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Business Cooperation - Improving The Working Life Relevance of Higher Education

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Abstract—Education programmes should provide students with the skills for working life. This is important not only for students, but also for companies. Skills refers, in addition to competence in a specific area, to general competencies, working life practices in common use and, for example, knowledge of software used in the business world. It is even more important to take into account the needs of working life when teaching adult students, who often study alongside work with the aim of progressing in their careers. In spring 2019, Kokkola University Consortium Chydenius conducted a survey targeting information and communication technology (ICT) companies in its local area. The results highlighted the attitude of the job seeker in the recruitment phase. The employers valued qualifications, but still emphasized the ability to work independently as well as social and teamwork skills as the most important things. This survey provides a good starting point for taking into account the needs of the business world when developing education. This paper reviews the results of the survey and discusses how education providers and students can take them into account in their own activities.

Index Terms—Industry co-operation, soft skills, employability skills, curriculum design, working life relevance, higher education

I. INTRODUCTION

The role of continuous learning is emphasized in today's rapidly changing society, which requires a rapid response to educational needs. From society's perspective it is important that education programmes at different levels of education provide skills for working life. In recent years, this requirement for working life relevance has increasingly been directed also towards universities [1], [2], [3].

It is naturally important for working life that the substances being taught are topical. To respond to the competition and continuous development of working life, students must also have skills and abilities that help them adapt to changing work environments [4], [5]. In addition, so-called soft skills, needed in virtually all jobs, regardless of field, are important for the student's future. Several wide-ranging studies have presented reference frameworks and different groupings for soft skills [6], [7], [8], [9], [10], [11]. It is highly challenging to exactly define the skills that make a graduate more employable, and no total consensus on the issue has been reached [1], [12]. Such general soft skills typically include interaction skills, different project management and other working methods, and

the ability to operate the software commonly used in business. The specific soft skills required also change as working life changes. Developing soft skills and the relevance of studies for working life can ease the transition from education to working life and improve students' labor market opportunities. Although it can be agreed that having different soft skills is useful, few longitudinal studies exist on their impact on employment or career progression.

In addition to the content of education, employers also look at other issues during recruitment. For example, Branine [13] has stated that employers look for person-related rather than work-related skills. According to him, the majority of employers look for attitude, personality, and soft skills rather than high level qualifications. Identifying the factors that are important in recruitment and making students aware of them provides, alongside knowledge of the content of the work and soft skills, the full picture of what is required of students from the perspective of employment.

By taking into account the needs of businesses, it is possible to influence companies' attitudes towards education. The importance of this is particularly highlighted when it comes to continuous learning, in the context which students are typically adults who are already active in working life. If the employer has a positive attitude towards the employee's studies, the employer can offer, for example, flexible working hours, and support the employee's studies in other ways. It is therefore important for students and education providers that employers see education as supporting companies' goals.

Taking business perspectives into account requires identifying the needs and wishes of companies and developing close interaction between companies and education providers. The Kokkola University Consortium Chydenius, the Centria University of Applied Sciences and the Federation of Education in Central Ostrobothnia are working together to implement an ESF-funded project that aims to improve ICT graduates' access to employment. As part of this project, a survey study was carried out in spring 2019 to determine the views of ICT companies in the region on, for example, the issues that are significant in recruitment and what general competencies companies require of employees. The aim of the study is to help the region's education organizations to produce a suitable workforce for companies, and through this to optimize

the employment and career progression of graduates from educational institutions in the region. Education providers can take into account the views and needs that arose in the study in their current education programmes and, if necessary, fill the gaps in graduates' skills through continuing education.

This article presents the results of a company survey and discusses how education providers, as well as students, can react to the issues highlighted in the results.

II. IMPLEMENTATION OF THE STUDY

During spring 2019, a research survey was carried out in the Kookola region, which focused on prominent ICT employers. The survey was conducted as interviews. The interviews aimed to identify the relevance of different levels of education, the issues that are important to companies in recruitment and what kind of general competencies (soft skills) the companies wish their employees to have. The interview mapped the skills needed for ICT expert positions. For the companies interviewed, in practice it typically means e.g. a person with programming skills. The study also collected information on, for example, the project management methods, project management tools and application development environments used in the business world, as well as applications for and the prevalence of remote work.

During the interviews, employers were asked to assess the significance, recruitment and general competencies of the educational programme by providing the interviewee with response options to act as a catalyst for discussion. The response options are presented in more detail in Chapter III under each theme. Remote work and project work were discussed in a less formal manner, using a few questions related to the topic as a springboard.

Seven companies participated in the interviews. The interviewees were chief executive officers or those responsible for recruitment. The survey was carried out by sending a questionnaire to the directors of the companies in advance, and this questionnaire was used as the basis for the interviews. The interviews were recorded, transcribed, and analyzed. The companies that responded to the survey included both nationally operating companies (2), and internationally operating companies (4).

Many of the respondent companies operate in more than one business area. All companies dealt at least in some extent with the software. For one company the main business was related to hardware and for four of the companies business activities involved support services and consulting. The main markets of the companies were equally formed of large companies, small enterprises and public organisations.

III. RESULTS

A. The importance of education

The significance of the education found in the surrounding area was determined by asking how important it is to have education in the area leading to a vocational qualification in ICT, a vocational qualification in business and information technology, and a university degree. In addition about the

importance of having continuing education in the area was asked. The respondents were asked to rate importance on a four-item scale (very important, important, not very important, insignificant). In addition, the interviewees selected the two most important educational programmes.

Companies are aware of the importance of the information technology training and qualifications found in the economic region, even if they do not necessarily require a degree from all recruits. A degree completed signifies a completed "project" and thus improves the job seeker's chances in recruitment. The companies that participated in the interview considered a university degree in the area as more important than education leading to a vocational qualification in the field of information technology, which was nonetheless also considered important. Employers also saw continuing education and other similar targeted training in the area as important. Some respondents rated the importance of targeted training as very high. The nature of these companies' operations are such that they do not have to present the level of education of their employees who participate in projects during, for example, a competitive tendering process: in a changing operating environment it is more important to be able to find suitable employees for a specific time. Some companies emphasize the need for a university degree among project leaders. On the other hand, in terms of progression in the company, continuing training played a more important role than a degree.

B. Recruitment

The interviewees were asked to assess the importance of recruitment-related matters (Table I) on a four-item scale (very important, important, not very important, insignificant). They were also asked to select the three most important options in the table. There was also a discussion on the topic, during which the interviewees explained their choices in more detail.

In their assessment of the issues presented in Table I, when recruiting a new employee, the employers clearly considered the attitude of the job seeker in the job interview to be the most important issue. The attitude in the interview was also the most important when the respondents were asked to select three of the most important issues from the list presented. Six of the seven respondents rated the attitude of the job seeker as the most important issue and the seventh rated it as the second most important issue.

All the interviewees considered the content of the completed studies/courses and a CV or Portfolio that stands out from the masses to be important or very important. A CV/Portfolio that stands out from the masses was also the second most important issue when companies were asked to choose the three most important issues that affect recruitment. In some companies, this was considered a significant factor already when applicants were selected for interviews.

Work experience of over a year and other official certificates on continuing education were considered almost equally important to the above. Three companies rated long work experience even among the top-three most important issues. On the other hand, some companies considered that work experience

TABLE I
ISSUES AFFECTING RECRUITMENT

1) Qualifications
2) Other official certificates (e.g. continuing education course)
3) Content of completed studies/courses
4) Work experience, less than a year
5) Work experience, more than a year
6) Regional commitment
7) CV/portfolio that stands out from the masses
8) Small capstone project carried out during studies approx. 100 hours of work for single worker Whole project approx. 300–500 hrs (3–5 students)
9) Larger capstone project carried out during studies approx. 200 hours of work for single worker Whole project approx. 600–1000 hrs (3–5 students)
10) Attitude during interview
11) Other information

was of little importance, and constantly also recruited recent graduates. Capstone projects carried out during studies were valued as important in most of the responses. They were seen as equal to the role of work experience.

When recruiting an employee, their regional commitment was seen as the least important issue. Of the seven respondents, five did not feel it was important. In addition to this, work experience of less than a year was also considered less important: slightly more than half did not consider it important for recruitment. The applicant's degree received the third least support but still on average it was considered important. The importance of recruitment-related matters by company are presented in Table II.

TABLE II
IMPORTANCE OF RECRUITMENT-RELATED MATTERS BY COMPANY (A-G).
SCALE 1=VERY IMPORTANT, 2=IMPORTANT, 3=NOT VERY IMPORTANT,
4=INSIGNIFICANT. THE NUMBERING OF COMPETENCES CORRESPONDS TO
THE NUMBERING SHOWN IN TABLE I.

Issue	A	B	C	D	E	F	G
1)	2	2	3	3	2	2	3
2)	2	3	3	1	2	2	2
3)	2	2	2	2	2	2	2
4)	2	3	3	2	3	2	3
5)	2	2	2	2	2	2	3
6)	2	3	3	2	3	3	3
7)	2	2	2	1	2	2	3
8)	2	3	2	3	2	2	2
9)	2	3	2	3	2	2	2
10)	1	1	2	1	1	1	1

During the companies' interviews, in addition to the actual questions asked, the motivation of the job seeker, which is certainly reflected in their attitude, was raised. In terms of attitude, the interviews also highlighted enthusiasm and a desire to learn new things, i.e., the desire to personally develop. In certain specific recruitment situations, special expertise may also be important if the job in question requires it.

When the companies searched for employees, their methods varied rather widely. Most companies use different social media (including LinkedIn, Facebook), their own websites, and traditional job search ads. The answers also highlighted personal networks, as well as direct contacts with schools

and teachers. Potential summer employees or thesis project workers are also recruited in this way, who may then become potential employees at a later stage.

C. General competencies

Using the previously presented four-item scale to assess how important they consider the general competencies presented in Table III, the employers considered it very important to have the ability to absorb new knowledge, as well as the ability to analyse, define and solve problems. The other issues were considered important, with the exception of language skills other than English or Swedish and international work and study experience, which were seen to be less important. When the skills presented in Table III are classed into inter-related skill groups, it can be concluded that the answers emphasized the ability to work independently but also social skills, including teamwork skills. In addition to these, English proficiency and skills related to the field of applications other than information technology skills also emerged to some extent.

TABLE III
GENERAL COMPETENCIES ELICITED IN QUESTIONNAIRE

1) Ability to work independently /taking responsibility
2) Ability to absorb new information
3) Ability to analyse, define and solve problems
4) Proficiency in English
5) Proficiency in Swedish
6) Proficiency in some other language
7) Ability to write technical reports
8) Interaction and argumentation skills
9) Social skills
10) Teamwork skills
11) International work and study experience
12) Project management skills
13) Leadership skills
14) Knowledge of finances and expenses
15) Sales/marketing skills
16) Pedagogical skills
17) Skills in field of applications other than information technology
18) Remote work skills

Although five employers out of seven valued the ability to work independently/take on responsibility as the most important characteristic, on the four-item scale, absorbing new knowledge was considered the most important. After these, the ability to analyse, define and solve problems, as well as interaction and argumentation skills, together with social skills and teamwork skills, were also central. The importance of general competencies by company are presented in Table IV.

What made answering challenging was the fact that the necessity for employee skills is strongly influenced by their work tasks. Different qualities are valued in different work tasks. The responses of the interviewees reflect the typical competence profile of the most commonly hired employees, but the general competencies expected of, for example, a person who is hired for management positions or tasks mainly involving financial management, may differ significantly from those described above.

TABLE IV

IMPORTANCE OF GENERAL COMPETENCIES BY COMPANY (A-G). SCALE 1=VERY IMPORTANT, 2=IMPORTANT, 3=NOT VERY IMPORTANT, 4=INSIGNIFICANT. THE NUMBERING OF COMPETENCES CORRESPONDS TO THE NUMBERING SHOWN IN TABLE III.

Competence	A	B	C	D	E	F	G
1)	1	2	2	2	2	1	1
2)	2	1	2	1	1	1	1
3)	1	1	2	1	2	1	2
4)	2	2	1	2	2	1	2
5)	3	3	3	2	2	2	2
6)	2	3	3	4	3	2	4
7)	1	2	3	1	2	2	3
8)	2	2	3	1	2	2	2
9)	1	2	2	1	2	2	2
10)	1	1	2	1	2	2	2
11)	2	3	4	3	3	2	4
12)	1	2	2	1	2	2	2
13)	2	2	2	3	2	2	3
14)	2	3	3	2	2	2	1
15)	1	4	4	2	2	2	2
16)	2	2	4	2	2	2	2
17)	1	3	2	1	2	2	1
18)	2	3	2	1	2	3	2

D. Remote work

In all the companies interviewed, employees had the opportunity to work remotely on certain days. Five out of seven companies already had several employees who mainly worked remotely. With the exception of one company, all the companies had several offices, which typically meant internal remote work between different offices. Both synchronous communication tools (videoconferencing) and asynchronous tools (chat) were used in remote work. Interestingly, email and phones no longer play a very large role in remote work; more modern communication tools seem to be in use.

With the exception of one, all the companies already also recruited remote workers, and one remote worker, who had not yet been recruited, was planning to do so in the future. Consequently, the geographical location of the employee was not a problem for companies in terms of recruitment.

Several interviewees mentioned that it would nevertheless be good for the employee to be able to visit the office from time to time. This would help create a sense of community and, for example, integrate the employee into the company's way of working. Companies also typically want employees to work at the office at the beginning of their employment for some time before moving to remote work, so that the company's practices become familiar and it can be seen that their work is going smoothly.

The responses revealed that the option to work remotely also depends on the nature of the work. For example, for those in management, regular remote work is impossible in practice. On the other hand, there are no obstacles for programmers, and for salespeople it is even desirable that their workplace is located close to customers.

E. Project work

During the interviews, we also wanted to identify project work practices. Project work is a very central form of work,

especially in ICT companies, and awareness of the solutions and practices used by the companies helps education providers make the most of the same tools and methods for implementing their training.

Scrum and Kanban were the most used project management methods, whereas Jira was by far the most popular project management tool. In addition, some companies also used their own customised and self-implemented solutions for project management. The companies' application development environments were widely dispersed due to the companies' various fields of operation.

IV. DISCUSSION

The importance of education seems to depend a great deal on the post for which the applicant is applying. However, it was evident that higher education in the field was considered slightly more important than education leading to a vocational qualification. The importance of continuing education and the different certificates related to specific competence areas are also important and are particularly emphasized in career progression.

The significance of a degree is understandable, especially in situations in which the company participates in competitive tendering. In these tendering processes, the qualifications of the employees involved in projects are often given value. This is the situation in Finland, especially with regard to public sector competitive tendering. On the other hand, in companies that do not need to do this, the role of degrees is not necessarily emphasized.

The most important information for students in this study is provided in the results related to recruitment. The student can significantly influence these matters through their own actions and choices. In fact, it is very difficult for the education provider to influence many recruitment-related issues. The students' own attitudes, desire to learn new things and the desire to develop themselves seem to be central to employment. This is particularly important in the ICT sector, as the operating environment is strongly evolving and therefore rapidly changing. An employee who can keep up with change is valuable.

Making one's own competence visible is also very important. From the very beginning of the education programme, students should try to collect their various practice and work samples so that they can then present them to the employer, if necessary, during recruitment. For example, actively using the GitHub service throughout one's studies would be one solution, as different work can be stored on it and work samples suitable for each situation can be filtered from it to be shown. For their part, the education provider may enable the use of such solutions to promote the presentation of competencies by, for example, taking them into use as tools for submitting project works and exercises related to the education programme.

In many respects, the student can also influence general competencies – for example through their choices during their education. Skills that arose as important in the survey, which

one can develop during one's studies, include interaction and argumentation skills, taking responsibility, and proficiency in English. Working in a group and the ability to define and analyse problems can also be developed, at least to some extent, regardless of a person's characteristics. On the other hand, some general competencies are such that they are more a matter of characteristics or character traits. Examples of these that emerged as important in the interview include sociability and the ability to absorb new knowledge. One must be aware of general competencies so that one can pay attention to them. It is thus important that the education provider communicates to the students the expectations that companies have of graduates.

Remote work has more or less become a part of companies' working methods. In other words, where one lives no longer seems to be as important a factor in terms of employment as it was in the past. This is particularly true for certain jobs.

Working methods used in teaching can significantly influence the development of general competencies. Based on the results, during the education programme, students should be taught and required to conduct independent work and take responsibility. On the other hand they should also learn teamwork, sociability and interaction that develops argumentation with other students. Moreover, the ability to analyse, define and solve problems, for example, is a skill that can be developed through pedagogical solutions during an education programme.

The skills desired by companies are partly related to working independently, but at the same time working in a group. There must be a balance between these in the education programme. The Master's Programme in Mathematical Information Technology is implemented as distance education. This means that studying naturally involves a great deal of independent work and taking responsibility for one's own studies. However, the results of the study also highlight the importance of teamwork and interaction, which must be given particular attention, especially in the context of distance learning.

Students can be very heterogeneous in terms of general competencies. The courses could offer students option of doing exercises independently or, for example, with a partner or in a group. This would increase the student's opportunity to develop precisely the skills that are important to them.

Pedagogical choices are made at the course level and are greatly influenced not only by the desired competence objectives, but also by the teacher's working methods and the topic to be taught. However, the education provider should ensure that the training programme as a whole teaches not only substance-related skills, but also desired general competencies. For this reason, it is important that someone has an overall picture of what kind of pedagogical solutions are used in the education programme's courses.

The survey also provided invaluable information for the education provider about the project management and remote work practices and technological solutions used by the companies. The more the same practices and solutions can be used in teaching, the better the working life relevance of education.

The results of this survey have already led to measures in

the arrangements for the Master's Programme in Mathematical Information Technology at the Kokkola University Consortium Chydenius. The results of this study have been published in the first introductory course for all new students. In this way, all the students are made aware of these expectations from the beginning of their studies. During the educational programme, the needs of companies can also be used to justify the choice of working methods at the course level. The Github service is used in some courses when returning programming exercises. It is hoped that this will guide students to keep their assignments so that they can be more easily presented to the employer in a job search situation. Learning tasks that require interaction and group work have also been added to the courses, so that the students' soft skills would better meet the wishes of the companies at the end of their studies. The results will also be utilized in the future as education is developed to better meet the needs of working life.

V. CONCLUSION

From the recruitment perspective, the interviews strongly highlighted the employee's attitude. Attitude was associated with, for example, the willingness of job seekers to learn new things and develop personally. This result is good for the job seeker because everyone can affect their own attitude. It is also important to show your skills during the recruitment process. It is a good idea to prepare for this early on during one's studies by collecting, for example, all the work samples into some kind of repository that enable the long-term retention and sharing of works into different contexts. The education provider can influence this by introducing such tools to use when submitting project works or exercises.

Of the general competencies, the ability to learn new things and work independently and, on the other hand, the ability to interact and work in a team emerged as the most important. The education provider should therefore ensure that the education programme uses working methods that develop these characteristics, which in some respects can even be seen as opposites.

Remote work has become popular in recent years. The data used in this research were collected before the COVID pandemic, and it can be assumed that remote work opportunities have continued to increase due to the various restrictions and regulations. However, even according to this data, it was evident that where one lives is not an obstacle to employment and that all companies had positive attitudes to remote working.

At the level of an education programme as a whole, radically changing the direction of the curriculum is a moderately slow process. However, many of the issues raised in this study are such that they can already be influenced by, for example, courses' pedagogical solutions. In this case, working life relevance can be improved, even in the short term. Compared to its benefits, this kind of survey is so easy to implement that it should be used, for example, every few years as a tool for developing education. It would also be useful to develop other channels of interaction between companies and education providers in the future.

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