

Interdisciplinary Interaction in ISO 9001-2015 Standards

National Research University of Electronic Technology MIET
M.V. Akulyenok

The article is devoted to the analysis of quality management system of interdisciplinary interaction and trends in university QMS improvement in accordance with the requirements of the new implemented edition of International ISO 9000 standards, in particular, the requirement for risk management.

Key words: quality management system, interdisciplinary interaction, risk management, positive and negative risks.

Significant innovation potential and highly negative risks of interdisciplinary interaction further the pressing need in considering the International ISO 9001-2015 standard requirements [1], in particular, risk management.

It should be noted that the quality management system (QMS) has been formally implemented into most universities and, in most cases, it lacks high effectiveness. At the same time, the unreasonably imposed scope of documentation does not improve the quality of education. Only a few universities have succeeded in fulfilling the requirements stated in the earlier standard edition, i.e. implementation of approach process into the T&E activity and, thus, achieve effective QMS. Adopted and implemented on November, 1, 2015, the newly edited standards GOST R ISO 9000-2015 and GOST R ISO 9001-2015 [1,2] specified two aspects: firstly, solving the more complicated problems within specified transition period to September, 2015; and secondly, implementing the developed requirements to improve the education program (EP) quality at a totally new level.

Management risks in the QMS structure, being included in the new ISO 9001-2015 standard edition, could be the response to the dynamic external and internal realities of this or that university. Under conditions of unpredictable changing, constant opportunities and challenges, high risk and

subjectivity in evaluating an organization status and its surroundings, probability to achieve the stated goals, the approaches that are applied in high school management require improvement, i.e. implementing the process of management risk. Basically, risk management, within QMS of any company, is a development tool providing the transfer to a more qualitatively conceptual level "preventive action" and relevant documentation procedures, which have been excluded from the described standard requirements.

In accordance with the existing regulatory documents [1-5], the operational definition could be: **risk is the consequence of an uncertainty action on achieving specified goals. "Consequence of uncertainty action"** is any inclination from expected result and/or event, both positive and negative (i.e. not only emerging possibilities but also risks with negative consequences). "Uncertainty" is complete and/or partial absence of information and/or knowledge needed to understand the events, their consequences and probabilities.

In this case, goals as desired result, presently absent, are in good agreement not only with the concept "goal in quality, but also exactly reflect its specific nature "education program goals". The education program path from the stated goal and planned learning outcomes to

REFERENCES

1. Kirsanov A.A. Metodologicheskie problemy sozdaniya prognosticheskoi modeli spetsialista [Designing prognostic model of a professional: methodological challenges]. Kazan: Publ KNRTU, 2000. 229 p.
2. Averintsev S.S., Arab-Ogly E.A., Il'ichev L.R. et al. (eds.) Filosofskii entsiklopedicheskii slovar' [Encyclopedia of philosophy]. Moscow: Sovetskaya entsiklopediya, 1989. 584 p.
3. Blauberg I.V., Sadovskii V.N., Yudin E.G. Sistemnye issledovaniya i obshchaya teoriya sistem [Systemic research and system theory]. Sistemnye issledovaniya: ezhegodnik [Systemic research: annuary]. Moscow: Nauka, 1969, pp. 7–29.
4. Litvinova T.N., Echka E.M. Mezhdistsiplinarnyi podkhod v nauke i obrazovanii [Elektronnyi resurs] [Interdisciplinary approach in science and education]. Materialy I Vserossiyskoi elektronnoy seminar-konferentsii Global'noe nauchnoe soobshchestvo: integratsiya, kooperatsiya, kommunikatsiya (21-30 aprelya 2015 g.) [Proceedings of the first all-Russia electronic seminar-conference Global Scientific society: integration, cooperation, communication (April 21–30, 2015)]. Volgograd, 2015. URL: <http://www.gs-conf.com/index.php/stati-i-vserossiyskaya-elektronnaya-seminar-konferentsiya-globalnoe-nauchnoe-soobshchestvo-integratsiya-kooperatsiya-kommunikatsiya/37-mezhdistsiplinarnyj-podkhod-v-nauke-i-obrazovanii> (Accessed: 17.05.2016).
5. Disterveg A. Izbrannye pedagogicheskie sochineniya [Selected Works on Pedagogy]. Moscow: Uchpedgiz, 1956. 378 p.
6. Zimnyaya I.A. Pedagogicheskaya psikhologiya: uchebik dlya vuzov [Pedagogical Psychology: college textbook]. Moscow: Logos, 2003. 383 p.
7. Rep'ev Yu.G. Interaktivnoe samoobuchenie [Interactive Self-Learning]. Moscow: Logos, 2004. 248 p.



M.V. Akulyenok

goal acquisition is long. It is inevitable that this path itself involves the influence of varied risks. In this case, the application of risk management methods would be very useful. This in itself is necessary for interdisciplinary programs as the uncertainty source "intensity" and further possible synergy effect and insurmountable difficulties increase with the intensity and depth of interdisciplinary interaction (from two disciplines to specialties, majors and/or fundamentals [6, 7, 8]).

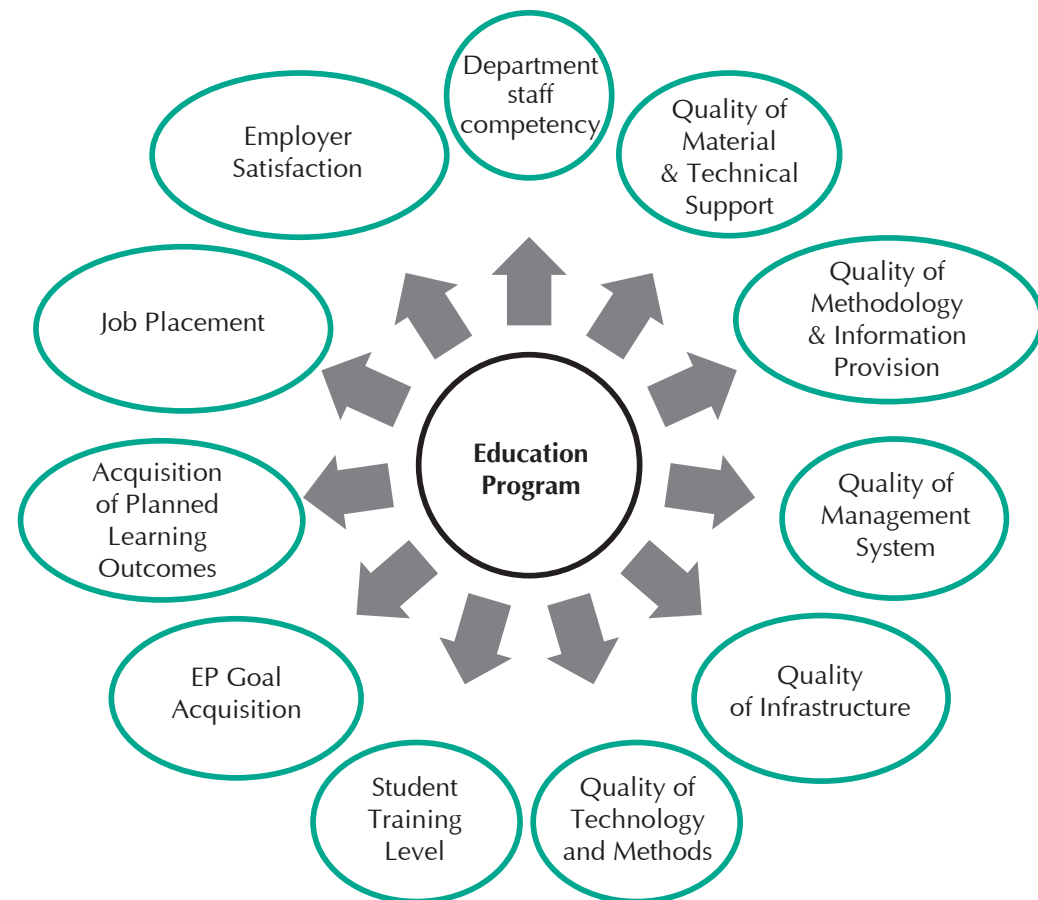
Principally, decreasing risk of EP quality should be taken into consideration in the risk analysis of EP during its planning and development, including the determination of the goals and learning outcomes [9, 10]. Despite the multi-concept of the term

"education quality" (ref. Example [11]), described risk is often considered to be (fig.1):

- no achievement of education program goals;
- noncompliance of requirements for graduates according to FSES HE;
- learning outcomes noncompliance to planned ones;
- inability to entirely identify and implement employer's requirements;
- no target-focused training;
- noncompliance of staff training to State Accreditation criteria;
- impossible job placement;
- necessary professional retraining;
- etc.

During EP planning and development

Fig. 1. Basic aspects of the concept "education quality"



(according to §6.1 GOST R ISO 9001-2015) and its further implementation, risk management implies:

- determining the context of the education program (external and internal realities);
- identifying the risks, including their detection and description;
- quantitative evaluation and comparative analysis of risks;
- actions on risks (management decision making, for example, reducing the probability of unfavorable results and minimization of possible losses).

As well as constant information sharing with interested parties and monitoring designed measures and EP implementation throughout the process. This involves not only the analysis of occurring changes and newly emerging risks, but also the evaluation of the effective action on the risks. Systematic approach in identifying and evaluating risks involves the structured process based on the corresponding elements through the specific methods [3-5].

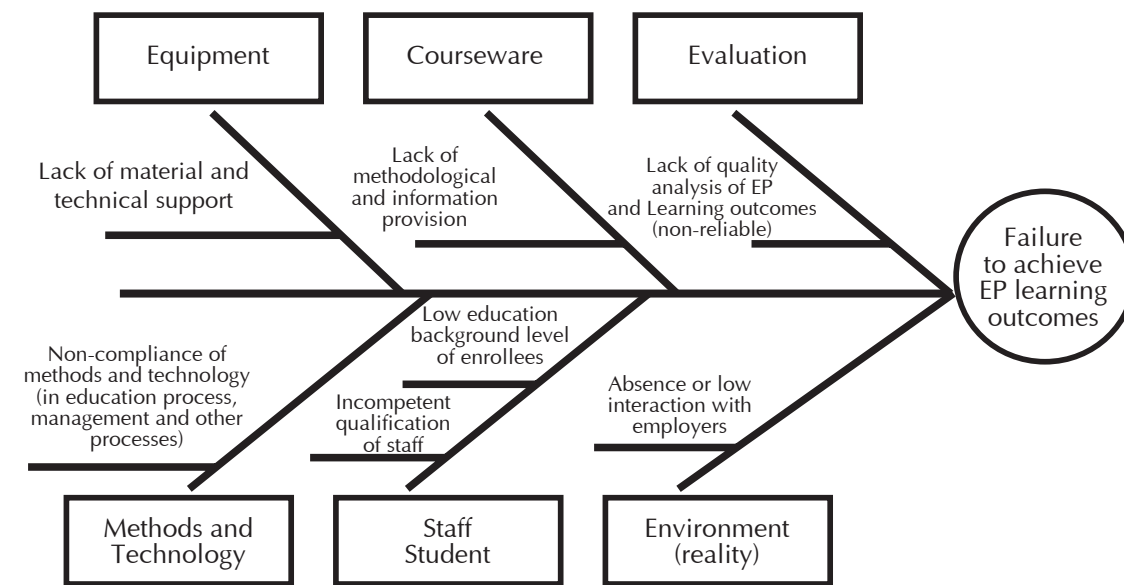
Identification (detection and description

of risks) includes cause-effect analysis. In this case the risks involving goal acquisition and planned EP learning outcomes could and should be analyzed. For example, the EP learning outcomes noncompliance to the planned ones (or low EP effectiveness) could be connected with a series of reasons, a few of which are illustrated in the cause-effect diagram (fig. 2). To identify the factors affecting the achievement of planned learning outcomes, the universal "5M" tool analogue (man-machines-materials-methods-milieu), adapted to the T&E activities, was applied.

Interdisciplinary education programs embrace not only the above-mentioned factors, but also a wide range of additional factors associated with the result interaction, which, in its turn, influence the possible synergy effect. Thus, the following reasons for noncompliance of interdisciplinary education program learning outcomes to planned ones could be included in this risk list:

- slight interaction within the internal university reality, for example, ineffective (or unmanageable)

Fig. 2. Achieved and expected learning outcomes: reasons for non-conformity



interaction between department staff and lack of university administration support;

- slight interaction with the external reality: for example, ineffective (or unmanageable) interaction between enterprise- employers and interested parties.

Functional risk management implementation into planning and development of EP furthers:

- implement focused-risk definition of EP goals and learning outcomes;
- improve effective academic-teaching staff interaction within internal university reality, as well as university department-employer interaction and university-graduate interaction;
- perform operative monitoring, constantly observing the risks that could emerge both at the EP stage of

planning and designing and during its implementation.

There is one more positive aspect – informal risk management implementation could possibly solve the problem of university QMS. i.e. document management optimization through risk-oriented identification of necessary and unnecessary documents within the framework of both QMS and EP management.

Consistent interdisciplinary interaction and interdisciplinary EP risk analysis would involve the following: promoting interdisciplinary education program goal achievement, developing and integrating risk management into the QMS structure, updating university QMSs in compliance with the new GOST R ISO 9001-2015 requirements and improving EP management efficiency.

REFERENCES

1. GOST R ISO 9001-2015 Sistema menedzhmenta kachestva. Trebovaniya. Vved. [Quality Management System. Requirements. Introd.] 2015.11.01, Moscow: Standartinform, 2015, 32 p.
2. GOST R ISO 9000-2015 Sistema menedzhmenta kachestva. Osnovnye ponjatija i opredelenija.Vved. [Quality Management System.Major concepts and definitions. Introd.] 2015.11.01, Moscow: Standartinform, 2015, 53 p.
3. GOST R ISO 31000:2010 Menedzhment riska. Principy i rukovodstvo. Vved. [Management risk. Principles and guidelines. Introd.] 2011.09.01, Moscow: Standartinform, 2012, 26 p.
4. GOST R ISO/ISP31010–2011 Menedzhment riska. Metody ocenki riska. Vved. [Management risk. Risk evaluation methods. Introd.] 2012.12.01 Moscow: Standartinform, 2012, 74 p.
5. GOST R 51897-2011, ISO Guideline 73:2009 Menedzhment riska.Terminy i opredelenija. Vved. [Management risk. Terms and definitions. Introd.] 2012.12.01 Moscow: Standartinform, 2012,16 p.
6. Pokholkov Yu.P. Editor Letter Engineering Education, Tomsk, no. 14, 2014, pp. 2–3.
7. Lori N.F. Interdisciplinarity in engineering education. Trends and concepts. Engineering Education, Tomsk, no. 14, 2014, pp. 27-30
8. Akulenok M.V. and Larionov N.M. Development of personnel specialized training in the field of high-tech production quality, Engineering Education, Tomsk, no. 7, 2011, pp. 36-39.
9. Akulenok MV. Razrabotka obrazovatel'nyh programm novogo pokolenija po napravleniju «Upravlenie kachestvom» [Developing new generation education programs in "Quality management"] Problemy upravlenija kachestvom obrazovanija, sb. tr. H Vseros. nauch.-prakt. Konf, Penza, ICS RAS, 2015, pp .12–15.
10. Akulenok M.V. Ocenka riskov obrazovatel'noj programmy [Risk analysis of education programs] Problemy upravlenija kachestvom obrazovanija, sb. tr. H Vseros. nauch.-prakt. Konf, Penza, ICS RAS, 2014, pp.11–16.
11. Metodologicheskie podhody k ocenke programm podgotovki specialistov obrazovatel'nogo kompleksa [Methodological approaches in evaluating specialist programs] ed. Buyankina R.G., Zamiralova E.V., Knyazev N.A., Sokolovskaya M.V. and Popova O.M. Philosophy education, 2015, no. 5, pp. 65–73.