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## **PRE-MASTER'S TRAINING OF FOREIGN STUDENTS AS A FACTOR IN IMPROVING THE QUALITY OF GRADUATES**

**Abstract.** The article discusses the practice of teaching foreign citizens in pre-master's programs at the preparatory faculty for foreign citizens of MADI. The result of the study is the conclusion about the improvement in the quality of training of masters who have completed the pre-master course, in comparison with masters who studied according to the usual curriculum. The authors give a rationale for the adjustments in the content of engineering disciplines, made in order to achieve a higher level of development of competencies by future undergraduates. The authors provided both statistical data on the results of the study and promising tasks for further research.

**Key words:** pre-masters' training, foreign students, engineering research competencies, educational plan.

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## **ПРЕДМАГИСТЕРСКАЯ ПОДГОТОВКА ИНОСТРАННЫХ СТУДЕНТОВ КАК ФАКТОР ПОВЫШЕНИЯ КАЧЕСТВА ВЫПУСКНИКОВ**

**Аннотация.** В статье рассматривается практика обучения иностранных граждан по предмагистерским программам на подготовительном факультете для иностранных граждан МАДИ. Результатом исследования является вывод о повышении качества подготовки магистров, прошедших предмагистерский курс, по сравнению с магистрами, обучавшимися по обычному учебному плану. Авторы дают обоснование корректировок содержания инженерных дисциплин, производимых с целью достижения будущими магистрантами более высокого уровня развития компетенций. Авторы предоставили как статистические данные по результатам исследования, так и перспективные задачи дальнейших исследований.

**Ключевые слова:** предмагистерская подготовка, иностранные студенты, инженерные исследовательские компетенции, учебный план.

**Introduction.** The Preparatory Faculty for Foreign Students of MADI (PFI MADI) has been preparing citizens from foreign countries for further training in international educational programs for more than 60 years. Until 2003, when organizing training in pre-university programs, there was only one criterion determining the further trajectory

of the educational process of the future student. This criterion was the training profile (engineering, economics, natural science, etc.). However, after Russia joined the Bologna process, another criterion appeared – this is the level of further education received. When implementing any system, there is some information lag, namely, if you think in computer terms, a delay in responding to user input. This is also typical for the education system. The introduction of the all-Russian classifier of specialties in education OK 009-2016 clearly made it clear that it is necessary to divide educational programs by levels of training at the stage of pre-university training. Since 2014, various levels of education have already become firmly embedded in our daily life, and processing, preparation for approval and further testing of new educational plans have begun.

At the MADI PFI, they first thought about the pre-master's degree in terms of separating future masters into a separate group, already in 2006, when the faculty began training bachelors from Myanmar. Even then, it was realized that the existing educational plans did not develop the competencies necessary for future masters. The system of changing the curriculum at that moment seemed to be a rather complicated process. There was also no clear picture of the demand for training in these programs. Therefore, at the scientific and methodological seminars of the departments, it was decided, within the framework of the current curriculum and educational plan of the pre-master's level, to concentrate on a deeper study of those sections of disciplines that future masters need in the process of studying under the main programs. From 2006 to 2012, while this training was being implemented, the point adjustment of educational plans was carried out primarily, of course, in the Russian language, and in parallel in other disciplines, too. This became possible because future masters were assigned to separate groups and taught within the framework of a standard curriculum, but according to adapted programs. Manuals on the future specialties of students were prepared, in which the vocabulary minimums necessary for studying at the master's degree were understood.

Since 2013, the faculty has for the first time implemented the allocation of pre-masters into separate groups with a separate curriculum. Based on

the results of this work, a number of articles by the authors of the MADI PFI on teaching general theoretical disciplines to future masters were published in 2016. And for 8 years now we have been preparing this contingent according to a separate master's plan and educational plans. This period allowed us to assess how the training of candidates in the master's degree subsequently goes, since the master's degree lasts for 2 years and there are already graduates, which allows us to obtain data and conduct a comparative analysis of the results of masters who studied under additional programs in common groups with bachelors. During this period, periodic changes and additions to the curriculum took place within the framework of new requirements adopted by the Ministry of Education, new courses of disciplines were developed, tested and introduced. All curricula and educational plans were discussed at the faculty council and were approved for implementation. In some disciplines, the number of hours increased and decreased, and as a result, in our opinion, an optimal curriculum was developed taking into account the modern realities of the educational process [1].

**Materials and methods.** MADI, being a technical university, pays more attention to engineering areas of training, so all research was conducted on the basis of engineering and technological profile. Every year, from 750 to 1000 foreign citizens studied at MADI, of which about 24% studied at the faculty. Among all students of the faculty, the share of students enrolled in the pre-registration program over the past 10 years averaged 22% and ranged from 14 to 27% by years of study (Fig.1).

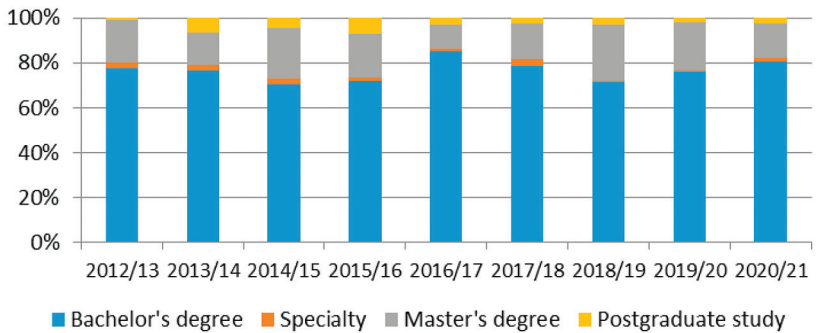


Fig. 1. The proportion of students by training levels by year

Unlike future bachelors and specialists, the course for whom contains more practical and applied tasks, future masters are directed towards the research field of knowledge. For example, future master engineers need a more advanced mathematical apparatus to create models of their future research, which is reflected in the educational plans. The most successful newly introduced and revised courses include «Russian – An Introduction to the specialty», «Mathematics», «Physics» [2; 3].

Additional general education program of Engineering, Technical and Technological (Master's degree, postgraduate student), which provides training for foreign citizens and stateless persons to master professional educational programs in Russian on full-time form of study for 1-year present on table 1.

The development of an optimal curriculum has been considered by many faculties [4]. Russian as the main subject in the curriculum of pre-master's training currently implemented at the faculty remained within the mandatory hours established by the Requirements – 612 classroom hours and another module of the Russian language was added, the so-called introduction to the specialty, in which future masters are taught the rules of writing abstracts, articles, preparation of scientific reports, etc. in the amount of 72 classroom hours. Of the other general education subjects, the largest number of hours is devoted to the study of mathematics, because engineers are trained at MADI and this knowledge will help them in processing statistics, creating mathematical models, etc. The physics course is aimed at maintaining knowledge about the science of physics. It does not include any solutions to problems, the theory is considered in Russian and only applied physical processes in terms of studying terminology. Computer science is aimed at getting acquainted with the Russian keyboard, working in office packages, in which students will then have to work while studying for a master's degree, and also includes a short course in algorithms and programming [5]. It is one of the first to enter the educational process, because most masters have the skill of working on a computer, and you just need to apply it to the Russian language. Of the additional subjects, the course includes the History of Russia, which is also aimed at getting to know our homeland and developing the spoken language.

Educational plan of pre-master's year 2021

№	Name of the general education discipline	Contact work		Independent work including exam		Examination work		Total labor intensity		Form of intermediate and final certification	
		hour	credits	hour	credits	hour	credits	hour	credits	1 semester	2 semester
Basic general education disciplines											
1	Russian	612	17	792	22	72	2	1404	39	exam	exam
2	Mathematics	108	3	180	5	36	1	288	8	test	exam
3	Physics	72	2	108	3	36	1	180	5	test	exam
4	Computer science	72	2	108	3	36	1	180	5	test	exam
5	Russian - introduction to the specialty	72	2	108	3	-	-	180	5	-	test
Total for the main general education disciplines		936	26	1296	36	180	5	2232	62	1 ex. + 3 test.	4 ex. + 1 test.
Additional general education disciplines											
6	History	72	2	72	2	-	-	144	4	test	exam
Total for additional general education disciplines		72	2	72	2	-	-	144	4	0 exam. + 1 test.	0 exam. + 1 test.
Total for program		1008	28	1368	38	180	5	2376	66	1 ex. + 4 test.	4 exam. + 2 test.

We have been working on this plan for the last few years, until then we had to rework it with changes in our legislation and financing of additional educational programs.

The purpose of this study is to assess the quality of master's training through the analysis of the average score obtained by a graduate who studied at the pre-university stage according to a separate curriculum with adapted educational plans of disciplines for pre-master's programs.

**Results.** Previously, there was not enough quantitative research in terms of determining how the training of future masters of the group according to a separate curriculum within the framework of pre-master's training and training of masters in common language groups with future bachelors and specialists affects.

When analyzing this sample, students studying at the expense of the federal budget of the Russian Federation were considered. Since 2013/2014 academic year, all data on students are entered into a single information base of the Ministry of Education and Science, and it reflects the educational trajectory of a student studying on a budget, provided that universities timely enter information into it, you can track the result of training graduates of the faculty in senior courses. For each student, statistics were taken on how he studied at the faculty and how his studies in Russia ended. Unfortunately, not all Universities in Russia fill out this database correctly, but the main conclusions can be drawn from the available data. The results of processing data from the specified database are shown in Fig. 2.

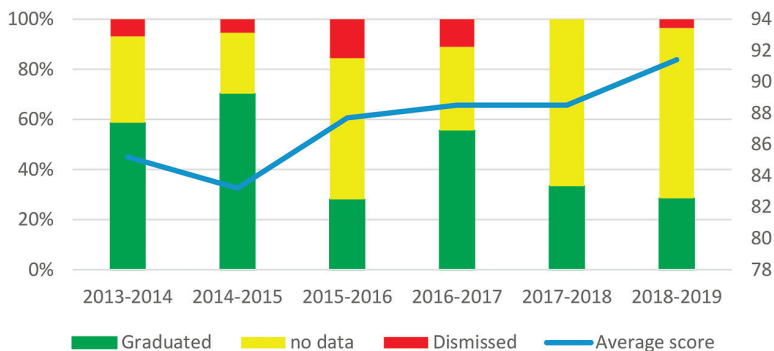


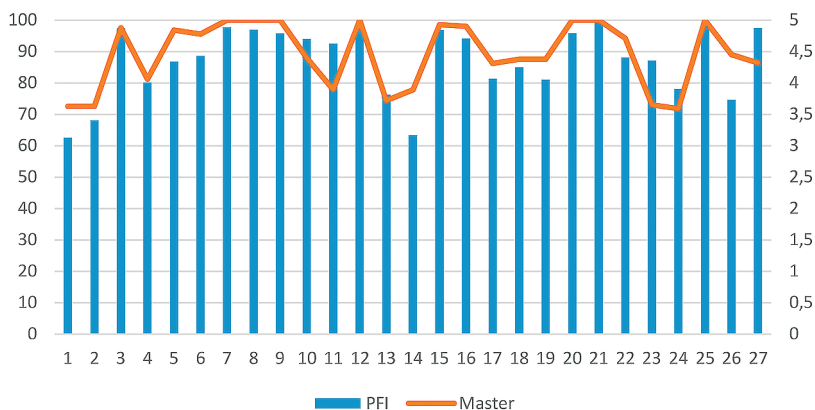
Fig. 2. Analysis of the release of pre-masters

The research was limited to 2018/2019 because graduates of the faculty of 2019/2020 are still studying for a master's degree and there is no data on the result of their graduation. The red color shows the number of student deductions as a percentage, and except for 2015/2016, it is not very large, this year was difficult for the University because of changes in the leadership and the course of development, which affected the activities of the faculty. The yellow color indicates uncertainty when representatives of universities have not entered the necessary data into the Ministry of Science and Higher Education system, but with a high probability, it can be assumed that they have also successfully completed a master's degree, because when deducting for academic failure, it must be entered into the system. The graph shows how the average score of graduates of pre-master's programs has changed, and we see that it has increased every year and in 2018-2019 it amounted to more than 91 points. It should be noted that the average score of pre-masters is always higher than that of students in bachelor's/specialty programs. The higher the average score at the faculty, the more likely it is that higher results will be obtained when studying at the master's program. Complete and accurate data are available for students who have chosen to study at the MADI Master's program at the expense of the budget.

**Discussion.** The study was conducted among students in the master's groups of foreign citizens and those who chose the MADI Master's degree for further study. The study does not fully take into account the initial competencies of students, namely, the average score of a bachelor's degree was taken as a basis where it was present, but the results obtained allow us to draw certain conclusions. In the future, the study will be expanded, and new source data will be added to the multivariate table of values and an additional analysis of the results obtained will be carried out.

Except for a few students, their average score on the result of training in pre-registration programs corresponds to the average score of the final diploma. Only two students were expelled during the specified period and did not complete the training program, while one of them voluntarily and one because he did not pass the exams, his average score at the PFI was 63,8. At the PFI we use a 100-point assessment scale, the





*Fig. 3.* Comparison of the final score based on the results of studies at the faculty and in the master's degree

classic 5-point scale was adopted at MADI. The results of the training are shown in Fig. 3. The bars show the results of students at the faculty, the scale on the left of the PFI, and the Master graph, red, shows how these same students completed their studies at the master's program, the scale on the right. As can be seen from the figure, the results are quite strongly correlated.

The average score of all students was also analyzed, not only those studying at the expense of the federal budget, but also those studying at the expense of their personal funds (contract). During the study period, it was revealed that students in groups working on the pre-master's program, compared with students engaged in regular groups, showed different average scores of final academic performances. The average academic performance of pre-masters is almost 8,5 points higher. The average score in the preparatory groups is 87.05 points. The average score in the main groups is 78,73 points.

One of the important components of pre-master's preparation is the formation of environmental awareness of pre-master students, which is necessary for the sustainable development of the transport and road industry. This is achieved by introducing pre-masters to modern scientific research on environmental topics [6–13].

**Conclusion.** The scientific novelty of the results lies in the fact that no quantitative studies have previously been conducted regarding the impact of group training on a separate educational plan within the framework of pre-master's training and master's training in common groups with future bachelors and specialists. Studies when masters study under a separate program in the Russian language have been conducted before, but how the comprehensive educational plan affects the pre-university stage has not been sufficiently covered.

According to the results of the study, it was found that masters who were trained in special pre-master's groups with their own curriculum received diplomas with honors in greater numbers, and their average score was higher. Publication activity in journals and participation in conferences and seminars on research topics has also increased.

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