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Synergetic Approach Model for Improving Vocational Education: Characteristics, Guidelines and Applications

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SUMMARY: The main purpose of vocational education is to prepare students for their future professional development, including the acquisition of skills and competencies necessary for the labor market. The research aims to present a model that gains effectiveness of applying a synergetic approach for improving vocational education. The synergetic approach could be an innovative pedagogical concept in VET that creates an open educational environment utilizing the application of different approaches and teaching methods. Basically the model proposed combines the change in curricula, the use of learning resources for practical teaching and the change in the way of assessment as kernel guideines for achieving better student outcomes. The ensuing benefits of applying a synergetic approach in VET are related to the possibility that vocational education is required to meet the needs of the contemporary labor market, as well as it answers to the expectations of society to prepare young people for their successful employment in industry. Other benefits are related to the possibility of restructuring the learning content, using various teaching methods, formative assessment, acquisition of permanent knowledge, as well as acquisition of skills for critical evaluation of information and self-evaluation of the achieved results to increase motivation. In synergetic learning, the content of the learning materials differs significantly from those traditionally used in vocational training, and the teacher has the opportunity to adapt the learning content to the needs of the specific student.

KEYWORDS: open learning environment, synergy, synergetic education, transformation, VET.

1. INTRODUCTION

Nature and philosophy of synergetic education

Well- known in the pegagogy and educational research environment, the term synergy originates from "**συνεργία**", meaning "syn" - together and "ergos" - action, as synergetic is equated with "acting together, interaction or cooperation of two or more". Joint and cooperative action in synergetic education is associated with the action of various factors at different levels, through which an effective educational process is achieved (Bogdanova 2015). As a science, synergy is connected to all spheres of knowledge, and the universality of the synergetic approach allows its application in education as well. The basis of the synergetic approach is the philosophical change of education, to achieve intensive and profound modification and transform education into an **open system**, to achieve balance and complement individual components. The approach achieves a synergy between "the two main types of missions of the original pedagogical (upbringing, training, education) - **the civilizing** and **the evaluative aspect** " (Rasheva-Merdzhanova 2015, p. 662). Achieving synergy between the two mentioned layers is a prerequisite, on the one hand, for stimulating the assimilation of knowledge and skills, and on the other hand, for **increasing social commitment and self-development**, as well as “group outcomes exceed result of individual effort” (Farra et al., 2018) Without the achievement of the specified synergy in education, there are discrepancies between the requirements and demand of the labor market and the acquired knowledge and skills of the graduating students, as well as between the competencies specified in the diploma obtained and the actual realistic knowledge of the graduates.

“The synergetic methodology is an important area that contributes to integrated education, which can become the basis of modern education based on a systems approach” (Khotambekovna, 2021). At the heart of synergy is "coordinated action, cooperation, interaction, integration, systematicity and complexity, which achieves a new understanding of the world around us, based on self-management and self-organization" (Radeva 2015). Synergism is an open system that in education allows to develop and transform "a number of specific segments of educational practice and at the methodological level" (Rasheva-Merdzhanova 2015, p. 663). The synergetic approach is also defined as an innovative pedagogical concept that creates a synergetic educational environment that

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allows the application of different approaches and teaching methods to encourage students to form a synergetic style of thinking, which is an open and multifaceted type of thinking that allows for real analysis of reality (Nikolaevna, 2010; Todorova, 2013; Jafarov, 2023).

Based on the synergic approach there are created a different schools, play therapy centers, online learning centers and even Synergic Education Institute [1].

2. OPPORTUNITIES FOR USING A SYNERGETIC APPROACH TO IMPROVE VOCATIONAL EDUCATION

The main purpose of vocational education is to prepare students for their future professional development, including the acquisition of skills and competences necessary for the labor market. The implementation of a synergetic approach in vocational education requires a transformation of the classroom-lesson system in order to achieve an open learning environment, as well as to introduce the use of synergetic textbooks and teaching materials with the help of which to practically introduce synergy into the educational process (Savova 2017). The synergetic approach in VET along with the effective partnership between education and and industry could distribute a skillful workplace training "with real labor market relevance and young people gain an early appreciation and understanding of the world of the work" (Field, 2010; Lin, 2019).

The synergetic approach is a way of teaching the learning content in a **holistic** way, thorough "open system of knowledge and skills, which are not only effectively used in professional activities, but also are quickly rebuilt and updated with changes in modern science" (Tsiuniak, 2020). The approach uses all available resources to explore the potential and creative personality of students, allowing the creation of future specialists through self-assessment, encouraging their creative thinking and resolving discrepancies between teaching and knowledge acquisition. Traditional vocational training focuses on the theoretical transfer of knowledge in its form of reproductive learning and the production of a certain range of terminological facts, which are largely incompatible with the demand for specialists in the labor market. Modern professional education fails to meet the demand of the market and society, in the logic of high competitiveness, requiring a large set of dynamic competences (transversal). Only a **multi-dimensional, multi-subject and holistic** way of teaching and learning process can produce quality graduates and personnel for future economic development. The value-oriented, multidimensional and integrated teaching and learning process can be ensured through a synergetic approach to the development of the pedagogical system through openness, co-creation and value orientation in professional education (Wu, Sarker 2022).

The main elements in introducing the Synergetic Approach in VET (*see* **Figure 1.**) are:

1. *Change in the Curricula:* alignment with industry needs, focus on practical skills; integration of technology.
2. *Use of Learning Holistic Resources for Practical Teaching:* real-world projects; case studies; simulations and games; field trips.
3. *Change in the Way of Assessment:* performance-based assessment; portfolio assessment; authentic assessments; continuous assessment.

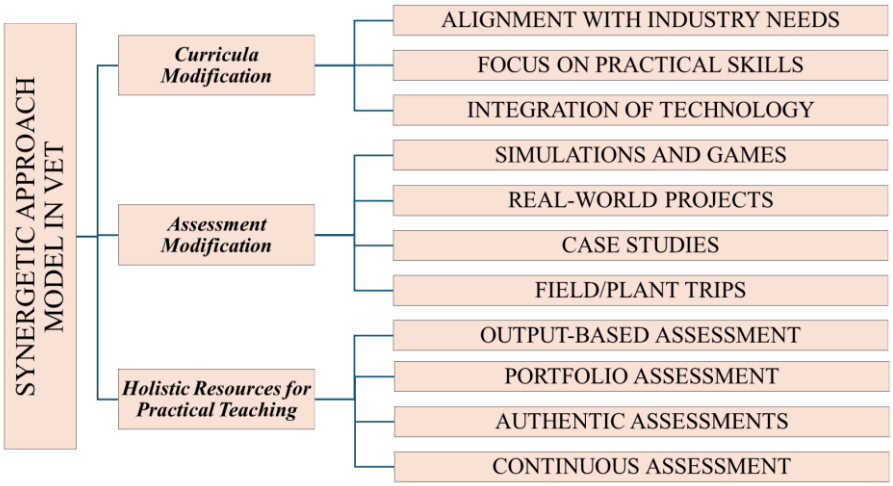

Figure 1. Diagram of Constituents of the Synergic Approach Model.

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The curriculum is the main means of implementing change in vocational education, as well as of evaluating the effectiveness of applying the synergetic approach. The preparation of training programs with the application of a synergetic approach should enable the organization of effective training and guarantee the quality of the training process. The main mission of the curriculum in vocational education is to achieve the expansion of students' knowledge and the acquisition of skills necessary for future specialists in the labor market. The change in the curriculum should allow students to acquire knowledge in a specific profession that is real and can be validated, the achievement of which also requires a change in the teaching materials in vocational education (Yan 2023).
When implementing a synergetic approach in vocational education, various teaching methods can be used, depending on the curriculum. However, the use of *problem-solving methods (Problem - Based Teaching)*, which are designed to test students' relevant activities and their ability to make impartial, objective and informed decisions. The teacher's activities when using the synergetic approach are also related to improving students' knowledge and skills to observe and investigate facts, search for and critically evaluate information, test hypotheses, draw conclusions, etc., through which to interpret problems and to find their solutions (Zamanova 2022).
School, as an institution from which we must draw knowledge, is gradually changing to an institution in which consciousness must be built. Efforts should be directed not at producing phrase-learners, but at building learners with conceptual ideas of the meaning of life, of its goals and objectives, of the overall structures and network-like influence of everything from/to everything. Education in professional disciplines should also form thoughts, concepts and views, value judgments that gradually build up established beliefs sufficiently well synchronized with the concepts of the humanities.
The scientific content of professional and technical disciplines is contextually related to the laws of humanities and socio-economic sciences. Thus, through a synergetic approach in learning, some laws of technology (example from the context of physics, electrical engineering, etc.) can be summarized and considered in a generalized form with the aim of creating lasting connections for memorization. ***Example***, statements like:

1. The amount of heat given off is equal to the amount of heat absorbed.
2. Electric charges pass from one body to another like the energy that is exchanged between physical bodies, neither created nor destroyed.
3. Electrical energy is converted into heat, light, chemical, mechanical, and vice versa.

Analogies here can be indicated not only through interdisciplinary integration with philosophy, economics, but even from folklore and folk sayings such as: "From nothing comes nothing", "What knocks, so calls", "What you sow, you will reap". Training in professional disciplines provides great opportunities to prove the connection between theory and practice and the synergetic view and connection of seemingly unrelated objects. New knowledge is often built on practical experiences students have, then reinforced through exercises and practice. The internal logic of the educational content of professional disciplines often contains conceptual structural units that must first be philosophical explanations in the learning process. The guiding principle is often: "There are absolutely no limits in nature"; in this way, the student is provided with an opportunity for a self-directed and self-developing functional analysis of the acquired knowledge, which later turns into actual worldview positions of the surrounding material world.
"Many teachers do not perceive mathematics, science and engineering as creative fields at all" (Kahn 2021: 104), and continues "many teachers continue to imagine that learning mathematics and exact sciences consists of memorizing formulas to arrive at the trusted answer; even engineering, which is actually a process of creating something new from scratch or combining elements in new and non-obvious ways, is for some reason seen as dry subjects to be learned by rote" (Kahn 2021: 105).
Technical and professional sciences abound with opportunities to build skills in almost every subject, and especially when applying problem-based learning and student activation, the so-called active learning through synergetic approaches in the professional disciplines, strong-willed personality qualities such as purposefulness, decisiveness, persistence, self-control, principledness can be built. The educational process of professional training gives the opportunity to build these qualities of the personality during the experimental and laboratory work.
In the process of teaching, the teacher inevitably refers to the surrounding reality, which at the same time is constantly changing, and through the synergetic principles, the teacher should acquaint the students not only with the absolute but also with the relative truth, which they must accept as objective. They must learn to be able to work with multi-truth constructs and generalizations.
A number of studies prove that students often wrongly evaluate processes and phenomena for which the close connection and philosophical meaning of these concepts is not clearly explained in advance. A purely didactic error, driven by the desire to form a

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technical perspective, is the overemphasis of causality and the condescending role of creativity. Teachers should have a creative approach to the methodical use of philosophical concepts and reduced absolutization of causality as the main way to explain processes.

Through large summaries and synergetic principles in learning, the learning methodology is brought closer to the learning object. That is, if the knowledge of professional subjects concerns Matter, forms and time, which are in eternal motion, change, non-linearly related, then the methods by which we clarify their characteristics and attributes must rest on the same philosophical-interpretive basis.

In vocational education, the synergetic approach is also used in vocational guidance and career counseling of students. It is necessary to make a distinction between vocational guidance and career counseling. By its very nature, career guidance is about helping students choose a profession, while career guidance takes place after the choice of a specific profession (Vasilev, Merdzhanova 2003). The main difference between the two concepts is that vocational guidance is aimed at choosing a profession, while career guidance is at choosing career development. Synergy in career guidance is related to combining "the choice of a profession with the choice of opportunities for education, training and employment, emphasizing the interaction between learning and the labor market" (Bogdanova 2015, p. 340). Career guidance in vocational education should be carried out on the basis of synergy between career consultants, business and the educational institution, in order to encourage students to make a decision in the field of their career development and to evaluate their effectiveness. Synergism in vocational training and education can be effectively applied as principles in the selection of content as well as in its structuring.

Prof. Merdzhanova's book "**Synergetic Philosophy of Education** " has worked in depth on the issues of synergetic content in professional education. He also calls the principles "achievement of synergetic thinking" (Merdzhanova 2017, p.25)

Such as **the holographic principle** are listed (Talbot 1991): about "reality" and "fact" as a personal interpretation of reality and fact **without being absolute**; things are interpretive images of pictures that we have learned to understand and see as we see. This principle would help build the content structure of professional education, with the aim of eliminating the "absolutization of fact", as immanent, primordial, eternally significant, (considering how many facts today are ultimately disproved in the near future), but rather the narratives in the texts should follow descriptiveness of characteristics, without giving dichotomous conclusions of the type yes-no, wrong-true, true-false. Such an approach in Western literature is known as **descriptive thinking and descriptive learning:** a thorough analysis of the situation, the phenomenon, and taking into account all the characteristics and interrelationships with all its variables, without giving evaluations and judgements, but rather looking for an **analysis of effectiveness and applicability.** The descriptive model of teaching as a synergetic approach in professional education is summarized in ***Table 1.***

Table 1. Elements of a descriptive model in synergetic education.

Observation skills:	Emphasis on teaching students to carefully observe and identify key details in their work environment or in the context of a specific task.
Documentation:	learning to document procedures, processes and results in a clear and detailed manner. This documentation may include written descriptions, diagrams or other forms of presentation.
Problem analysis:	breaking down complex problems into manageable components - kernels - and accurately describing the interrelationships between all components.
Communication:	Clear and accurate communication is a crucial aspect of descriptive thinking in professional education. This includes: passing on technical information, detailing procedures or reporting observations.
Technical documentation:	In technical and professional fields, technical documentation is often created or interpreted. A descriptive approach helps to understand and create accurate technical documents.

The aim is to cultivate analytical and observational skills to ensure that learners can understand, describe and are absorbed effectively in their chosen professional field.

Another type of synergy in the selection of content which is to be devoid of any **"*truth absolutization*"** and prevalent sovereign of truth in science. "Truth" is a deterministic function of time, and for a greater universality of professional knowledge is to analyze phenomena and facts descriptively, forcing the transition from "***absolute truth***" *to "****truth of approximation***". Modern knowledge is a self-consistent network "without a firm and eternal foundation" (Merjanova, 2017 p.42).

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Prof. Merdzhanova has examined in-depth analyzes and examples of the construction of a synergetic textbook, with a complete structure of the requirements and the method of its compilation It is named there as **synergetic "iconic" textbook.** (Merdzhanova, 2017 p.101-120).

3. BENEFITS OF A SYNERGETIC APPROACH IN VOCATIONAL EDUCATION

The synergetic approach has the potential to provide an opportunity for vocational education to meet the needs of the modern labor market, as well as answers to society's expectations of preparing young people for their successful employment (Rasheva-Merdzhanova 2015). In vocational education, the increase in subjects for the acquisition of the relevant professions in the last high school stage leads to a decrease in the students' learning motivation, which creates prerequisites for difficulties in learning the learning content. Using a synergetic approach allows teachers to use a great number of teaching strategies on the basis of which to restructure the learning content; use different teaching methods to attract and hold students' attention, increase their concentration and attention, and apply formative assessment. In order to achieve the effectiveness of applying a synergetic approach in vocational education, it is necessary to provide students with various opportunities for learning and self-assessment (including distance learning, outside the traditional classroom); the learning process should be student-oriented; the training should develop skills and competences in the students, and not form perishable theoretical knowledge, as well as the created learning environment should be supportive (Zamanova 2022).

The synergetic approach in vocational education offers a promising solution to meet modern labor market demands and societal expectations for youth employment. Multiple studies highlight its potential benefits. Wu and Sarker (2022) propose an "intervention-approach-synergy-integration" mechanism to connect educational elements and stakeholders, potentially reducing the demand-supply gap for quality graduates. Rukasova (2019) emphasizes the synergetic approach as a strategy for developing professional competence, focusing on non-linearity, openness, coherence, and self-organization. Zhuravlova et al. (2021) suggest combining personal learning environments with student motivation to improve vocational education. Anisimova and Efremova (2021) advocate for a "synergetic" update of educational content alongside digital transformation to enhance education quality. These studies collectively demonstrate that the synergetic approach can integrate resources, stakeholders, and technologies to create a more responsive and effective vocational education system aligned with industry needs and societal expectations.

During the learning process in professional education, using a synergetic approach, students acquire lasting knowledge, because they are given the opportunity to independently search, critically evaluate information and self-assess the results achieved, which motivates them to continuous self-improvement. Another benefit of using the synergetic approach is that students' learning motivation is high because they are aware of why they are studying the specific learning material and how they will benefit from this knowledge. Effectiveness in the learning process when applying a synergetic approach is determined by the fact that it stimulates the joint implementation of activities between students, and the teacher evaluates the activities in order to continuously improve the pedagogical process and increase the interest of students (Vladimirovna, Mustafaevna, 2022).

One of the main goals in the organization of training in vocational education and the learning process is to respond to the interests and needs of each student as a whole, to stimulate the development of his/her talents, skills and abilities, as well as potential opportunities. The synergetic approach allows the learning process to be oriented towards the student, significantly supporting the development of his intellectual abilities. An advantage of the synergetic approach is the development of students' independence. In synergetic learning, the content of the learning materials differs significantly from those traditionally used in vocational training, and the teacher has the opportunity to adapt the learning content to the needs of the specific student. In synergetic learning, great importance is attached to the overall development of students as individuals, which is why it is necessary to use individual methods and teaching materials for students (Zamanova 2022). Another benefit of the synergetic approach in vocational education is formative assessment, which is based on multiple student activities in the classroom (solving assigned tasks, active participation, discussion, etc.) and self-assessment (performed using appropriate online assessment tools, independently by the students).

4. CONCLUSION

Modern vocational education needs significant alteration and adeqate adaptation to the new chalanges to ensure a quality connection between training and the labor market. Part of the necessary reform is the use of a synergetic approach, which will allow the creation of conditions for permanent symbiotic enhancement and intensification of knowledge and competences, self-development and

acquisition of the professional qualities that are strongly needed. The synergetic approach is aimed at realizing one of the most complex tasks of the modern education system - a transition to the formation of a creative personality, with developed intellectual potential and mastered competencies for realization in various professional fields.

NOTES

[1] https://synergeticeducation.com/

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