

Stephaniya RYKHLINSKA
Boris PANKEVYCH Olga BARANETSKA
Department of Descriptive Geometry and Graphics
State University "Lviv Politechnic"

INFLUENCE OF CURRICULUM CONTENTS ON FORMING SOCIAL MOTIVES OF TEACHING

This work is devoted to working out of new in contents curriculum according to new typical teaching plans in graphical discipline with consideration of social and cognitive teaching motives. It is also devoted to investigation of psychological aspects of student's acception of Engineering and Computer Graphics bases. Carried out tests for revealing of student's spatial imagination allowed to work out new methodics of course teaching and to inculcate it on some faculties of university. The methodics includes into itself the course of lectures and variants of individual tasks to graphical and laboratory works.

The subject "Engineering and Computer Graphics" has clearly expressed professional purposefulness. Engineering Graphics together with special subjects has an aim to form in students the knowledge and the skills which are necessary for practical activity. There is a necessity to understand correctly and as more as possible to use numerous conventionalities on drawings such as designation of roughness surface, delineation and designation of threads, drawing up rules of typical details and other analogous special data. Without ability to read drawings there is no and can not be any professional preparation of future specialists. To imagine in details for oneself the volumetric shape of the delineating object on the drawing it is necessary at least three factors: systematic interpretation by the teacher the discipline materials; using of visual aids and practical work of students in individual tasks, including Computer Graphics.

All this in complex will allow to formulate good spatial imagination of students, to master graphic work technique and to take away the disproportion between large volume of course material, its labour-intensivity from one side and allocated time - from the other.

The disproportion between increasing knowledge volume which is to be learned and continually decreasing teaching terms directs teaching process on the intensification way. An Engineering Graphics teacher has a task to inculcate in students the skills of geometric constructing and to develop the spatial imagination necessary for studying more complicated special courses.

A wish to study Engineering Graphics is only there, where there is an inspiration which appears during successful solving of the problem, where there is an assurance of student in such success.

Assurance of most students in their knowledge and abilities is an important proof of methodic measures effectivity which take place in teaching process.

Possibility of preliminary projecting of teaching process and further recreation of project in a classroom allows systematicaly and consecutively to incarnate into practice planned aim.

The important instrument of operation by students teaching-cognitive activity in the computer technology conditions is Computer Graphics which creates extremely wide possibilities, beginning from quick-acting and ending by wide coloured and graphical possibilities. During Computer Graphics inculcation into teaching process some urgent need appears. This need is in revalue of methodics of Engineering Graphics teaching as original source of Computer Graphics.

Scientific, technical and social progress makes dependent transition on new contents of teaching progressive forms and methods of classes. It is favourable to new students understanding of social meaning of subject "Engineering Graphics", which has concrete embodiment in real life in learning and working activity thus autors have worked out new teaching program, which is directed to practical student's activity.

In the first place, the traditional methodics of Descriptive Geometry teaching is rather complicated. It is difficult to perceive it to students which have a low level of spatial imagination.

In the second place, the need of creating of modern textbook in Engineering Graphics has occurred. The textbook has to be based on the last scientific achievements of Geometry modelling branch, on the experience of leading professorships and on the demands of scientific and technical progress with consideration of discipline curriculum. And it (curriculum) has to be constructed in such way Computer Graphics to be taught together with Engineering Graphics where the hard parallel between the elements of space and graphic editor commands has to be conducted.

In the third place, it is necessary to make students familiar with scientific problems. The activeness of student, his desire to perceive more has decisive meaning and is possible only in that case when a student understands the necessity teaching of the discipline for the future professional activity.

Improvement of specialist's preparation quality to a great extent is defined by the organization of teaching process and demands forming of according discipline course. Course is to have general, logically connected structure which reflects the system of effective connections. It (this structure) allows to define it as integrated structure of technical delineation constructing, which units traditional and computer methods. The circle of necessary definitions is widened, traditional sequence and contents of graphical work is changed.

Analysis of problem situation defined the necessity of knowledge forming directed to their effective using as mean of solving different building problems, investigation and information transmission on geometric models, i.e. geometric modelling problems. That's why some changes were taken into contents of Descriptive Geometry and Engineering Graphics. Some chapter which seemed secondary became the mainest, the other relegate themselves to the background. For example, conception about tracks of planes, about perpendicularity and metric problems; curved lines and their projective peculiarities, curved surfaces, their formation; planes which are tangents to the surfaces, evolutions of surfaces are missed or partly missed (besides mechanical faculties) and exchanged by the other, more convenient for Computer Graphics means. From the other side, more attention is paid to the most common algorithm of geometric building, constructing of surface. During the reading of the lectures together with kinematic means the other ones of curved surfaces are taught. Special attention is paid to parameteric analysis and axonometrical projection, and methodics of Engineering Graphics teaching bases on demands of Computer Graphics.

The choosing of geometric problems during the contents formation of teaching programs depends on basic direction of specialist's preparation and psychological peculiarities of students of different faculties. It testifies about necessity of differentiated approach in teaching of Engineering Graphics, at least in the first adaptational period of teaching with aim of bringing up spatial thinking of students to necessary level of development.

Practical classes in Engineering Graphics begin from clearly practical problem, which could prove to students the necessity to master such knowledges. After that the abstract problems perceive as necessary, as such which richen the personal professional experience. The basis of teaching is a personal contact between student and teacher, classroom work, directed to improving of skills forming and drawing reading. During this it was taken into consideration that if students haven't perceived the logic of drawing formation, haven't got the skills of graphical activity, it is difficult to learn to read the drawings and descriptive geometry too much exchanging them by the work with computer keyboard.

During the forming of contents of practical tasks it was taken into consideration actual expenditures of time for their fulfilling and psychological peculiarities of students. According to this teaching program student fulfills all the volume of works practically in the classroom. Before it a teacher elucidates as far as creatively, logically and originally student has prepared to the work. Under the necessity, by the way of directing questions the teacher directs the student to rational and simple decision of set problem, to the correction of mistakes, creative valuation of the task and its logical completion. Creative activeness of student will display only in this case, when he values the mistakes himself and decides how to correct them. Teacher gives the necessary instructions in technique of drawing fulfilling and recommends the teaching and reference literature, necessary for the next stage of work, gives an appreciation of a student's work.

Deficiency of interest or stimulus is a reason of that why the student studies worse than his abilities allow.

There are another factors. For example, if the student cannot get the temp of teaching of material in the classroom, it depresses him. But if the temp is too slow, it is boring for student. Coursemates can influence the progress of their colleague. Longcontinued watchings students convincingly testify, that if very gifted student have friends among contemporaries, which are not interested in studying, he, maybe, feels that he is "forced" to learn worse.

Sometimes, the progress is worse than it could be and you should find the reasons of it deeper. For example, student's fear to not reach some level can make the student's progress worse. The first step to overcome it is to find stimulus of studying. For this it is necessary clearly to realize the aim of studying. But not always it is easy to understand as far as important to master some subjects.

Undoubtedly, not everything in the teaching process seems to student necessary, at least now. It's useful to explain to student that even general pieces of information in different subjects make rich the understanding of environment. Besides, the personal talents which were imperceptible to this moment may be opened. To master teaching process it is more easy when there is clear understanding that prize, which waits for you, is worth of your efforts.

Diligence, finding a motive for studying and cognition all these things are connected between themselves.

During this one should remember that valuation of student's knowledge has to be not an end in itself, but an element of future specialist preparation. Knowledge control has to be teaching, but not fixing, in its process the knowledge have to be enriched.

Psychological and methodological inspection of student, carried out the professorship of Descriptive Geometry and Graphics showed, that majority of students have no wish to fulfill the drawing by the manual way. The more so, that such drawings demands routine, uncreative work. Such work can be fulfilled quickly and qualify by the computer. It gives the possibility not only to form the delineation, but to edit in accordance with demands. Classes, connected with work on the computer, students attend with pleasure, they have any doubt in necessity of studying of such discipline as "Engineering and Computer Graphics".

Rationally prepared working program of teaching, successfully selected according to the contents and to the volume the graphic works allowed to lead up to optimum the quantity of manual work which does not pass the student's perception border and in the same time it teaches a student to work not only with computer but with the help of drawing instruments. "Computerization" of Engineering Graphics helps students to perceive the teaching material more easy, because it recreates on the monitor screen. The delineation on the screen can be operated, i.e. it can be perceived in orthogonal projections or in three-dimensional space, watching it in any foreshortening (as geometric body or surface), which develops student's spatial imagination and helps in solving of rather complicated problems of geometric modelling, projecting and so on. During the forming of teaching program contents it was taken into consideration all possible students to full themselves more sure working at the computer, and Engineering Graphics to became to them true "roadsign" in studying of graphic editor commands of some system (specifically of system Auto CAD).

Expediency of such teaching methodics is a result of such situation that practically the all volume of work according to the teaching program student fulfills in the classroom as laboratory works. It is impossible to fulfill it by the mediator. Such cases had place when the works fulfilled at home as graphic works. The fulfilling of homework is compulsory, but not as graphic part in the state of working drawing, but as drawing model with the certificate of dialogue in the view of some sequence of commands and commentaries to them. Having such certificate of dialogue student and teacher have a conversation from the point of the most rational using of graphic editor commands to construct the delineation on the monitor screen. They solve the problem of decreasing of machine time for its fulfilling and outputting of results on printer.

Drawing, which are fulfilled in the course of Engineering Graphics are orthogonal objects projections. Constructors documents mainly consists of such drawings. Paralelly the documents are rather often supplemented by the drawings of axonometrical projections that have in themselves two, three visible surfaces (it depends of point of view of watcher) which allow to imagine flat delineation of surfaces and to cast a glance at the whole object.

The constructing technique of visual delineations by the Auto CAD means is complicated. Complexity is limited by that the delineations of three-dimensional objects stays by its very nature flat drawing. After all both the screen where drawing is build and paper, on which is printed are flat, two-dimensional. The illusion of three-dimensional objects by graphic methods.

The possibility of numeral objection model getting is a main distinctive feature of Computer Graphics. In it is its principal distinguishing feature from the traditional "paper" drawing technology, where for description of object some orthogonal, axonometrical and slantangle projections and sections are forecasted. But there is no the only document which could describe the object thoroughly. In Computer Graphics such electron document is a numeral object model.

Simple idea of object model getting as sum of elementary solids lies in the basis of modelling. During it the sum accept there in algebraic interpretation: solids (graphic primitives) can be taken together or broken down. This is an idea of simple children constructor, which consists of wooden cubes, prisms, wedges and other geometric solids which allows to take up different complexities (fig. 1).

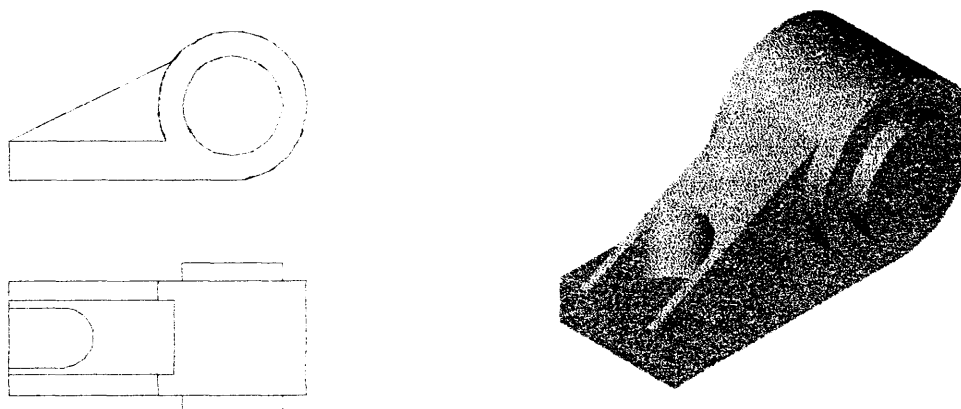


Fig. 1

Fig. 1

AutoCAD is the huge system with great possibilities. The experience of using it in teaching process testifies that it became a base on the way of mastering this powerful and convenient projecting system. Working systematically student will open for himself new possibilities, will improve acceptable for him technology, aproximating it to optimum one. Studying according to this teaching program will allow to student to understand clearly for himself its conceptional bases and, thus using it in all kinds of activity (from teaching to professional) will be for him simple and thrilling affair.

Such methodics of carrying out classes allows to form positive attitude of students to studying as to social important activity and to activate the teaching process.

ROLA TREŚCI PROGRAMOWYCH W MOTYWACH NAUCZANIA

Autorzy są nauczycielami akademickimi w Katedrze Geometrii Wykreślnej i Grafiki Politechniki Lwowskiej. W artykule omawiają programowe wyznaczniki przedmiotu „grafika inżynierska i komputerowa”, który w nowy sposób ustawia dydaktykę geometrii wykreślnej i rysunku technicznego.