LOOK ACADEMIC PUBLISHERS
OPEN ACCESS

IEJME— MATHEMATICS EDUCATION
2016, VOL. 11, NO. 8, 3021-3036

Integrative Connection of Mathematics and Economics

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ABSTRACT

The relevance of the problem stated in the article is due to the fact that there is a great variety of statistical methods now. The survey of the peculiarities of statistical methods indicates the wide possibility of applying the methods and stages of the correlation and regression analysis when building a model. The significance of the specification stage when building the regression model is determined, its theoretical basis and essence are described. One of the important aspects of the specification stage is the selection of the most significant variables (factors). The purpose of the article is to create and prove the model of integration of general and special economic disciplines with mathematics, to suggest the algorithm of the selection of factors at the specification stage of building the regression model in the framework of the application of integrative intersubject connections. The leading approach to the study of this issue is the method of formation of professional competence of future economists through the application of mathematical methods and models, knowledge and skills, which, in turn, provides the development of basic economic knowledge and skills. In the article we developed the method of solving the problem of application of mathematical statistics methods in building the econometric models in the framework of integration of intersubject connections, and we suggested the algorithm of selection of variables for building the effective regression model, which contributes to the conscious selection of the factors in the model and ensures the accuracy of real trends of the model and the model assessments, the obtainment of adequate forecast results.

KEYWORDS
integration connections, mathematics and economics, correlation analysis, regression analysis, specification of regression model, algorithm

ARTICLE HISTORY
Received 14 April 2016
Revised 30 May 2016
Accepted 13 June 2016

Introduction

Union of industrialists, representatives of small and medium business as the main purpose of social partnership sees joint implementation of specific measures aimed at increasing of the effectiveness of vocational education. Each side seeks its own path of development and forms of social partnership.

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The processes, which take place in the society at the present stage in all spheres of life, place new demands on the professionalism of the economic specialists. Today the labor market demands a new quality specialist, who is professionally competent, mobile and competitive, responsible, ready to obtain, to prehend, to analyze and transfer the professionally significant information, who is capable of decision-making and evaluation of its effectiveness, of projecting his activity and further self-education (Shaidullina et al., 2015 a,b; Ivanov et al., 2015). Consequently, the higher education system is confronted with the problem of improving the forms, resources, teaching methods, and the search for innovative ways to use them in educational activity of students of economic specialties. The most actual question is to improve the quality of mathematics education and the formation of mathematical competence of future economists, which is the core of their professional competence.

Various aspects of the economic orientation of the process of teaching mathematics in secondary schools and colleges were described by A. A. Babenko (2003), N. A. Burmistrova (2001), O. A. Klimenkova (2003), L. D. Ryabokoneva (1996), A. S. Simonov (2000), and others; at the economic universities - N.A. Burmistrova (2011), D. A. Kartezchnikov (2007), P. V. Kiyko (2006), N. A. Klimova (2004), N. V. Kolacheva (2006), D. V. Nikanorenko (2003). The connection of economic disciplines with mathematics and natural sciences developed historically. The mathematical tools allow us to give the precise definition to such economic concepts as elasticity, multipliers and to other concepts, and the use of economic knowledge and studying the mathematical models in economy let us give the economic interpretation of the various abstract mathematical structures. For example, such methods of mathematical statistics as methods of correlation and the regression analysis play an important role in building of econometric models. The regression and correlation analyses were created as methods for describing the changes of two or more variables, describing the statistics data.

The publications of many authors (Ayvazian & Mkhitaryan, 2001; Glantz, 1998; Glass & Stanley, 1976; Eliseeva et al., 2007; Cochran, 1976; Kremer & Putko, 2013; Mkhitaryan, Arkhipov & Sirotin, 2012; Silchenkova, 2014; Urbach, 1975; Hollander & Wolfe, 1983) were devoted to the methods of mathematical statistics, in particular to the methods of the regression and correlation analyses. These methods are the main, universal mathematical methods of modern science, which are actively used not only in economy, but also in many scientific fields (in psychology, biology, medicine, and in other spheres).

The works of A. Y. Danyluk (2001), A. G. Gein (2000), K. U. Kolesina (2009), E. S. Nikitina (2007), V. G. Smelova (2009), and others are dedicated to the field of intersubject integration. In the works of V. I. Zhilin (1999), P. V. Kiyko (2006), O. A. Klimenkova (2003), N. A. Klimova (2004), V. N. Maximova (1981), V. M. Monakhov (1988), A. S. Simonov (2000), and others the intersubject connections and the ways of implementing them in studying various disciplines are considered.

The intersubject connections are the process and the result of creating a continuously connected unified whole. In learning they are carried out by

merging into one synthesized course of (course of study, topic, program) elements of different courses of study, merging of scientific concepts and methods of different disciplines in the general scientific concepts and learning methods, aggregation and summation of the fundamentals of the science in solving the problems of intersubject learning.

Most of professional and special economic disciplines, studied by students of economic specialties, are connected in some integrative way with mathematics, as in the modern society mathematical concepts, models and methods, hardware and software are widely used for information representation.

For a example, the presentation of the courses "Economic theory", "World Economy" is difficult without reliance on such topics of the mathematics as "The derivative, the geometric meaning of the derivative," "The geometric meaning of the equations and inequalities," the courses "Strategic Planning", "Organization of production", "Real estate appraisals" - without studying the foundations of "Methods of calculating", the course of "Marketing" – without "Probability theory and mathematical statistics". Here the connection of facts studied in various economic and mathematical disciplines is necessary to understand the economic theory fully.

As a result of the integration of mathematics and economics the intensive development of economic thinking of students is carried out and their economic culture is increased.

The problem of development of theoretical and practical issues of economic thinking is studied by many well-known Russian and foreign scholars such as L. I. Abalkin (1987), A. Y. Arkhipov (1999), O. V. Letunova (2012), P. Heine (1997), and others. L. I. Abalkin (1987) defines economic thinking as a complex of views, ideas, and approaches to the assessment of the phenomena and to decision-making that people are guided by in their economic activities. P. Heine (1997) considers the concept of "the economic way of thinking" not as a set of ready-made conclusions, or "the technique of thinking", but as a prerequisite, a direction of thinking.

We can identify the following components of economic thinking (levels of development): 1) the ability to find the necessary information and to apply it under new conditions; 2) the ability to formulate the problem, the ability to analyze the situation; 3) the ability to apply the economic terms of the problem; 4) the choice of the optimal solution, the choice of the rational method of solving the problem; 5) the ability to interpret the results economically; 6) the alternativeness; 7) the ability to carry out value-judgments, analysis, classification, generalization.

The sphere of applying instruments of economic thinking is practically unlimited. In the course of training at the university the student actualizes, above all, the economic values which gain some vital and professional personal meaning for him. The process of training students for their working career focuses on a wide spectrum of personality manifestations, defining professional training as one of its bases. Having studied the theoretical sources, the generalizations of experience we identified the characteristics of a competitive

specialist activities, taking into account the peculiarities of human activities in the field of economy.

The analysis of the content of the university mathematical and economic education shows that there are prerequisites for the implementation of these connections in the learning process. V. I. Zhilin (1999) underlines the relative independence in the development of course of study structures of some educational course of study which are the components of integratable educational content. The integrated studies should be preceded by the preliminary differentiation and specialization of courses of study and learning activities, and then be followed by integration.

The idea of integrating the content of education is due to the modern social mandate of students training for their future professional activity.

Materials and Methods

We used the following research methods: theoretical (the study and the analysis of the literature on the issue of the research, the system analysis, classification and modeling); empirical (pedagogical supervisions, surveys); statistics methods (correlation and regression analyses).

We identified the basic research methods in building the models of the regression analysis:

1) the obligatory preliminary study of the line graph and the correlogram of bench-mark statistics. It is necessary to pay special attention to the selection of the neutral points, the metric scale, the type of the scale, the display of the asymptotes, the underlines of values, as well as the imposition of various graphs to enhance their analytic properties;

2) the use of formalized tests to determine the characteristics of the regression equation, if the type of the line graph does not allow us to give the definitive conclusion;

3) the verification of the used method or the model of the data, which were not used in their specification and identification. Since the main purpose of the modeling is to obtain the interpretable model of any process (economic, biological, etc.) on the basis of the available information, the reflection of the inherent relationships, and the purpose of prediction is getting the forecast with the help of the model or the more abstract computational procedures, then the data used in the analysis are considered only as a means of achieving these objectives. Thus, the most important is not to give the thorough description and the approach to the sample data, but the assessment of the general laws of the entire assembly. So the compared forecasting methods should use only historical information of the analyzed data files without going beyond its limits.

We also identified the methodical system of formation of professional competence of future economists through the application of mathematical methods and models, knowledge and skills, which, in turn, ensures the production of basic economic knowledge and skills:

1) understanding the general concepts of mathematical models and features of mathematical models of economy; 2) the ability to build and analyze

mathematical functions and their graphs, occurring when considering economic issues (the function of demand, supply, costs, production-possibility curves, isoquants, isocosts, etc.); 3) the ability to use the whole economic apparatus of elementary functions; 4) understanding of various schemes of the interest accrual, the functioning of banks and the banking system as a whole; 5) understanding the concept of discounting and its applications; 6) the ability to model the activity of the company in a monopoly market and the market of perfect competition; 7) to have the concept of production functions and optimization problems associated with them; 8) to be able to use the mathematical apparatus for analyzing the economic feasibility of investing in long-term projects that require large money loans; 9) to understand the tax calculation technique and the place of mathematical methods in economic processes; 10) to understand the meaning and significance of the most important economic concepts (factors of production, productivity, profitability, deposits, dividends, multipliers, bonds, stocks, exchange rate, the refinancing of banks, etc.); 11) to have an idea of elasticity, its varieties, limiting characteristics, and so on.

As a result of the implementation of the built methodical system the student gets the intensive development of economic thinking and economic culture, and his readiness to function in the new economic conditions, which are characteristics of the modern Russian society.

Results

Having studied the works by V. I. Zhilin (1999), V. M. Maximova (1981), P. V. Kiyko (2006), O. A. Klimenkova (2003), N. A. Klimova (2004), V. M. Monakhov (1995), A. S. Simonov (2000), and others, we analyzed the concept of intersubject connections and their implementation in the study of various subjects.

The intersubject connections are the process and the result of creating a continuously connected unified whole. In learning they are carried out by merging into one synthesized course of (course of study, topic, program) elements of different courses of study, merging of scientific concepts and methods of different disciplines in the general scientific concepts and learning methods, aggregation and summation of the fundamentals of the science in solving the problems of intersubject learning.

The intersubject connections are the reflection in the course, which was built with allowance for its logical structure, topics, concepts, revealed at the lessons of other courses of study. Intersubject connections represent the reflection of the dialectical relationships in the content of educational course of study that are objectively valid in nature and are studied by modern science.

We understand the intersubject connections as the unity of purpose, functions, content elements, educational course of study, which, when implemented in the educational process, promotes generalization, systematization and strength of knowledge, the formation of generalized skills, in the end - the holistic scientific outlook and qualities of the comprehensively and harmoniously developed personality.

As it is known, the system assumes the integrity, the unity of the elements that are in a relationship of mutual subordination, hierarchy, – integrity, contributing to the achievement of certain goals. Higher education can be seen as a system. Natural communications exist between different areas of science and culture, between science and ideology, between theory and practice, between the sensual and theoretical knowledge. The logical connections of separate systems of knowledge in academic courses find expression in the content of education.

The content of any educational course of study can be considered as a didactic system, in which the leading ideas perform the communication function. The leading ideas perform the function of systemically important connections in the content of subjects around which the integration of its structural elements into a single system takes place. The leading ideas can perform the integrating function in the learning process. The learning material, studied on the intersubject basis, contributes to the generalized nature of the cognitive activity of students.

The problem of qualitative training of students at the classical university is relevant for all subjects, including such a fundamental course of study for all specialties as mathematics.

Taking into consideration the fact that the professional activity of graduates in economics assumes such a level of knowledge of mathematics, which would enable them not only to master all of these professional activities but also to be prepared to understand the prospects of development of economy and economic theory, considering the volume and the purposeful content of mathematics, the time limit, the dynamics of change in the economic component of the development of the society, we had to change the process of teaching mathematics to provide a complete fulfillment of these demands.

The content-information intersubject connections are the intersubject connections which are established on the analysis of the content of the selected courses of study.

This type of intersubject integration communications is represented in the programs of the courses of study and is used in teaching.

The connection of facts studied in various theoretical courses of study is important for revealing the principles in which these phenomena can be explained. Therefore, a close analysis of the similar facts from different courses of study is necessary to avoid simple duplication and to show the connection of facts and concepts.

Here is the model of intersubject connections of general and special economic courses of study with mathematics.

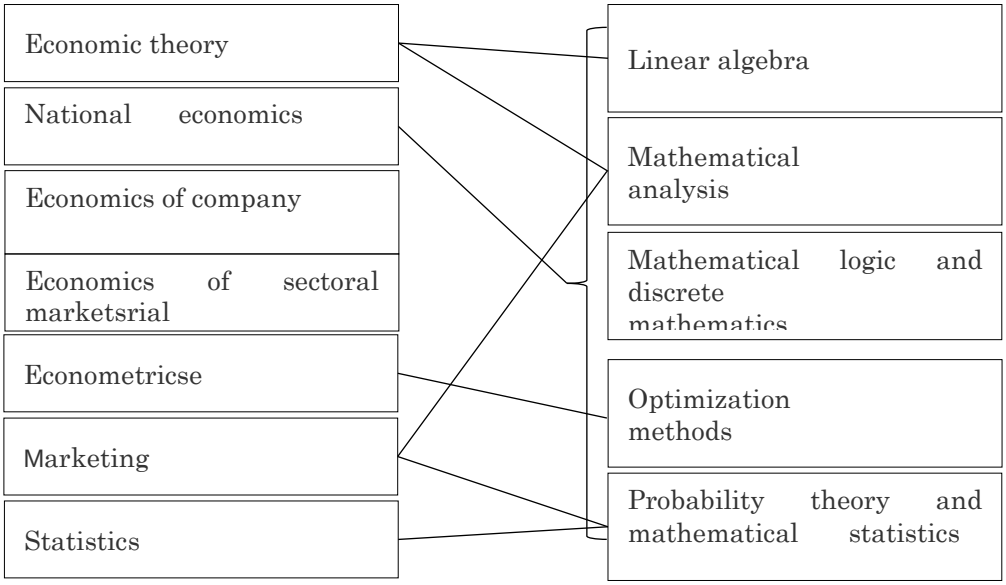

Figure 1. The model of intersubject connections of economy with mathematics

The operation-activity intersubject connections are intersubject connections in the ways of learning cognitive activities and skills of students in studying different courses of study.

This type of intersubject integration embraces broadly a variety of courses of study studied at the classical university. The uniformed calculation-graphic and computing skills are developed by the example of mathematics and economic disciplines. Thanks to this kind of intersubject connections, science is presented to the students, not only as a system of knowledge, but also as a system of methods. For a example, the application of mathematical methods in economics allows students to form generalized skills of mental activity in preparation of course works on economic disciplines. And students need to pay attention to the fact that the most important discoveries in our days were made by using the methods of one science in the study of some other science.

The problem of application of intersubject connections is usually solved through the study of scientific pedagogical and methodological literature of the related courses of study, through the initiatives of university teachers.

There are significant difficulties here, connected with the lack of understanding of the representatives of different sciences and the absence of thorough elaboration of common methodological and methodical approaches to their teaching. There are two problems: the problem of finding the objective method based on sharp calculations, allowing to determine the range of disciplines that are most closely related to each other (in this case, a course of mathematics with general economics and special subjects such as econometrics); the problem of the control method of assessment of learning results, built on the basis of integration.

Let us consider the use of content and information and operational-activity intersubject connections by the example of methods of mathematical statistics,

namely, the use of methods of correlation and regression analysis in econometrics at the stage of model specification.

Building a multiple regression equation begins with a decision on the specification of the model. It includes two aspects: the selection of factors (independent variables x_1, …, x_m) and the selection of the type of regression equation $y = f(x_i, a, b_i) + \varepsilon_i$, $i = \overline{1,m}$, $\hat{y}_x = f(x_i, a, b_i)$ (Shilova, 2015). The selection of the model is due to the knowledge of economic theory. In turn, the modern computer programs allow us to estimate the relationship between the economic (statistical) variables almost instantly. At the same time various indicators of quality of statistical regressions are calculated. Here, we pay attention to the second aspect (more complex from the practical point of view) - to the selection of factors, and we focus on solving the substantive problems of statistical and economic analysis.

The inclusion a set of factors in the equation of multiple regression is primarily due to the concept of the student about the nature of connection of the modeled indicator with the phenomena under study. The factors included in the multiple regression, must meet the following requirements:

1. The factors should be quantitatively measurable.

It is necessary to implement the content-information intersubject connections with mathematical statistics. If you want to include the quality factor in the model, with no quantitative measurement, then it should be given a quantitative certainty. For example, the location of property is taken into account in the model of the value of property. All locations can be ranged.

2. The factors must not be multicollinear and be in the exact functional dependence.

Here it is necessary to apply the content-information and operation-activity intersubject connections: students need to recall the concept of collinearity (linear coupling) from the course of mathematics and mathematical statistics, to apply the knowledge and skills of defining it between two variables, to recall that two variables are collinear, if the correlation coefficient is more than 0.7 in absolute value.

The inclusion of multicollinear factors in the model is not desirable due to the following consequences:

1. The interpretation of multiple regression parameters as the characteristics of the action factors in the "pure" form is made difficult, as the factors are correlated; the parameters of linear regression lose their economic sense.

2. The estimations of parameters are not reliable, they show big standard errors and change with the variation of the observation volume (not only in magnitude but also in index), that makes the model unsuitable for the analysis and forecasting.

The inclusion of a set of factors in the equation of multiple regression is primarily due to the concept of the researcher about the nature of connection of the modeled indicator with other economic phenomena, theoretically the

regression model allows to take into account any number of factors, but practically there is almost no need in it.

The selection of factors is carried out on the basis of the qualitative theoretical and economic analysis. However, the theoretical analysis does not often allow to answer the question clearly about the quantitative relationship of the characteristic under study, and about including factors in the model.

Consequently we suggest implementing of the factor selection using the (author's) algorithm.

The Algorithm

1. The factors are selected on the basis of the nature of the problem (economic or others).

The content-information intersubject connections between economic theory and econometrics are used here.

2. The factors, for which the t-test for the regression parameters was not performed, are selected.

The content-information intersubject connections of econometrics with the section of mathematical statistics - statistical hypothesis testing, and operational-activity intersubject connections are implemented when applying Student's t test for assessing the statistical significance of the regression coefficients.

3. The selected factors are examined for multicollinearity:

1) p-value H0: $\Delta_1 = 1$, alternative H1: $\Delta_1 \neq 1$.

$$\Delta_1 = \begin{vmatrix} 1 & r_{x_1x_2} & \dots & r_{x_1x_m} \\ r_{x_2x_1} & 1 & \dots & r_{x_2x_m} \\ \dots & \dots & \dots & \dots \\ r_{x_mx_1} & r_{x_mx_2} & \dots & 1 \end{vmatrix},$$

where $\Delta 1$– a matrix determinant of interfactor correlation, $r_{x_ix_j}$ –interfactor correlation coefficients ($i, j = \overline{1,m}$).

The operation-activity intersubject connections are implemented here: linear algebra with econometrics (in calculation of the determinant of the n-order) and mathematical statistics with econometrics (in calculation of the correlation coefficients and their estimation).

Note 1. The coefficients $r_{x_ix_j}$ may be calculated, for example, using MS Excel Correl statistical functions, and the determinant of a square matrix by the mathematical function MDETERM.

The operation-activity intersubject connections are implemented with consideration of information technologies.

Note 2. If $\Delta_1 \to 0$, the factors are multicollinear and the results of multivariable correlation are not reliable. If $\Delta_1 \to 1$, the factors do not correlate.

2) the empirical value of the criterion $K = n - 1 - \frac{1}{6} \cdot (2m + 5) \cdot \lg(\Delta_1)$ has distribution, which is close to χ^2 (Eliseeva et al., 2007). The content-information and operational-activity intersubject connections of econometrics with the section of mathematical statistics - statistical hypothesis testing are implemented here.

3) the critical value of the criterion $K(\alpha;k)$ is found here with the help of statistical functions HI2.OBR.PH for the significance level α and the degree of freedom $k = \frac{n \cdot (n-1)}{2}$;

4) if $K \geq K(\alpha;k)$, the hypothesis H0 is rejected and multicollinearity is not proved. If $K < K(\alpha;k)$, the hypothesis H0 is accepted, and multicollinearity is not present.

The content-information and operational-activity intersubject connections of econometrics with the section of mathematical statistics - statistical hypothesis testing are implemented here.

3. If there are several multicollinear factors the following steps must be made:

1) the modulo n sum is calculated under each column of the matrix of paired coefficients of correlation, using a mathematical function of ABS, each value of the sum corresponds to the particular factor. The operational-activity intersubject connections are used with due account for information technologies

2) the maximum sum is selected from the sums of the found module elements of the matrix of paired correlations, and it will reveal the number of the factor that most correlates with other factors (that is more dependent on other factors);

3) the most dependent factor must be deleted from the model.

Note 1. In practical researches, as a rule, there is a scattering of points with respect to the regression line. It is due to the influence of other factors, which are not accounted for in the regression equation. In other words, there are deviations of factual data from the theoretical data. The magnitude of these deviations lies at the basis of calculation of the residual variance:

$$\sigma_{\text{residual}} = \frac{1}{n} \cdot \sum (y - \hat{y}_x)^2 .$$

The smaller value of the residual dispersion, the smaller the impact of the not taken into account regression factors and the better the regression equation suits the given data.

Note 2. In the selection of factors it is also recommended to take the number of the included factors 5-7 times smaller than the cumulative population size on which the regression is based.

In addition to the selection of the factors included in the regression, the other important aspect is the ranking of the selected factors, since the coefficients of the "pure" regression (b_1, …, b_m) are not comparable with each other.

The efficiency of the factor selection algorithm was revealed in relation to the changes in the views of the students of the training courses 38.03.05 Business Informatics, 38.03.01 Economics, studying econometrics in the positive or negative direction.

The trend in the changing relationship of students to one of the aspects of the regression analysis was identified before and after it on the basis of the students' responses to the question: "Do you need an algorithm for the selection of factors?" (answers: "Yes" - "No").

The survey results were compared using the McNamara criterion. The sample of 20 students was randomly selected out of the students who studied in the econometrics classes in 2015/2016 years.

The survey results are given in the table.

Table 1. The survey results

	«Yes» in the second survey	«No» in the second survey
«Yes» in the first survey	a = 8	b = 0
«No» in the first survey	c = 10	d = 2

On the basis of the data of the table we can test the hypothesis H0: the use of the algorithm for the selection of factors with applying of inter-subject communications has no significant effect on the building of the regression model. The alternative hypothesis H1: the use of the algorithm for the selection of factors with applying of inter-subject communications has a significant effect on the building of the regression model.

To test the hypothesis H0 when $n = b + c = 10$ and the statistics of the criterion for T = 0 according to the table A (Grabar & Krasnyanskaya, 1977) for α = 0,05 we find the probability of appearance of statistical value less or equal to the observed value of statistics for the given value n = 10. In accordance with a decision rale, since 0.001 <0.025, then H0 is rejected at the significance level of α = 0,05.

Consequently, the survey of students shows the considerable interest in studying the suggested algorithm with the active use of the content-information and operation-activity intersubject connections at the highest level (in the terms of psychology), at the cognitive level.

Discussions

The publications of N. A. Burmistrova (2001, 2011), D. A. Kartezhnikov (2007), P. V. Kiyko (2006), O. A. Klimenkova (2003), N. A. Klimova (2004), N. V. Kolacheva (2006), Y. M. Kolyagin et al., (1975), E. A. Loktionova (1998), V. M.

Monakhov (1995), D. V. Nikanorenko (2003), E. S. Nikitina (2007), L. D. Ryabokoneva (1996), A. S. Simonov (2000), M. Y. Tumaykina (2000), and others are devoted to the issues of integration of mathematical and economic education in relation to schools and universities. The main issues, discussed in the works of these authors, are the following:

- The mathematical provision of the profile economic education in 10-11 grades and the development for them of some additional sections of mathematics. In these classes, thanks to the inclusion of new sections of mathematics (linear algebra, graph theory, elements of mathematical logic and others), the students have an opportunity of considering linear programming, network diagrams, input-output balance and others.

- The development of the economic content of the university courses of the mathematical analysis and higher mathematics and the consideration of their issues in 10-11 grades with the profound study of mathematics.

- The wide demonstration of the diverse economic examples based on the use of school mathematics.

- The economic education of students, the analysis of the work of school production units, modeling of business and others.

However the researchers mostly discuss school education.

Meanwhile the problem of the development of integrative tendencies between the mathematical and economic disciplines in training students of the economic profile at the classical university is not fully solved, we still have the problem of the professional orientation of teaching mathematics in higher education and we search for the means of its solving on the integrative basis.

In turn, the analysis of the works on the application of mathematical statistics methods, including methods of the correlation and regression analyses (Ayvazian & Mkhitaryan, 2001; Glantz, 1998; Glass & Stanley, 1976; Gmurman, 2003; Grabar & Krasnyanskaya 1977; Gurtovaya, 2004; Dougherty, 2004; Eliseeva, 2014; Ermolaev, 2006; Cochran, 1976; Kremer & Putko, 2013; Mkhitaryan, Arkhipov & Sirotin, 2012; Novikov, 2013; Nosko, 2011; Prosvetov, 2008; Silchenkova, 2014; Urbach, 1975; Fischer, 1978; Hollander & Wolfe, 1983), as well as the analysis of the published scientific views on the subject, methodological concepts and practical developments led to the conclusion that the theoretical and methodological aspects of statistical sampling factors are insufficiently developed and unambiguous. The objective need for further in-depth theoretical and methodological research is related to the question of building a new factor selection algorithm, which will improve the aspect of building the regression model.

Conclusion

Notwithstanding the extensive training of specialists for the economic sphere, the demand for these occupations is currently quite high in the labor market. The deepening market relations require highly qualified economic specialists.

The quality of the future economist depends on the ability to solve professional problems. The competitiveness and the need of the graduates of economic specialties in the professional activity are possible with qualitative fundamental natural science training, which is formed in turn with the active application of broad integrative connections of economics and mathematics, using information technology in the process of training, besides, economic culture and economic thinking of students are developing. All this is due to the fact that training of students in economic subjects is based on training of the mathematical disciplines, and between these disciplines intersubject connections objectively exist and should be established. The knowledge gained in the study of mathematics, must find application and be further deepened by the study of economic discipline.

The integrative intersubjectes. connections between mathematics and economics are possible in the implementation of methodical system of formation of professional competence of future economists through the application of mathematical methods and models, knowledge and skills, which, in turn, ensures the production of basic economic knowledge and skills. The integration of mathematics and economics is schematically illustrated by the model of intersubject connections of general and special economic disciplines with mathematics, developed by us.

The method of solving the problem of application of mathematical statistics methods in building the econometric model was developed. The significance of one of the aspects of the specification phase was determined, the location of selection factors in building the regression model was proved, the theoretical foundations and the nature of the specification stage in the study were stated. The algorithm for variables selection at the specification stage of building the regression model was suggested, which contributes to the conscious selection of the factors in the model and provides the confirmation of the real trends of the model, the expansion of its information content and the increase of the degree of reliability of the forecast results.

Recommendations

This research focuses on the aspects of the integration of mathematics and economics. Due to the fact that between mathematics and economics there are deep intersubject connections, the ability to solve and analyze very complex problems of economy with the help of mathematical methods based both on theoretical principles of mathematics, and on the widespread use of computers, and finally, clarifying the economic sense of the obtained results is really strong. As an example of integration the specification stage of building the regression model was considered. One of the important aspects of the specification stage is the selection of the most significant variables (factors). This aspect, as it is shown in the mini research, causes great difficulties in building and further studying of the regression equation. For the adequate selection of the variables, we suggest the algorithm that takes into account the main problems that arise at this stage, and allowing us either to avoid them or to properly solve them.

It should be noted that this work will give the opportunity to apply the obtained knowledge purposefully and competently by students and teachers in building the regression model.

Acknowledgments

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University

Disclosure statement

No potential conflict of interest was reported by the authors.

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