

The Role of Technical Faculties in Developing Skills and Competencies of Students - Challenges and Trends in Education

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Abstract: *The success and competitiveness of a country are closely related to the quality of education. A country that invests in education and ensures a substantial number of skilled professionals for market needs also establishes a prerequisite for the economic growth and development of that nation. Young people today are faced with circumstances characterized by constant changes in the demands placed on them. In order to be ready for the labor market, in addition to formal education, faculties must offer more to students and support them in their personal and professional development. Technical faculties, through their offered study programs, play a crucial role in identifying, activating, and enhancing the potential of their students, equipping them with the skills and abilities necessary for a successful life and career. In response to market needs, employer expectations, and the input from students (including prospective high school students), the Technical Faculty "Mihajlo Pupin" in Zrenjanin consistently strives to organize and adjust its extracurricular activities in line with these requirements. This ensures that its students are well-positioned to transition more smoothly from student amphitheaters, classrooms, and laboratories into the job market. This paper describes the activities that this faculty organizes for this purpose, such as professional visits to companies, trainings, workshops, professional internships, mobility through Ceepus and Erasmus+ programs, and the establishment of a Center for Practice and Career Development. The need for these extracurricular activities arose after analyzing the requirements for educational profiles and employment opportunities post-studies, aiming to assist our students and gain a competitive advantage in the education market.*

Keywords: *Technical Faculties, Extracurricular Activities, Trainings, Professional Internship, Center for Practice and Career Development*

1. Introduction

Contemporary trends in the development of countries with a market economy highlight that education and the cultivation of human resources are prioritized in national strategies and policies for social, economic, and technological progress. In the context of the Republic of Serbia's development, the reconstruction and transformation of education, particularly professional education, are integral aspects of the overall sustainable development of the country. [1]

Higher education should never be viewed in isolation from the economy, the requirements of employers, and the labor market. Education serves a broader purpose, encompassing the interests and needs of various stakeholders, including the state, educational institutions, individuals pursuing education and subsequent employment, the National Employment Service, and employers, i.e., the economy. [2]

Changing conditions in the labor market, the emergence of new professions, and evolving requirements in terms of knowledge and skills present a trend that both prospective employees and organizations, as well as higher education institutions, are currently grappling with. The fact that higher education represents the final formal step before entering the workforce underscores the significant role played by faculties in supporting the personal and professional development of their students.

In the context of technical faculties and engineering professions, a primary indicator of the future engineering specialist's professional competence is the established professional way of thinking. This signifies their intellectual ability to address professional challenges. [3]

The success of an engineering program is gauged by the graduates' high expertise in their professional careers, along with the complete satisfaction of their employers and society. Therefore, technical faculties must consistently review their programs to ensure that engineering graduates can effectively navigate the challenges they encounter today. [4]

Today, the Technical Faculty "Mihajlo Pupin," after 50 years since its establishment, stands as the foremost university-level institution in Banat (Province of Vojvodina, Serbia) and is a responsible member of the University of Novi Sad. The instructional programs across all three academic study levels at the Faculty are accredited. Studies are offered in the fields of Information Technologies, Mechanical Engineering, Industrial Engineering in Oil and Gas Exploitation, Engineering Management, Environmental Protection Engineering and Clothing Engineering.



Fig. 1. Technical Faculty "Mihajlo Pupin" Zrenjanin

The base strategy of Faculty is the choice of study programs interesting for industry, continual improvement of the teaching process quality, development of students' research abilities, promoting mobility for both students and teachers, the establishment of cooperation with the regional industrial and institutional environment with the aim of easy and quick integration of graduated students into industrial courses and their further contribution to the increase of innovation and competitiveness of local and regional industry.

This paper will delve into some extracurricular activities organized by the Faculty with the specific objective of facilitating easier employment for students after completing their studies.

2. Activities with students at the Technical Faculty "Mihajlo Pupin" aimed at enhancing employment prospects after graduation

2.1. Professional Visits and Lectures by Industry Experts

The Technical Faculty "Mihajlo Pupin" in Zrenjanin is actively engaged in fostering collaboration with the economy sector, reflecting the trend in the development of modern society. The faculty has executed a significant number of contracts and agreements for cooperation with companies, institutions, public enterprises, and educational institutions. These partnerships aim to further enhance collaboration in the realm of professional and scientific training for our students. This includes organizing professional visits and involving experts from various industries directly in teaching across all study areas at the Faculty.

The Faculty hosts numerous professional lectures annually (Figure 2), complemented by regular visits from our students to companies in the local area (Figure 3).



Fig. 2. Lectures by experts on various topics from practice [5]



Fig. 3. Professional visits [5]

2.2. Trainings, Workshops, Laboratory Work

The Faculty regularly organizes educational workshops and seminars led by expert lecturers from various fields. These training sessions can significantly enrich the student experience and undoubtedly contribute to additional motivation for research and active participation in their areas of interest.



a)



b)

Fig. 4. a) Welding training; b) Workshop "Practical application of infrared thermography in technique" [5]

Laboratory work cultivates teamwork and communication skills as students collaborate with peers and faculty members. This collaborative environment mirrors the dynamics of professional settings, preparing students for the challenges they will face in their future careers. Additionally, students who actively participate in laboratory research may have opportunities to co-author publications or present their findings at conferences, further enriching their academic portfolios.

In essence, the significance of students working in university laboratories lies in the comprehensive preparation it offers for their future endeavors, equipping them with the skills, knowledge, and practical experience crucial for success in their chosen fields.



a)



b)

Fig. 5. Students in the physics (a) and chemistry laboratory (b) [5]

2.3. Professional Internships

Companies want personnel who can immediately join work processes without a long internship, and student internships are a sure way to secure personnel ready to engage in work. [6]

Professional internships in higher education involve students engaging in practical work within a real business environment. The primary objective is to apply theoretical knowledge and master skills necessary for future work, while also establishing initial contact with the labor market and gaining practical experience before completing their studies. Our Faculty incorporates two modalities of professional internships: as part of the curricula for all study programs and as an optional activity typically initiated by the employer. Moreover, the "Summer Professional Practice" project, conducted in collaboration with Zrenjanin businessmen for over 10 years, has provided opportunities for more than 200 students to gain valuable practical experience.



Fig. 6. Professional internship for students majoring in Industrial Engineering in oil and gas exploitation [5]

The gap between the demands of the economy and the competencies acquired through higher education can certainly be narrowed by empowering students through professional internship programs. Through these

programs, students can gain work experience and acquire the knowledge and skills needed for future employment.

2.4. Mobility of Students [7]

Internationalization, recognized as one of the top priorities by numerous countries and higher education institutions, has gained increasing prominence. Within this realm, a significant focus is placed on the mobility of students, which, at our universities, is predominantly facilitated through programs such as Erasmus+, CEEPUS III, and others.

Students who have participated in these mobility programs report that such exchanges have allowed them to acquire valuable practical knowledge and experience, while also providing an opportunity to learn about new cultures. The implementation of student mobility programs at esteemed academic institutions has created a broad spectrum of opportunities for enhancing knowledge and skills.



Fig. 7. Our students on Erasmus and CEEPUS exchanges [5,7]

2.5. Center for Practice Development and Career Guidance of Students

The link between students and the labor market in higher education is facilitated by career development centers, which serve as advisory and supportive entities within higher education institutions.

The Center for Practice Development and Career Guidance of Students at the Technical Faculty "Mihajlo Pupin" in Zrenjanin was established in 2023 with the aim of providing support for student practice development, coordinating and assisting in navigating the path to the labor market for a large number of students. This initiative contributes to a higher level of service quality offered by the institution. Additionally, the Center's responsibilities include promotional activities, collaboration with the economy, and promoting lifelong learning.

Employability skills are considered crucial student outcomes that every engineering graduate must acquire and possess upon completing their academic journey. These skills are essential for overcoming the challenges of intense competition in the job market.

The effectiveness of aligning higher education study programs with the demands of employers is still unadequate. Career development centers, functioning as specialized organizational and advisory entities within higher education, can play a crucial role in helping and facilitating the transition of young people from education to the labor market.

3. Conclusion

The aim of this paper was to show in a clear way how important and necessary it is for faculties to get involved and follow the trends in the labor market, the needs of employers and the economy, and in this way organize activities that will help students where the given quality and given competencies are needed practically show. Therefore, the cooperation of everyone in the labor and employment sector, then the faculty and the

economy, is a necessary factor in building a successful higher education, as well as in creating a successful career of students that will be tailored to the employees and to the employers and the economy at the same time.

The Technical Faculty "Mihajlo Pupin" is committed to addressing the needs of graduates and their prospective employers by adopting a competent approach in the preparation of future specialists within higher education institutions.

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5. References

- [1] Ministry of Science, Technological Development and Innovation of the Republic of Serbia, Strategy for Scientific and Technological Development of the Republic of Serbia for the period from 2021 to 2025, "Power of Knowledge", Available: <https://nitra.gov.rs/images/nauka/Strategija-nauc-tehnol-razvoj-RS-Moc-znanja.pdf>
- [2] S. Škorić, M. Carić and J. Matijašević, „Higher education according to a successful career in economy“, *XXVIII conference Development trends: "University education for the economy"*, Kopaonik, Serbia, 14 - 17. 02. 2022., pp. 114-117.
- [3] V. A. Ivashova, R. V. Pavliuk, A. V. Zaharin, L.F. Maslova and S. S. Alivanova, “Improving Competences of Engineering Students in Terms of Development of Research Function”, *International journal of environmental & science education*, Vol. 11, No. 15, 7476-7485, 2016.
- [4] E.S.M Suresh and B R Beena, „Developing professional competence of faculty and students of civil engineering to meet the global standards“, *Proceedings 2019 Canadian Engineering Education Association (CEEA-ACEG19) Conference*, University of Ottawa, Canada, June 9 – 12. 2019., paper 001– 1 of 8.
- [5] *Annual reports*, Technical faculty "Mihajlo Pupin" Zrenjanin
- [6] E. Desnica, D. Dobrilović, J. Pekez, L. Đorđević and I. Palinkaš, „The importance of new technologies in the education and professional development of future engineers in the technical profession“, *24th International Conference on »Innovations in Science & Technology« (MIST 23)*, Milan, Italy, 14.-16. june 2023., pp. 1-8.
- [7] E. Desnica, V. Mihajlović, S. Dzitac and J. Pekez, „International activities of mechanical engineering students at the Technical faculty "Mihajlo Pupin" Zrenjanin“, *XIII International Conference – Industrial engineering and Environmental Protection (IIZS 2023)*, Zrenjanin, Serbia, october 2023., pp.45-49.