BOOSTING EFFICIENCY OF PROJECT-ORIENTED TEACHING AND LEARNING THROUGH CLASSROOM MANAGEMENT AND ONLINE TESTING

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Abstract. A set of classroom management and testing policies was elaborated and, after two years of piloting, it was further developed and administered to 247 students at the Faculty of Mathematics and Informatics, Plovdiv University "Paisiy Hilendarski". The main purpose of this effort was to enhance the efficiency of project-oriented teaching and learning. The findings confirmed the positive outcome of this approach and the potential to be successfully applied to traditional classroom settings.

Keywords: classroom management, project-oriented learning, The Common European framework of reference for languages: learning, teaching, assessment, testing

Theoretical background

Contemporary cognitive theory studies no longer regard learning as a passive process of knowledge accumulation, but rather as a process of dynamic construction of internal knowledge representation, individual interpretation and processing of current experience. (Tsvetanska, 2006, p. 167) For this reason, over the last decade there has been a dramatic change which has affected not only the teaching methods and techniques of in higher education, but also the work of teachers/tutors, as well as students' expectations and requirements. The English language curriculum at the Faculty of Mathematics and Informatics (FMI) of Plovdiv University Paisiy Hilendarski has also undergone such smooth change. Instead of the traditional teaching of knowledge which requires memorizing and repeating, a modern educational institution should provide knowledge about the method - mastering learning strategies based on performance and individual expression. (Tsvetanska, 2006, p. 159)

According to experiential education proponent John Dewey (Dewey, 1941, p. 26), considered a reformer in teaching, education is perceived by the student's experience and what s/he learns from their environment rather than by previously formally structured subjects. The overall experience of the learner forms the curriculum, and that is what has the greatest value in the process of learning. Therefore, a developing education essential prerequisite is learning by doing or the process of gaining knowledge through experience. It is Dewey who first spoke about active methods of learning that are associated with the so-called active learning. It stimulates learners do more than just

receive information from a teacher or textbook and memorize and repeat it. (Gyurova et al., 2006, p. 176)

Stemming from these new theories is the need for a new approach towards education and classroom management, and reconsideration of traditional models. Thus, the methods of active and interactive learning appeared. Active learning is learning based on questions. It is a process of change - through different states, experiences, stages of searching, and self-discovery, rather than learning (memorizing) facts and important conclusions made by somebody else in another time and under different conditions. In the active learning paradigm, the basic idea is adopting theories and concepts through student's involvement in problematic situations, case studies, simulation games, and work in small groups. Therefore, many techniques that stimulate the activity of the learner are engaged within its framework. (Tsvetanska, 2006, p. 162)

On the other hand, education in an interactive learning environment also has a number of indisputable advantages. Interactive classroom management requires that knowledge learning, formation of skills, attitudes building, provocation of independent thinking, and personal development happen simultaneously. Furthermore, the interaction realized in the learning process is not merely between teachers/tutors and trainees but between trainees themself, where they learn from each other's previous knowledge and experience. From passive consumers of already existing ideas and truths, students become active partners of the teacher and create their own knowledge. What is more, teachers/tutors themself are participants in the process of group learning and development - they are open, flexible, sensitive to others, able to cope equally well with academic challenges and the pedagogical and life aspects of the educational environment and interaction. A peaceful, positive and stimulating learning environment is maintained, as well as effective feedback.

It is necessary to distinguish active and interactive teaching methods when we consider effective classroom management. Active methods place the learner in active learning position where s/he can acquire knowledge themselves. Interactive methods, in turn, require association with a particular group; they suggest an interaction with other learners and dialogical communication with these learners, which is extremely useful when learning a foreign language, e.g. English.

English teaching at FMI certainly has an established history. But the rapidly changing socio-economic conditions imposed a serious and thorough reconsideration of this activity. The English teacher's most important task is to place students in a situation where they can reflect on their experience so that it becomes an effective, usable knowledge. The teacher/tutor should try to create a positive and supportive learning environment, motivate students to take an active role in the learning process, and provoke their interest not to memorize the textbook material but to study the subject themself and discover the knowledge and skills that will be useful to them.

Among methods offering highest levels of interactivity (case studies, project work, role plays, discussions, and working in small groups) teachers of English at FMI have chosen as most effective project-oriented teaching enhanced by trainer-developed tests. In comparison with traditional teaching tools such as teacher-centered lectures, etc., the use of interactive methods in much greater extent provokes students to communicate with each other as each of them is free to seek information and interaction with a chosen partner in order to succeed in the implementation of the learning tasks.

V. Gyurova and co-authors (2006, p. 43) outline two types of interactive classroom management systems - systems based on technology and people-oriented systems. Contemporary educational practice aims at integrating the capabilities of both types of interactive techniques to increase the participation of learners. Technology-based systems rely on the use of various technical means such as computer products and technology, electronic books, videos, etc. Their goal is to create an environment that supports learning. People-oriented learning systems are based on the feedback and direct communication between the participants in the learning process. The goal here is to establish active contacts between students who share information based on their past experiences. English language teaching at FMI has established an effective symbiosis between the two systems. Students' excellent command of Information Technology allows the use of technology, while the teacher builds a creative environment for direct communication and discussion of the course content.

Placing students in small groups is another successful classroom management technique in English language teaching at FMI. This is the most adequate learning environment as it offers more opportunities for decentralized cooperation, more local autonomy and diversity. Since 2001, when the Common European Framework of Reference for Languages (CEFR) came out, there have been some regulations which help teachers adequately determine each student's level of proficiency in English. Thus, a curriculum is developed according to the group's needs and the use of the appropriate interactive method complies with the students' skills. The group work, combined with the right amount and type of individual work and the assessment in English classes at FMI are all aligned with the Common European Framework of Reference for Languages (CEFR).

FMI language classroom policy

The process of teaching English at the Faculty of Mathematics and Informatics is founded on the redistribution of students from administrative groups into language groups. In the administrative groups all the students from a given speciality, or programme, are assigned, depending on their faculty numbers, to groups 1, 2, 3, etc. In contrast, language groups are formed on the basis of the students' knowledge and skills in English and thus the groups respectively become A, B, C, etc. as shown in Figure 1.

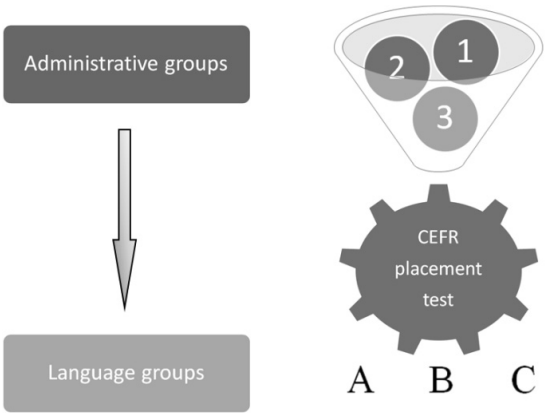


Figure 1. Language placement procedure at FMI

This redistribution is made by means of placement tests administered online. The multiple choice QPT (Quick Placement Test, 2001) is most handy – it takes only 30 minutes and the scores are mapped against the Common European Framework of Reference for Languages (CEFR). There are a host of other placement tests, some available for free. In accordance with the CEFR, learners can be divided into three main categories: A – Basic User, B – Independent User, and C – Proficient User. These three divisions can be further subdivided into six levels as follows:

- A1 Breakthrough or beginner
- A2 Waystage or elementary
- B1 Threshold or intermediate
- B2 Vantage or upper intermediate
- C1 Effective Operational Proficiency or advanced
- C2 Mastery or proficiency.

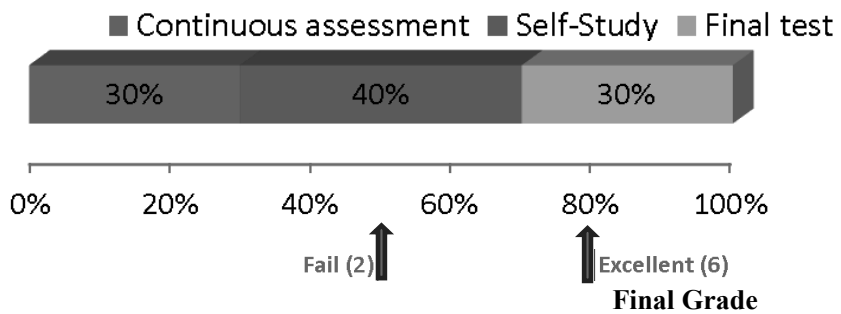
After the students at FMI are redistributed into language groups of the same level, they are given a language needs analysis questionnaire and then are informed about the teaching materials they will be using during the two trimesters of studies and the basic rules for forming the final grades in English. The educational policy at FMI is for continuous assessment in English in which students are examined continuously during their language education instead of sitting for a test during their exam session.

The final grades of this discipline are formed on the six-point scale at the end of the course based on the average of the two grades for the two trimesters of English studies, each of which is formed as follows:

- continuous assessment (tests or other assignments during the course which account for 30% of the final grade)

– individual work (project assignments during the course - 40% of the final grade), and
– exams (during the last week of each of the two trimesters a test is given covering all the material studied until then and it represents 30% of the final grade).

Then the students are informed of their so formed final grades, cf. Figure 2, which are entered in the examination records and in the students' books.



Final Grade

Figure 2. Grading Policy at FMI

This diagram is illustrative – grading policies may vary between teachers from other departments or universities who wish to adopt it for their own use. The full text is available on http://english.shotlekov.net/ to ensure transparency and integrity in teacher-student relations. Trainees can refer to it as necessary and it reassures them the subjective components in assessment and evaluation have been reduced to a minimum because of quantified criteria for the grading components.

All the students who have not received a passing grade at the end of the course are given a second chance to retake the final exam which tests all of the covered material during their English studies. The grades obtained from the students' continuous assessment and individual work remain as they were at the end of the course and cannot be changed. The updated final grade is then recalculated in accordance with the basic grading scheme: continuous assessment 30%, individual work 40%, and exam results 30%.

Students who studied at another higher education school before being admitted to Plovdiv University can have their grades in English recognized. This grade recognition is based on the academic transcript of the university where the student was taught before, with a minimal workload as follows:

– For full time students majoring in Mathematics, Applied Mathematics, Business Mathematics and Mathematics and Informatics, 100 academic hours are required.

- For full time students majoring in Informatics the required number of academic hours is 100, and respectively 50 hours for part time students of the same speciality.
- For full time students majoring in Business Information Technologies are required 80 academic hours and respectively 50 for part time students.

In case the workload was smaller or in the absence of a grade in English, students are awarded the following final grades:

Satisfactory 3, or they sit for an examination and obtain a grade on the basis of the language level demonstrated:

- A1 A2 - Satisfactory (3)
- B1 - Good (4)
- B2 – Very Good (5)
- C1 C2 - Excellent (6).

Additionally, students who have been transferred from other universities, specialities, etc. are allowed to attend classes and join the standard assessment and evaluation procedure.

Those students who are holders of internationally recognized certificates for language skills will be assessed after developing a project in English for specific purposes assigned by their teacher, which accounts for 40% of their final grade. The student's certified language level is recognized as a continuous assessment grade (30%) and an exam grade (30%) as follows:

- A1, A2 and B1 corresponds to Satisfactory (3)
- B2 - Good (4)
- C1 - Very Good (5)
- C2 - Excellent (6).

The students need to show the original of their certificate and leave a photo copy for the teachers' archive.

During the course of studies those groups of students that are at a language level from A1 to B 1 study English for General Purposes with elements of English for Specific Purposes. Suitable textbooks that are currently used are New Headway Elementary and Pre-Intermediate levels, which comprise a student book and a workbook and can be supplemented by adapted photocopiable or teacher-designed materials. The individual work of students includes doing the exercises in the workbook as well as developing project assignments such as preparing and delivering PowerPoint or oral presentations, writing essays, collecting information about assigned topics and then applying it to complete individual tasks, etc. The continuous assessment covers two tests per trimester, the dates of which are announced on the dedicated website. They are usually carried out online in class every third and sixth week of the ten-week long trimester. If a

student fails to turn up for a test or presentation of their individual work, they obtain a poor grade for that particular task.

The tests given to the students during and at the end of the trimesters are developed by their teachers to measure how much of the material taught within a certain period of time has been learnt and they use the obtained feedback to make adjustments, if necessary, to their lesson plans. The tests used at the FMI can be classified as achievement, limited time, group, computer tests which are current (or final), objective, norm-referenced and non-standardized. The types of tasks used most often are multiple choice questions, True or False, matching and ordering of text, the grades of which are calculated automatically, as well as short answer questions and translations that need to be assessed additionally by the teacher. The different test methods have their own advantages and disadvantages. Multiple choice questions with three or more distractors, for example, take longer time to create but a large number of questions can be answered within a comparatively short time and they are easy to score. However, teachers try to use more than one method for testing any language ability. By varying the test methods the predictability of the test format is reduced and possibly the learning of test-taking strategies for particular test formats (Alderson, 1995, p. 46).

When constructing a test, the teacher goes through several stages to verify it comprises all the studied material and to assure its good quality.

First of all, the test author draws an overall plan of the test. At this stage they have to consider in detail what exactly they need to measure, what its manifestations are, and which circumstantial factors could influence the results of the measurement. At the second stage the teacher has to determine what content is to be tested. During the third stage the test author makes a test specification which represents a detailed plan of the test including its purpose, the sort of learners who will be taking the test, the number of sections and types of questions in the test, which language skills will be tested, etc., as well as the test methods and assessment criteria to be used. The next stage involves item development i.e. this is the time when an initial set of test items is constructed. After that the test author deals with the test design and assembly making sure that the content actually tested corresponds to the content of the specification. The sixth stage concerns the production and printing or publication of the test. The remaining stages of the test creation process control the test administration, scoring the test responses, establishing the passing scores, reporting the test results to the students, item banking – the process of securely storing test items for potential future use, and preparing a test technical report (Ivanova, 2011, pp. 278-284).

As already stated, tests constitute an important part of the grading at FMI but they are not considered in isolation from the overall student performance during the process of education in English. If a student has failed a test for a certain reason, they have the

opportunity to prove their knowledge and skills in other tests as well as in developing and presenting their individual work.

The experiment - classroom implications

This approach has been in place at FMI for quite a long time in an effort to enhance students' performance in the settings of using English as a medium in web-based interdisciplinary project-oriented teaching of Information Technology to students of Computer Science. One of the issues in such an approach, as highlighted by Shotlekov (2012, pp. 100-101), is capable of compromising the teaching and learning process: absenteeism. In settings where attendance is not mandatory and trainers have no administrative leverages to encourage it, this issue is even more topical because it leads to demotivation of all stakeholders: absent students, attending students, and teachers alike. Students' failure to attend classes, either physically or virtually, renders impossible or inefficient brainstorming, discussions, multimedia project presentations, and other class-level or team-level activities. Hence, rates of failed deliveries are high. This in turn leads to plummeting motivation in the rest, i.e. performing students. They face two possibilities: either bear the missing peers' burden, or put up with a lower team grade if each team is assigned a team grade which then becomes each member's grade. Therefore, a more detailed assessment policy is needed both on a project evaluation level and on a course assessment level in order to take into account each student's contribution and to encourage trainees to be involved in the learning process. "When some students have missed progress tests, feedback questionnaires, etc. they wish to catch up in class, but during this time they cannot take part in the work of their teams which leads to understaffing in these teams and plummets motivation because it hinders advancement… On the other hand, late students take the test later than their peers and are thus vulnerable to the washback effect, thus scoring less than they would have under normal conditions." (Shotlekov, 2012, p. 102). There are yet other students who show up only during tests, if the in-house rules and regulations allow this, which strongly undermines teachers' efforts to develop team work skills. The same author has found that

Table 1. Grade distribution (%) at weights: Continuous assessment – 0.3, Self-Study – 0.4, Final test – 0.3

Teacher:	**Fail 2**	**Satisfactory 3**	**Good 4**	**Very good 5**	**Excellent 6**
Teacher 1, N=65	29.2	27.7	15.4	21.5	6.2
Teacher 2, N=44	4.5	20.5	25	25	25
Teacher 3, N=138	9.4	25.4	14.5	20.3	30.4
Theoretical distribution	3.2	22.4	44	27.2	3.2

the approach described in this article more often than not helps raise students' awareness of the need to be active participants in the learning process as well as assure more fair assessment. Different weights have been used through the years but the ones applied the last two years have been found most consensual among students and teachers alike. More details on various weight distribution patterns are presented in Appendix 1.

Continuous assessment in the FMI language learning policy covers student performance in terms of attendance of contact classes, involvement in the learning process, and formative assessment (e.g. quizzes). By Self-Study we designate project work and homework, while Test stands for a Final test administered at the end of the trimester or during the re-sits. The theoretical grades for all components are obtained after a conversion of the total scores for the three components based on quantitative criteria thereof. Since the actual grades are rarely natural numbers, but rather decimals rounded to the second decimal place, this may lead to some deviations between our simplified calculations in Appendix 1 and the actual real-life scenarios. Nevertheless, using adjusted values, i.e. rounded to whole numbers, leads to insignificant differences that can be ignored for our purposes. Certificate holders have been excluded from the data. Figure 3 provides a visual representation of the numbers in Table 1.

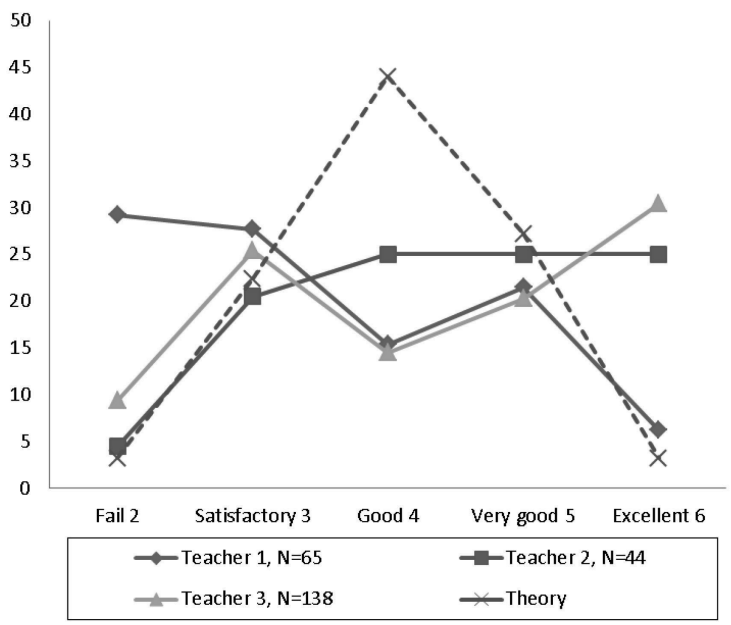


Figure 3. Percentage distribution of the grades (Continuous assessment – 0.3, Self-Study – 0.4, Test – 0.3)

For the Fails, the graph reveals that Teachers 2 and 3 were very close to the theoretical distribution, while Teacher 1 deviated, probably due to the fact that first-year university students are not accustomed to a new university environment where rules are applied without major concessions. Besides, these were more proficient students who expected that their knowledge of English was enough for a good grade and did not participate in the learning process ignoring the weight on attendance and projects on the Final grade – 70% altogether. For the Satisfactory grades, as well as for the Very goods, all three teachers scored close to the theoretical share. For the Goods, none of the teachers went close to the theoretical distribution, as Teacher 2 was less far away. As for the excellent grades, only Teacher 1 complied while the other two trainers differed largely. This can be accounted by the lower language levels of the students which presupposed higher awareness of the need for more contact time with the teacher and more intensive classroom participation. We believe the discrepancy between some students' expectations and the final grades will beneficial to them in their real life careers where performance and compliance matters enormously. No one can expect a lucrative paycheck at the end of the month just because of the assumption that s/he is a great software engineer unless this has been demonstrated in the quality of work as required by the employer.

Conclusion

As Staribratov & Angelova (2011, p 331) have put it, "New technologies pose new challenges to learners' training: more flexible and time-efficient learning process (transition from a discrete to continuous model of study); access to information and diversity of knowledge; wider range of knowledge sources". In such settings, some of them have experienced difficulties with their motivation, discipline and direction on the learning path. The approach described in this article has been field-tested with courses in English, but it can be directly deployed for any kind of training regardless of the content matter: be it Mathematics, Computer Science, Business, or another domain. It can also be applied to some of the course modules, e.g. set theory, algebra, mathematical logic or graph theory. Each of these according to Garov & Radev (2012, p. 345) is indispensable for the correct formulation of the concepts and ideas of different application tasks, their formalization and computerization, as well as the mastering and development of modern Information Technology." We have found that our classroom management and testing policies, while beneficial to the traditional classroom practices, boost the efficiency of project-oriented teaching and learning.

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Appendix 1

Theoretical percentage distribution of grades according to the weight of the components making up the final grade

Components, weight			Final Grades, %				
Attendance	Self-Study	Test	Fail 2	Satisfactory 3	Good 4	Very good 5	Excellent 6
0.4	0.5	0.1	**4.8**	**24**	**39.2**	**25.6**	**6.4**
0.5	0.4	0.1	**4.8**	**24**	**39.2**	**25.6**	**6.4**
0.3	0.6	0.1	**5.6**	**25.6**	**33.6**	**28.8**	**6.4**
0.6	0.3	0.1	**5.6**	**25.6**	**33.6**	**28.8**	**6.4**
0.7	0.2	0.1	**7.2**	**26.4**	**29.6**	**28**	**8.8**
0.2	0.7	0.1	**7.2**	**26.4**	**29.6**	**28**	**8.8**
0.1	0.8	0.1	**12**	**25.6**	**23.2**	**24**	**15.2**
0.8	0.1	0.1	**12**	**25.6**	**23.2**	**24**	**15.2**
0.3	0.5	0.2	**3.2**	**25.6**	**39.2**	**27.2**	**4.8**
0.5	0.3	0.2	**3.2**	**25.6**	**39.2**	**27.2**	**4.8**
0.4	0.4	0.2	**4**	**24**	**44**	**24**	**4**
0.2	0.6	0.2	**4.8**	**28.8**	**32.8**	**28.8**	**4.8**
0.6	0.2	0.2	**4.8**	**28.8**	**32.8**	**28.8**	**4.8**
0.1	0.7	0.2	**7.2**	**26.4**	**29.6**	**28**	**8.8**
0.7	0.1	0.2	**7.2**	**26.4**	**29.6**	**28**	**8.8**
0.4	0.3	0.3	**3.2**	**22.4**	**44**	**27.2**	**3.2**
0.3	0.4	0.3	**3.2**	**22.4**	**44**	**27.2**	**3.2**
0.5	0.2	0.3	**3.2**	**25.6**	**39.2**	**27.2**	**4.8**
0.2	0.5	0.3	**3.2**	**25.6**	**39.2**	**27.2**	**4.8**
0.6	0.1	0.3	**5.6**	**25.6**	**33.6**	**28.8**	**6.4**
0.1	0.6	0.3	**5.6**	**25.6**	**33.6**	**28.8**	**6.4**
0.3	0.3	0.4	**3.2**	**22.4**	**44**	**27.2**	**3.2**

0.4	0.2	0.4	**4**	**24**	**44**	**24**	**4**
0.2	0.4	0.4	**4**	**24**	**44**	**24**	**4**
0.5	0.1	0.4	**4.8**	**24**	**39.2**	**25.6**	**6.4**
0.1	0.5	0.4	**4.8**	**24**	**39.2**	**25.6**	**6.4**
0.3	0.2	0.5	**3.2**	**25.6**	**39.2**	**27.2**	**4.8**
0.2	0.3	0.5	**3.2**	**25.6**	**39.2**	**27.2**	**4.8**
0.4	0.1	0.5	**4.8**	**24**	**39.2**	**25.6**	**6.4**
0.1	0.4	0.5	**4.8**	**24**	**39.2**	**25.6**	**6.4**
0.2	0.2	0.6	**4.8**	**28.8**	**32.8**	**28.8**	**4.8**
0.1	0.3	0.6	**5.6**	**25.6**	**33.6**	**28.8**	**6.4**
0.3	0.1	0.6	**5.6**	**25.6**	**33.6**	**28.8**	**6.4**
0.1	0.2	0.7	**7.2**	**26.4**	**29.6**	**28**	**8.8**
0.2	0.1	0.7	**7.2**	**26.4**	**29.6**	**28**	**8.8**
0.1	0.1	0.8	**12**	**25.6**	**23.2**	**24**	**15.2**

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ПОВИШАВАНЕ НА ЕФЕКТИВНОСТТА НА ПРОЕКТНО ОРИЕНТИРАНОТО ОБУЧЕНИЕ ЧРЕЗ МЕНИДЖМЪНТ НА КЛАСА И ОНЛАЙН ТЕСТОВО ИЗПИТВАНЕ

Иван Шотлеков, Ваня Иванова, Кирина Бойкова

Резюме. Разработен е набор от политики за управление на класа и тестово изпитване, които след двугодишна апробация бяха доразвити и приложени при 247 студенти във Факултета по математика и информатика на Пловдивския университет „Паисий Хилендарски“. Основната цел на тези усилия е да се повиши ефективността на проектно ориентираното обучение. Резултатите потвърдиха положителния резултат от този подход и потенциала да се прилага успешно и в контекста на традиционните форми на обучение.

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