

Experience in Application of Electronic Educational Resources at Students of Economical Specialty for Development of Some Volitional Characteristics

Laisan N. Zainullina and Valeriya L. Vorontsova

Chair of Economical-Mathematical Modeling of Institute of Management,
Economy and Finances of Kazan Federal University, Kazan, Russia

Abstract: There are many researches about usage of web technologies in educational activity; however, there are very few ones that touch upon influence of net educational environment on development of endurance and stamina of students who are being educated including students of economical specialties. In this study, we investigate the efficiency of combination of traditional educational forms and distance educational technologies in development of students' insistency also, we reveal advantages of using electronic educational resources in students' learning activity. In higher school there is a focus on independent work that is why persistency in learning activity is necessary. However, first-year students do not have the skills of self-organization and time management, sufficient insistency and diligence at independent learning. That is why organization of independent work of first-year students is effective only at systematic teacher's control. Electronic educational resources allow developing students' ability of self-organization of their educational and cognitive activity as well as to develop insistency. Application of electronic educational resources for increasing students' insistency in educational activity is substantiated by the results of "Insistency" test (the researchers are Ye.P.Ilyina and Ye.K. Feshchenko), analysis of semestrial progress and results of examination in the discipline "Mathematical analysis" as well as application of χ^2 criterion and calculation of statistical coefficients Q and Q². Teachers of higher school may use obtained results as a base for taking decision in favor of using electronic educational resources in their teaching practice.

Key words: Insistence, development of insistence, electronic educational resource, distant educational technologies, independent student's work, co-integration coefficient mathematical analysis, systematic character

INTRODUCTION

Development of informational technologies conditioned occurrence and adoption of electronic education into higher educational system as a brand new form of education.

Electronic Educational Resources (EER) represent the base of electronic education. Electronic educational resource is an educational resource that was developed and implemented on the base of computer technologies.

There is a huge amount of publications and web sites, dedicated to classification of electronic educational resources which contain recommendations regarding their creation and practical implementation (Ilyin, 2014; Yakushina, 2015; Anonymous, 2015; Khmelev and Vasilyev, 2013; Osin, 2010, 2005; Druzhinina *et al.*, 2015).

Researches made by Osin (2010, 2005), Dorofeeva (2013) Osadchaya (2013) and Bordovskiy *et al.* (2007) touch upon the question of the role of electronic educational resources in educational process. The problem of application of electronic educational systems is topical for Foreign researchers as well. Thus, Varre *et al.* (2010) investigate the necessity of widening distance education in small American village schools. There are several researches that include comparative analysis of efficiency of these two types of education (traditional and virtual one) in higher educational establishment (Kramer *et al.*, 2015; Moazami *et al.*, 2014). Scientific study of Foreign colleagues present new technical possibilities that open with electronic education such as distance laboratories and distance experiments (Tho and Yeung, 2014; Costa *et al.*, 2010).

In higher educational system, the major part of the time is allocated for independent work of the students.

Independent work with manuals and training aids is of informative character where the control of training achievements is absent. EER covers all components of educational process such as theoretical and practical parts and assessment of obtained knowledge. Interactive character of EER provides widening possibilities of independent educational work at the account of using active educational forms.

Available organizational forms of education (lecture, practical training, etc.) do not consider different values of students' preparedness and commitment. EER allow the teacher to create original training courses, which make possible to change the view and structure of the material and by this to individualize students' educational loci.

MATERIALS AND METHODS

Theoretical part: We offer considering advantages of application of EER in students' educational practice in some different view. Namely, that combination of electronic educational technologies and traditional forms of education may influence development of students' endurance and insistency.

Psychological dictionary refine insistency as a seek to achieve something willed or necessary within a certain time period, including success in activity, regardless of existing difficulties and misfortunes.

According to Ilyin (2009)'s definition, insistency is a person's striving to achieve particular goal here andnow, i.e., it is oriented at performance of a certain short-term task.

Many papers were dedicated to study of the essence of insistency. Duckworth *et al.* (2007) consider endurance and insistency as personal characteristics which favor achieving successes in life.

MacArthur (1955) in his research established a two-component structure of insistency in achieving of goal, set by the test subjects.

Researches of Hancock and Szalma (2008) and Maddi (2006) are dedicated to study of peculiarities of influence of stress and insistency as a means of its overcoming.

Iyuu (2009), Visotskiy (1984), Gordeeva (2013) Krupnov and Dronov (2007) and Feshchenko (1999) refer insistency to volitional characteristics of person which define the majority of behavior acts.

The question regarding students' insistency in education was not a random one, since, educational activity is a must for digestion of knowledge, skills and abilities requires mental strain, persistency and insistency, besides, professional self-actualization would not be possible without this characteristic.

RESULTS AND DISCUSSION

While analyzing materials regarding possibility of developing students' insistency in the process of electronic education, we have not found any modern paper that would be dedicated to this topic.

For studying of insistency development of students from economic specialties, who were trained with application of electronic education, on the base of the Institute of Economy and Finances of Kazan Federal University a forming experiment was taken. Experimental base was formed by 152 first-year students (The 76 students from three experimental groups and 76 students from three control groups) of General Economic department, who were trained on a contract base.

During the experiment "Insistency" test was applied (Ilyina, 2009; Feshchenko, 1999). The test consists of 18 questions with two variants of answer each. At interpretation of results, the test subjects are divided into three groups: with low, medium and high level of consistency.

At the beginning of academic year, students from control and experimental were tested with definition of their insistency level. Obtained data showed that initially students from both groups had approximately the same level of tested personal quality.

In control groups, educational activity was performed in traditional form "lecture-practical training". In experimental groups, traditional education forms were combined with electronic education.

According to the curriculum, in the first semester electronic course "Mathematical analysis" was chosen. According to academic program for economic specialties, students were given 252 for this discipline, where 62 were given for lections, 64 for practical lessons and 126 for independent work. Lectures and practical lessons are held twice a week. After each topic learnt students from control group were asked to independently read the lecture and solve given problems from the manual in written form. Students form experimental group had to solve control tasks at educational electronic resource as well as to pass some test on this topic. At EER students were able to review materials of the lecture once again, to familiarize with examples and discuss solutions of problems at forum or ask teacher a question.

In control groups, assessments of knowledge digestion by students was performed in the view of questionnaires, doing sums at the blackboard, test and examination works. In experimental groups, the results of works, made at EER were assessed and considered in current rating of educational progress. Frequency and time of occurrence of students at the web site was monitored as well as the number of their actions; progress monitoring was made through forums and chats.

In the program of “Mathematical analysis” course in the first semester, it was planned to conduct three written auditorium examination works. In the first examination work, the majority of students omitted the most that were difficult for them. At writing the second and third examination works, experimental groups demonstrated positive dynamics in will and insistency of accomplishing the task and try to solve it. This data is presented in Table 1.

Efficiency of combination of electronic and traditional forms of education in higher educational establishment reflected the data of repeated testing. Check of statistical significance was based on application of χ^2 criterion and calculation of association coefficient Q (or contingency coefficient ϕ) and association coefficient Q^2 or (or contingency coefficient ϕ^2) at significance threshold $\alpha = 0.05$. Calculated coefficients Q^2 or ϕ^2 are interpreted as an influence level of combination of traditional and electronic education on level of insistency of testes students.

For experimental groups, the level of insistency was assessed in the following way: 28.95% of students had “low level”, 61.84% of students had “medium level” and 9.21% of them had “high level”. In control groups, these levels equaled 27.63, 60.53 and 11.84%, respectively of the total number of students. Let us note that among the tested subjects students with the low level of insistency represented almost the third part of total sample. Such students may be expelled in future from the university because of poor academic progress.

While comparing the data of repeated pedagogic diagnostics according to results of forming experiment, we detected positive dynamics of student’s insistency in experimental groups, which is reflected in Table 2. In experimental groups, the number of students with “low” level of insistency decreased by 17.11 and equaled 11.84%, the number of students with “medium” level of insistency increased by 13.2 and equaled 75%, the number of students with “high” level of insistency increased by 3.95 and equaled 13.16%, respectively. In control groups the number of students, whose level of insistency was assesses as “low” decreased by 6.58 and equaled 21.05%, number of students with “medium” level of insistency

increased by 7.89 and equaled 68.42% and the number of “high” level decreased by 1.31 and equaled 10.53%, respectively.

Calculated determination coefficient of association that defines statistical significance of combination of traditional and electronic education, equaled $Q^2 \approx 0.18$. Thus, effectively selected combination of traditional forms of education and distance educational technologies by 18% defines the possibility of developing insistency of students from experimental groups.

Efficiency of students’ learning activities reflected in final rating points for discipline course “Mathematical analysis”. In control groups, weighted average mark equaled $M(x) = 3.5$, in experimental groups $M(x) = 3.85$.

Per results of winter examination period on “Mathematical analysis” discipline, in control groups weighted average mark equaled 3.47, in experimental groups $M(x) = 3.8$.

Despite small difference in mean examination marks, qualitative indices of knowledge digestion of the course “Mathematical analysis” for students of control and experimental groups, have significant difference. In control groups, 10 students got “distinction” at the exam, and 25 students got “merit”, which equals to 46% of their total number. In experimental groups, 15 persons got “distinction” at the exam and 34 got “merit” which equals 64.5% of their total number.

Summary: In high school where independent work is in focus, insistency in learning process is a must. First-year students do not have the skills of self-organization and time management, sufficient insistency and diligence at independent learning. That is why organization of independent work of first-year students is effective only at systematic teacher’s control. Character of tasks

Table 1: Correlation of the number of insistent students from control and experimental groups of the total number of the ones who had troubles with tasks

No. of test work	Control group (%)	Experimental group (%)
The 1st one	49	48
The 2nd one	60	66
The 3rd one	43	87.5

Table 2: Correlation of insistency levels of students from control and experimental groups before and after performance of forming experiment

Levels	Number of students in %			
	Before performance of forming		After performance experiment of forming experiment	
	Control group	Experimental group	Control group	Experimental group
Low	27.63	28.95	21.05	11.84
Medium	60.53	61.84	68.42	75.00
High	11.84	9.21	10.53	13.16

with organized control system and self-assessment system, ability to build individual educational loci and orientation at achieving final goal develop students' ability of self-organization of their educational and cognitive activity as well as to develop insistency.

The latter one is proved by results of testing insistency level of students in experimental groups, by calculation of statistical coefficients Q^2 and Q , by results of academic progress for the semester and results of winter examination period in discipline "Mathematical analysis".

CONCLUSION

At organization of learning activity of students from experimental groups with application of electronic education and a positive dynamics of their insistency was detected. Thus, total number of students from experimental groups, whose level of insistency was assesses as "medium" and "high" increased from 71.05-88.16% and in control groups this index increased from 72.37-78.95%.

Efficiency of learning activity of students from experimental groups appeared to be higher than that of students from control groups: 64.5% versus 46% of positive examination marks.

The results, we obtained may serve as a reason for introducing electronic educational resources into training and pedagogic practice.

ACKNOWLEDGEMENT

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

REFERENCES

- Anonymous, 2015. Recommended practice of introduction and application of electronic educational resources into general education institutions of the Russian Federation. We site of municipal budgetary general education institution "Pafnutovskaya Osnovnaya Shkola". <http://pafnitschool.edusite.ru/p7aa1.html>.
- Bordovskiy, G.A., I.B. Gotskaya, S.P. Ilyina and V.I. Snegurova, 2007. Usage of electronic educational resources of a new generation in educational process: Research and methodology materials. Saint-Petersburg: Publishing House of Herzen State Pedagogical University of Russia, pp: 31.
- Costa, R., G. Alves and M. Zenha-Rela, 2010. Contextual analysis of remove experimentation using the actor-network theory. Ninth European Conference on e-Learning, ECEL; Porto; Portugal, pp: 329-332.
- Dorofeeva, T.V., 2013. Role of electronic educational resources in teaching humanitarian disciplines in higher educational establishment with economical orientation. *J. Bulletin Tomsk State Pedagogic University*, 1 (129): 62-65.
- Duckworth, A.L., C. Peterson, M.D. Matthews and D.R. Kelly, 2007. Grit: Perseverance and passion for long-term goals. *J. Personal. Soc. Psychol.*, 92 (6): 1087-1101.
- Druzhinina, O., O. Masina and V. Vorontsova, 2015. Use of Computer Technologies in Education and Scientific Research for Training Economists. *Asian Soc. Sci.*, 11 (11): 45-49.
- Feshchenko, Ye.K., 1999. Age-sex peculiarities of self-assessment of willed qualities. Thesis of Candidate of Psychological Sci., Saint Petersburg, pp: 136.
- Gordeeva, T.O., 2013. Internal sources of insistency and its role in successful learning activity. *Psychol. Personality's Formation*, 1: 33-48.
- Hancock, P.A., J.L. Szalma, 2008. Stress and Performance. P.A. Hancock and Szalma (Eds.), *Performance under Stress*.
- Ilyin, V.A., 2014. Electronic educational resources. Types, structure and technologies. Program products and systems. *Electron. Scienti. J.*, 2014, No. 2. <http://swsys-web.ru/electronic-educational-resources.html>.
- Ilyin, Ye.P., 2009. Psychology of will. 2nd Edn. Saint-Petersburg: "Piter" Publishing House, pp: 368.
- Khmelev, V., Yu. Vasilyev, 2013. Bases of development of electronic educational resources. Lecture 2. Types of electronic resources. National Open Institute INTUIT.
- Kramer, B.J., J. Neugebauer, J. Magenheimer and H. Huppertz, 2015. New ways of learning: Comparing the effectiveness of interactive online media in distance educational with the European textbook tradition. *British J. Edu. Technol.*, 46 (5): 965-971.
- Krupnov, A.I. and V.M. Dronov, 2007. Correlation of insistency with emotional and regulative attributes of temper. *Bulletin of Peoples' Friendship University of Russia*, 3-4: 13-19.
- MacArthur, R.S., 1955. An experimental investigation of persistence in secondary school boys. *Canadian J. Psychol.*, 9 (1): 42-54.
- Moazami, F., E. Bahrampour, M.R. Azar, F. Jahedi and M. Moattari, 2014. Comparing two methods of education (virtual versus traditional) on learning of Iranian dental students: A post-test only design study. *BMC Medical Education*, 14 (1): 45.
- Maddi, S.R., 2006. Hardiness: The courage to grow from stresses. *J. Positive Psychol.*, 1: 160-168.
- Osin, A.V., 2010. Open educational module multimedia systems. Publishing Service Agency, pp: 328.

- Osin, A.V., 2005. Multimedia in education: context of PDF information system development. A monograph. Publishing Service Agency, pp: 320.
- Osadchaya, L.M., 2013. Application of electronic educational resources at the lessons of in-plant training. Materials of report at applied science conference in 2013. www.gigabaza.ru/doc/38074.html.
- Tho, S.W. and Y.Y. Yeung, 2014. Remote laboratory system for technology-enhanced science learning: The design and pilot implementation in undergraduate courses. 22nd Intl. Conference on Comput. in Educat., ICCE, Nara Prefectural New Public HallNara; Japan, pp: 740-749.
- Varre, D.L.C, J. Keane and M.J. Irvin, 2010. Enhancing online distance education in small rural US schools: A hybrid, learner-centred model. *British J. Edu. Technol.*, 18 (3): 193-205.
- Visotskiy, A.I., 1984. Age dynamics of school children's will activity. *Issues of psychology of will activity of personality and team.* Ryazan State University, Ryazan, pp: 22-32.
- Yakushina, Ye.V., 2015. Electronic educational resources: topical questions and answers. http://vio.uchim.info/Vio_97/cd_site/articles/art_3_2.html.