Правительство Российской Федерации

Федеральное государственное автономное образовательное учреждение высшего профессионального образования

«Национальный исследовательский университет «Высшая школа экономики»

Факультет компьютерных наук
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компьютерных наук
И.В. Аржанцев

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2016 г.

Программа дисциплины

«Психология управления командой разработчиков программного обеспечения»

для направления 09.04.04 «Программная инженерия»

подготовки магистратуры

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Одобрена на заседании Департамента программной инженерии «___»_____ 2016 г.
Руководитель Департамента С.М. Авдошин
Рекомендована Академическим Советом образовательной программы
«Программная инженерия» «___»_____ 2016 г.
Академический руководитель образовательной программы Д.В. Александров

Москва, 2016

Course Information

Specification Author:

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Subject Title in English:

Psychology of Software Development Team Management

1. Application Guidelines and Regulations

This specification presents a detailed description of the educational purpose, curriculum, and assessment methods for the discipline "Psychology of Software Development Team Management". This course is delivered to master students of software engineering department, business informatics faculty, HSE. The specification was developed in accordance with the following standards and regulatory documents:

- Master curriculum of MSc educational program 231000.68 "Software Engineering", specialization "Software development management". - Moscow, HSE, 2010.
- Curriculum of 1st year MSc educational program 231000.68 "Software Engineering", specialization "Software development management". - Moscow, HSE, 2010.
- Federal state educational standard of higher education in software engineering (Master degree) approved by Order of the RF Ministry of Education and Science of 9 November 2009 N543 (in Russian).

The specification is intended to be used as a source of information by:

- students and potential students;
- lecturers delivering lectures and conducting practical classes on the course or related disciplines;
- professional and statutory regulatory bodies when carrying out accreditation.

2. Course Objective

In the highly competitive software industry, improving the software development process can be critical to a company's success. More specifically, improving a team's productivity can save employers significant time and money. The main issues for software development team productivity are in the area of "soft" skills, psychologically based phenomena and peculiarities.

The objective of the Psychology of Software Development Team Management course is to develop professional competencies, related to applying best practices of applied psychology to real situations, process of communication and management of software development teams.

Today the demand is growing for software development experts capable of analyzing problems, making decisions in business situations that involve risk or uncertainty, and building effective and efficient communication into and outside the team. These skills can be acquired through systematic studying of various team management incidents - cases. The curriculum is built so that the students immediately learn to use theoretical knowledge in practice by studying various team management incidents, identifying mistakes of people involved in the stories, and proposing problem solutions.

3. Learning Outcomes

During the course, the students will:

- Study the basic terms, definitions and principles of psychology regarding the team management (including software development teams);
- Master methods and tools for planning, control, arrangement, motivation, and communication in team working assignments;
- Master models of team management and forming effective and efficient teams (including cross-cultural, dispersed, virtual, and inter-disciplinary teams), assuming roles of the end user, software engineer, senior architect, CIO, and company chairman;
- Acquire practical skills in managing teams of software developers;
- Acquire practical skills in real-world decision making and problems solving in teamwork assignments.

The course contributes to the development of the following systemic and professional competencies [3]:

1. *Project activities*
   - The ability to arrange a multidimensional (including, crosscultural) communication and to manage it (СК-М7).
   - The ability to use the social and multicultural differences for problem solving in professional and social activities (ПК-3 СЛК-М3).
   - The ability to work in multidisciplinary team, including the international environment (ПК-9 СЛК-М9).
2. *Managerial activities*
   - The ability to plan and manage the process of software development (ПК19 ИК-М5.1.ПТД_ПИ1 (ПИ)).
   - The ability to arrange and manage the joint work of software development team, interact with counterparts (ПК-25 ИК-М7.3.ОУД (ПИ)).

4. Discipline in the Educational Program

Curriculum:

The course length is 190 academic hours, including 18 hours of lectures, 22 hours of practice and seminars, and 150 hours of self-study. Academic control forms are one home assignment and one test. It is a part of specialized curricula unit, and it is delivered in modules 1-2 of the second academic year. Number of credits is 5.

Prerequisites:

The course is based on the knowledge of foundations of psychology (general, cognitive, social, organizational), group dynamics and communications in professional practices.

Subject Structure and Contents

No.	Topic name	Course hours, Total	Audience Hours		Self-study
			Lectures	Practical studies / seminars	
Module 1					
1.	Introduction to the course. Psychological aspects of software development team management	14	2	2	10
2.	Psychological characteristics and personality types in software development teams.	26	2	4	20
3.	Team roles vs. functional roles in software development teams.	24	2	2	20
4.	Team design and development.	14	2	2	10
5.	Managing software development virtual and distributed teams.	24	2	2	20
Module 2					
6.	Managing software development multicultural teams.	24	2	2	20
7.	Managing agile software development teams.	13	1	2	10
8.	Management and leadership in software development teams.	24	2	2	20
9.	HR-aspects of software development team management.	14	2	2	10
10.	Software development team management in organizational context.	13	1	2	10
	Total:	**190**	**18**	**22**	**150**

5. Grading and Assessment

Type	**Form**	**2 year**				**Notes**
		1	**2**	**3**	**4**	
Progress check	Written test	*				45 minutes
	Homework assignment	*				Case study development in team
Final check	Written exam		*			90 minutes – case study analysis

5.1. Evaluation criteria

Written test

Students get a written test with 45 minutes to complete. The test contains Yes-No questions, single-choice and multiple-choice questions, as well as open-ended questions. Students are scored based on the number of questions they answered correctly, and the weight of each question in the overall result (varies from 1 for single-choice and Yes-No questions, to 10 for open-ended questions). Evaluation formula is 10*(score_achieved/maximum_score). A maximum score of 10 can be achieved.

Homework assignment

Homework is in the form of case study development and analysis, providing in teams of 4-5 students. The topics and cases select by the student based on their interests. Once approval of the topic is obtained from course instructor, the student writes the case study based on the information from public sources, personal experience and imagination. Evaluation criteria for student's homework assignment are presented in the table below. A maximum score of 10 can be achieved.

Development of case study	Analysis of case study
• Relevancy of information • Real-life story basis • Structure of text • Sufficiency of selected material • Freshness of ideas • Accuracy of problem statement • Author's contribution and analytical processing of information from public sources	• Demonstration of good command of theoretical knowledge • Ability to identify both common and specific problems • Exploring various solutions • Openness to different perspectives • Being persuasive in argumentation • Application of risk management principles and decision making methods

Written exam

Final exam is in the form of case study analysis. Cases are selected and assigned at random by the course instructor. Evaluation criteria for student's homework assignment are presented in the table above. A maximum score of 10 can be achieved.

Penalties

Should plagiarism be identified in the student's homework, disciplinary measures are applied as appropriate per the HSE Charter.

Should the student fail to present homework before the end of the 1st module, but submit it at any point during the 2nd module until the week of interim exams starts, a reduction of the scores for the assignment by 30% is applied. In this case, a maximum score of 7 for the homework assignment can be achieved.

5.2. Overall Score

Overall score on the course **Ofinal** is determined using the following formula:

Ofinal = 0,2*Otest+0,3*Ohome+0,2*Oauditorium+0,3Oexam

where

- **Otest** - score achieved by the student for the written test;

- **Ohome**- score achieved by the student for the homework teamwork assignment;
- **Oauditorium** – score achieved by the student for the participation in group discussion during the seminars and practical work in class;
- **Oexam** - score achieved by the student for the written exam.

A score of 4 or higher means successful completion of the course ('pass'). A score of 3 or lower means failure to complete the course ('fail').

6. Detailed Curriculum Plan

Topic 1: Introduction to the course. Psychological aspects of software development team management

Topic outline:

- Course agenda
- Understanding programmers and software engineers, types of programmers
- Understanding ways of managing programmers and software engineers: why they seems to be unmanageable?
- Terms and groups, definitions and principles of psychological aspects of software development team management
- Framework for case study analysis

Main references/books/reading:

- DeMarco, T., Lister, T.R., Peopleware: Productive Projects and Teams (Second Edition), 2010.
- Fox, J.R., Digital Work in an Analog World Improving Software Engineering Through Applied Psychology, 2011.
- Mantle, M.W., Lichty, R., Managing the unmanageable: Rules, tools, and insights for managing people and teams. Addison-Wesley, 2013. (Chapters 1, 2)
- Weinberg, G.M., The Psychology of Computer Programming: Silver Anniversary Edition. Anl Sub, 1998.

Additional references/books/reading:

- Brooks, F.P., The Mythical Man-Month: Essays on Software Engineering, Anniversary Edition (2nd Edition), 1995.
- Csíkszentmihályi, M., Flow: The Psychology of Optimal Experience. New York: Harper and Row. 1990.
- Feldt, R. et al., Towards Individualized Software Engineering: Empirical Studies Should Collect Psychometrics, Proc. Workshop Cooperative and Human Aspect of Software Eng. (CHASE), ACM Press, pp. 49–52. 2008.

- Kaluzniacky, E., Managing Psychological Factors in Information Systems Work, Information Science Publishing, 2004.

Topic 2: Psychological characteristics and personality types in software development teams.

Topic outline:

- Understanding types of programmers and software personality
- Introduction to the personality theories
- Myers-Briggs Types (MBTI)
- The Keirsey Temperament Sorter
- Types of temperament
- Big Five Personality Dimensions
- DISC
- Types of reaction on conflict and on stress
- Soft skills vs. hard skills

Main references/books/reading:

- Bents, R., & Blank, R., Understanding the dynamics of typical people: An introduction to Jungian type theory, Hogrefe, 2010.
- Briggs-Myers, I., Introduction to Type®, CPP, 1998.
- Fox, J.R., Digital Work in an Analog World Improving Software Engineering Through Applied Psychology, 2011.
- Mantle, M.W., Lichty, R., Managing the unmanageable: Rules, tools, and insights for managing people and teams. Addison-Wesley, 2013. (Chapters 1, 2 (p.27-28), 7)
- Hirsh, S.K., & Kummerow, J.M., Introduction to Type® in organizations, CPP, 1998.

Additional references/books/reading:

- Acuna, S.T., Juristo, N., and A.M. Moreno, Emphasizing Human Capabilities in Software Development, IEEE Software, vol. 23, no. 2, 2006, pp. 94–101.
- Capretz. L.F., Personality Types in Software Engineering, Int'l J. Human-Computer Studies, vol. 58, no. 2, 2003, pp. 207–214.
- Curtis, B. The Impact of Individual Differences in Programmers, in Working with Computers: Theory Versus Outcome, Eds. G. C. van der Veer, T. R. G. Green, J.-M.Hoc, and D. M. Murray, Academic Press, London, 1988, pp. 279-294.

  development teams. Team Performance Management Vol. 17 No. 3/4, 2011 pp. 187-205. 2011.

- Hardiman, L.T., Personality Types and Software Engineers, Computer, vol. 30, no. 10, 1997, p. 10.
- Keirsey, David, Portraits of Temperament, Prometheus Nemesis Book Company, Del Mar, California, 1987.
- P'Rayan, A., & Shetty, R.T., Developing Engineering Students' Communication Skills by Reducing their Communication Apprehension. English for Specific Purposes World (www.esp-world.info), Issue 4 (20), Volume 7, 2008.
- Teague, G.J., Personality Type, Career Preference and Implications for Computer Science Recruitment and Teaching, Proc. 3rd Australian Conf. Computer Science Education, ACM Press, 1998, pp. 155–163.

Topic 3: Team roles vs. functional roles in software development teams.

Topic outline:

- Functional roles in software development teams
- Functional programming departments and personality factors required
- Team roles (Belbin Self-Perception inventory)
- Developing the team roles in software developing teams
- Team profile in software development project

Main references/books/reading:

- Belbin, R. Meredith, Management Teams, John Wiley & Sons, New York, 1981.
- Belbin, Meredith, Team Roles at Work, Butterworth-Heinemann, Ltd, Oxford, 1993.
- Mantle, M.W., Lichty, R., Managing the unmanageable: Rules, tools, and insights for managing people and teams. Addison-Wesley, 2013. (Chapter 5, p.137-138)

Additional references/books/reading:

- Huckman, R.S., Staats, B.R. and Upton, D.M., Team familiarity, role experience, and performance: evidence from Indian Software Services, Management Science, Vol. 55 No. 1, pp. 85-100. 2009.
- Lencioni, P., The Five Dysfunctions of a Team. Jossey-Bass. 2002.
- Stevens. K.T. The Effects of Roles and Personality Characteristics on Software Development Team Effectiveness, Dissertation submitted to the Faculty of Virginia Polytechnic Institute and State University, March 1998.
- Zahniser, Richard A., Building Software in Groups, American Programmer, July/August 1990, pp. 50-56.

Topic 4: Team design and development.

Topic outline:

- Types of teams
- Team composition
- Team size
- Team forming
- Stages of team development (Forming-Storming-Norming-Performing)
- Criteria of team effectiveness

Main references/books/reading:

- Mantle, M.W., Lichty, R., Managing the unmanageable: Rules, tools, and insights for managing people and teams. Addison-Wesley, 2013. (Chapter 5. P.133-135, 187-188, 225-226, 341)

- Zakarian, A. and Kusiak, A. Forming teams: an analytical approach, IIE Transactions 31: 85-97. 1999.

Additional references/books/reading:

- Abilla, P., 2006. Team Dynamics: Size Matters Redux. [Online]. Available: http://www.shmula.com/team-dynamics-size-matters-redux/182/.
- Jeffery, D. R., The Relationship Between Team Size, Experience, and Attitudes and Software Development Productivity, Proceedings of COMPSAC87, Tokyo, Japan, October 7-9, 1987, IEEE Computer Society Press, pp. 2-8.
- McGrew, J.F., Bilotta, J.G., and Deeney, JM. Software Team Formation and Decay: Extending the Standard Model for Small Groups, Small Group Research 30(2): 209-234. 1999.
- Scott, T.J. and James H. Cross II, Team Selection Methods For Student Programming Teams, Software Engineering Education: Proceedings of 8th SEI CSEE Conference, New Orleans, Louisiana, March 29 - April 1, 1995, Springer-Verlag, pp.295-303.
- Shaw, Marvin E., Group Dynamics: The Psychology of Small Group Behavior, McGraw-Hill, New York, 1971.
- Straus, Susan G. and Joseph E. McGrath, Does the Medium Matter? the Interaction of Task Type and Technology on Group Performance and Member Reactions, Journal of Applied Psychology, Vol. 79, No. 1, 1994, pp. 87-97.
- van Knippenberg, D., Schippers, M.C., Work Group Diversity, Annual Review of Psychology 58: 515-541. 2007.

- Wi, H., Oh, S., Mun, J. and Jung, M. A team formation model based on knowledge and collaboration, Expert Systems with Applications 36: 9121–9134. 2009.

Topic 5: Managing software development virtual and distributed teams.

Topic outline:

- Specifics of work with geographically distributed and virtual teams
- Virtual communication
- Managing virtual environment

Main references/books/reading:

- Karolak D.W. Global Software Development: Managing Virtual Teams and Environments (Practitioners). Wiley-IEEE Computer Society Pr,1998.
- Mantle, M.W., Lichty, R., Managing the unmanageable: Rules, tools, and insights for managing people and teams. Addison-Wesley, 2013. (Chapter 2, p.23; chapter 3, p.39; chapter 5, p.124, 128, 130-133; chapter 8, p. 334)
- Noll. J., Scacchi, W.Supporting Software Development in Virtual Enterprises. Journal of Digital information, volume 1, issue 4. 1999.

Additional references/books/reading:

- Damian, D., Zowghi, D. Requirements engineering challenges in multi-site software development organizations, Requirements Engineering No., pp.149–160, 2003.
- DeMarco, T., Lister, T.R., Waltzing with Bears: Managing Risk on Software Projects, 2013.
- Katzenbach, J.R., Smyth, D. The discipline of virtual teams. Leader to leader. No.22, p.16-25, 2001.
- Seashore, S.E., Group Cohesiveness in the Industrial Work Group, Arno Press, New York, 1977.
- Tiwana, A. Beyond the black box: knowledge overlaps in software outsourcing, IEEE Software 21, pp.51–58, 2004.
- Virtual teams transcend space and time. The Futurist, September-October, p.59, 1997.
- Whitworth, E., Agile Experience: Communication and Collaboration in Agile Software Development Teams. M.A Carleton University, Canada. 2006.

Topic 6: Managing software development multicultural teams.

Topic outline:

- Multiculturalism in IT, culture differences
- Multicultural model (Hofstede), culture specifics
- Specific problems and team management peculiarities
- Generation styles
- Cross-functional teams

Main references/books/reading:

- Carmel, E. Global Software Teams. Prentice-Hall, New Jersey, 1999.
- Mantle, M.W., Lichty, R., Managing the unmanageable: Rules, tools, and insights for managing people and teams. Addison-Wesley, 2013. (Chapter 2, p.10, 25-27; chapter 5, p.128-129)
- Walsham, G. Making a World of Difference: IT in a Global Context. Wiley, Chichester, 2001.

Additional references/books/reading:

- Colbert, A.E., Kristof-Brown, A.L., Bradley, B.H., Murray, R.B. Geo transformational leadership: the role of goal importance congruence in top management teams. Academy of Management Journal, Vol.51, No.1, pp.81-96, 2008.
- DiRomualdo, A., and Gurbaxani, V. Strategic intent for IT outsourcing. Sloan Management Review 39, 4, pp. 67–80.1998.
- Earley, P.C.,Mosakowsky, E. Creating hybrid Team Cultures an empirical test of transactional team functioning. Academy of Management Journal, Vol.43, No.1, pp.26-49, 2000.
- Gopal, A. Mukhopadhyay, T., and Krishnan, M.S. The role of software processes and communication in offshore software development. Commun. ACM 45, 4, pp.193–200. 2002.
- Haiyan Huang, Eileen M. Trauth Cultural Diversity Challenges: Issues for Managing Globally Distributed Knowledge Workers in Software Development. Cultural Diversity Challenges. pp.253-275, 2007.
- Nicholson, B. and Sahay, S. Some political and cultural issues in the globalisation of software development: Case experience from Britain and India. Information and Organization 11, 25–43. 2001.
- Nicholson, B., Sahay, S. and Krishna, S. Work practices and local improvisations with global software teams: A case study of a UK subsidiary in India. In Proceedings of the IFIP Working Group 9.4 Conference on Information Flows, Local Improvisations and Work Practices (Cape Town, May 2000).
- Parker, G.M. Cross-functional teams: working with allies, enemies and other strangers. San Francisco; Jossey-Bass, 1994.
- Trower, Jonathan K. and Detmar W. Straub, Jr., Improving the Performance of Technologists and Users on Interdisciplinary Teams: An Analysis of Information Systems Project Teams, Computer Personnel, November, 1991, pp. 62-72.

Topic 7: Managing agile software development teams.

Topic outline:

- Kanban, Extreme, Pair-programming and other agile practices from psychological view
- Psychological aspects of SPI models in agile software development

Main references/books/reading:

- Boehm, B. & Turner, R.. Balancing Agility and Discipline: A Guide for the Perplexed. Addison-Wesley. 2003.
- Cockburn, A. Crystal Clear: a Human-Powered Methodology for Small Teams. Addison-Wesley. 2005.
- Mantle, M.W., Lichty, R., Managing the unmanageable: Rules, tools, and insights for managing people and teams. Addison-Wesley, 2013. (rules p. 217-221, Chapter 9, p.381-385, 389)

Additional references/books/reading:

- Abrahamsson, P., Salo, O., Ronkainen, J. & Warsta, J. 2002. Agile Software Development Methods: Review and Analysis. VTT Publications 478. VTT Electronics. Espoo. 107 p. ISBN 951-38-6009-4; 951-38-6010-8. http://virtual.vtt.fi/inf/pdf/publications/2002/P478.pdf.

- Agile Alliance Manifesto for Agile Software Development. 2001. http://www.agilemanifesto.org/principles.html (June, 2006).

- Churchville, D., Agile Thinking: Leading Successful Software Projects and Teams. ExtremePlanner Software, 2008.
- Coplien, J. O. & Harrison, N. B. Organizational Patterns of Agile Software Development. ed. Pearson Prenctice Hall. Upper Saddle River, NJ. 2005.
- Kettunen, P. Managing embedded software project team knowledge. IEE proceedings. Software Engineering. Vol.150. No.6.pp.359-366. 2003.

- Thamhain, H.J. Managing innovative R&D teams. R&D management. No.33(3). Pp.297-311, 2003.

Topic 8: Management and leadership in software development teams.

Topic outline:

- Management vs. Leadership roles, functions, behavioral patterns
- Management and leadership issues in software development
- Competency model for managers and leaders in software engineering

Main references/books/reading:

- Haavisto, T. Effective teams: A handbook for team Leaders and Team Members. ABB Development Center, 1997.
- Mantle, M.W., Lichty, R., Managing the unmanageable: Rules, tools, and insights for managing people and teams. Addison-Wesley, 2013. (Chapters 5, 6)

Additional references/books/reading:

- Hackman, J. Richard, Groups That Work (and Those That Don't), Jossey-Bass Publishers, San Francisco, 1990.
- Turley, E.A., and J.M. Bieman, Competencies of Exceptional and Non-Exceptional Software Engineers, Systems and Software, vol. 28, no. 1, 1995, pp. 19–38.
- Varney, Glenn H., Building Productive Teams, Jossey-Bass Publishers, San Francisco, 1990.
- Walz, D.B., and J.L. Wynekoop, Identifying and Cultivating Exceptional Software Developers, Computer Information Systems, vol. 37, no. 4, 1997, pp. 82–87.
- Weinberg, Gerald M., Becoming a Technical Leader, Dorset House Publishing, New York, 1986.
- Weinberg, Gerald M., The Psychology of Computer Programming, Van Nostrand Reinhold Company, New York, 1971.

Topic 9: HR-aspects of software development team management.

Topic outline:

- HR-issues in software development team management: selecting, attracting, assessing, retaining, developing, succession planning
- Finding and hiring great programmers
- Preparing to the interview
- Getting new programmers started off right: on-board recommendations, "first-day" musts
- Motivational aspects of computer personnel management
- Motivating programmers: motivational theories, motivational factors s applied to programmers, key motivating factors

Main references/books/reading:

- Couger, J. Daniel and Robert A. Zawacki, Motivating and Managing Computer Personnel, John Wiley & Sons, New York, 1980.
- Fox, J.R., Digital Work in an Analog World Improving Software Engineering Through Applied Psychology, 2011.
- Mantle, M.W., Lichty, R., Managing the unmanageable: Rules, tools, and insights for managing people and teams. Addison-Wesley, 2013. (Chapters 3, 4, 6, 7)

Additional references/books/reading:

- Ferratt, T. W. and L. E. Short, Are Information Systems People Different: An Investigation of Motivational Differences, MIS Quarterly, December, 1986, pp. 376-387.
- Hae-ching, C., McLeod, R.Jr., Use of a Decision Support System to Evaluate Candidates Applying for Programmer/Analyst Positions, Computer Personnel, November, 4-10, 1991.

- McLean, Ephraim R., John R. Tanner, and Stanley J. Smits, Self-perceptions and Job Preferences of Entry-Level Information Systems Professionals: Implications for Career Development, Computer Personnel, November, 1991, pp. 33-43.
- Myers, Martha E., Motivation and Performance in the Information Systems Field: A Survey of Related Studies, Computer Personnel, November, 1991, pp. 44-49.
- Nelson, R. Ryan, Michael W. Kattan, and Paul H. Cheney, Training, Ability, and The Acceptance of Information Technology: An Empirical Study of IS Personnel and End Users, Computer Personnel, November, 1991, pp. 20-32.
- Tsai, H.T., Moskowitz, H. ,and Lee, L.H. Human resource selection for software development projects using Taguchi's parameter design, European Journal of Operational Research 151: 167-180. 2003.

Topic 10: Software development team management in organizational context.

Topic outline:

- Organizational psychology in context of software development team management
- Interacting with other teams on different organization levels
- IT-leaders in top management of organization
- Establishing a successful programming culture

Main references/books/reading:

- Mantle, M.W., Lichty, R., Managing the unmanageable: Rules, tools, and insights for managing people and teams. Addison-Wesley, 2013. (Chapters 5, 8)
- Shneiderman, Ben, Software Psychology, Winthrop Publishers, Inc., Cambridge, Massachusetts, 1980.

Additional references/books/reading:

- Avgerou, C. Information systems and global diversity. Oxford, New York: Oxford University Press. 2002.
- Campion, M.A., Medsker, G.J., and Higgs, A.C. Relations between work group characteristics and effectiveness: Implications for designing effective work groups, Personnel Psychology 46: 823-850. 1993.
- Cohen, S.G. and Bailey, D.E. What Makes Teams Work: Group Effectiveness Research from the Shop Floor to the Executive Suite, Journal of Management 23(3): 239-290. 1997.
- Cummings, J.N., Work Groups, Structural Diversity and Knowledge Sharing in a Global Organization, Management Science 50, issue 3, 352-364. 2004.
- Funk, Jeffery L., The Teamwork Advantage, Productivity Press, Cambridge, Massachusetts, 1992.
- Katzenbach, J.R., Smith, D.K. The wisdom of teams: creating the high performance organization. New York: Harper Business, 1994.
- Outi Salo, Enabling Software Process Improvement in Agile Software Development Teams and Organisations 2006.

- Shonk, James H., Team-based Organizations, Business One Irwin, Homewood, Illinois, 1992.

7. Educational Methods and Technologies

Case studies are stories with educational message [4]. Case study method was introduced in the beginning of 20th century in Harvard Business School primarily for development of analytical and problem-solving skills among training lawyers and managers. The case study method used at practical classes:

- makes the learning process interactive and entertaining;
- contributes to the development of analytical skills;
- encourages active use of theoretical knowledge;
- allows for students to feel at real-world situation;
- is adaptive to students level and background;
- admits both teamwork and independent work;
- imposes minimal requirements to laboratory equipment.

Educational institutions in the US and Europe are actively working on adopting this innovation into the educational practice of teaching psychological aspects of software development team management. Case study analysis was enlisted in among the skills that students at both undergraduate and graduate levels should embrace as a professional in team management. In this course we use a framework of methods, tools and taxonomies for analysis of case studies in managing software development teams. This framework allows students to study every situation in a formal rather than ad-hoc way, and apply a wide range of threat modeling, risk analysis and project management techniques in close to real life conditions.

a. Recommendations for course instructors

A big problem that an educator faces when using case studies for teaching psychological aspects of software development team in higher school is the lack of ready-made materials available for free use, apart from ”product success story” case studies presented on web sites of a few companies for advertisement purposes. Sometimes teacher should collect or model relevant story from scratch or invite examples of cases from the audience.

b. Educational guidelines for students

Students will benefit from reading the sources listed in Section 7 and by active participating in simulations of real teamwork in classes.

8. Assessment Methods

Written test

The written test is a computer testing assessment based on the topics covered in the course (see Section 5 for the list of topics).

Written Exam

Student is assigned a case study related to one of the course topics.

9. Learning Resources

a. Course reader and main book(s)

- DeMarco, T., Lister, T.R., Peopleware: Productive Projects and Teams (Second Edition), 2010.
- Fox, J.R., Digital Work in an Analog World Improving Software Engineering Through Applied Psychology, 2011.
- Mantle, M.W., Lichty, R., Managing the unmanageable: Rules, tools, and insights for managing people and teams. Addison-Wesley, 2013.
- Weinberg, G.M., The Psychology of Computer Programming: Silver Anniversary Edition. Anl Sub, 1998.

b. Main literature

- Haavisto, T. Effective teams: A handbook for team Leaders and Team Members. ABB Development Center, 1997.
- Shneiderman, Ben, Software Psychology, Winthrop Publishers, Inc., Cambridge, Massachusetts, 1980.
- Stevens. K.T. The Effects of Roles and Personality Characteristics on Software Development Team Effectiveness, Dissertation submitted to the Faculty of Virginia Polytechnic Institute and State University, March 1998.

c. Additional literature

- Mentioned above after each topics outlines.

10.Special Equipment

Lectures, seminars, and practical studies are conducted in a classroom equipped with an overhead projector and audio portables.

11.References

1. Master curriculum of MSc educational programme 231000.68 “Software Engineering”, specialization “Software development management”. - Moscow, HSE, 2011.
2. Curriculum of 2nd year MSc educational programme 231000.68 “Software Engineering”, specialization “Software development management”. - Moscow, HSE, 2014.
3. Federal state educational standard of higher education in software engineering (Master degree) approved by Order of the RF Ministry of Education and Science of 9 November 2009 N543 (in Russian).
4. Herreid, C.F. (ed): Start With a Story: The Case Study Method of Teaching Science. National Science Teachers Association, Arlington, VA. pp. 466 (2007)

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