professional domain and the simultaneous availability of multiple avenues for vocational self-identification among participants in the contemporary educational system.

The proliferation of numerous paths for vocational self-identification is intrinsically tied to the realities of modern economic development and the requirements of the market situation for the competence of professionals in a particular type of activity. Professional self-determination in this context is an individual feature of each individual subject of the Education system, in terms of the prospects for their professional development and improvement. The consistent contact of the fundamental factors forming the structure of the educational space, as well as their disequilibrium caused by the complexities of the psychological development of a single individual, can be qualitatively described using the principle of uneven distribution of abilities and personal characteristics of all participants in the modern educational process (Yuan, 2020). A number of random circumstances that determine the direction of development of the modern educational space may conflict with individual educational trajectories determined by individual participants in this process, and in this case the level of contradictions is determined by the individual characteristics of these trajectories in each case. The prospects for the development of the Education system are largely determined by the caliber of personalized learning paths of the individual participants in this process.

This means that there is an influence of the characteristic tendencies of building an individual educational process in the existing Education system on this entire

system as a whole. At the same time, the great difficulty lies in the ability to timely determine the effectiveness of the chosen field of study and the degree of its compliance with the modern realities of the Education system and the socio-economic needs of society (Kartashova; Plish, 2020). The formation of a personality in professional terms may not always proceed steadily and be distinguished by the lack of order in the sequence of changing stages that are mandatory for the full-fledged formation and development of a personality (Isak; Babak; Hren, 2023). The stages necessary for professional development should consistently replace each other, but this is not always the case. A contributing factor to the situation could be the inappropriate selection of a model for the personalised educational pathway, especially concerning the requisite progression of developing professional skills for an aspiring expert in a specific domain. The self-organisation of the Education applicant does not always play a major role in this context, since much is determined by mistakes made in the process of learning the basics of the chosen speciality at the stage of study at an educational institution (Yano *et al.*, 2021). In this case, the situation can be qualitatively changed by re-studying the key points of the curriculum that cause complexity already within the framework of practical professional activity.

The complexity of applying the competence approach in the contemporary system of Education lies in the impossibility of practical monitoring of the quality of maintaining a specialist's competencies for a long time after the start of their professional activity. The standards of the modern Education system assume the possibility of achieving a given level of professional competence of a student, provided that they pass all the requirements of the curriculum and pass the qualification standards, conditionally confirming the fact that they have achieved a given level of professional competence in the chosen speciality. However, in the existing socio-economic realities, there are no conditions for verifying the compliance of the competencies of the subject of Education sometime after graduation from an educational institution, which to some extent complicates the evaluation of the actual proficiency of gained professional skills (Chiang; Thurston; Lin, 2020).

At the same time, the process of university Education presupposes the obligatory independent work of the student, starting from the choice of the direction of study to the consistent implementation of all the tasks facing them throughout the entire course. The very fact of graduation from an educational institution is not yet evidence of the achievement of the required level of professional competence by the subject of Education – everything is determined by the quality of his subsequent professional activity and the rate of growth in the chosen profession. A high level of professional competence in any type of activity cannot

be achieved immediately. In order to achieve a high-quality level of professional development, a person needs to consistently go through a number of stages of professional growth and development that contribute to the development of skills necessary for proficiently executing professional responsibilities in subsequent roles (Williams *et al.*, 2018).

New educational paradigms emerging in recent years within the professional Education framework determine the direction of development of both the Education system itself and its subjects in the context of their chosen trajectory of individual development. Updating the content of the modern Education system in all its manifestations largely depends on how quickly and effectively students and teachers themselves will be able to adapt to the current changes and contribute to the reversal of their consequences for the benefit of the Education system as a whole. A significant problem of the situation under consideration may be the lack of elaboration of the concept of the modern Education system, when evaluating the aspect of professional competence and the significance of the personalised educational pathway in relation to it (Kaliuzhna, 2023). This issue requires further study using modern methods of assessing the quality of building an individual trajectory of Education in the space of a modern educational institution and the role of a Higher Education applicant in this matter. The educational space of a modern university acts as a broad field for the formation of a complete set of competencies necessary for a student to carry out their subsequent professional endeavours.

Within the academic setting of a tertiary Education institution, an individual educational trajectory can be defined as a narrowly focused programme for the development of professional competencies with their subsequent practical consolidation (Li *et al.*, 2019). At the same time, the modern student is provided with complete freedom in choosing the directions of their own development and the methods used for this. The personal potential of the student plays a pivotal function in this scenario since the subsequent integration of the young specialist into the social and professional environment depends on how well it will be realised. The development of a personalised educational pathway on the basis of a competency-based approach is of great importance in terms of the prospects for creating optimal conditions for young specialists to achieve a high level of professional, cultural and personal competencies that are of fundamental importance in terms of their further social and professional integration (Ryan; Daly, 2019). Establishing ideal circumstances for the inception and growth of personalised educational pathways stands as a primary objective of the educational framework across all tiers, given the present economic context.

5 Conclusions

The modern Education system emphasizes the importance of personalized, active, and technology-integrated learning experiences to prepare students for the realities of today's workforce. The competency-based approach aims to develop essential life skills, critical thinking, and a positive approach towards diversity, inclusion, compassion, and responsibility while fostering individual personality, analytical skills, and decision-making abilities. The construction of personalized educational pathways in line with competence-oriented strategies involves the active participation of the subject of Education in the learning process, their deliberate choice of profession and learning methods, and personal responsibility for the effectiveness of the learning process as a whole. The success of professional self-realization and development of an individual rests partially on the quality of their training and the degree of one's personal involvement and efforts expended to attain intended outcomes. The contemporary market dynamics set the standards for professional skill levels of educational institution graduates, and the personal trajectory of Education reinforces the subject's personal responsibility for their professional growth. Further research in this field should evaluate the effectiveness of personalized educational pathways in developing transferable higher-order skills, adaptability, and a lifelong learning mindset, considering opportunities for balancing personalized competency development with collaborative and socialized learning approaches. The development and implementation of dynamic and responsive competency models through ongoing foresight should align with evolving societal needs, promote holistic development, and mitigate potential risks of narrowness and obsolescence.

Desenvolvimento de um percurso de aprendizagem personalizado com base numa abordagem por competências

Resumo

O objetivo deste estudo é avaliar objetivamente os modelos de Educação baseados em competências e fornecer orientação sobre a concepção de percursos de aprendizagem personalizados, mas equilibrados, que promovam a adaptabilidade, a aprendizagem ao longo da vida e o desenvolvimento holístico. O estudo analisa abordagens comparativas para mapear competências para categorias profissionais mais amplas e tópicos emergentes para mitigar riscos potenciais de quadros de competências restritos, como obsolescência e baixa transferibilidade. A metodologia deste trabalho baseia-se numa combinação de análise qualitativa de aspectos problemáticos da formação de uma trajetória individual de Educação moderna, com um estudo analítico das perspectivas de implementação de uma estratégia orientada para as competências para a resolução prática de todas as questões levantadas no objeto declarado de investigação científica. Os principais resultados deste estudo devem ser considerados como a criação de um modelo teórico do percurso de aprendizagem personalizado baseado na abordagem por competências, bem como a definição teórica das condições para a criação da estrutura da trajetória individual de Educação baseada na abordagem por competências.

Palavras-chave: Sistema Educativo. Competências Profissionais. Instituição Educativa. Formação da Personalidade. Conhecimento.

Desarrollo de un itinerario de aprendizaje personalizado basado en competencias

Resumen

El objetivo de este estudio es evaluar objetivamente los modelos educativos basados en competencias y proporcionar orientación sobre el diseño de vías de aprendizaje personalizadas pero equilibradas que fomenten la adaptabilidad, el aprendizaje permanente y el desarrollo holístico. El estudio analiza enfoques comparativos para mapear competencias en categorías ocupacionales más amplias y temas emergentes para mitigar los riesgos potenciales de marcos de competencias estrechos, como la obsolescencia y la baja transferibilidad. La metodología de este trabajo se basa en una combinación de análisis cualitativo de los aspectos problemáticos de la formación de una trayectoria individual de la Educación moderna, con un estudio analítico de las perspectivas de aplicación de una estrategia orientada a la competencia para la resolución práctica de todas las cuestiones planteadas en el tema declarado de la investigación científica. Los principales resultados de este estudio deben considerarse la creación de un modelo teórico de la trayectoria de aprendizaje personalizado basado en el enfoque por competencias, así como la definición teórica de las condiciones para crear la estructura de la trayectoria individual de Educación basada en el enfoque por competencias.

Palabras clave: Sistema Educativo. Competencias Profesionales. Institución Educativa. Formación de la Personalidad. Conocimientos.

References

- BOSHUIZEN, H. P. A.; MARAMBE, K. N. Misconceptions in medicine, their origin and development in education and working life. *International Journal of Educational Research*, Oxford, v. 100, n. 101536, 2020. <https://doi.org/10.1016/j.ijer.2020.101536>
- BOUBAKER, O., et al. *New trends in observer-based control*. London: Academic Press, 2019.
- CHIANG, T.-H.; THURSTON, A.; LIN, H.-C. How the excellent working-class student becomes a cultural capital constructor: reflections on the theories of cultural reproduction. *International Journal of Educational Research*, Oxford, v. 103, n. 101625, 2020.
- FEDOROV, S. E. The new quality of education and its assessment in the implementation of the competence-based approach. *Innovations*, [s. l.], v. 11, n. 121, p. 61-73, 2008.
- GIDDENS, J.; CAPUTI, L.; RODGERS, B. *Mastering concept-based teaching*. Amsterdam: Elsevier, 2020.
- HOLMBOE, E.; DURNING, S.; HAWKINS, R. *Practical guide to the evaluation of clinical competence*. Amsterdam: Elsevier, 2017.
- HURETSKA, N. Modern challenges and prospects for the development of remote education: a systematic review of the literature. *Scientific Bulletin of Mukachevo State University. Series "Pedagogy and Psychology"*, Mukachevo, v. 9, n. 4, p. 107-115, 2023. <https://doi.org/10.52534/msu-pp4.2023.107>
- ISAK, L.; BABAK, O.; HREN, Y. Digital tools in professional education training. *Professional Education: Methodology, Theory and Technologies*, Pereialav, v. 18, p. 104-125, 2023. <https://doi.org/10.31470/2415-3729-2023-18-104-125>
- JOHNSTONE, S. M.; SOARES, L. Principles for developing competency-based education programs. *Change: The Magazine of Higher Learning*, London, v. 46, n. 2, p. 12-19, 2014. <https://doi.org/10.1080/00091383.2014.896705>
- KALIUZHNA, N. Using innovative tools to support and monitor open science. *Library Science. Record Studies. Informology*, [s. l.], v. 4, p. 33-41, 2023.

KARTASHOVA, L. A.; PLISH, I. V. Digital Agenda for the Development of Education: Focus on the Formation of Digital Competencies. *Scientific Bulletin of Mukachevo State University. Series "Pedagogy and Psychology"*, Mukachevo, v. 6, n. 1, p. 157-165, 2020. [https://doi.org/10.52534/msu-pp.6\(1\).2020.157-165](https://doi.org/10.52534/msu-pp.6(1).2020.157-165)

LEAL-RODRIGUEZ, A.L.; ALBORT-MORANT, G. Promoting innovative experiential learning practices to improve academic performance: empirical evidence from a Spanish Business School. *Journal of Innovation & Knowledge*, [s. l.], v. 4, n. 2, p. 97-103, 2019. <https://doi.org/10.1016/j.jik.2017.12.001>

LEE, L.; EVANS, A.; DOWNEN, T. Golf, networking, and accounting education: A gendered approach. *Journal of Accounting Education*, [s. l.], v. 52, n. 100681, 2020. <https://doi.org/10.1016/j.jaccedu.2020.100681>

LI, Y., *et al.* The relationship between home-based parental involvement, parental educational expectation and academic performance of middle school students in mainland China: a mediation analysis of cognitive ability. *International Journal of Educational Research*, Oxford, v. 97, p. 139-153, 2019. <https://doi.org/10.1016/j.ijer.2019.08.003>

MATRICANO, D. *Entrepreneurship trajectories: entrepreneurial opportunities, business models, and firm performance*. London: Academic Press, 2019.

MESTRE, J.; ROSS, B. *Cognition in education*. London: Academic Press, 2011.

MORAL, S.V.; DE-BENITO CROSSETI, B. Self-regulation of learning and the co-design of personalized learning pathways in higher education: a theoretical model approach. *Journal of Interactive Media in Education*, [s. l.], v. 1, p. 1-6, 2022. <https://doi.org/10.5334/jime.749>

NIKITINA, M. G.; POBIRICHENKO, V. V. *Model for the implementation of a professionally oriented educational trajectory of students based on a competence-based approach*. 2019. Available from: <https://cyberleninka.ru/article/n/model-realizatsii-professionalno-orientirovannoy-obrazovatelnoy-traektorii-obuchayuschih-sya-na-osnove-kompetentnostnogo-podhoda>. Access in 2024 Apr 16.

OBERG, D.; INGVALDSEN, S. *Media and information literacy in higher education*. Amsterdam: Chandos Publishing, 2016.

RYAN, J. C.; DALY, T.M. Barriers to innovation and knowledge generation: The challenges of conducting business and social research in an emerging country context. *Journal of Innovation & Knowledge*, [s. l.], v. 4, n. 1, p. 47-54, 2019. <https://doi.org/10.1016/j.jik.2017.10.004>

SYLENKO, Y. Individualization of independent work in the professional training of future teachers: An experimental study. *Scientific Bulletin of Mukachevo State University. Series "Pedagogy and Psychology"*, Mukachevo, v. 10, n. 1, p. 68-76, 2024. <https://doi.org/10.52534/msu-pp1.2024.68>

TANG, Y.-Y. *Brain-based learning and education*. London: Academic Press, 2017.

TIWEN, H. Historical and pedagogical aspect of the development of the academic talent of students in abroad theory and practice. *Professional Education: Methodology, Theory and Technologies*, Pereialav, v. 17, p. 228-241, 2023. <https://doi.org/10.31470/2415-3729-2023-17-228-241>

WILLIAMS, I. R., *et al.* The impact of outdoor youth programs on positive adolescent development: Study protocol for a controlled crossover trial. *International Journal of Educational Research*, Oxford, v. 87, p. 22-35, 2018. <https://doi.org/10.1016/j.ijer.2017.10.004>

YANO, V. A. N., *et al.* Validity evidence for the multidimensional scale of perceived social support at university and safety perception at campus questionnaire. *International Journal of Educational Research*, Oxford, v. 107, n. 101756, 2021. <https://doi.org/10.1016/j.ijer.2021.101756>

YODER-WISE, P.; KOWALSKI, K.; SPORTMAN, S. *The leadership trajectory*. Amsterdam: Elsevier, 2020.

YUAN, R. Novice nontraditional teacher educators' identity (re) construction in higher education: a Hong Kong perspective. *International Journal of Educational Research*, Oxford, v. 99, n. 101508, 2020. <https://doi.org/10.1016/j.ijer.2019.101508>



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Contribution of the authors: Danagul Koshanova, Alma Zakirova, Aidana Tynyshkali – collected the data, performed the analysis, and wrote original manuscript.

Data: The authors confirm that the data supporting the findings of this study are available in the article.

Conflict of interest: The authors declare that there is no conflict of interest.