

A model for optimizing the structure of teaching techniques for distance learning in the russian higher education system

Gardanova Z., Ponkratov V., Kuznetsov N., Nikitina N., Dudnik O., Latypova E., Shcherbatykh S.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This study aims to develop a methodical approach to optimize the structure of teaching techniques and approaches to distance education, as exemplified by Russian universities, to enhance students' professional competencies. A pedagogical experiment was conducted with the participation of 746 second to fourth year students majoring in engineering at the Ural Federal University in Russia. The coefficients for the relative importance of professional competencies were obtained through expert assessment. The number of experts was 40 faculty members with teaching experience of more than five years. The pedagogical experiment revealed the regularities of the influence of the forms of distance learning on the formation of students' professional competency levels. The values of students' developmental competency levels have been determined. Non-linear regression models have been developed based on the values of the integral level of professional competencies and the percentage of distance-learning forms in the number of instructional hours. The proposed methodological approach will be useful for university professors and teachers in identifying the most effective forms of distance learning and in differentiating teaching methods not only in the context of the general pandemic but also in the natural conditions of the educational process.

<http://dx.doi.org/10.3390/joitmc6040147>

Keywords

COVID-19, Distance learning, Higher education, Pandemic, Professional competencies, Students

References

- [1] United Nations Educational, Scientific and Cultural Organisation. Education for All 2000–2015: Achievements and Challenges. Available online: <https://unesdoc.unesco.org/ark:/48223/pf0000232205> (accessed on 24 April 2020).
- [2] United Nations Educational, Scientific and Cultural Organisation. Learning throughout Life: Challenges for the Twenty-First Century. Available online: <https://unesdoc.unesco.org/ark:/48223/pf0000127540> (accessed on 24 April 2020).
- [3] Kulnazarova, A.; Ydesen, C. UNESCO without Borders. Educational Campaigns for International Understanding; Routledge: London, UK, 2018.
- [4] Radif, M.; Mohammed, N.A. Computer science teacher's perception and needs towards E-learning in Iraq. J. Southwest Jiaotong Univ. 2019, 54. [CrossRef]
- [5] Caliskan, S.; Suzek, S.; Ozcan, D. Determining student satisfaction in distance education courses. Procedia Comput. Sci. 2017, 120, 529–538. [CrossRef]

- [6] Alrubaie, S.A.; Alrubaie, M.A.; Hassoon, I.M. The role of activating electronic training in increasing efficiency of training process. *J. Southwest Jiaotong Univ.* 2020, 55. [CrossRef]
- [7] Kegeyan, S.E. Distance learning: Its advantages and disadvantages. *Int. J. Prof. Sci.* 2016, 1, 71–74.
- [8] Learning House. Online College Students 2018. Comprehensive Data on Demands and Preferences. Available online: <https://www.learninghouse.com/knowledge-center/research-reports/ocs2018/> (accessed on 24 April 2020).
- [9] Zuhairi, A.; Karthikeyan, N.; Priyadarshana, S.T. Supporting students to succeed in open and distance learning in the Open University of Sri Lanka and Universitas Terbuka Indonesia. *Asian Assoc. Open Univ. J.* 2019, 15, 13–35. [CrossRef]
- [10] Qayyum, A.; Zawacki-Richter, O. Open and Distance Education in Australia, Europe and the Americas: National Perspectives in a Digital Age; Springer: Singapore, 2018.
- [11] Qayyum, A.; Zawacki-Richter, O. The state of open and distance education. In *Open and Distance Education in Asia, Africa and the Middle East*. SpringerBriefs in Education; Zawacki-Richter, O., Qayyum, A., Eds.; Springer: Singapore, 2019; pp. 125–140.
- [12] The Ministry of Education of the Russian Federation. National Project “Education”. Available online: <https://edu.gov.ru/national-project/> (accessed on 24 April 2020).
- [13] Ministry of Science and Higher Education of the Russian Federation. Order No. 397 “On the Arrangement of Educational Activities in Organizations Implementing Educational Programs of Higher Education and Relevant Additional Professional Programs, in the Context of Preventing the Spread of a New Coronavirus Infection in the Territory of the Russian Federation”. Available online: <https://www.minobrnauki.gov.ru/common/upload/library/2020/03/main/397.pdf> (accessed on 24 April 2020).
- [14] Ministry of Science and Higher Education of the Russian Federation. Order No. 484 “On Measures to Implement the Decree of the President of the Russian Federation No. 206 of 25 March 2020 “On the Announcement of Non-Working Days in the Russian Federation””. Available online: <https://minobrnauki.gov.ru/common/upload/library/2020/03/main/484.pdf> (accessed on 24 April 2020).
- [15] Ministry of Science and Higher Education of the Russian Federation. Order No. 634 “On Amendments to the Order of the Ministry of Science and Higher Education of the Russian Federation No. 545 Dated April 2, 2020 “On Measures for the Implementation of the Presidential Decree No. 239 of April 2, 2020 “On Measures for Ensuring Sanitary and Epidemiological Welfare of the Population in the Russian Federation in Connection with the Spread of a New Coronavirus Infection (COVID-19)” by Organizations Subordinated to the Ministry of Science and Higher Education of the Russian Federation””. Available online: https://minobrnauki.gov.ru/common/upload/library/2020/04/main/Dokument_1.pdf (accessed on 24 April 2020).
- [16] Podtserob, M.; Bershidsky, M.; Petrova, Y. Russian Universities Report on the Transition to Online Education. *Vedomosti*. Available online: <https://www.vedomosti.ru/management/articles/2020/03/25/826230-rossiiskie-vuzi> (accessed on 24 April 2020).
- [17] Shapovalova, S. Why Is Distance Learning Called the “Imperative of Our Time”? *Regnum*. Available online: <https://regnum.ru/news/innovatio/2924037.html> (accessed on 24 April 2020).
- [18] Committee on Education and Science. Draft Federal Law No. 607448-7 “On Amendments to the Federal Law “On Education in the Russian Federation” as Regards Improving the Practical Training of Students”; 2018. Available online: <https://elibrary.ru/item.asp?id=41863282> (accessed on 24 April 2020).
- [19] Education Navigator. Coronavirus “Exposed” All the Problems of Distance Learning. Available online: https://fulledu.ru/articles/1621_koronavirus-obnazhil-vse-problemy-distancionnogo.html (accessed on 24 April 2020).
- [20] Wilkinson, B.; Leis, H. This Research Can Help Organizations Plan for Different COVID-19 Scenarios. *World Economic Forum*. Available online: <https://www.weforum.org/agenda/2020/04/research-can-help-organizations-plan-for-different-covid-19-scenarios/> (accessed on 24 April 2020).
- [21] Leung, K.; Wu, J.T.; Liu, D.; Leung, G.M. First-wave COVID-19 transmissibility and severity in China outside Hubei after control measures, and second-wave scenario planning: A modelling impact assessment. *Lancet* 2020, 395, 1382–1393. [CrossRef]
- [22] United Nations Office for the Coordination of Humanitarian Affairs. COVID-19: Scenarios, Possible Global Humanitarian Developments over the Next Six Months. Available online: <https://reliefweb.int/report/world/covid-19-scenarios-possible-global-humanitarian-developments-over-next-six-months-april> (accessed on 24 April 2020).
- [23] Moore, K.A.; Lipsitch, M.; Barry, J.M.; Osterholm, M.T. COVID-19: The CIDRAP Viewpoint. Part 1: The Future of the COVID-19 Pandemic: Lessons Learned from Pandemic Influenza. *University of Minnesota*. Available online: https://www.cidrap.umn.edu/sites/default/files/public/downloads/cidrap-covid19-viewpoint-part1_0.pdf (accessed on 24 April 2020).
- [24] Kleczkowski, A.; Kao, R.R. Scenarios for How the COVID-19 Pandemic Might End, and Why We Might Have to Live with It for Years to Come. *Newsweek*. Available online: <https://www.newsweek.com/scenarios-how-covid-19-pandemic-ends-1494374> (accessed on 24 April 2020).
- [25] Arias, J.J.; Swinton, J.; Anderson, K. Online vs. face-to-face: A comparison of student outcomes with random assignment. *e-J. Bus. Educ. Scholarsh. Teach.* 2018, 12, 1–23.
- [26] Alhihi, M.; Ossiannilsson, E.; Berigel, M. Levels of interaction provided by online distance education models. *EURASIA J. Math. Sci. Technol. Educ.* 2017, 13, 2733–2748. [CrossRef]
- [27] Xu, L.; Yang, Q. Modeling and analysis on teacher-student relationship. *Discrete Dyn. Nat. Soc.* 2019, 2019, 5481926. [CrossRef] [PubMed]
- [28] Shah, S.I.; Shahjehan, A.; Afsar, B.; Afridi, S.A.; Saeed, B.B. The dynamics of leader technical competence, subordinate learning, and innovative work behaviors in high-tech, knowledge-based industry. *Econ. Res.* 2020, 33, 623–638. [CrossRef]
- [29] Smith, B.; Hernandez, M.; Gordon, J. Competency-Based Learning. Available online: <https://apps.dtic.mil/dtic/tr/fulltext/u2/1077111.pdf> (accessed on 24 April 2020).

- [30] Herppich, S.; Praetorius, A.-K.; Förster, N.; Glogger-Frey, I.; Karst, K.; Leutner, D.; Behrmann, L.; Böhmer, M.; Ufer, S.; Klug, J.; et al. Teachers' assessment competence: Integrating knowledge-, process-, and product-oriented approaches into a competence-oriented conceptual model. *Teach. Teach. Educ.* 2018, *76*, 181–193. [CrossRef]
- [31] Krawczak, M.; Szkatuła, G. On matching of intuitionistic fuzzy sets. *Inf. Sci.* 2020, *517*, 254–274. [CrossRef]