Digital Internship Model for Higher Professional Studies

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INTRODUCTION

Study programs offered by professional higher education institutions (PHEIs) typically involve mandatory internships, with defined learning outcomes and ECTS-expressed workload. At the level of HEIs, internships are organized to ensure structured and applied learning through practical experience under the supervision of a professional(s) with a significant background in the field of the internship, leading to the recognition of learning outcomes.

When an internship is performed in exchange for ECTS credits, it must be strongly related to an academic discipline, and students are usually required to demonstrate what they have learned through the internship (by keeping a journal, writing an essay, or preparing a presentation). Such an approach leads to the development of the outcome-based internships. This outcome-based learning focuses on facilitating the achievement of desired learning outcomes through learning and assessment activities designed to that purpose.

Generally, it is considered that this integration of internships into the curriculum made a shift from treating students as workers who are learning to work, to treating students as learners who are working to learn [1]. Yet, it is clear that internships provide great opportunities for students to acquire diverse knowledge and competencies. Importantly, compared to learning in the classroom, learning in the workplace is less predictable, and those unplanned learning outcomes may be even more meaningful for students [2], [3].

As each workplace learning experience is different, with a tendency to be less structured as it involves both formal and informal learning, it is clear that the definition of an internship learning outcome has to include a student-based component. Furthermore, when it comes to digital, virtual or remote internships, it is of great significance to foresee the advantages and disadvantages of the learning outcomes achieved.

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DEFINING LEARNING OUTCOMES

The general goal of all internships is to provide students with opportunities to apply what they have learnt. Clearly, when academic internships are mandatorily linked to the curriculum, they have to have more specific learning goals and broader outcomes than simple career exploration or mastering the basics of professional practice. In addition, mandatory professional higher education internships are very distinctive because they share common goals and elements with the school learning processes such are reading, writing, critical thinking, and problem solving.

The goals and therefore learning outcomes differ depending on the educational level and year of study.

Bachelor's level internships

The primary goal of a bachelor level internship is an orientation towards the prospective future employment. Students are introduced to the work field, and can gain some experience working in a professional organization.

Master's level internships

Internships at master's level must have a clear academic or practice-based research component or be directed to solving a practical problem. If the internship itself does not comprise a research component, the student has to carry out an additional research project directly related to the internship. The employer offering the internship must be informed beforehand that the student will carry out the research, and must be asked emphatically to facilitate the research by allowing time, access to archives or data, granting rights to interview the employees, etc.

Broadly speaking, internship learning outcomes in professional higher education are both general and program-specific. There are several categories of internship learning

outcomes: knowledge, technical competences, as well as academic-related and non-technical generic competences (soft skills) [3].

Focusing on what and how students are expected to learn requires that an intended learning outcome specifies not only what is to be learned, i.e. the topic, but also how it is to be learned and what standard it should meet [4]. Well-articulated learning outcomes not only help to guide the curriculum design process by fostering constructive alignment, but they also make the process of quality assurance more transparent [3], [4]. Importantly, learning objectives focus students' learning on specific areas, and can help students maximize the time spent in an internship.

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PROGRAM-SPECIFIC INTERNSHIP LEARNING OUTCOMES

The program-specific internship learning outcomes include the knowledge and technical competences, the latter being a particularly important aspect for the engineering internships. What students expect from their internship experience is the gain in general and disciplinary knowledge. The knowledge of engineering and scientific theories and related practice is what is considering as the disciplinary knowledge [5]. In addition, the disciplinary knowledge includes health and safety awareness, knowledge of industrial standards and codes of practice, risk-analysis methods, engineering judgment and an appreciation of appropriate ethical conduct, intellectual property and legal issues in the field of engineering [6].

Interestingly, **the disciplinary knowledge** as an internship outcome appears to be more crucial for the engineering students, comparing with students that perform work-based learning in other, non-engineering subjects. For example, while only 24% of engineering students felt able to apply theory they had learned at university, this figure was as high as 57% for the biologists at their internship positions [6]. Yet, it is important to notice that, in contrast to the engineering placements, the majority of biology/biochemistry placements were at research laboratories, and not companies.

Another critical aspect of internship learning outcomes, particularly for the engineering students, is achieving **technical competences**. Technical competencies include: the ability to design and conduct experiments, use techniques and tools relevant to the discipline, analyze and interpret data, and apply the knowledge learnt at university to practical work [3], [5], [6].

Thus, the program-specific learning outcomes could be defined as:

- Professional knowledge and/or behavior (i.e. meeting the employer's expectations with regard to the workplace behavior; gaining the knowledge relating to a specific company/industry; gaining the knowledge about a specific technological process, learning about specific and common job functions such as: marketing, management, customer service, accounting, security, PR, production, design, training, etc.; applying classroom learning to the workplace practice).

- Specific skill-building (i.e. improving skills, confidence, competency in specific areas related to a study program or particular area of professional interest).

- Project-related skills (i.e. developing skills necessary for carrying out research, analysis, organization, time management, teamwork, multiple task coordination, initiative, adaptability, and project completion).

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GENERIC COMPETENCES AS LEARNING OUTCOMES

In addition to the program-specific knowledge and technical competences, the development of generic or non-technical competencies is also one of the key learning outcomes of engineering and science internships. It includes development of soft skills, personal attributes and attitudes that are vital for students' whole-person development [7].

Until recently, it was questionable whether higher education should be responsible for the development of students' generic competences. Nowadays, however, there is only a discussion about whether all academic courses should provide students with training in generic competences [8]. The fact that the Organization for Economic Cooperation and Development (OECD) claimed that the development of what they call "21st century skills", "employability skills", "soft skills" or "generic skills" is an international priority goes in favor of such an opinion [9].

When it comes to the importance of the generic skills development during an internship, there are no differences between engineering and other students. They all claim that the internship improved their communication and networking skills and that it increased the students' confidence, maturity, independence and motivation [3].

Generic competences as the internship learning outcome can be classified in two categories: academic-related generic competences and soft skills.

Academic-related generic competences include several important skills required for the accomplishment of a study program in general. They include the following: writing skills, problem-solving skills, the ability to identify the relationship between theory and practice, presentation skills, research skills and language skills [3].

Problem-solving skills and the ability to identify the relationship between theory and practice are highly valued and expected learning outcomes. On the other hand, writing, presentation and language skills are not easily recognized and noted as the internship learning outcomes in professional studies. This is particularly true for engineering students as they

mostly dislike writing [10]. However, an internship does provide students with the experience in discipline-specific writing tasks. For example, they have to write user guidelines or feasibility study reports, and they all have to write about and present their internship experience, which in turn enhances their awareness of the importance of writing skills for professional practice.

The development of research skills is dependent on the nature of the allocated task and therefore it is not a necessary part of each internship experience.

Soft skills include a large list of skills such as: interpersonal communication skills, adaptability, time-management skills, planning skills, teamwork skills, professional judgment, independence, positive attitudes (e.g. self-confidence, openness, respect, proactive attitude, conscientiousness) [3], [7]. It also includes communication skills. (i.e. speaking, persuasion (sales), customer service, leadership, and listening - as practised in the professional world) as well as employability-enhancing activities (i.e. gaining some experience to add to your resume; expanding your network of company or industry contacts; earning a job reference to vouch for your performance).

During the internship learning outcomes articulation, it is important to present the student with the value of soft skills development, even more so as soft skills are not easy to assess. From the perceptions of researchers who question the feasibility of assessing generic competences, the assessment may lead students to eventually lose interest in developing generic competences and create a situation in which students master the skills only for assessment purposes [11].

ASSESSMENT OF INTERNSHIP LEARNING OUTCOMES

To be useful, learning objectives should be SMART:

- Specific
- Measurable
- Attainable
- Results-Focused
- Time-Focused

The assessment of learning outcomes is generally performed during the internship by the student supervisor and by the mentor at a HEI upon the internship completion.

The assessment by the teacher is typically based on the combination of the following indicators, presented by the student:

- Summary of activities on periodic basis
- Personal reflection on professional or skill development related to work duties
- Project and report related to work duties
- Academic papers that require the application of the concepts from the curriculum (including Bachelor or master's thesis)
- Industry or company analysis
- Oral presentations based on work experience
- Interactive group exercises based on work experience.

Some of the HEIs require the second form of the assessment, where the student provides his/her self-assessment of accomplishing the individual outcomes, occasionally coupled with his/her oral presentations given to the classmates and freshmen in the program.

And finally, the third form, which involves the industrial supervisor who, as an outside constituent, rates the student's achievement of prescribed outcomes, is also of great significance.

At the end of a successful internship, students should be able to identify, integrate, and apply both general scientific concepts and technical knowledge from their majors to their work environment.

ACHIEVEMENT OF LEARNING OUTCOMES IN DIGITAL INTERNSHIPS

Virtual work placement is defined as follows: "a virtual work placement involves the use of an information and communication technology (ICT) supported environment, where students interact with each other and companies independent of time and space and across traditional geographical boundaries. In this environment, effective communications are created between

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students, faculty and company representatives, in order to carry out a specific and meaningful work-based activity that fits within the student's compulsory educational curriculum." [12] (The INTERN project, 2007).

Obviously, the question arises whether the internship learning outcomes are achievable if internship is performed remotely and in a virtual fashion?

Program-specific learning outcomes in digital internships

As for the professional higher education studies, the focus is placed on program-specific learning outcomes. If properly planned, a digital internship may provide the student with the same level of knowledge and technical competences as the traditional workplace learning. It is worth noticing that, when it comes to the achievement of learning outcomes in digital internships, a good definition of the project, careful preparation and detailed planning, as well as a clear distribution of roles prior to the activity are even more important than with traditional work placements.

It is recommended that the assignments should be designed in such a manner that would ensure that students make valuable contributions to the company. It is crucial to ensure that the student is not just passing the time behind the desk.

Helping students to achieve the program-specific learning outcomes in virtual work placements requires a specific pedagogical approach. The approaches such as guided independent learning, collaborative learning, problem/project-based learning have proven to be good methods for the organization of virtual activities.

The achievement of technical competences, such as the ability to design and conduct experiments, analyze and interpret data, and apply the knowledge acquired at university to practical work, is to a large extent feasible in the virtual internship model. However, the achievement of the learning outcomes that involve the use of techniques and tools relevant to the discipline can be limited in digital internships if the particular technical competence is associated with the use of specific equipment. Yet, this can be, at least partially, overcome by the usage of video tutorials, augmented reality or similar approaches.

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Generic competences in digital internships

While the program-specific learning outcomes, as the priority of the internships in professional higher education, can be easily achieved in the virtual model, the achievement of the generic competences can be a greater challenge.

Yet, the achievement of the academic-related–generic competencies, including writing skills, problem-solving skills, the ability to identify the relationship between theory and practice, presentation skills, research skills and language skills are not limited by the virtual setting for the internship conduction. All of these skills are required at the internship assessment stage, as this is the process that to a large extent includes writing different kinds of reports and presentations. Moreover, the virtual format actually emphasizes the significance of written communication as this is the primary way for students to express themselves.

On the other hand, the soft skills development may be affected by the virtual internship, compared with the internship in the real work environment. The virtual internship is somewhat inferior to the traditional work-based learning when it comes to the development of interpersonal communication skills, adaptability, teamwork skills, professional judgment, positive attitudes, speaking, persuasion (sales), customer service, leadership, and listening — as practised in the professional world.

However, the virtual internship model is actually superior to the traditional internship with regard to the development of time-management skills, planning skills and independence. In virtual internships, students engage in a professional learning experience independent of their physical location, be it their homes, their home institutions or a host university. There is some flexibility regarding the working hours, as well. Although this means that virtual internships can provide a way to combine studies, work and social life, they increase students' responsibilities as they have to perform tasks independently. Importantly, students have to develop good time-management and planning skills and avoid procrastination issues.

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CONCLUSION

In order to accept the virtual internship as the legitimate model for a mandatory element of the curriculum in professional higher education, related to a study program and granting a number of ECTS credits, it is required that this type of work-based learning provides a student with the same learning outcomes as the real work experience. As virtual internships can provide the appropriate level of the discipline-related knowledge and academic-related generic competences, it could be concluded that this mode of learning can be incorporated into professional study programs.

However, there is a concern that soft skills, particularly communication skills can be belittled by the virtual internship, compared with the communication in the real work environment. Yet, one has to be aware that today students are typically very familiar with the online communication. Even more, the 4th industrial revolution that blurred the boundaries between the physical, digital, and biological worlds actually requires the development of distinctive communication skills. Thus, the limitation of virtual internships which concerns communication skills and finding new modes of online communication could easily turn into the advantage for the students' future work.

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