The Eurasia Proceedings of
Educational & Social Sciences (EPESS)
ISSN: 2587-1730

The Eurasia Proceedings of Educational & Social Sciences (EPESS), 2023

Volume 33, Pages 63-69

IConSE 2023: International Conference on Science and Education

Developing Research and Academic Competencies of Students through Three Cycles of Studies

Natasha Angeloska-Galevska
Ss. Cyril and Methodius University in Skopje

Abstract: One of the primary goals of university education is to develop research and academic competencies of students as key factor for their academic success and further professional career. European strategic documents on education also stress the importance of these skills as an immanent part of generic skills of students. The aim of this paper is to present how research and academic skills of students are acquired through the three cycles of studies starting from the undergraduate to the doctoral level of studies. For this purpose, we first review the definitions of the research competencies in relevant papers and documents, so that we are able to identify which skills, values and knowledge university student should possess to be considered as competent to do research. Then we analyze to what extent courses for developing of research competencies are incorporated in the university education for pedagogues, educators and teachers, as well as how global research trends and tendencies affect the content of curricula and training. We can conclude that reforming of curricula in the past decades continuously enhanced the research skills of students through the university education at all three levels. Yet there is much more that has to be done in terms of better organized programs, gaining good research practice with introducing of peer mentoring, taking advantage of information technology which will include virtual classroom strategies for research, and strong cooperation with research institutions.

Keywords: Research skills and competencies, Academic competencies, University study programs

Introduction

Developing research and academic competencies of students is one of the primary goals of university education as key factor for their academic success and further professional career. Definitions and frameworks for research competencies can be found in various strategic documents, reports, and guidelines published by international organizations, governmental bodies, and educational institutions. These definitions emphasize a combination of knowledge, skills, and attitudes necessary for conducting quality research in various research-related areas.

The *aim* of this paper is to present how research and academic skills of students are acquired through the three cycles of studies starting from the undergraduate to the doctoral level of studies. For this purpose, we made desk research to review the definitions of the research competencies in relevant papers and documents, in order to identify which skills, values and knowledge university students should possess to be considered as competent to do research. Then we analyse the current situation in Macedonia and conclude how courses for developing of research competencies are incorporated in the university education for pedagogues, educators and teachers, what the effect of global research trends and tendencies on the content of curricula and training is, and what are the main challenges in the process of enhancing the research competencies through the academic studies.

Method

The paper is based on desk research using secondary data from relevant strategic documents. The sample for documentation analyses for the first part of study comprise of the relevant documents issued by European

Commissions, OECD, UNESCO, European Qualifications Framework (EQF), National Qualifications Framework (NQF), and other documents such as Bratislava Declaration of Young Researchers, The European Charter for Researchers, etc.

The sample for documentation analyses for the second part of study comprise of the university study programs for undergraduate, graduate and doctoral level that are currently use at the Institute of Pedagogy at the Faculty of Philosophy at Ss. Cyril and Methodius University in Skopje, as well as the other three faculties for teacher training in the Republic of Macedonia (Bitola, Shtip, and Tetovo).

Results and Discussion

Definitions of the Research Competencies in the Strategic Documents

Research competencies in the European context and in other strategic documents are often defined in alignment with the broader goals of education, research, and innovation policies. These definitions emphasize a combination of knowledge, skills, and attitudes necessary for conducting high-quality research. While specific terminologies and emphases may vary, common characteristics can be identified across various European and international strategic documents where competencies are viewed as a holistic concept defined as knowledge, understanding, skills, values, beliefs and attitudes. (European Commission, 2013)

Based on the comparative analyses of documents published by the most relevant bodies such as the European Qualifications Framework (EQF), the European Research Area (ERA) Framework, and documents from the European Commission (European Commission, 2020, 2020a, 2021), UNESCO (UNESCO, 2016) and OECD (OECD, 2018), we make list of eight key aspects that are often included in the various definitions of research competencies with the short description of each category:

1. In the frame of research competencies the candidates should possess *deep and interdisciplinary knowledge* that means competence in the fundamental theories, concepts, and methodologies relevant to the specific field of research as well as an ability to integrate knowledge from multiple disciplines, fostering a holistic understanding of complex issues.

2. *Methodological skills* such as proficiency in designing research projects, including formulating research questions, selecting appropriate methodologies, and planning data collection and analysis. Students should possess skills in gathering, processing, and analyzing data using quantitative or qualitative methods, as well as familiarity with relevant software tools. They should be able to critically evaluate existing research, identify gaps, and formulate innovative research hypotheses.

3. *Communication skills* that means proficiency in writing clear, concise, and scholarly research papers, reports, and proposals and other academic and scientific texts. They should be also able to present research findings effectively to the public, peers and specialized audiences. Skills in creating visual representations of data and research findings are also part of this category as a way to enhance understanding and engagement.

4. Researchers should take account of *Ethical and professional standards* in their work that means understanding the ethical considerations in research, including integrity, honesty, trust and respect for research participants' rights. Professional integrity refers to the adherence to professional standards, including responsible authorship, acknowledgment of sources, and avoiding plagiarism.

5. Capacity for *Problem-solving and innovation* is also defined as part of the research competencies that means ability to identify research challenges, develop hypotheses, and propose solutions based on evidence and analysis. Innovative approach means ability to generate novel and original ideas, technologies, or strategies that contribute to the advancement of knowledge and societal progress.

6. *Collaboration and networking skills* are immanent to the research competencies because they encompass ability to work effectively in research teams, fostering collaborative relationships with peers, mentors, and experts, participating in collaborative research initiatives and engaging in building professional networks.

7. *Lifelong Learning and Adaptability* are related to the research competencies as willingness and ability of students to be engaged in continuous learning, keeping up-to-date with the latest advancements and

methodologies in the field. Capacity to adapt to evolving research challenges, changing technologies, and interdisciplinary approaches are also crucial be a good and successful researcher.

8. Lately, with the emerging need for Open Educational Resources, definitions of the research competencies are expanding with the *open science skills and competencies*. As it is defined in the EC document named Providing researchers with the skills and competencies they need to practise Open Science: "Open science skills should be embedded within formal education from the earliest possible stage; these skills need to be embodied in all members of society…Open Science skills must be integrated within formal structured education through elementary school, high school and further and higher education – as well as through professional skills training and through lifelong learning. (European Commission, 2017, p.16.)

Furthermore, experts define four broad categories of open science skills:

- Skills and expertise necessary for open access publishing
- Skills and expertise regarding research data, data production, management, analysis/use/reuse, dissemination and a change of paradigm from "protected data by default" to "open data by default", respecting legal, and other constraints
- Skills and expertise to act in and beyond one's own scholarly and disciplinary community
- Skills and expertise resulting from a general and broad concept of citizen science, where researchers interact with the general public to enhance the impact of science and research. (European Commission, 2017, p.17)

Open access brings new opportunities, enables and facilitates the communication of scientists from various countries, increases the visibility of authors and the transparency of their work, spreads their research results, and reduces the possibility of plagiarism or unwanted duplication of research activities. Very soon, the openness of the research process will become a required component in the evaluation of research and research papers.

Researchers will be obliged to store their data and the entire research material including the statistical procedures and instruments in a space (a cloud) within the repositories and to make them available to the public. (Angeloska Galevska, 2022, p.23). In relation to this, the repository of the Faculty of Philosophy and the Ss. Cyril and Methodius University offers a precious collection in which scientific works created over decades have become permanently preserved and accessible to everyone. (Repository of UKIM, 2023)

Research competencies are outlined in national and strategic documents of the countries and internationally, worldwide. Most of the countries have National Qualifications Frameworks (NQFs) where the qualifications, including research competencies, are defined at different levels of education. Research competencies are also outlined within the policy documents, guidelines and curriculums of higher education institutions and research organizations as a goal that students have to accomplished. Although there are differences in the various definitions, the overarching goal is to prepare researchers with the diverse skills and knowledge necessary for contributing meaningfully to research, innovation, and society.

Analyses of the Academic Programs Related to the Development of the Research Competencies

Research competencies are developed progressively through the three cycles of academic studies: Bachelor's, Master's, and Doctoral degrees. Each cycle builds upon the skills acquired in the previous one, fostering a deeper understanding of research methodologies, critical thinking, and scholarly communication. Comparative analyses of the university programs highlight some general tendencies typical in developing and refining of research competencies through the three academic cycles:

Bachelor's Degree (First Cycle – Undergraduate level)

At the undergraduate level, students are introduced to the basic research concepts, methods, and principles. They learn how to conduct literature reviews, find out the stages of the research process, including formulating research questions, and understanding the importance of evidence-based arguments and the research ethics. Furthermore, students learn basic quantitative and qualitative research methods, data collection techniques, and basic statistical analysis. At the Institute of Pedagogy at Faculty of Philosophy in Skopje, obligatory courses of Methodology of Educational Research, Techniques for Educational Research and Statistics in Education are the main courses aim to develop research skills of students. (Faculty of Philosophy, 2023). In addition, there is also

an elective course in Inferential statistics and course in Evaluation that are related to these aims, especially in estimation of the reliability and validity of sources and data.
In all these courses there is also an emphasis on developing critical thinking skills, enabling students to evaluate existing research, analyze data, forming well-reasoned arguments and draw meaningful conclusions. Even though they are foundational courses, students are required to design research projects as condition for passing the exam. These experiences introduce them to the fundamentals of data collection and analysis.

Beside these courses, at the Institute of Pedagogy and other institutes at the Faculty of Philosophy in Skopje, there is also a course in Academic speaking and writing with aim undergraduates to develop essential communication skills through writing research papers, giving presentations, and engaging in classroom discussions (Faculty of Philosophy, 2023). Through this course student gain information literacy and become proficient in accessing and using academic databases, libraries, and online resources to gather information for their seminar works, term papers, or research proposals. Undergraduates conduct literature reviews to understand the existing body of knowledge in their field of study, learning to synthesize information and identify key concepts and theories. They are also encouraged to do collaborative projects on different topics. Participation in group projects fosters teamwork and collaborative research, enabling students to learn from peers and develop interpersonal skills.

Master's Degree (Second Cycle - Graduate Level)

Master's programs delve deeper into research methodologies, where students learn more on advanced qualitative and quantitative research methods. They gain expertise in experimental design, survey construction, case studies, and data analysis techniques. Depending on the module they had selected (Pedagogy, Educational management, Management of human resources), master's students often explore a specific field of study, and develop specialized research skills tailored to their area of interest.

In writing their master thesis, graduate students are obliged to conduct advanced and in-depth literature reviews, identifying gaps in existing research, learning to critically analyse scholarly articles, formulating research proposals for their theses or projects, and contribute to the academic discourse. Furthermore, they should be capable to conduct an independent research project, starting from the phase of choosing an appropriate problem, developing a research design, execution of theoretical and empirical research, and reporting on a substantial research endeavor. Through all these phases they are supported and leaded by their mentor but still have to apply their research skills in a more autonomous and comprehensive manner.

At the Institute of Pedagogy at Faculty of Philosophy, beside the course in Research Planning that has a compulsory status, four additional courses are offers related to the development of the research competencies: Qualitative research methods, Quantitative research methods, Statistical Analyses, and Evaluation of the teaching process. (Faculty of Philosophy, 2023).

Master's students are also obliged to public presentation of their research findings to the academic committee, peers and faculty, enhancing their presentation and communication skills. Some master's programs offer training in scientific writing, including drafting research papers and grant proposals, preparing students for academic publishing and funding applications, and that is recently done at the master programs at the Faculty of Philosophy in Skopje with addition of the course in Academic writing of scientific papers within some of the modules (Faculty of Philosophy, 2023).

Doctoral Degree (Third Cycle - Postgraduate Level)

Doctoral programs provide comprehensive training in advanced research methods, focus extensively on developing advanced academic and research competencies. Doctoral candidates conduct original, in-depth research projects, making a significant contribution to the existing body of knowledge in their field. Doctoral candidates are expected to conduct independent and original research, addressing critical questions or problems in their discipline. They design and execute complex research projects, often leading to publications in peer-reviewed journals.

All PhD candidates at the University Ss. Cyril and Methodius in Skopje are obliged to pass obligatory courses in Research Methods and Research Ethics as the first generic courses and to choose further among other offered generic courses. A strong emphasis on research ethics is placed at the doctoral level, ensuring the responsible

conduct of research. Further in their studies in the doctoral program in pedagogy, majority of candidates choose the courses in statistics feeling lack of knowledge from their prior education in analysing research data. Quantitative and Qualitative Research Methods is also one of the most chosen courses within the doctoral programs. Within these courses doctoral students receive specialized training in advanced research methodologies, including advanced statistical analysis, experimental design, qualitative data analysis, and mixed-methods approaches.

Doctoral programs at Ss. Cyril and Methodius University also foreseen obligatory participation of students at doctoral conferences where they should present research results accomplished during their studies in order to enhance scholarly communication. Doctoral candidates hone their skills in frequent academic communication with their professor and peers, presenting their research, publishing in academic journals, and defending their dissertations before an academic committee. They are expected to demonstrate critical thinking, innovation, and creativity in their research, pushing the boundaries of knowledge in their field.

Throughout these academic cycles, research competencies are not only developed through formal coursework but also through hands-on research experiences, collaboration with faculty and peers, and active engagement in the scholarly community. Collaboration with peers and experts in the field enhances their research perspective. By the time students complete their doctoral studies, they are expected to possess advanced research competencies, enabling them to make significant contributions to their field and pursue careers in academia, research institutions, industry, or government sectors.

During their studies, PhD candidates work closely with experienced mentors, receiving individualized guidance and support throughout the research process. One mentor can have maximum three PhD candidates. Sometime they also serve as teaching or research assistants, practicing and improving their mentorship, research and leadership skills. Related to this, many doctoral programs involve opportunities for students to gain teaching experience, allowing them to mentor undergraduates and master's students.

Doctoral students are also encouraged to interdisciplinary and international collaboration, to communicate and cooperate with scholars from diverse fields, expanding their perspectives and approaches to research. They are obliged to have at least one-week mobility to another University and do research work related to their topic. In order to make this process easier in year 2023 new CEEPUS network named Empowering social dimension of education through quality teacher education development research (SOCTED) is established between six universities aiming to enable mobility of academic staff and PhD candidates. The major aim of this CEEPUS network is to promote an innovative exchange of research and mentoring in the field of the social dimension in teacher education (CEEPUS, 2023). Such a projects have great benefit for successful academic accomplishment of studies, by broadening students' research horizons and fostering innovative approaches.

Within the academic programs for educators and teacher training at Macedonian faculties, in order to enrich and expand the research work, more courses on quantitative and qualitative research methods are offered to students at master and doctoral level. However, “there is a worryingly high number of study programs at teacher training faculties in Macedonia that have been noticed to have unsatisfactory or a total lack of coverage of methodological subjects… It is especially useful that students, even at the graduate level, are encouraged to do applicative and comparative research. In addition, the University, Faculties and Institutes should work on continuous creation of electronic databases for research in separate scientific fields, as well as databases for MA and PhD work.” (Angeloska Galevska, 2016, p. 93). During their studies students are expected to publish their research findings in peer-reviewed journals and present at conferences. This disseminates their work to the academic community and beyond. Training the young university staff in planning and implementing scientific research, as well as writing articles and reports according to academic standards is significant for the ranking of the universities and faculties, where one of the main criterion is the conducted research and the published reports of the research results in renowned professional and scientific journals. “The main problem of the university is that the academic staff is quite old on average, and there are fewer and fewer young assistants and researchers who will be able to contribute to the future development of research, and consequently to the better ranking of our universities.” (Angeloska Galevska, 2022, p.24). Existing conditions are critical and imply urgent need for engagement of young researchers and collaborates on the state universities in Macedonia.

Conclusion

Research competencies are outlined in national and strategic documents of the countries and internationally, worldwide. They are also defined within the policy documents, guidelines and curriculums of higher education

institutions and research organizations as a goal that students have to accomplished. Although there are differences in the various definitions, the overarching goal is to prepare researchers with the diverse skills and knowledge necessary for contributing meaningfully to research, innovation, and society.

Global research trends and tendencies affects the content of curricula and training and are successfully incorporated in the national curriculums in the Republic of Macedonia. Analyses of the curricula point out that throughout each cycle, students develop a deeper understanding of research competencies, from foundational skills in the bachelor's degree to advanced skills in the master's degree, and ultimately, the ability to conduct independent, original research at the doctoral level. Doing research on the foundations of methodology and practical training for research work during the first cycle is the basis for quality and in depth scientific works of research during the MA and PhD studies.

Throughout these academic cycles, research competencies are not only developed through formal coursework but also through hands-on research experiences, collaboration with faculty and peers, and active engagement in the scholarly community. The progression through these academic stages allows individuals to build a strong foundation of research expertise and prepares them for successful careers in their field of interest. Moving ahead through these cumulative academic process, students develop increasingly sophisticated research competencies, equipping them with the skills and expertise needed to engage in high-quality research, contribute to their disciplines, and pursue careers in academia, research institutions, industry, or government sectors.

Recommendations

Reforming of curricula in the past decades continuously enhanced the research skills of students through the university education at all three levels. Yet there is much more that has to be done in terms of:

- better organized programs,
- gaining good research practice with introducing of peer mentoring,
- taking advantage of information technology which will include virtual classroom strategies for research,
- developing open sciences skills and competencies,
- strong cooperation between research institutions
- urgent need for engagement of more young researchers at the state universities.

Creating productive research environment is of great importance. “As well as researcher diversity, we must consider the diversity of environments where the research is done, removing barriers to inter-disciplinarity. The current ‘publish or perish’ and hyper-competitive environment is toxic to the research endeavour as it encourages extreme individualism, and is linked to an increase in fraudulent science. Members States and the EC are enabling this. These issues need to be addressed to create an inclusive, supportive and collegial research culture.” (Gluck, 2016, p.6).

Academic results can become even better if students enter university with at least modest previous research experience. In this context, creating the curricula that force the research and scientific thinking should start at the secondary school. Curricula and methods of assessment should incorporate research and scientific skills and give the pupils opportunity to practice research skills and develop scientific thinking through the curricular and extra-curricular activities.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the author.

Acknowledgements or Notes

* This article was presented as a poster presentation at the International Conference on Science and Education (www.iconse.net) held in Antalya/Turkey on November 16-19, 2023.

References

Angeloska Galevska, N. (2016). *Why should teachers be researchers? Modern Approaches in Social and Educational Research,* 91-98. Retrieved from http://hdl.handle.net/20.500.12188/24691

Angeloska-Galevska, N. (2022). Methodology of pedagogy – pillar of pedagogical science. *Conference Proceedings/International Scientific Conference 75th Anniversary of the Institute of Pedagogy - Educational Challenges and Future Prospects*. Skopje: Faculty of Philosophy,17-23.

Brussels, F. C. (2013). *Supporting teacher competence development: for better learning outcomes.* European Commission

CEEPUS. (2023 November 12). *Empowering social dimension of education through quality teacher education development research (SOCTED)*. Retrieved from https://www.ceepus.info/nw/1818-2324.

EURAXESS. (2005). *The European charter for researchers*. Retrieved from https://euraxess.ec.europa.eu/sites/default/files/am509774cee_en_e4.pdf

European Comission, DG Research and Innovation. (2020). *Strategic plan 2020-2024.* Retrieved from https://commission.europa.eu/system/files/2020-11/rtd_sp_2020_2024_en.pdf

European Commission, Directorate-General for Research and Innovation. (2020a). A new European research area: based on excellence competitive, talent-driven and open. Publications Office. Retrieved from https://data.europa.eu

European Commission, Directorate-General for Research and Innovation. (2021). The new European research area, publications office of the European Union. Retrieved from https://data.europa.eu

Faculty of Philosophy (2018). Study program in pedagogy. Retrieved from http://fzf.ukim.edu.mk/

Gluck, S. (2016). *Bratislava declaration of young researchers* (p.6). (2016). Retrieved from https://www.mariecuriealumni.eu/sites/default/files/sarah_gluck.pdf

O'Carroll, C., Hyllseth, B., & Berg, R. (2017). *Providing researchers with the skills and competencies they need to practise open science, publications office*. Retrieved from https://data.europa.eu

OECD (2018, April 5). The future of education and skills - Education 2030. Retrieved from https://www.oecd.org

Repository of UKIM. (November 11, 2023). Retrieved from https://repository.ukim.mk/

UNESCO.(2016). UNESCO science report: Towards 2030. Retrieved from https://unesdoc.unesco.org

Author Information

Natasha Angeloska -Galevska
Ss. Cyril and Methodius University
Faculty of Philosophy
Bul. Goce Delchev 9
Skopje, Macedonia
Contact e-mail: *natasa@fzf.ukim.edu.mk*

To cite this article:

Angeloska-Galevska, N. (2023). Developing research and academic competencies of students through three cycles of studies. *The Eurasia Proceedings of Educational & Social Sciences (EPESS), 33,* 63-69.