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# SYNERGETIC APPROACH AS A FACTOR IN DEVELOPING STUDENTS' ORGANIZATIONAL AND MANAGERIAL ABILITIES

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**Abstract**
This study examines the effectiveness of the synergetic approach in developing organizational and managerial abilities among higher pedagogical education students. The research involved 82 students and compared an experimental group taught through synergetic principles with a control group using traditional methods. Organizational and managerial abilities were assessed through five key components. The experimental group demonstrated a significant improvement, with average scores increasing from 2.76 to 4.12, while the control group improved from 2.79 to 3.21. The proportion of high-level students in the experimental group rose from 14.6% to 51.2%, and statistical analysis confirmed the significance of these changes ($t = 8.74$; $p < 0.01$). The findings indicate that the synergetic approach promotes a flexible, student-centered learning environment that enhances managerial competence and professional readiness in future teachers.

**Keywords**: Synergetics, synergetic approach, organizational and managerial ability, self-organization, student-centered learning, pedagogical experiment, project-based learning, competence, higher education.

## Introduction

In the context of contemporary reforms in higher education, the professional preparation of future specialists is no longer limited to the acquisition of theoretical knowledge and subject-specific skills. Modern pedagogical practice requires graduates who are able to organize learning environments, manage group interaction, make responsible decisions, plan educational activities and evaluate their own professional performance **[1, 2]**. This requirement is especially important for students enrolled in pedagogical higher education institutions, because their future

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professional roles may include not only teaching, but also classroom leadership, methodological coordination, organization of educational events, management of student communities and participation in institutional development **[3]**.

The development of organizational and managerial abilities among students has therefore become an important pedagogical task. Such abilities include the capacity to set goals, plan actions, distribute tasks, organize teamwork, communicate effectively, make decisions under uncertain conditions, accept responsibility, analyze outcomes and regulate personal activity **[4, 5]**. If these qualities are not developed during university education, graduates may experience difficulties when they enter real educational practice, where teaching is closely connected with coordination, leadership and management of human interaction **[6]**.

Traditional models of instruction often provide students with ready-made tasks, fixed algorithms and teacher-controlled activity. Although such models may support the transmission of knowledge, they do not always create sufficient conditions for independent organization, initiative, flexible decision-making and collective responsibility **[7]**. In contrast, modern competence-based education requires active methods in which students participate in the design, implementation and evaluation of learning tasks. The synergetic approach is one of the methodological directions that can respond to this need, because it views education as an open, complex and self-developing system **[8, 9]**.

Synergetics studies the patterns of development in complex, open and self-organizing systems. When applied to education, this approach allows the learning process to be understood not as a linear transfer of knowledge from teacher to student, but as a dynamic interaction of participants, goals, information flows, learning situations and social relations **[10]**. From this perspective, the student is not a passive object of pedagogical influence, but an active subject capable of self-organization, self-development and meaningful cooperation with others **[11]**.

The synergetic approach is closely connected with such principles as openness, self-organization, non-linearity, bifurcation, coherence, feedback and reflection. In pedagogical practice, these principles can be expressed through project work, small-group collaboration, problem-based tasks, case analysis, role distribution, collective planning, peer evaluation and reflective discussion. These forms naturally involve students in organizational and managerial activity and enable them to experience the logic of leadership in a safe educational environment **[12, 13]**.

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Although the ideas of system-based and synergetic thinking have been discussed in pedagogical literature, the direct experimental study of their influence on students' organizational and managerial abilities remains insufficient. In many cases, synergetic principles are described at a theoretical level, while their practical implementation and measurable outcomes are not fully presented **[14, 15]**. This creates the need for empirical research that can show whether synergetic organization of learning activities has a statistically significant effect on students' managerial competence.

The purpose of this study was to determine and justify, through pedagogical experimental work, the influence of learning activities organized on the basis of the synergetic approach on the development of students' organizational and managerial abilities. The study was based on the following hypothesis: if the educational process is organized according to the principles of openness, self-organization, non-linear development, collaborative activity and reflection, then the level of students' organizational and managerial abilities will increase more significantly than under traditional learning conditions **[16, 17]**.

## MATERIALS AND METHODS

The research was carried out during the 2025–2026 academic year at Shahrisabz State Pedagogical Institute. The participants were second- and third-year students majoring in pedagogy and psychology. A total of 82 students took part in the study. By random selection, the participants were divided into two comparable groups: an experimental group consisting of 41 students and a control group consisting of 41 students. The experimental group included 24 female and 17 male students, while the control group included 23 female and 18 male students. The results of the initial diagnostic stage showed that the groups had approximately equal starting indicators, which made it possible to compare the results of the formative work objectively.

The study was organized in three main stages. The first stage was the preparatory and diagnostic stage, which lasted four weeks. During this stage, an initial diagnosis was conducted to determine the baseline level of students' organizational and managerial abilities. The second stage was the formative stage, which lasted fourteen weeks. At this stage, educational activities in the experimental group were organized on the basis of synergetic principles, while the control group continued studying through traditional lecture-practical methods. The third stage was the final evaluation stage,

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which lasted three weeks and included post-test diagnostics, statistical processing and interpretation of the results.

In the experimental group, the content of the classes was constructed according to several interrelated synergetic principles. The principle of openness was implemented by allowing students to participate in choosing learning tasks, project topics and sources of information. Students were encouraged to use external information resources, practical cases, expert opinions and examples from real educational practice. The principle of self-organization was implemented through small-group work in which students independently distributed roles such as group leader, secretary, presenter, timekeeper and evaluator. In this way, learners practiced internal coordination and shared responsibility.

The principle of non-linearity was reflected in problem-based and uncertain situations. Students were offered cases in which a single correct answer was not provided in advance: limited resources, shortage of time, conflict in a group, unexpected changes in the project plan or the need to choose between several alternatives. Such tasks required students to compare possible strategies, justify their choices and take responsibility for the consequences of decisions. The principle of coherence was realized through coordinated group activity, mutual reporting, peer support and feedback. Reflection was used at the end of each lesson: students analyzed their own contribution, the effectiveness of group interaction and the changes needed for the next project.

Within the formative stage, students completed several practical case-projects, including “Educational Project Management”, “A Model for Managing a Classroom Community” and “Organization of an In-School Event”. These projects required students to identify a goal, divide the work into tasks, appoint responsible persons, prepare a plan, monitor implementation, present the result and evaluate the effectiveness of group activity. In the control group, the same general educational themes were studied; however, the level of student independence in organizing activity was limited, and the teacher retained the leading role in planning and controlling the lesson.

To evaluate the development of organizational and managerial abilities, a diagnostic model based on five components was used: goal setting and planning; task distribution and delegation; teamwork and communication; decision-making and responsibility; and self-analysis and self-management. The main diagnostic tools were an adapted

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questionnaire based on a five-point scale, pedagogical observation during classes and project work, expert assessment by three pedagogical experts, and mathematical-statistical analysis. The questionnaire included 25 items distributed across the five components. Each component was assessed on a scale from 1 to 5 points.

The levels of organizational and managerial ability were interpreted as follows: a high level corresponded to 4.1–5.0 points, an average level corresponded to 3.0–4.0 points, and a low level corresponded to less than 3.0 points on the five-point scale. The data were processed using Microsoft Excel. Average scores, percentages, growth indicators and Student's t-test were calculated. The reliability of the results was evaluated at the levels of $p < 0.05$ and $p < 0.01$.

## RESULTS AND DISCUSSION

At the beginning of the research, the initial diagnostic results showed that the experimental and control groups were almost equal in terms of organizational and managerial ability. In the experimental group, 14.6% of students were at a high level, 46.3% were at an average level, and 39.1% were at a low level. In the control group, 17.1% of students were at a high level, 43.9% were at an average level, and 39.0% were at a low level. The average score was 2.76 points in the experimental group and 2.79 points in the control group. The difference between the groups at the initial stage was statistically insignificant, which confirms the comparability of the groups before the formative intervention.

**Table 1. Initial diagnostic results of students' organizational and managerial abilities**

| Group | High level (n/%) | Average level (n/%) | Low level (n/%) | Total (n) | Mean score |
|---|---|---|---|---|---|
| Experimental group | 6 / 14.6% | 19 / 46.3% | 16 / 39.1% | 41 | 2.76 |
| Control group | 7 / 17.1% | 18 / 43.9% | 16 / 39.0% | 41 | 2.79 |

The results of the final diagnosis after the fourteen-week formative stage demonstrated a clear difference between the two groups. In the experimental group, the number of students at a high level increased from 6 to 21 persons, which represents an increase from 14.6% to 51.2%. At the same time, the number of students at a low level decreased from 16 to 4 persons, or from 39.1% to 9.8%. In the control group, positive changes were also observed, but they were much less intensive: the

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proportion of students at a high level increased from 17.1% to 24.4%, while the proportion at a low level decreased from 39.0% to 26.8%.

**Table 2. Final diagnostic results after the formative stage**

| Group | High level (n/%) | Average level (n/%) | Low level (n/%) | Total (n) | Mean score |
|---|---|---|---|---|---|
| Experimental group | 21 / 51.2% | 16 / 39.0% | 4 / 9.8% | 41 | 4.12 |
| Control group | 10 / 24.4% | 20 / 48.8% | 11 / 26.8% | 41 | 3.21 |

The average score in the experimental group increased from 2.76 to 4.12 points, which means a growth of 1.36 points. In the control group, the average score increased from 2.79 to 3.21 points, which means a growth of only 0.42 points. Thus, the growth in the experimental group was more than three times higher than in the control group. This indicates that the synergetic organization of learning activities created more favorable conditions for the formation of practical organizational and managerial behavior.

A component-by-component analysis provides a deeper understanding of the changes. In the experimental group, significant growth was recorded in all five components. The highest increase was observed in goal setting and planning, where the score rose from 2.71 to 4.18 points. This can be explained by the fact that project-based tasks required students to formulate objectives, establish stages of work and define expected outcomes. The second highest increase was recorded in task distribution and delegation, where the score rose from 2.68 to 4.05 points. This result is directly connected with the principle of self-organization, because students repeatedly practiced assigning roles and responsibilities within their groups.

**Table 3. Results by components of organizational and managerial ability**

| Component | EG initial | EG final | CG initial | CG final |
|---|---|---|---|---|
| Goal setting and planning | 2.71 | 4.18 | 2.74 | 3.25 |
| Task distribution and delegation | 2.68 | 4.05 | 2.70 | 3.12 |
| Teamwork and communication | 2.84 | 4.21 | 2.86 | 3.30 |
| Decision-making and responsibility | 2.75 | 4.09 | 2.77 | 3.18 |
| Self-analysis and self-management | 2.80 | 4.07 | 2.82 | 3.21 |

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Teamwork and communication reached the highest final score in the experimental group, rising from 2.84 to 4.21 points. This result shows that synergetic learning environments strengthen interpersonal interaction and coordinated action. When students participate in joint projects, they have to listen to one another, agree on common decisions, resolve disagreements and present collective results. These actions gradually transform communication from a spontaneous exchange of opinions into a purposeful managerial resource.

Decision-making and responsibility also improved substantially in the experimental group, rising from 2.75 to 4.09 points. The improvement can be associated with non-linear and problem-based tasks used during the lessons. Students were placed in situations where they needed to choose among several possible solutions, justify their choice and accept responsibility for the final result. In real pedagogical work, such ability is essential, because teachers and educational organizers frequently act under conditions of uncertainty, limited time and changing circumstances.

The component of self-analysis and self-management increased from 2.80 to 4.07 points. This result confirms the importance of reflection in the synergetic approach. Reflection helped students move from external evaluation by the teacher toward internal evaluation of their own actions. At the end of each lesson or project, students discussed what had been successful, what had caused difficulties and how their work could be improved. Such reflective practice supported the development of self-regulation and professional awareness.

**Table 4. Statistical verification of the results**

| Indicator | Experimental group | Control group |
|---|---|---|
| Initial mean score (X1) | 2.76 | 2.79 |
| Final mean score (X2) | 4.12 | 3.21 |
| Growth indicator (ΔX) | 1.36 | 0.42 |
| Student's t-test value | $t = 8.74$ | $t = 2.31$ |
| Degrees of freedom (df) | 80 | 80 |
| Significance level | $p < 0.01$ | $p < 0.05$ |

The statistical analysis confirmed the reliability of the obtained results. In the experimental group, the difference between the initial and final results was highly significant ($t = 8.74$; $p < 0.01$). This means that the positive changes were not accidental, but were related to the purposeful pedagogical influence of the synergetic

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approach. In the control group, the changes were also statistically significant ($t = 2.31$; $p < 0.05$), but the level of significance and the magnitude of growth were considerably lower. This suggests that general educational progress took place in both groups, but the synergetic model produced a stronger and more systematic developmental effect.

The results of the study can be interpreted from several pedagogical perspectives. First, the principle of self-organization transformed students from performers of teacher instructions into active organizers of learning activity. They learned to plan, coordinate and monitor group work. Second, openness expanded the educational environment beyond the textbook and classroom by allowing students to use real cases, external information and practical examples. Third, non-linearity created meaningful learning situations in which students could not simply reproduce a ready answer, but had to construct solutions and revise decisions when conditions changed. Fourth, coherence and collaborative activity improved the quality of group interaction. In a synergetic learning environment, the result of the group depends not only on the individual knowledge of each participant, but also on the ability of participants to coordinate their actions. This aspect is especially valuable for future teachers because the educational process itself is a system of interactions among students, teachers, parents and administrators. Fifth, reflection gave students the opportunity to understand their own developmental progress and identify personal strengths and weaknesses in organizational and managerial behavior.

The relatively modest progress in the control group can be explained by natural academic development and the general influence of the educational process. However, traditional instruction did not provide the same intensity of independent decision-making, role distribution and project responsibility. Therefore, the control group improved mainly in a gradual and limited way, while the experimental group demonstrated structural changes in the level of organizational and managerial competence.

At the same time, the implementation of the synergetic approach revealed certain difficulties. At the beginning of the experiment, some students were not psychologically ready for independent organizational activity. In several groups, role distribution caused disagreement, and some students tried to avoid responsibility. These difficulties were overcome through the teacher's facilitative support. The teacher did not impose ready decisions, but helped students clarify the task, regulate communication and analyze the consequences of their choices. This indicates that the

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teacher's role in a synergetic learning environment changes from a transmitter of knowledge to a facilitator and coordinator of the educational process.

Overall, the findings support the research hypothesis. The synergetic approach proved to be more effective than traditional instruction in developing students' organizational and managerial abilities. The approach is particularly useful because it combines theoretical learning with practical action, individual responsibility with collective coordination, and external task performance with internal reflection. These features make it appropriate for pedagogical higher education, where future specialists need not only subject knowledge, but also the ability to organize educational processes and lead groups responsibly.

## CONCLUSION

The pedagogical experimental work confirmed that the synergetic approach is an effective factor in developing students' organizational and managerial abilities. Learning activities based on openness, self-organization, non-linearity, coherence, collaborative activity and reflection significantly increased the level of students' ability to plan, distribute tasks, communicate, make decisions and regulate their own activity.

The average score in the experimental group increased by 1.36 points, from 2.76 to 4.12, while the control group increased by only 0.42 points, from 2.79 to 3.21. The proportion of students at a high level in the experimental group rose from 14.6% to 51.2%, and the proportion at a low level decreased from 39.1% to 9.8%. Statistical verification using Student's t-test confirmed the reliability of these changes ($t = 8.74$; $p < 0.01$).

The most noticeable progress was observed in goal setting and planning, task distribution and delegation, teamwork and communication, which shows that self-organization and collaborative project activity are the most productive mechanisms for developing managerial behavior. The study also showed that the teacher's facilitative role is important for successful implementation, especially at the initial stage when students may not yet be ready for full independence.

On the basis of the obtained results, it is recommended that pedagogical higher education institutions more widely introduce project-based and group-based learning activities organized according to synergetic principles; develop methodological guidelines for teachers on facilitation and reflective learning; and establish regular

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monitoring of students' organizational and managerial abilities. Future research may focus on the influence of the synergetic approach on other professional competencies, including communicative, innovative and leadership competencies.

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