**Scientific Electronic Archives**
*Issue ID*: Vol.18 (4), July/August 2025, p. 1-6
DOI: http://dx.doi.org/10.36560/18220252092
ISSN 2316-9281
+ Corresponding author*:* jelisavka.bulatovic@gmail.com

# Forms of work in teaching - the field of information technology: a case study

Jelisavka Bulatovic [1+]
[1] Academy of Technical - Art Professional Studies, Belgrade, Serbia

**Abstract.** Forms of work in teaching differ in their method of implementation and elements which they possess and the choice of their use is chosen depending on the appropriateness of the situation, i.e. each form of teaching the teacher implements in his work depending on the content he teaches, the possibilities and resources he has for the implementation itself, the content and activities thatthey are found in the content itself and the level of motivation and cooperation of the students themselves.The paper discusses and explains the possibilities of forms of work in teaching in which the students of the Academy of Technical - Art Professional Studies in Belgrade participated. It's not just the classroom environment that's changing, either; instructors and educators alike have to change their methods of teaching to match the new ways in which students prefer to learn.
**Key words:** Teacher, students,information technology, forms of work, survey.

## Introduction

Teaching forms of work mean didactic communication strategies of students and teachers that enable and facilitate the learning process (Hirst, 1971). In the international literature, the forms of work are most often divided according to the activity and the number of students with whom one works during classes. These are: frontal form, group form (including pair work and team work) and individual form of work (see Brownand Hilferty, 1986; Rowan,1994; Brodie et al, 2002; Geerincket al, 2010). The frontal form of work (the teacher's presentation towards which the students are oriented) has become dominant and ubiquitous. Teachers use this form when introducing students to new material, when summarizing old material, and when detailed clarification of facts and conclusions is necessary. The most significant advantage of the frontal form is its economy: all students receive information simultaneously. The biggest weakness of the frontal form is the unidirectional nature of the teacher-student relationship (see Apple 2012; Yakovlevaand Yakovlev, 2014; Slemp et al,2020). The nature of this relationship ignores the interactive, social nature of learning and can impoverish the entire network of communication. For this reason, it is necessary to limit the use of this form. Group work includes direct, two-way interaction between all participants in the class, which is achieved by dividing into smaller or larger work groups or by organizing a group discussion.In pair work, students who have a common task cooperate and necessarily adapt to each other. The very dynamics of group work can lead to stagnation, for example, when weaker students rely too much on more capable ones or when individual students are too sensitive (Selvaraj et al, 2021; Paulsrudand Nilholm, 2023). The individual form of work is simply the independent work of students on concrete tasks in class. Students can work at their own pace, using their energy and time freely. The advantage of this form is the improvement of personal organizational skills, critical thinking, the application of various knowledge, the acquisition of responsibility and the ability for self-evaluation.A major objection to the individual form, as well as the frontal, is the lack of social interaction. In order for teaching to be effective, the teacher must coordinate all possible forms well and use them in approximately equal amounts (Bahodirovich and Romilovich, 2021; Walsh,2022; Cusipaget al,2024).

## Analysis and Discussion

Students of the Academy of Technical - Art Professional Studies in Belgrade participated in the survey of this research: first-year students at the design department, second-year students at the management department and third-year students at the textile department for the purposes of the publication "Teaching aids in the teaching of informatics and computer science". Due to the incompleteness of the data in this text, we provide only partial results, which refer to " Forms of work in

teaching - the field of information technology: A case study ". For the purposes of this research we relied on many years of experience of the author of these lines in conducting survey research (see Bulatovic, 2008; Bulatovic,2011;Bulatovic,2013; Rajovic and Bulatovic, 2016; Bulatovic and Rajovic, 2018; Bulatovic and Rajovic, 2022).The sample included 42 students at the Department of Design, Textiles and Textile Engineering in the 2021/22 school year. The questionnaire contained eight questionswith the aim of determining which forms of work are most often used in the teaching of information technology,according to the opinion of the students.The technique of systematic observation, which falls within the scope of the descriptive method, was used for the purposes of this research. Within the observation unit, the introductory, central and final part of the lesson was observed. The following are questions and answers from students in the survey.

*How are classes in your department?*

28.7% of students answered under a) The teacher teaches the lesson, and we listen; Under b) The teacher teaches the lesson with the help of videos and computers, 44.9% of respondents answered; 26.2% of respondents answered under c) we work in a group.

One of the basic problems of teaching, the insufficient motivation of students, can be overcome by careful planning of teaching activities and by directing them to work and learning through situations in which students can safely accomplish the intended tasks.It is especially important that the achievements of students are reflected in the development of thinking abilities, and not only in the reproduction of knowledge, which is why students must be given the opportunity to acquire knowledge in an environment that encourages research activities and creativity in work. With a new approach to learning, the correct choice of methods, forms of work and the use of the possibilities of educational technology in teaching, it contributes to the acquisition of permanent knowledge and the development of abilities for further learning (see Caspersen et al,2018; Caspersen et al,2019; Oshanova et al,2021; Mukhabbat, 2023).

*We work in pairs:*

84.7% of respondents answered under a) when we renew the lesson; the other 15.3% gave the answer when we learn new material under b).

The results of the work brought Simon and his associates (see Simon and Forgette-Giroux, 2000; Simon and Johnson, 2008; Simon and Richardson, 2009) to the conviction that working in pairs shows extraordinary effects, both qualitatively and quantitatively. Students in pairs can master the teaching material gradually, as it suits both the student and the other pair.Cooperation in pairs helps isolated and withdrawn students to become more actively involved in educational work. Two students team up and do the same or similar tasks, under uniform working, spatial, temporal and material conditions.

*When we work in pairs, we share:*

37.1% of respondents answered under a) According to the seating arrangement; 4.6% answered under b) Random selection method; 29.8% claimed under c) As anyone wants; 4.7% of respondents answered under d) By gender structure; 23.8% stated under e) How the teacher arranges and under.

This form of work achieves active learning through interaction. The student is therefore fully active during class. Also, in addition to the knowledge presented in class, the student acquires other socio-intellectual skills, such as: formulating one's own position so that others can understand it, listening carefully to another person, leading a dialogue, asking questions, spotting ambiguities (not) changing one's opinion due to pressure, getting feedback (see Gillies, 2003; Mion et al, 2009; Cohen & Lotan, 2014).

*When solving tasks (when working in pairs):*

13.4% of respondents answered under a) We agree on who will do what; 86.6% gave the answer The teacher determines who will do what under b).

Pair work is a cognitive, emotional and social encounter between two students. Partners help each other, find support in each other, encourage and correct each other. In that dialogue, they are alternately in the position of subject and object, confronting attitudes that contribute to expanding and deepening their knowledge. The partners emerge from the dialogue strengthened both emotionally and intellectually. Working in pairs allows the members to fully express themselves, which is not possible in face-to-face teaching. Both students can communicate very actively, participate in interactions (see Porter et al,2011; Ekborg et al,2013).

*When you do a task alone, the task is:*

18.7% of students answered under a) Difficult and I can't solve it; Under b) With the help of the teacher, I manage to solve it, 62.6% of respondents answered; 18.7% of respondents answered under c) It is not difficult for me, I solve it quickly.

Field & Leicester (2003) show that the use of different learning strategies is highly related to the quality of learning and academic outcomes, and on this basis adds that students must master different learning strategies and must know when the application of certain strategies is most effective. Research in the world shows that one of the key problems of education is precisely the ability of students to choose, combine and coordinate the use of different learning strategies in an effective way (Alonso et al, 2005). The formation of IT skills for independent work in class implies a transition from copying and reproductive actions of students to productive and independent work.The process of developing IT skills for independent work should not only be led by the teacher, but should

also be under constant control on his part. The formation of IT skills for independent work is one of the necessary conditions for further personal development, the development of IT education and self-education.

*When we are working on the lesson, I would like to:*

The respondents gave the following answer to this question: Under a) I prepare the presentation myself and act as a teacher 14.2%; Under b) Let's divide into groups in which each group will present its task at the end of class 27.7%; Under c) We work in pairs 12.8%, Under d) The teacher teaches a lesson 45.3% .

Starting from the understanding that the teacher influences student motivation with everything he does in the classroom, starting from the way he communicates with students and the emotional climate he creates in the classroom, through the choice of didactic-methodical solutions, to the way of evaluation. Students emphasize the importance of the teacher's actions aimed at understanding the material, planning and allocating time for learning. Therefore, it is about the teacher's actions that are aimed at reviewing the possibilities of the students themselves and different ways of working during learning and teaching while supporting and encouraging the student's independence on the cognitive level.

*When we renew the material, I would like to:*

Under a) 52.4% of respondents answered that it should be a quiz competition; 21.9% of respondents answered under b) We use the computer and answer the teacher's questions; 19.6% claim under c) We conduct the lesson through conversation and under d) I solve the knowledge test, 6.1% of respondents answered.

A quiz, as one of the ways of organizing a team competition, can be used to encourage different activities of students and their thought processes. Apart from competition between groups, this form of work can also include elements of cooperation on joint tasks within groups. For the implementation of the quiz, content from the teaching of information technologies can be selected, as it is suitable for connecting various school and extracurricular knowledge and experiences. As Gardner (1983) himself states, intelligence is based on the information content that exists in the world: numerical information, spatial information, and so on.Accordingly, they are divided into musical-rhythmic, visual-spatial, verbal-linguistic, logical-mathematical, bodily-kin-esthetic, interpersonal, interpersonal, naturalistic and existential intelligence. With that in mind, curricular and extracurricular school activities should be created in such a way as to influence the development of each of the aforementioned intelligence's.In other words, what teaching in schools lacks are activities that engage students in multiple ways and match their abilities, affinities, and learning styles, developing whole and versatile personalities. Taking all that into account, a multimedia quiz based on STEAM education can represent an adequate combination of all the above, and could be part of the answer to the set requirements and a solution to some of the aforementioned dilemmas.In addition to composing interesting and diverse questions, particularly important problem situations and creative challenges from the STEAM field - mathematics, art, natural sciences... creating a quiz also involves creating a multimedia presentation and preparing materials for practical work. In addition, the organization of the competition itself, the management of the program and the operational part of the quiz improve the entrepreneurial, as well as the social, digital and communicative competences of teachers and students (see Gardner,1983;World Economic Forum, 2015).

*How do you imagine ideal teaching?*

To the last question asked in the survey, the following are the respondents' answers: Under a) With a lot of interest 54.1%; Under b) Watching a movie 8.7%; Under c) That together with the teacher we work on the lesson 36.3%; and under d) Other 0.9% .

For many students, only studying is something they would rather avoid and spend that time in a different way. The specific problem is that education lags behind the times we live in, and some understandings and values have stopped developing and remained at a level that would correspond to the 20th century. Creativity in the curriculum is the main problem faced by countless Academies around the world, which greatly suppresses the talent and motivation of students to work. We could change this status, as emphasized by Novakov (2019) referring to the researches of Metcalf (2017), Cain (2013) by giving schooling a completely new form that includes: thinking (the teacher's thinking about how to 'package' and present the content to the students is of key importance for the process of innovative learning); Self-reflection (This is very important for a serious profession like this, because it can provide an opportunity for teachers to look at their entire work, to know what brings results, and on the other hand, what needs to be worked on and what needs to be improved); Ask open questions (Through this way of working, students become more aware of their potential, which they had not discovered until then, and create connections with other students) based on the various stories and understandings presented;Flexible places to work (Newspapers and progress in the school system should accompany the classrooms themselves, and provide students with the opportunity for independent work, but also for better communication with their peers. Unfortunately, the space of many classrooms is still poorly concentrated, which leads to difficult monitoring of classes); Problem-finding (In this way, teachers can provide students with the opportunity to think deeply, ask critical questions, and apply creative problem-solving methods);Success does not always come from the first (When students are

not aware of the existence of failure in their work, the development of their personality and the entire educational system is suppressed); 'Flipped' classroom (The time spent in class is designed for activities such as group discussions, group work as well as independent learning. According to the Flipped Learning Network, 71% of teachers, who implemented this learning method, saw that student grades actually improved );Involve other people in classrooms (Technology, which is advancing at a tremendous speed, is also a way to connect various entrepreneurs and innovators in one classroom, which would "refresh" the boring look of the traditional school class. This can be done through live interaction, via the Skype application, as well as many other ways); Design Thinking Process (Represents a set of structured strategies that identify challenges, gather information, generate potential solutions and refine ideas and test solutions. I have a challenge - How do I approach it? I learned something - How do I present it to people? I see an opportunity - What can I do create? I have an idea - How do I work on it? I tried something new - How do I make it come to life?) (see Novakov,2019).

**Conclusion**

Our research record, based on similar research by Somekh et al (1997), Dede (2008), Bhakta and Dutta (2016), points to the following conclusions:

1. One of the important questions that arise as part of didactic and the actual implementation of classes concerns the question of how to achieve the content of classes and achieve learning outcomes, for which forms of work are used in classes. It is important to become familiar with the types of forms of work in teaching, their purpose and contribution to the teaching itself, the teaching process, and how a particular form of work reflects on the students' knowledge.

2. The sample included 42 students at the Department of Design, Textiles and Textile Engineering in the 2021/22 school year. The questionnaire contained eight questions with the aim of determining which forms of work are most often used in the teaching of information technology,according to the opinion of the students.

3. The analysis of the survey indicates that 44.9% of respondents to the question of how classes are conducted at your department answer that the teacher teaches the lesson with the help of video-beams and computers. 84.7% of the respondents emphasize that they work in groups when revising the lesson. When they work in pairs, 37.1% of respondents answered that they sit according to the seating arrangement, that is, 23.8% of them state how the teacher arranges.

4. In solving tasks (when we work in pairs), partners help each other, and they come out of the dialogue strengthened both emotionally and intellectually. Working in pairs allows the members to fully express themselves, which is not possible in face-to-face teaching. 86.6% of respondents answered that the teacher determines who will do what. When we do the task alone, according to the majority of respondents, 62.2% of them manage to solve it with the help of the teacher. Research in the world shows that one of the key problems of education is precisely the ability of students to choose, combine and coordinate the use of different learning strategies in an effective way.

5. Students emphasize the importance of the teacher's actions, which are aimed at understanding the material, planning and allocating time for learning. For example, when a new lesson is being taught, 45.3% of respondents would most like the teacher to teach the lesson, and 27.7% to divide into groups in which each group will present its task at the end of the lesson. When renewing the material, the respondents would most like it to be a quiz, 52.4% of respondents, while 21.9% answered that they answer the teacher's questions with the help of a computer. Taking all that into account, a multimedia quiz based on STEAM education can represent an adequate combination of all the above.

6. For many students, studying itself is something they would rather avoid and spend that time in a different way. Creativity in the curriculum is the main problem faced by countless Academies around the world, which greatly suppresses the talent and motivation of students to work. So the response of the respondents is not surprising: with a lot of interest 54.1%, watching a movie 8.7%, that together with the teacher we work on the lesson 36.3%; and under Other 0.9%. 'Flipped' classroom (The time spent in class is designed for activities such as group discussions, group work as well as independent learning. According to the Flipped Learning Network, 71% of teachers, who applied this learning method, saw are that student grades have actually improved).

Quality teaching consists exclusively of the teaching process, the teacher and the student. For this reason, it is important that effort and commitment are invested by both parties, that is, that students make the best use of their competences and knowledge, while it is up to teachers to provide students with the best possible conditions for the realization of the process itself. The professional references of the teachers themselves should certainly be included (Bulatovic, 2002; Bulatovic, 2011a; Bulatovic, 2011b; Bulatovic, 2013; Bulatovic, 2024.). In this way, we create a

pleasant and high-quality climate for learning and work. The responsibility for implementing the professional development of teachers lies with the educational institution where the teacher works and the professional team of the said institution. Of course, the institution's activity itself is sometimes not enough, therefore it is important to encourage teachers to independently learn about forms of work.

**References**

HIRST, P. H; What is teaching?. *Journal of Curriculum Studies,* v.3*,* n.1, pp. 5-18.1971.

BROWN, J. D; HIFLERTY, A; The effectiveness of teaching reduced forms of listening comprehension. *RELC journal*, v.17, n.2,pp. 59-70.1986.

ROWAN, B; Comparing teachers' work with work in other occupations: Notes on the professional status of teaching. *Educational Researcher*, v. 23, n.6, 4-17.1994.

BRODIE, K; LELLIOTT A; DAVIS, H; Forms and substance in learner-centred teaching: Teachers' take-up from an in-service programme in South Africa. *Teaching and teacher Education,* v.18, n.5, pp. 541-559. 2002.

GEERINCK, I; MASSCHELEIN, J; SIMONS, M; Teaching and knowledge: A necessary combination? An elaboration of forms of teachers' reflexivity. *Studies in Philosophy and Education*, n. 29,pp. 379-393.2010.

APPLE, M. W; Controlling the work of teachers. In *Knowledge, Power, and Education,*pp. 116-131, Routledge.2012.

YAKOVLEV, N. O; YAKOVLEV, E. V; Interactive teaching methods in contemporary higher education. *Pacific Science Review,* v. 16, n.2,pp. 75-80.2014.

SLEMP, G. R; FIELD, J. G; CHO, A. S; A meta-analysis of autonomous and controlled forms of teacher motivation. *Journal of Vocational Behavior*, n.121*,* pp.103459.2020.

SELVARAJ, A. M; AZMAN, H; WAHI, W; Teachers' Feedback Practice and Students' Academic Achievement: A Systematic Literature Review. I*nternational Journal of Learning, Teaching and Educational Research,* v. 20, n.1. pp. 308-322. 2021.

BAHODIROVICH, O. J; ROMILOVICH, B. R; Project for training professional skills for future teachers of technological education. *Mental EnlightenmentScientific-Methodological Journal*, pp. 139-150. 2021.

PAULSURD, D; NILHOM, C; Teaching for inclusion–a review of research on the cooperation between regular teachers and special educators in the work with students in need of special support. *International Journal of Inclusive Education,* v. 27, n. 4, pp. 541-555. 2023.

WALSH, T; 'Promoted widely but not valued': Teachers' perceptions of team teaching as a form of professional development in post-primary schools in Ireland. *Professional Development in Education,* v. 48, n. 4, pp. 688-704. 2022.

CUSIPAG, M. N; OLUNYKA, S; BERNABE, M. T. N; BOGNOT, F. L; Perceptions toward achieving work-life balance and job satisfaction in online teaching. *Multidisciplinary Science Journal*, v. 6, n.1, pp. 2024012-2024012. 2024.

BULATOVIC,J; Computer software and their application in design, textile technology and management.*Tekstilna industrija*, v. 56, n. 10-12, pp. 25-28.2008.

BULATOVIC,J; Key Issues in Information Systems Management: A Serbia Perspective (Delphi study). *Global Journal of Computer Science and Technology*, v. 11, n.19, pp. 35 -50. 2011.

BULATOVIC,J;Demographic Differences and Professional Stress of College Employees: A Case Study in Serbia, *Kultura i Edukacja*, v. 5, n. 98, pp. 153-184. 2013.

RAJOVIC,G; BULATOVIC,J; Quality of life in rural villages of Montenegro - Gnjili Potok and Vranještica: Case study,*Scientific Electronic Archives*, v. 9, n.2, pp. 24 - 35. 2016.

BULATOVIC,J; RAJOVIC,G; Environmental Awareness Population in City Municipality of Zvezdara (Belgrade) - for the Sustainable Zvezdarske Forest.*World News of Natural Sciences*, n. 16, pp. 1-17. 2018.

BULATOVIC,J; RAJOVIC,G;Casestudy of raccretional fishing in Rajova (Rajovic) River (Montenegro) preliminary research - Part II.*Larhyss Journa*l, v. 51, pp. 31 - 41. 2022.

CASPERSEN, M. E; GAL-EZER, J; McGETTRICK, A; NARDELI, E; Informatics for all the strategy. *ACM*. 2018.

CARPESEN, M. E; GAl-EZER, J; McGETTRICK, A; NARDELI, E; Informatics as a fundamental discipline for the 21st century. *Communications of the ACM*, v. 6, n.4, pp. 58 -58. 2019.

OSHANOVA, N. T; BUKANOVA, A. K; KAZHIAKPAROVA, Z. S; SALBYROVA, M. T; SHARMUKHANBET, S. R; Training Future Computer Science Teachers in the Context of Digitalisation Based on the" History of Informatics" Course. *World Journal on Educational Technology: Current Issues*,v. 13, n.3, pp. 354 -369. 2021.

MUKHABBAT, K; Importance of Teaching Computer Science. *Innovative Science in Modern Researc*h,pp. 70 - 71. 2023.

SIMON, M; FORGETE-GIROUX, R; Impact of a content selection framework on portfolio assessment at the classroom level. *Assessment in Education: Principles, Policy & Practice*, v. 7, n.1, pp. 83 - 100. 2000.

SIMON, S; JOHSON, S; Professional learning portfolios for argumentation in school science. *International Journal of Science Education*, v.30, n.5, pp. 669 - 688. 2008.

SIMON, S; RICHARDSON, K; Argumentation in school science: Breaking the tradition of authoritative exposition through a pedagogy that promotes discussion and reasoning. *Argumentation*, n. 23 ,pp. 469 - 493. 2009.

GILLIES, R.M; Structuring cooperative group work in classrooms. *International Journal of Educational Researc*, v. 39, n.1 - 2, pp. 35 -49.2003.

MOIN, L. J; MAGIERA, K; ZIGMOND, N; Instructional activities and group work in the US inclusive high school co-taught science class. *International Journal of Science and Mathematics Education*, n. 7, pp. 677 - 697. 2009.

COHEN, E. G; LOTAN, R. A; Designing groupwork: strategies for the heterogeneous classroom third edition. Teachers College Press.2014.

PORTER, L; BAILEY LEE, C; SIMON, B; ZINGARO, D; Peer instruction: Do students really learn from peer discussion in computing?. *In Proceedings of the seventh international workshop on Computing education research*, pp. 45 - 52.2011.

EKBORG, M; OTTANDER, C; SILFEVR, E; SIMON, S; Teachers' experience of working with socio-scientific issues: A large scale and in depth study. *Research in science education*, n. 43, pp. 599 - 617. 2013.

FIELD, J;EICESTERL, M (Eds.); Lifelong learning: Education across the lifespan. Psychology Press. 2003.

ALONSO, F; LOPEZ, G; MANRIQUE, D; VINES, J.M; An instructional model for web-based e-learning education with a blended learning process approach. *British Journal of educational technology*, v.36, n.2, pp. 217-235.2005.

GARDNER, H; Frames of mind: The theory of multiple intelligences. Basic Books. New York.1983.

WORLD ECONOMIC FORUM; *New vision for education: Unlocking the potential of technology*. British Columbia Teachers' Federation. 2015.

NOVAKOV,S;Ten ways to make teashing intereseting. Available at:https://www.nauci.me (08.10.2023). 2019.

METCALFE,J;Learning from Errors.*Annu Rev Psychol*, v. 3, n.68, pp. 465-489. 2017.

CAIN,S;Quiet: The Power of Introverts in a World That Can't Stop Talking. New York Times Bestsellers. 2013.

SOMEKH, B; DAVIS, N. (Eds.); Using information technology effectively in teaching and learning: Studies in pre-service and in-service teacher education. Psychology Press.1997.

DEDE, C; Theoretical perspectives influencing the use of information technology in teaching and learning. International handbook of information technology in primary and secondary education, pp. 43 - 62.2008.

BHAKTA, K; DUTTA, N; Impact of information technology on teaching-learning process. *International Research Journal of Interdisciplinary & Multidisciplinary Studies*,v. 2, n.11, pp. 131-138. 2016.

BULATOVIC,J; Analysis and software suggestion for project management of introducing information system (IS).*Management - journal for management theory and practice*, v. 7, n. 26, pp. 80-87. 2002.

BULATOVIC,J; Application of Method of Financial Risk in Serbian Companies - Survey Sample Company, *International Journal of Economics and Financial Issues*, v. 1, n. 2, pp. 54-73.2011a.

BULATOVIC,J;Analysis and risk assessment resources planning project introducing information system. *International Journal of Business Continuity and Risk Management*,v.2, n.2, pp. 105-138.2011b.

BULATOVIC,J;Identification of risk factors that have significantly different degrees of impact on the introduction of IS, a project with virtual teams than traditional project teams: a Serbian perspective. *International Journal of Business Continuity and Risk Managemen*t, v.4, n 3, pp. 189 - 210. 2013.

BULATOVIC, J; Interview as a research method in teaching: a case study. *Scientific Electronic Archives*, v. 17, n.3, pp. 1 - 8. 2024.