Information needs and practices in teaching and using industrial property for nonlawyers in Slovenia

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Introduction. The paper presents some findings of the Erasmus+ project IPEDU, which aims to include intellectual property education, more specifically industrial property, in the curriculum of technical universities, through training the teaching, support staff and librarians. We present selected results of the first two project stages for Slovenia, which is one of the project partners.
Methods. Initial stages of the project assess the current level of inclusion of industrial property topics into higher education curricula and labour market needs. Samples include Slovenian technical sciences faculties, and employers of technical profiles with needs for industrial property knowledge. Online surveys are used for data collection.
Results. General, not positive, alignment was found in terms of expected competencies: Companies do not place high priorities on industrial property competencies of their non-law employees. Furthermore, many higher education institutions do not include these topics in their teaching. Industrial property teaching is needed, but not done, which implies the need for educators-employers dialogue. A relatively traditional image of libraries emerges, as they are usually not involved in teaching. This provides an excellent opportunity for libraries to evolve and become more proactive.
Conclusions. Our findings offer a valuable contribution to the planning of a systematic and holistic intellectual property curriculum for technical studies within the European Union.

Keywords: intellectual property, industrial property, technical sciences, higher education, labour market, academic libraries

1. Introduction

With the increasing accessibility to various digital works and online information about products it is more likely for this content to be unauthorizedly accessed, distributed or misused in other ways. Therefore, awareness of intellectual property issues and challenges has become even more important.

According to World Intellectual Property Organization (World Intellectual Property Organization 2020), intellectual property refers to various creations of the mind, such as literary and artistic works, inventions, designs, symbols and names. Intellectual property is protected by law, which has a positive effect on creativity, innovation, competitiveness, development, research, and investment (Slovenian Intellectual Property Office n.d.; World Intellectual Property Organization 2020). While copyright is one of the most recognizable type of intellectual property, industrial property (IP)[1] is equally important. It is focused on protecting the design of a product that is new and has individual character (Slovenian Intellectual Property Office n.d.). IP includes patents for inventions, industrial designs, models, trademarks, service marks, commercial names, designations, and geographical indications (Bux & Maciejewski 2022; World Intellectual Property Organization 2020). It and may protect three-dimensional features of the product, such as shapes, or two-dimensional features, such as patterns, lines or colour (World Intellectual Property Organization 2020). Depending on the country, IP is governed by different international and national laws. For example, in Slovenia, IP rights are subject to the European Union legislation (Bux & Maciejewski 2022) and are additionally regulated by various national acts, such as the Industrial Property Act (Zakon o industrijski lastnini 2001), Act Amending the Industrial Property Act (Zakon o spremembah in dopolnitvah Zakona o industrijski lastnini 2020), and Employment Related Industrial Property Rights Act (Zakon o pravicah industrijske lastnine iz delovnega razmerja 2003) that determine the types of IP, procedures regarding their registration and protection, and defines rights and obligations of stakeholders.

IP plays an important role in various disciplines, from mechanical engineering, biotechnology to fashion. There is a demand in the labour market for workers who have a high level of awareness and competencies in intellectual property field (Soetendorp 2008). Along with other factors (such as legal and fiscal frameworks, the state of science and technology, etc.), they are a fundamental prerequisite for creating an encouraging, supportive, innovative, and legally safe environment. While IP knowledge can be self-taught, but they are more effective when provided by competent professionals as part of systematic training and formal educational processes. However, there is no guarantee that IP training will be included in the curricula of faculties other than law schools.

Higher education (HE) institutions are frequently positioned at the crossroads of research, education, and innovation and their goal is to produce a competent workforce. Therefore, Soetendorp (2008) argues that intellectual property education is relevant for students at all levels and from all disciplines. Educators should not only promote awareness of the IP rights themselves, but also teach better management of these rights in contracts, agreements, and workflows in general, including appropriate use of relevant information sources. In addition, educational focus should be aligned with the actual needs and expectations of the labour market and industry.

1 The acronym “IP” is most often used for Intellectual Property. However, as this paper focuses on Industrial Property, which is its sub-area but consists of words with the same starting letters, we use IP to denote the latter.

Not only teachers, but also academic libraries, which are usually part of HE institutions, should play an important role in these processes by providing relevant sources, consulting, and participating in teaching. Through their innovative approaches, librarians are slowly transforming from mere instructors to active collaborators in the educational process (Corrall & Jolly 2019). Many academic libraries have a copyright expert (Schmidt & English 2015), while some university libraries around the world have also developed a special professional profile known as a "copyright librarian", "scholarly communications librarian" or "copyright officer". Interestingly, most of these professionals have a degree or academic background in Library and Information science rather than formal legal education (Fernández-Molina et al. 2020; Patterson 2016).

According to their users' needs, libraries usually pay more attention to copyright. However, they may also provide support in other subfields, such as IP, especially if they are located at a HE institutions that specialise in technical fields. In some countries, such as the United States of America, England, Scotland, and China, intellectual property and IP centres are located in public, university, state, or special libraries (Allinson et al. 2019; Yang & Liu, 2021; Wallace & Reinman 2018).

Meanwhile, in some other countries, such as Slovenia, the system of education and dissemination of knowledge about IP is not yet so widespread. There is a lack of research and information on the extent to which technical HE education institutions (such as the Biotechnical Faculty, the Faculty of Electrical Engineering, or the Faculty of Mechanical Engineering) include IP in their curricula. Furthermore, intellectual property offices are not located in libraries and not much is known about the role of librarians in providing IP training and support. However, there are so-called Knowledge Transfer Centres/Offices that are part of universities, such as the Knowledge Transfer Office at the University of Ljubljana, the TechnoCenter at the University of Maribor, and the Centre for Knowledge Development and Transfer at the University of Primorska.

This paper presents the Slovenian findings of the international survey of higher education institution practices and the actual labour market needs for current and future workers' IP competencies. The research was conducted in the first two stages of IPEDU project, which is aimed at introducing and enhancing education in the field of IP in the curricula of technical universities. The final goal of the project is to develop relevant learning methods that can be used by all stakeholders (IPEDU Project n.d.).

By comparing the data from two studies, we wanted to gain insight into the content and teaching approaches related to IP in the technical studies at Slovenian HE institutions and to compare these with employers' perceptions of the IP knowledge and skills of their non-law employees and job candidates. We pursued the goal of identifying potential differences between HE and labour market perceptions and needs in terms of IP topics. We developed three research questions:

- Do study programmes in technical sciences include learning goals from the areas of intellectual property and IP, which IP contents and topics were these, what are the reasons for potential non-inclusion, how is the teaching conducted (with outside experts and/or in-house libraries and librarians)?

- How important is it to the employers that their non-law staff and job candidates (engineers, scientists, business managers, entrepreneurs) possess IP skills and competencies?

- What is the attitude of the employers towards training in IP?

2. Methodology

In both studies, we used an online survey with questions of various types. For the first study, we used 12 yes/no, open-ended and Likert-scale questions asking about different aspects of IP teaching (contents, collaboration, etc.). For the second study, we used 11 menu-based, Likert-scale, and alternative questions asking about various aspects of the role and importance of IP in the workplace.

The target population for the first study were public and private faculties in Slovenia which offer study programmes in the field of technical sciences. To identify appropriate organisations, we analysed the list of all Slovenian faculties obtained from the publicly available data at the Ministry of Education, Science and Sport[2], reflecting the situation in December 2020. From this list, we selected only faculties with KLASIUS-P-16 (classification of fields of educational activities/qualifications) code 7 - engineering, manufacturing, and construction. We identified 32 such institutions, and sent them the invitation to complete the survey. Libraries and leaders of study programmes answered the questionnaire in January and February 2021. We obtained responses from 15 institutions (47%); of these, 11 institutions perform only technical study programmes, while 4 institutions have technical study programmes alongside other study programmes.

The target population for the second study were companies and offices that deal with industrial property (often as outsourcing agents), work with employment candidates, or have an intellectual property department or function, and also employ technical profiles. Because it is difficult to assess the size and structure of the population, we opted for purposeful sampling. The invitation to the survey was distributed in various ways in order to achieve maximum attention from potential respondents and thus generate maximum response. The request for participation was distributed through the national Office for Intellectual Property, national Chamber of Commerce and Industry, Intellectual Property Office of the University of Ljubljana, Central Technical Library, and various individual channels. Data collection lasted from February to October 2021 (in the meantime, due to the Covid-19 pandemic, the IPEDU project was suspended for 6 months). We obtained 62 adequately completed surveys. Three of them indicated that they employed only profiles from the law sector, making them not relevant respondents for our survey.

Due to the small numbers the results are presented using only descriptive statistics.

3. Results

When asked whether their study programmes included learning goals from the area of intellectual property, 11 responded positively, 7 responded negatively, and 11 did not know. Among the justifications of the negative answers, the most interesting were that these topics are covered by the centre for career development, and that the curricula are composed according to the ACM

2 Available at: https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/Visoko-solstvo/eVS-evidenca-VSZ-in-SP/eVS_VSZ_04122020.xlsx

guidelines, which do not contain recommendations for IP topics inclusion. The IP topics covered are: System approaches in handling an innovative organization (analysis of state, setting innovation goals, building an organizational innovation culture, systems of encouraging and rewarding, innovation and research management), IP (patents and models, procedures in registering and acquiring rights), WWW and EU support environment in innovations and research, project preparation, use of various materials, citing, open access, elements of IP protection (prevention of misappropriation, plagiarism, copyright). Also interesting were the answers to the question how often the specific IP topics were present in the study programmes in accordance with what would be needed.

Most respondents answered that IP topics are not included, although they would be necessary, especially general topics such as "*Fundamentals of IP legislation for the protection of intellectual property, which allows the individual to know how to protect their creations, products*." Respondents also indicated that there is a lack of knowledge about the different types of intellectual property. Surprisingly, most respondents actually do not know how intellectual property is represented in their study. Moreover, none of the respondents answered that intellectual property knowledge is taught wherever it is needed. This suggests that respondents generally do not have a complete insight into all curricula and content.

Regarding cooperation with outside experts and institutional librarians, only two of the 6 participants, who answered this question, indicated that they cooperate with the economy when preparing and executing the courses. The types of mentioned cooperation were: presentations and lectures by outside experts, and cooperation with a particular patent office. Only one participant (from a purely technical faculty) stated that they collaborated with the institutional library and librarians when preparing and executing the courses - the area was presentation of search approaches and various databases. The question to the librarians revealed that in general librarians are very rarely involved in the pedagogical process, and in a relatively limited manner. Some of them introduce the use of library information systems and catalogues, databases, citation methods, and two librarians have already presented the challenges of plagiarism.

The second survey showed that the notion of the importance of employers towards IP competencies of non-law staff is generally, although not entirely, positive. This can be seen from the 53% positive answers to the question of whether IP knowledge of employees or colleagues would be beneficial to the company/organization activities, and from the 78% positive answers that IP knowledge is relevant for their company’s work (for 35% it is very relevant, and for 43% somewhat relevant). The overall average of responses to the Likert-scale questions on the importance of individual IP-related competencies is also on the positive side: 3,06 for new job candidates and 3 for current employees.

With the Likert-scale questions, we wanted to identify the IP-related knowledge and skills that were the most and the least valued by employers in job candidates and current employees (Tables 1 and 2). Given the data available and the possible analyses, a threshold was set of more than 25% of responses in at least one of the values on each side of the scale, i.e. stronger statements (1 or 2, 4 or 5), but only if that value was not equally represented on the other end of the continuum in the same category. As can be seen, a tendency of a stronger agreement with statements regarding the importance of IP knowledge and skills among job candidates is evident in the following five competencies and therefore indicating their stronger importance: “Knowledge what IP is“,“Knowledge of hazards of infringing or misappropriating other's IP assets“,“Knowledge where

to find information on existing patents, trademarks, models etc.“, “Awareness when and how to consult with an IP expert or adviser“,“Basic knowledge on the different types of intellectual property“. Values 1 or 2, representing the attitude “not important”, were most strongly indicated for the competency “Ability for financial assessment of industrial property assets.“ Regarding current employees, a tendency toward stronger agreement with statements about the importance of IP knowledge and skills is evident in the following five competencies: “Knowledge what IP is“, “Knowledge how to utilize IP in their work”, “Knowledge of hazards of infringing or misappropriating other's IP assets“, and “Knowledge where to find information on existing patents, trademarks, models etc.”, while values 1 or 2 (not important) were mostly indicated for the competency “Knowledge of the basics of IP law“.

Table 1: Employers’ perceptions of importance of areas IP knowledge for job candidates

IP skills and competencies on:	**1 – not important**	**2 - slightly important**	**3 - moderately important**	**4 - important**	**5 - very important**	**Not sure**	**Total**	**Avg.**	**SD**
what IP is	6	8	9	9	12	0	44	**3,3**	1,4
basics of IP law	7	9	11	14	3	0	44	**2,9**	1,2
how to utilize IP in their work	8	8	9	10	8	1	44	**3,1**	1,5
hazards of infringing or misappropriating other's IP assets	7	8	6	14	8	1	44	**3,3**	1,4
where to find info on patents, trademarks, models etc.	8	4	11	13	8	0	44	**3,2**	1,4
when and how to consult with an IP expert/adviser	9	3	7	15	8	2	44	**3,4**	1,5
different types of intellectual property	9	5	8	14	7	1	44	**3,2**	1,5
process of obtaining IP protection	11	12	8	6	7	0	44	**2,7**	1,4
IP-related risk management	10	9	8	7	8	1	43	**2,9**	1,5
role of IP assets in strategic business planning	12	4	10	11	7	0	44	**2,9**	1,5
financial assessment of IP assets	13	6	11	7	5	1	43	**2,7**	1,5
utilizing IP domain to acquire info on competitors	11	4	9	12	9	0	45	**3,1**	1,5
								3,6	

Table 2: Employers’ perceptions of importance of areas IP knowledge for current employees

IP skills and competencies	**1 – not**	**2 - slightl**	**3 - moder**	**4 - import**	**5 - very importa**	**Not**	**Total**	Avg.	**SD**

on	important	very important	ately important	ant	nt	sure			
what IP is	7	9	4	12	12	0	44	3,3	1,5
basics of IP law	7	14	7	11	5	0	44	2,8	1,3
how to utilize IP in their work	7	11	7	14	5	0	44	3,0	1,3
hazards of infringing or misappropriating other's IP assets	8	10	5	14	6	0	43	3,0	1,4
where to find info on patents, trademarks, models etc.	8	9	5	10	12	0	44	3,2	1,5
when and how to consult with an IP expert/adviser	5	13	3	10	11	1	43	3,3	1,5
different types of intellectual property	8	10	7	12	7	0	44	3,0	1,4
process of obtaining IP protection	11	13	6	10	4	0	44	2,6	1,3
IP-related risk management	8	13	4	12	7	0	44	2,9	1,4
role of IP assets in strategic business planning	10	9	6	7	9	1	42	3,0	1,6
financial assessment of IP assets	10	12	5	11	5	1	44	2,8	1,5
utilizing IP domain to acquire info on competitors	8	10	6	9	10	0	43	3,1	1,5
								3,00	

This result can be supplemented by the finding that more than half of the companies (53%) prefer to use an outside specialist when it comes to IP issues, and only 11% prefer to use their own employees with IP knowledge. In addition, only one third (29%) of employees believe that it would be beneficial for the company/organization to have more non-law employees with IP knowledge.

We can’t be so happy looking at the employers’ attitude towards IP training, as these trainings are offered inadequately (42% said they never provide them even though it would be needed, and another 11% almost never provide it even though it would be needed), in spite the opinion that such trainings would be beneficial to the overall work/success of the company (53% agreed with this statement). When asked about the frequency of these trainings, i.e. how often they should be offered, the answer was that training should be organized when needed – that is whenever an IP issue arises, with a relatively large proportion believing that it should be done regularly, but no more than once or twice a year. It is also worth mentioning the large share of the answers “I am not sure”. This implies that probably many of the respondents either have not considered these issues to be important or have not dealt with them at all. The question that arises is, would a solution here be higher awareness of the importance of IP skills and competencies.

4. Discussion

What do these results mean in the context of IP skills and competencies in teaching and within labour market? First and foremost, we see some sort of general alignment in terms of expected competencies, although these are not very positive in the context of IP teaching: Companies do not place high priorities on the IP competencies of their non-law employees, and also, HE institutions do not include them in their teaching and are unsure if these competencies are needed. We can therefore expect only limited circumstances shaping information needs and practices in either case, but some still emerge. Looking at the HE situation, topics that seem to receive more attention revolve around what intellectual property is, what types there are, its practical applications and associated risks, and where to find information on patents, etc. At the workplace, the areas of high importance are the same (especially for new job candidates), but what seems to be most important is, when and how to consult with an IP expert/adviser. We would need to look deeper into what information HE educators, including academic librarians, need to provide quality teaching and good information resources and services, but it is already rather evident on which areas to concentrate.

It is interesting to note, however, that the need for IP competencies by non-law employees and job candidates still appears to be higher in companies than the need detected by the educational institutions. In other words, IP teaching is needed, but not done, which implies that perhaps some sort of dialogue between educators and employers is needed, including awareness-raising. Especially since the employers do not appear to be compensating for the lack of competencies with their own workplace training of non-law staff but are finding other ways when the need for IP expertise arises (training employees when the need arises, hiring outside law specialists – both of which can be more expensive).

Another rather sad fact, that needs improvement, is that that academic libraries do not seem to play an important role in HE education in the field of technical sciences in regard to IP competencies. If at all, they are included as information infrastructure and not as teaching aid. Here it is worth mentioning that the Slovenian LIS study programme, delivered at the University of Ljubljana, provides graduates with at least basic intellectual property competencies, which implies that librarians could be worthy teaching collaborators, even without too much additional training. A relatively traditional image of libraries emerges from our study, which in turn offers libraries an excellent opportunity to change it. Not only by researching the needs and behaviours of their users, but also by better and more active information provision for the identified needs. IP is a topic which is by its nature also a library topic, whether through information sources or through identification and taking care of users' information needs. It seems that here, too, proactivity is the answer for better placement of the library within its HE institution. What we see as another potential solution is that a library could also play an important role in opening the opportunities for the communication between educators and employers mentioned above.

5. Conclusions

A general picture of the situation regarding IP contents in the Slovenian technical study programmes and in the labour market I s emerging: The presence and inclusion of IP topics are poor

and the perception of their importance is low. Even poorer is the inclusion and participation of academic libraries and librarians. Respondents see the need to include certain IP topics in study programmes and among job-related skills.

Several questions arise: Which IP competencies should be developed within the technical sciences HE. Indeed, it may be questionable whether explicit IP knowledge and skills are even necessary for engineers. Perhaps they should in their education receive awareness when and how to apply IP in their work, and when and how to include other experts, e.g., from the field of law. Another question concerns the competencies of educators, which include academic librarians, as it is obvious that they need to be appropriately qualified to provide adequate training, backed with relevant information resources.

One of the drawbacks of the current research is small sample and response rate. This research could therefore be considered pilot in its nature. To obtain results with wider validity, our surveys would have to be executed on a larger and more systematically represented population, including at least coordinators of technical study programmes, study pro-deans, and, ideally, teachers in these programmes, as well as librarians at the respective institutions; and on the other side as wide as possible sample of employers to investigate whether any differences can be identified between industry sectors.

To get a more complete picture, we should also include questions about HE respondents' opinions on HE whether libraries and librarians should be included in planning and execution of teaching, whether a stronger presence of intellectual property topics is needed, what specific subtopics would be most relevant, whether teachers themselves feel confident and competent to teach intellectual property (and, if not, how this could be improved), whether librarians are competent and libraries should be included (and, if not, how this could be improved), and, last but not least, what would be needed to improve the overall situation, where to start, etc.

Nevertheless, our findings offer a valuable contribution to the planning of a systematic and wholistic intellectual property curriculum for technical studies within EU.

6. Acknowledgment

This research was done within the project IPEDU (Introducing Intellectual Property Education for Lifelong Learning and the Knowledge Economy)[3], which is co-funded by the Erasmus+ Programme of the EU, and participation partners. We thank the partners for their valuable contribution in planning the study and collecting the data.

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