RESEARCH OF FEEDBACK IN THE STUDY OF GRAPHIC DISCIPLINES IN HIGHER EDUCATIONAL INSTITUTIONS

ДОСЛІДЖЕННЯ ЗВОРОТНОГО ЗВ'ЯЗКУ ПРИ ВИВЧЕННІ ГРАФІЧНИХ ДИСЦИПЛІН У ЗАКЛАДАХ ВИЩОЇ ОСВІТИ

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Significant changes are taking place in the system of domestic higher education at the present complex stage. Qualitative graphic training of higher education graduates is an urgent problem, so it requires systematic updating of the existing methodological base and development of effective forms of training. In the general task of improving the educational process, the problem of feedback between teachers and students is hardly the most difficult and its importance can hardly be overestimated. The main purpose of our study is to summarize the results on the development and improvement of approaches in the methodology of teaching graphic disciplines, in increasing the motivation of learning of first and second year students of architecture and art specialties, taking into account the influence of feedback channels on the quality of learning. The importance of graphic disciplines for the professional training of architect, artist, designer and engineer is fundamentally important; they expand the capabilities of future graduates, making them universal specialists. In the process of studying these disciplines, students are given an attitude to develop both graphic mastery, artistic skills, sense of harmony and style, and to develop creative associative and artistic thinking. Theoretical and empirical methods were used in the work: analysis, classification and generalization of sources of the research base; author's experience in organizing the educational process; diagnostics of students' classroom graphic works with timing of time expenditures, as well as their homework assignments. It should be emphasized that the formation of professional graphic competencies of future specialists is impossible without a thorough study of the basics of graphic literacy, so the improvement of skills and elements of graphic culture of freshmen starts from the first semester. It should be noted that modern professional education faces the task of not only saturating the labor market with competent specialists, but also creating opportunities for professional growth and personal development, so it is necessary to continue and deepen such researches in the future.

Key words: *graphic disciplines, feedback, first and second year students of architecture and art specialties, methodological research toolkit.*

В системі вітчизняної вищої освіти на сучасному складному етапі відбуваються суттєві зміни. У загальній задачі вдосконалення навчального процесу чи не найскладнішою є проблема наявності зворотного зв'язку між викладачами та студентами – її значення важко переоцінити. Якісна графічна підготовка здобувачів закладів вищої освіти є актуальною проблемою, тому потрібне систематичне оновлення існуючої методологічної та методичної бази і розробка ефективних форм навчання. Основною метою нашого дослідження є узагальнення результатів щодо розвитку та вдосконалення підходів у методології викладання графічних дисциплін, у підвищенні мотивації навчання студентів першого і другого курсів архітектурних та художніх спеціальностей з урахуванням впливу каналів зворотного зв'язку на якість навчання. Значення графічних дисциплін для професійної підготовки архітектора, художника, дизайнера та інженера є принципово важливим, вони розширюють можливості майбутніх випускників, роблячи їх універсальними фахівцями. У процесі вивчення цих дисциплін студентам дається установка на розвиток як графічної майстерності, художніх навичок, почуття гармонії та стилю, так і на розвиток творчого асоціативного та художнього мислення. У роботі використані теоретичні та емпіричні методи: аналіз, класифікація та узагальнення джерельної бази дослідження; авторський досвід організації навчального процесу; діагностика студентських аудиторних графічних робіт із хронометражем тимчасових витрат, а також їх домашніх завдань. Наш багаторічний досвід показує, що першокурсники можуть отримати глибші знання лише за умови високої мотивації, систематичної індивідуальної роботи та отримання детальніших знань самостійно.

Ключові слова: *графічні дисципліни, зворотний зв'язок, студенти-першокурсники архітектурно-художніх спеціальностей, методологічні засоби.*

Problem statement. In recent years, the range of problems solved by graphic methods has noticeably expanded, so the importance of graphic disciplines, which.

lay the foundations for visual representation and spatial thinking. The graphic competence of graduates of creative specialties emphasizes the need for personality development in the conditions of training in modern higher institutions education, that is, shifting the emphasis to skill, and not just knowledge and theoretical approaches to teaching. Hence it is clear relevance and priority of high-quality graphic training of future specialists.

Analysis of recent research and publications. Different approaches to the state of graphic training in higher education institutions are widely discussed in the studies of modern geometric scientists [1, 103–113; 3, 38–42; 5, 131–134; 6, 17–21; 7, 101–104; 9, 227–233; 12; 13, 175–180; 15, etc.]. Of particular interest are the works that address the issues of differential learning and the effective use of methodological developments in terms of the content and scope of educational tasks [2, 202–205; 4; 8, 152–160; 11, 36–47, etc.]. The problems of improving differentiated approaches to improving the quality of graphic training of students, increasing the level and

possibilities of feedback in teaching, the volume and content of assignment topics separately by specialty, etc. remain unresolved.

Purpose of the article. The aim of our research is to summarize the results on the development and improvement of approaches in the methodology of teaching graphic disciplines, in increasing the motivation of learning of first and second year students of architecture and art specialties, taking into account the influence of feedback channels on the quality of learning.

Main material. Graphic representations are one of the most important means of cognition of the environment and creative attitude to it. Graphics training teaches to operate terminology and concepts related to information visualisation. Work with graphics most effectively develops visual and figurative thinking, which is very important in any creative process, because a new solution is initially presented in the form of a picture, scheme or model, i.e. it is presented in the creation of spatial images of reality.

The basis of the experimental base of our research are the results of the author's observations in the process of teaching students of the first and second years of graphic disciplines in the Architectural and Art Institute of Odesa State Academy of Civil Engineering and Architecture (OSACEA) and in the Institute of Digital Technologies of Design and Transport of the National University «Odesa Polytechnic» (NUOP). The main approaches in the process of studying and teaching the disciplines «Descriptive geometry», «Drawing and painting» for these students of architectural and art specialities were considered according to the unified methodology. During this term students learn the ways of constructing images of spatial objects on the plane, practice graphic skills of working with drawing tools, paints, brushes and other means, learn the rules of reconstructing the shape of an object with the help of logical analysis and algorithms of graphic actions of geometric and creative tasks. Theoretical and empirical methods were used in the study: analysis, classification and generalisation of the research source base; the author's experience in organising the educational process; diagnostics of students' classroom graphic works with timekeeping, as well as their homework. In total, 110 students' graphic tasks were analysed in our study to determine the impact of feedback on the quality and success of learning (Table 1).

Summarizing the results of table 1, we emphasize that the presence of students at lectures and practical classroom and online classes and at consultations had a certain influence on the quality of execution and timeliness of the provision of graphic works. This will be confirmed later by our work.

Descriptive geometry is the theoretical basis for constructing drawings, which are complete graphic models of spatial objects. Its main tasks are to study theoretical methods for graphically constructing three-dimensional objects on a plane, acquiring practical skills in making images (orthogonal, axonometric, perspective, etc.) and graphical methods for solving various applied problems. This discipline is one of the first graphic disciplines with which the professional education of an architect, artist, designer or engineer begins. Difficulties in mastering it may be associated with the special dependence of spatial imagination on logical thinking – without the formation of such an opportunity, it is quite difficult to feel freedom in creativity. For several years now, graphic disciplines have been taught in English at OSACEA, which is one of the important motivational factors for students . As a rule, classroom classes are conducted in a bilingual form, that is, the provision of educational material is mixed – in Ukrainian and English. The second important factor is the implementation of distance learning in the educational process – it is an innovation for the higher education system, which requires significant efforts for its practical implementation from both the students' and the teacher's side [10, 44–48; 14, 63–75; 16, 201–206, etc.]. It was necessary to organizationally change and modernize the methodology of teaching in the shortest possible time. With distance learning, feedback is required: from the student to the teacher and in reverse order.

Table 1

Characteristics of quantitative factors of the research base

	Group N 1	Group N 2	Group N 3	Group N 4	Notes
Number of students in the group	20	30	30	30	
Attendance at lectures	80%**	–*	80%	80%	** Online classes
Attendance for practical classes	80%**	90%	95%	90%	** Online classes
Consultation attendance (in the audience)	40%**	40%**	40%**	40%**	** Online classes

Notes. 1. * There are no lectures in the discipline "Drawing and Painting" according to the Curriculum (OSACEA).

2. Distribution of groups: group 1–2nd year students majoring in Graphic Design, discipline "Descriptive Geometry" (20 students in total); group 2–1st and 2nd year students majoring in Graphic Design, discipline "Drawing and Painting" (30 students in total); group 3–1st year students majoring in Fine Arts (30 students in total), OSACEA; group 4–1st year students majoring in Architectural Design, discipline Descriptive Geometry (30 students in total), Odesa Polytechnic.

3. The number of students was taken selectively.

Thus, there is a movement towards the ultimate goal of learning – complete and consistent assimilation of theoretical material and stable graphic skills.

Our study is based on a comparison of graphic test works of students of architectural and art specialties in the first semester using the authors' methodology, the basis of which is a criteria-based assessment system.

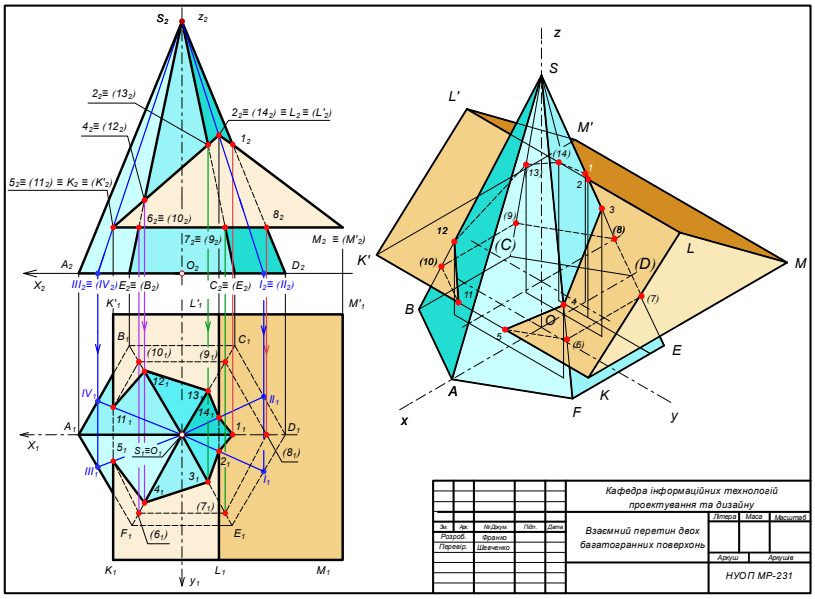
In **Drw. 1** shows an example of solving one of the important classical problems of descriptive geometry – constructing the line of intersection of two polyhedral surfaces in orthogonal projections and rectangular isometry.

In **Drw. 2** shows the student's drawings in the classroom (a) compared with those corrected through feedback (b) in an individual consultation.

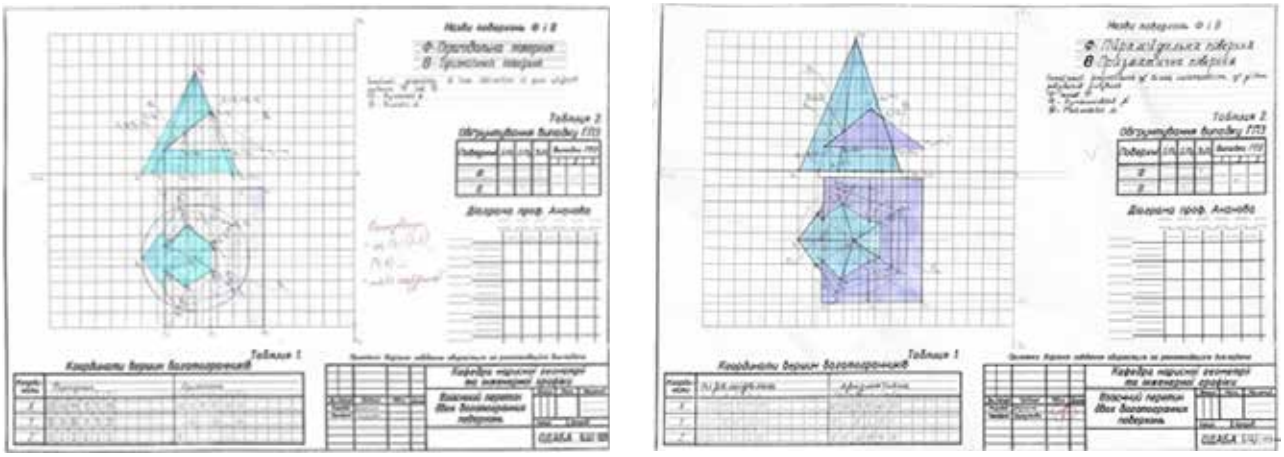
In **Drw. 3–5** show comparative examples of performing graphic work on **descriptive geometry** and **drawing** in practical classes (***a***) and worked out with the help of feedback (***b)***. The efficiency and quality of graphic work does not require additional comments.

One of the main factors investigated in our work was the feedback coefficient ***k*** and its influence on the quality of training. In general, this coefficient, according to the author's proposal, should be equal to one (1) and be proportionally evaluated depending on the presence and activity of students' work at lectures k_1 and practical classes k_2, as well as k_3 – at consultations **(table 2**).

Listed in the **table 2** results cause very interesting and ambiguous conclusions even among the authors. It can be stated that the criterion system for assessing the quality of graphic works has been successfully tested, it helps to find different approaches to

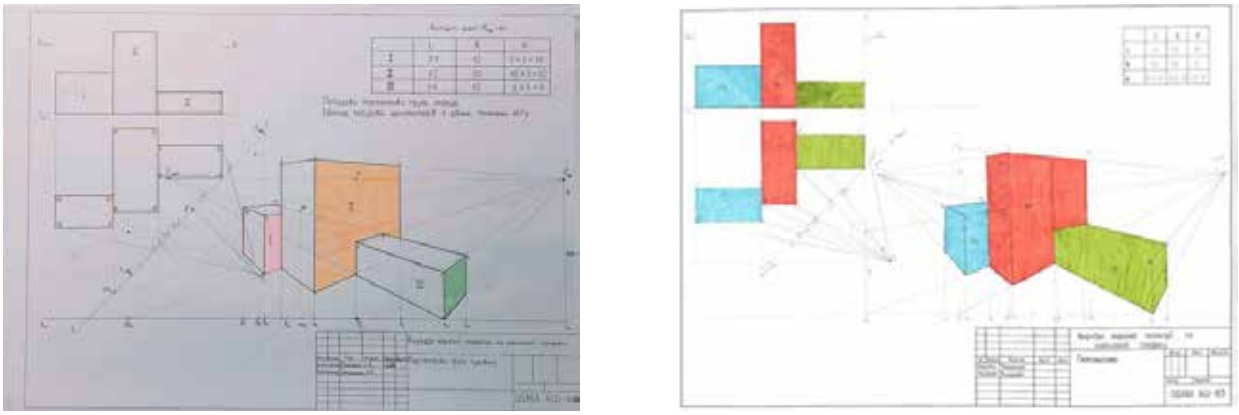


Drw. 1. Sample solution to the problems in descriptive geometry. Subject "Mutual intersection of polyhedral surfaces"



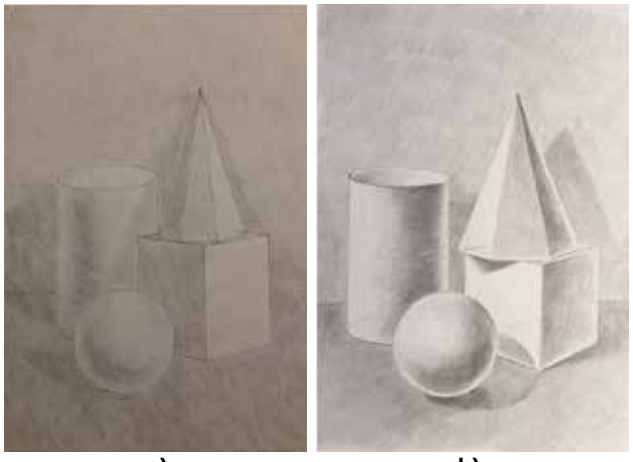
a) **b)**

Drw. 2. Examples of completing task in descriptive geometry. Subject "Mutual intersection of polyhedral surfaces" a) – in practical classes and b) – worked out with the help of feedback



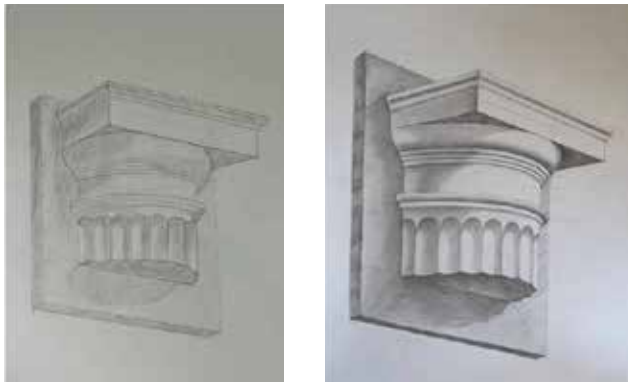
a) b)

Drw. 3. Examples of completing assignments task in descriptive geometry. Subject "Construction of a perspective image of a group of schematized buildings" a) – in practical classes b) – worked out using feedback



a) b)

Drw. 4. Examples of performing drawing tasks. Subject "Constructing a composition of geometric shapes in perspective with shadows" a) – in practical classes b) – worked out using feedback



a) b)

Drw. 5. Examples of completing drawing tasks. Subject "Construction of a fragment of the architectural structure Capitel in perspective with shadows" a) – in practical classes b) – worked out using feedback

Table 2

Comparative table of the influence of feedback channels on academic performance

	Group 1	Group 2	Group 3	Group 4	Notes
k_1	0,2**	–*	0,1	0,3	** Online classes
k_2	0,5**	0,4	0,4	0,4	** Online classes
k_3	0,3**	0,6	0,5	0,3	** Online classes

Notes. *1. * Lectures in the discipline "Drawing and Painting" are not provided for in the curriculum.*
2. The distribution of groups and the number of students is taken as in Table 1.
3. The generalization of the effect of coefficients on the quality of graphic works was evaluated based on the results of the authors' criterion system.

improving the teaching of graphic disciplines – and this is the subject of our further research.

Conclusions. The study of graphic disciplines contributes to the development of spatial imagination, constructive and geometric thinking, the ability to analyze and synthesize spatial forms. Mastering the methods of constructing various geometric spatial objects helps to obtain drawings as graphic models. Therefore, graphic training, the ability to correctly perform and read drawings is an important component in the education of architects, artists and designers Summing up, let's emphasize that the main direction of education reform at the current stage remains

the use of innovative learning technologies in the education system. One of the main tasks of the modernization of the higher education system is the introduction of modern forms and technologies of education based on research, including international ones. Professional competences are objectively necessary knowledge and skills caused by modern requirements for the future practical activities of the acquirers. From our point of view, the study of the impact on the quality of education as feedback, and many other important factors, is quite significant, so it is necessary to continue searching in this direction in the future.

REFERENCES:

1. Биркович Т.І., Варивончик А.В., Мазур Б.М. Особливості навчання студентів професійної майстерності в мистецьких закладах вищої освіти: *Питання культурології*. К.: 2021. №37. С. 103–113.
2. Bobek B. L.Teacher resiliency: a key to career longevity. *Journal of* Educational Strategies, Issues *and* Ideas *Ideas*. Athen: 2002. V. 75. С. 202–205.
3. Bredniova V. On the improvement of the methodology of engineer staff's graphic training on the basis of optimization of psychological and pedagogical approaches. Modern Tendencies in Pedagogical Education and Science of Ukraine and Israel: The Way to Integration. Ariel University. 2016. №7. С. 38–42.
4. Бредньова В.П. Нарисна геометрія. Конструктивні та прикладні задачі з елементами теорії: навч. посібник. Одеса: 2013. 196 с.
5. Бредньова В.П., Смичковська О.М., Прохорец І.М. Про підвищення ефективності професійної графічної підготовки студентів архітектурних і художніх спеціальностей. *Збірник наук. праць Херсонського державного університету «Педагогічні науки».* 2018. Вип. LXXXI, том 1. С. 131–134.
6. Бредньова В.П., Смичковська О.М., Прохорец І.М. До проблеми формування графічних компетенцій студентів архітектурних і художніх спеціальностей. *Науковий вісник Південноукраїнського національного педагогічного університету імені К.Д. Ушинського. Сер. «Педагогічні науки»*. 2018. № 1(120). С. 17–21.
7. Бредньова В.П., Прохорец І.М., Михайленко Е.В Research on the methodology of teaching graphic disciplines with the purpose of developing the creative potential of higher education students. *International scientific and practical conf. Pedagogy and Psychology in the Modern World*. Wloclawek, Republic of Poland. 2021. V. 2. P. 101–104.
8. Бредньова В.П., Яворська Н.М., Яворський П.В. Класичні задачі нарисної геометрії та їх застосування в архітектурно-художній практиці.. *Регіональні проблеми архітектури та містобудування: зб. наук. праць*. Одеса: 2021. №. 15. С. 152–160.
9. Бредньова В.П. Графічна освіта – важлива складова творчого професіоналізму митця в архітектурно-художній практиці. *Регіональні проблеми архітектури та містобудування: зб. наук. праць*. Одеса: 2022. №.16. С. 227–233.
10. Драч І.І. Компетентнісний підхід як засіб модернізації змісту вищої освіти. К.: Інститут інноваційних технологій і змісту освіти МОН України. 2008. Вип. 57. С. 44–48.
11. Коновець С.С. Особливості професійної підготовки викладачів образотворчого мистецтва у вищих навчальних закладах. *Вісник Львівської національної академії мистецтв*. Львів. 2011. № 22. С. 36–47.
12. Лаптон Е. Основи. Графічний дизайн 04: Нові засади. / Е. Лептон, Д. К. Філіпс. Київ: 2020. ArtHuss. 262 с.
13. Осередчук О. Модель моніторингу якості вищої освіти в Україні. *Витоки педагогічної майстерності*. Львів: 2022. № 29. С. 175–180.
14. Остропольська Є., Березовський Д., Хорошайло О. Інноваційні методики навчання студентів закладів вищої освіти в умовах дистанційної форми навчання. Наук. журнал*. IT Synergy*. К.: 2022. № 1. С. 63–75.
15. Удосконалення методології викладання графічних дисциплін для студентів архітектурно-художніх і будівельних спеціальностей: монографія / А.О. Перпері та ін. Одеса: ОДАБА, 2022. 181 с.
16. Якимович Т. Розробка критеріїв та показників оцінювання творчих робіт у контексті сучасних методологічних підходів. *Педагогічні інновації у фаховій освіті: зб. наук.праць.* Ужгород: 2016. Вип. 1 (7). С. 201–206.