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The Influence of the Gender Factor on the Quality of Education in the University

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Abstract

Many factors influence the student's academic performance at the university. The purpose of our study is to determine the influence of the gender factor on student achievement in the university. The base of the research was the Institute of Physics of the Kazan (Privolzhsky) Federal University. With the help of correlation and structural analysis, the influence of the gender factor on student performance in the university was investigated. For a more convincing result in our study, the period of training of students from the first year to the third was singled out. According to the results of the study, we came to the conclusion that the gender factor has a negligible impact on the progress of students at the Institute of Physics. The materials of the article can be used by teachers of higher education in the organization of the educational process, as well as by researchers in organizing and conducting an experiment on their problem in the higher school educational organization.

Keywords: gender equality, student, learning outcomes, correlation matrix.

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Introduction

To date, no country in the world has achieved full equality between the genders. It is expected in about a hundred years. Iceland has already covered 88% of the gender gap. It is followed by Norway, Finland, Rwanda and Sweden. The top ten also includes Nicaragua, Slovenia, Ireland, New Zealand and the Philippines. Russia is on the 49th place in the overall rating. But in medicine and education Russia has got almost the ideal indicators.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has identified four gender indicators in education: equal access; equality in the learning process; equality in the results of studies and equality in the results after receiving education. Note that there are 27 countries in the world that have overcome gender inequality in education. The range of problems concerning gender in education has always been urgent, but refers to one of the least developed ones. Three main areas can be noted in gender studies: sex-specific comparative analysis (men and women); studies of role positions, which people occupy in communication regardless of their biological sex (masculine, feminine, androgynous); the value orientations of the person, differing a little or much from the usual, value systems inherent in most people, etc. (Znakov, 2004; Butenko, 2000; Sillaste, 2001).

Since childhood, a woman occurs in unequal conditions as compared to men. Girls spend their time for work about a house 30% more than boys. And with age, this figure almost doubles, according to the report of the Global Gender Gap of the World Economic Forum (WEF), 2016. A woman always needs to fight for a 'place under the sun', to prove to everyone around and to herself that she has the same rights, as well as a man. This is what is witnessed at school, high school, at work.

Women and girls face difficulties on the way to obtaining and completing education, its application in life, including affiliation with the minorities, disability, early marriages, pregnancy, gender-based violence, and, what is the most important, traditional convictions of a woman's status and role in the society.

Most of the teachers at school are female - about 88%. It would seem that it is easier for a woman teacher to understand and accept girls. And a good relationship between a teacher and a student is known to cause a success in learning. Indeed, meta-analyses shows that the relationship aspect between a student and a teacher affects student's results, including a learning motivation, behavior and cognitive abilities; that the training organized optimally and holistically causes positive relationship between a teacher and a student, and hence, influences learning results (Allen, Witt & Wheelless, 2007, Cornelius-White, 2007). While at school, girls show better results than boys, though obtained through hard work.

There are 56% of women teachers in higher educational institutions. If we analyze women in terms of their position at the university, it will give the following picture: teaching assistants and senior lecturers - 67% of women (and 33% of men, respectively), associate professors - 56% (men - 44%), professors and provosts - 30% (men - 70%), rectors - 11% (men - 89%). This situation indicates a gender asymmetry in the composition of a higher education teaching staff.

We decided to analyze the influence of the gender factor on the progress of students (boys and girls) at the university. The aim is to determine: whether there is any interdependence between the male - female students' grades and those who read the subject: a female teacher or a male teacher. This is carried out through correlation and structural analysis of the data matrix (Garnaeva, Kuznetsov, & Nefediev, 2008), which allows revealing possible hidden factors.

Explore the Importance of the Problem

The researchers explore the problem of gender equality or inequality in higher professional

organizations from different angles. For example, studies of interpersonal relationships between a teacher and students with different ethnic backgrounds indicate the fact, that the relationship between a teacher and a student is more important for the second generation of migrants than for the first generation (den Brok, Van Tartwijk, Wubbels, & Veldman, 2010), the impact on academic performance of the relationship between a teacher and students (Roorda, Koomen, Spilt, & Oort, 2011), satisfaction from communication of students with their teacher (Goodboy, Martin & Bolkan, 2009), a creative team of a teacher and a student development, and the formation of professional qualities in this process (Khuziakhmetov & Gabdrakhmanova, 2015a, Khuziakhmetov & Gabdrakhmanova, 2015b, Gabdrakhmanova, Khusainova & Chirkina, 2015), the reflection in the educational process importance for students (Khusainova, Chirkina, & Gabdrakhmanova, 2015), associations between the authority of a teacher, the behavior of a teacher and the results of training, the significant role played by the credibility of a teacher in the teaching process (Finn et al., 2009), interpersonal relations of a student and a teacher perception by students (Telli, Brok, & Cakiroglu, 2010), the ecology of a student (Gabdrakhmanova & Khuziakhmetov, 2017), psychological analysis of students' listening to their professors (Cooper & Buchanan, 2010), learning communication, which helps to achieve good results in studies (Kerssen-Griep & Witt, 2012), feeling of satisfaction in communication with the teacher of a subject, which is the catalyst for motivating the student for his progress to success (Hodis & Hodis, 2015) and many others.

A comparative data analysis singularity

We decided to use the method of comparative analysis in our study, which is found in many other research works (Graf, 2016; Mahoney, 2004; Skocpol & Somers, 1980). Comparison of the results was presented in many research papers (Martynova, 2005; Pyatov, 2004). The correlation matrix has been repeatedly tested by scientists in their studies; its use and structural processing makes it possible to identify the hidden factors that affect the object of the research.

Status of a problem

We turned to the following research areas for solving of the highlighted problem:

- Theory and practice of the modern higher education,
- Studies treating a student as a research subject,
- Studies examining problems in the field of gender equality and the inequality of students of educational institution,
- Studies specifying methods used in a scientific research.

The analysis of these and many other scientific works on the selected problem has revealed, that the issues, related to investigation of the gender factor influence on the students' (boys and girls) progress in the university, more precisely the interdependence between the marks of male and female students, and their lecturers (a female teacher or a male teacher), are not sufficiently studied. We suggest using correlation and structural analysis to determine such interdependence, thereby increasing the number of techniques.

The Research Hypothesis

We have formulated the research hypothesis as follows:

Is there any interdependence between the marks of male and female students and their lecturers (a female teacher or a male teacher) at the Institute of Physics under the Kazan (Volga region) Federal University; what are the hidden factors that have a greater impact on a student's academic performance.

Materials and methods of research

Research tasks

The following tasks were being solved in the course of the study: 1) study of psychological and pedagogical literature on the theory and practice of modern higher education; on problems of gender equality and inequality in students environment of an educational institution; on methods of scientific research; 2) determining the indicators, 3) choosing the methodology, 4) identifying groups of students for analytical work; 5) drawing conclusions on the results of analytical work.

Theoretical and empirical methods

The following various methods mutually complementing each other have been used to confirm the hypothesis:

Theoretical methods: theoretical analysis and synthesis of philosophical, scientific and methodological literature, sociological, pedagogical, psychological, as well as the methods of generalization and comparison;

Empirical methods: study of documentation, statistical and mathematical methods of research, qualitative and quantitative analysis of experimental results.

The research base

The Institute of Physics of the Kazan (Volga region) Federal University (KFU) served as the base of the research.

Description of the experiment and the algorithm of operation in the process of correlation and structural analysis

We have selected a correlation and structural analysis (Garnaeva, Kuznetsov, & Nefediev 2008) as a diagnostic method. Such an analysis allows revealing the hidden factors, which affect the object under study. The application of this method in the study has been demonstrated earlier (Gabdrakhmanova, Garnaeva, & Nefediev, 2017).

The a research group was formed from the second and the third year students of Geodesy, Remote Sensing and RadioPhysics of the Institute of Physics under the KFU. The total number of students participating in the research was 155. The total number of teachers was 62, 41 of them -men, 21-women. The total number of student groups was 8, differing by the fields of training in Geodesy, Remote Sensing and Radio Physics students. We have identified the following parameters for analysis: student marks in cycles of mathematical subjects, physical subjects and humanitarian subjects.

Result

Progress and results of the experiment

The experiment was carried out as follows: analyzed were the humanities, mathematics and physics subjects. We identified the groups of students on the basis of their gender status, and groups of teachers also by their gender. The correlation of scores was studied both between individual subjects, and correlation depending on the gender of students and their teachers. In addition, the study of academic performance was carried out, its quality and the average value of the marks considering the reliability under the Student's t-criterion.

Based on the analysis of the results obtained from the humanitarian, physical and mathematical subjects, the following conclusion can be made:

For the training area of Geodesy and Remote Sensing

Significant gender differences are observed only for Physics subjects among the 2nd year students.

Average values: $N_2 = 69$ (average value of marks put by female teachers to all students of the group); $N_3 = 53$ (average value of marks put by male teachers to all students of the group) are significantly different with the reliability of the result, where α - is the probability level, at $\alpha = 0.05$ and $P = 0.95$. Significant correlation coefficients: $R_{13} = -0.45$ (between the students gender and the marks put by the male teachers); $R_{23} = 0.83$ (between the marks put by female teachers and male teachers).

There are no significant differences in academic achievements of girls and boys with male teachers.

There are significant differences (with a reliable conclusion, where α - the probability level is at $\alpha = 0.05$ and $P = 0.95$) in the average values of marks put by female teachers to girls and boys, 53 points to boys (quality = 13%, academic performance = 56%) and 69 points for girls (quality = 64%, academic performance = 91%).

For the third year students, significant differences in gender are observed in all three blocks of subjects:

Humanitarian block. Average values: $N_2 = 77$ (average value of marks put by female teachers to all students of the group); $N_3 = 74$ (the average value of marks put by male teachers to all students of the group) are significantly different, with the reliability of the result, where α - is the probability level at $\alpha = 0.05$ and $P = 0.95$. Significant correlation coefficients: $R_{23} = 0.55$ (between the marks put by female teachers and male teachers).

There are significant differences (with a reliable conclusion, where α - the probability level, at $\alpha = 0.05$ and $P = 0.95$), in the average values of marks put by male teachers to girls and boys, 73 points put to boys (quality = 75%, academic performance = 90%). and 48 points put to girls (quality = 60%, academic achievement = 60%).

There are significant differences (with a reliable conclusion, where α - the probability level, at $\alpha = 0.05$ and $P = 0.95$) in the average values of marks put by female teachers to girls and boys, 71 points put to boys (quality = 40%, academic achievement = 100%) and 54 points put to girls (quality = 60%, academic performance = 65%).

Mathematics block. Average values: $N_2=55$ (the average value of the marks put by female teachers to all students of the group); $N_3=39$ (the average value of marks put by male teachers to all students of the group) are significantly different, with the reliability of the result, where α is the probability level, at $\alpha = 0.05$ and $P = 0.95$. Significant correlation coefficients: $R_{23} = 0.62$ (between marks put by female teachers and male teachers).

There are significant differences (with the reliability of the conclusion, where α is the probability level, at $\alpha = 0.05$ and $P = 0.95$) in the average values of marks put by the male teachers to girls and boys, 55 points to boys (quality = 10%, academic achievement = 75%), and 39 points to girls (quality = 0%, academic achievement = 60%).

There are significant differences (with the reliability of the conclusion, where α is the probability level, at $\alpha = 0.05$ and $P = 0.95$) in the average values of marks put by the female teachers to girls and boys, 64 points put to boys (quality = 35%, academic performance = 90%) and 42 points put to girls (quality = 25%, academic achievement = 55%).

Physics block. Average values: $N_2 = 61$ (average value of marks put by female teachers to all students of the group); $N_3 = 40$ (the average value of marks put by the male teachers to all students of the group) are significantly different (with reliable result, where α is the probability level, at $\alpha = 0.05$ and $P = 0.95$). Significant correlation coefficients: $R_{13} = -0.45$ (between the students' gender and the marks put by

male teachers); $R_{23} = 0.88$ (between marks given by female teachers and male teachers).

There are significant differences (with a reliable conclusion, where α - the probability level, at $\alpha = 0.05$ and $P = 0.95$) in the average values of marks put by male teachers to girls and boys, 74 points put to boys (quality = 60%, academic achievement = 100%) and 52 points put to girls (quality = 60%, academic achievement = 65%).

There are significant differences (with a reliable conclusion, where α - the probability level, at $\alpha = 0.05$ and $P = 0.95$) in the average values of marks put by female teachers to girls and boys, 61 point put to boys (quality = 15%, academic performance = 70%) and 45 points put to girls (quality = 40%, academic achievement = 60%).

For the training area of Radiophysics

There are no significant differences in gender analysis in any block of disciplines among the second year students.

Among the third year students, significant differences in gender analysis are observed only for the block of humanitarian disciplines:

Humanities block, average values: $N_2 = 81$ (the average value of marks put by female teachers to all students of the group); $N_3 = 84$ (the average value of the marks put by the male teachers to all the students of the group) significantly differ with the reliability of the result, where α is the probability level, at $\alpha = 0.05$ and $P = 0.95$. The significant correlation coefficients: $R_{12} = -0.56$ (between the gender of students and the marks put by the female teachers).

There are significant (with the reliability of the conclusion, where α is the probability level, at $\alpha = 0.05$ and $P = 0.95$) differences in the average values of marks put by male teachers to girls and boys, 83 points for boys (quality = 94%, academic performance = 97%) and 89 points for girls (quality = 100%, academic achievement = 100%).

There are significant differences (with a reliable conclusion, where α is the probability level, at $\alpha = 0.05$ and $P = 0.95$) in the average values of marks put by female teachers to girls and boys, 78 points for boys (quality = 84%, academic achievement = 100%) and 92 points for girls (quality = 100%, academic achievement = 100%).

Discussions

Within Gender equality in higher education will be in the near future. In the meantime, girls who successfully study in a secondary school do not aspire to enter technical schools, since girls have a lower self-esteem than boys, and they are frightened by a teaching staff consisting mostly of men. Perhaps, new forms of educational process organization in the university (Garnaeva, Aganov, Nefediev, & Nizamova, 2015; Gabdrakhmanova, 2015; Khuziakhmetov, & Gabdrakhmanova, 2016; Garnaeva, Nizamova, & Temnikov, 2015; Gabdrakhmanova, Kalimullina, & Ignatovich, 2016; Gabdrakhmanova, Khodyreva, & Tornyova, 2016) will contribute to the formation of educational space with gender equality. The reliability and feasibility of the fulfilled research are determined by the application of modern research methodology using psycho-pedagogical and methodological sources; rational use of theoretical and experimental research methods.

Conclusion

The following main conclusions have been obtained by the results of the research:

1. The gender factor influences the academic progress of university students. The quality and

academic performance of students-boys and students-girls to some extent depend, as it turned out, on a person teaching the subject: a male teacher or a female teacher. The dependence is different for different years of study (in our research it is the 2nd and the 3rd years) and different at various training blocks of the Institute of Physics (in our research it is the geodesy and remote sensing and radiophysics).

2. The humanitarian block of subjects has been specially highlighted in our study. The female teachers of the humanitarian block of subjects evaluate the students-boys' activity a little lower than the male teachers.

3. This research needs to be continued. The process of assessing the activities of students by male teachers and female teachers shall be considered in more detail.

Recommendations

For the researchers. The materials of this article will be of interest to the researchers of problems related to gender equality in a higher educational institution. Researchers will be interested in the correlation matrix which would help to determine the hidden factor affecting the property of the object under investigation.

For practitioners. The materials of this article will be of interest to the higher school teachers, student groups curators, as they can be used in planning their work with students of the higher educational institutions.

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