

Formal Education in Data Science – Recent Experiences from Faculty of Technical Sciences of University of Novi Sad

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Abstract. In recent years, Data Science has become an emerging education and research discipline all over the world. Software industry shows an increasing and even quite intensive interest for academic education in this area. In this extended abstract, we announce main motivation factors for creating a new study program in Data Science at Faculty of Technical Sciences of University of Novi Sad, and why it is important to nurture the culture of interdisciplinary orientation of such program from early beginning of B.Sc. studies. Also, we announce how we structured the new study program and addressed the main issues that come from evident industry requirements. The program was initiated in 2017, both B.Sc. and M.Sc. studies, and we collect the new experiences.

Keywords: Academic Education, Data Science, Information Engineering.

In 2015, the three study programs in Data Science were accredited at the University of Novi Sad, Faculty of Technical Sciences in Novi Sad. One is a 4-year B.Sc. program in Information Engineering, and the two are master-level study programs: a) 1-year M.Sc. in Information Engineering, and b) 1,5-year M.Sc. in Information and Analytics Engineering. All the programs are officially accredited in the category of interdisciplinary and multidisciplinary programs, in the two main areas: Electrical Engineering and Computing, and Engineering Management. In practice, the programs cover in deep the disciplines in Data Science, as a completely new combination of courses predominantly coming from Computer Science, Software Engineering, Mathematics, Telecommunications and Signals, Finances, and Engineering Management.

Execution of the two of these study programs has been initiated in 2017. Those are B.Sc. in Information Engineering, and M.Sc. in Information Engineering. By this, now we have two active generations of students at both levels. Our first experiences with these generations of students are quite positive.

Design of the aforementioned study programs were motivated mainly by the idea to profile specific study programs in the scope of Computer Science, Informatics, or Software Engineering (CSI&SE) disciplines, so as to nurture the appropriate level of interdisciplinarity and contribute to resolving the following two paradoxes: (P1) More interdisciplinary oriented experts, capable of covering a wide range of tasks, knowledge and skills are always significantly better positioned in the software industry Human Resource (HR) market, while academic institutions offer study programs that are rather self-contained, i.e. oriented to a narrower knowledge scope. (P2) Students or young software engineers believe that they will be better positioned in software industry HR market just as they are good IT experts, i.e. programmers, while

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employers rather expect experts capable of recognizing and resolving their interdisciplinary oriented and complex requirements.

In our current academic education, we can identify study programs of the three categories, covering in some extent disciplines of CSI&SE, as a basis to provide Data Science education. Those are: (1) Specific study programs in CSI&SE; (2) Study programs in (Applied) Mathematics; and (3) Study programs in Economics, Business Administration and Management. Our experiences in teaching CSI&SE courses in study programs of all the three categories lead to the identification of typical students' and even teachers' behavioral patterns. In the paper we will discuss why such patterns lower the culture of interdisciplinarity, and how it can be raised by data science study programs. Also, we will transfer some our recent experiences from the execution of Information Engineering study programs, where we identify increasing awareness of students about the importance of Data Science in upcoming years, while still the polarization of students' population to one, with clear ideas about their future, vs. students with not clear recognition of their future opportunities is present.

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