Ergonomics – opportunity for new human jobs
Ergonomics – opportunity for new human jobs

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Foreword from the Coordinator

Dear Readers,

Let me welcome you to our final thoughts after successfully implementing the ERGO WORK Project!

The right to work and to actively participate has become one of the basic rights in modern society. Furthermore, the work, work place and work processes need to be designed in a way to ensure that they are safe, efficient and easy to use. Here Ergonomics steps in. Furthermore, there are several other modern design concepts advancing, designs that seek solutions for user-friendly, fully accessible work for ALL, regardless of one’s ability or disability. Some of the most common and related concepts are Universal design, Design for all and Inclusive design. They are highly complementary with multiplying benefits, and we have recognized them as important disciplines for creating an inclusive working environment for all.

ERGO WORK as a two-year project, financed by the European Union, Lifelong Learning Programme, Erasmus KA action (www.ergo-work.eu), considers how to design work places and organize work and work processes, not only accessible to employees without disabilities, but also to meet the needs of those employees who have some kind of an impairment and with special needs. Through the ERGO WORK Project, the discipline of Ergonomics, accompanied with Universal and Inclusive design aspects, has been applied to try to achieve a work-based inclusion.

Through a strong Business, Academic and Research alliance, the project brought to the involved stakeholders a deeper insight into methods, approaches and solutions for creating Ergonomic work places for persons with physical disabilities, the blind and visually impaired, the deaf and hard of hearing as well as persons with mental health problems and/or intellectual disabilities.

During the two years of the project’s implementation, the partnership carried out an in-depth analysis of the current situation in the European area (among relevant stakeholders and in the existing
curricula), updated the existing Ergonomics teaching contents at partner universities, and finally tested and implemented the impact of the teaching contents within six pilot projects at involved Slovenian and Polish companies, carried out by four multidisciplinary working groups of students, professors, company staff and targeted Persons with Disabilities. Through an intensive promotion, dissemination and sustainability campaign we have been promoting sustainable cooperation between Academia and Business and all other relevant stakeholders in Ergonomics for Persons with Disabilities in order to foster Reasonable Accommodation at work. One of the important final steps has been addressing the System and Policy makers on regional, national and EU levels with two sets of recommendations: Recommendations for multidisciplinary Curriculum Ergonomics & Recommendations to the System and Policy makers.

Through Proceedings you will be able to get an insight not only into the work done by the ERGO WORK partnership, but also into Ergonomics as a discipline and ‘an ergonomist’ as a profession in Europe, into disability terms in Slovenia and Poland, as well as an important overview of provisions / recommendations for future employment of ergonomics, and universal and inclusive design for equalization of work in European societies.

Although the project is coming to its conclusion, our work hasn’t reached its end. The project’s aims have already been integrated into the work of all the ten project partners, and will also reflect on future activities of other stakeholders involved in the project or being motivated by the project to initiate change in the field of inclusive work for all employees.

Join our growing network and let us build a better society together!

Nataša Rebernik,
ERGO WORK Coordinator
Introduction

Changes taking place in the employment of workers with disabilities depend on a number of issues, ranging from legal regulations and the policy of equal opportunities, funding of the adaptation of people and workplaces to the market, and concluding by raising the awareness of society. Modern organizations in employment policies implement the open-to-all approach, both to able-bodied and disabled persons. Moreover, they diversify their approach and competence of the staff, and orient their activities on the professional inclusion of Persons with Disabilities.

The aim of the study, entitled ‘Ergonomics – a new opportunity for human employment’, is to present the theoretical and practical aspects of ergonomics, some of its determinants, and to sensitize readers to issues of creation and dissemination of ergonomic work places. The authors have devoted particular attention to:

- Ergonomics in Europe, presenting an analysis of the status, projects and activities aimed at popularizing ergonomics and increasing the employment of ergonomists. It has indicated the role which the ergonomist plays in the range to ensure safety and health at work and the design of jobs;
- humanisation of work and state support for employers in the employment of disabled persons. Policies and government intervention in the employment of people with disabilities were indicated on the example of Slovenia;
- the state of knowledge on the employment of Persons with Disabilities in Poland, the directions of the activities of Polish government and its intervention. In addition, highlighted the role of education in the field of disability management in the workplace;
- the availability of work places for Persons with Disabilities. there were ways presented for increasing the number of ergonomic work places;
- pilot projects implemented in Slovenia and Poland. Objectives and plans for the implementation of projects, selection procedure and
the creation of multidisciplinary groups were characterized. Also presented were the conclusions which resulted from activities carried out;
- recommendations for system and policy makers on the European Union and Member States levels on ensuring inclusive employment opportunities for people with disabilities through workplace Ergonomics.

In addition, in the work place the adaptation of a health clinic for Persons with Disabilities was characterized. The subject of the characteristic was the Medical and Diagnostic Centre sp. z o.o. It described the process of the design of the objects and work places tailored to the needs of persons with specific dysfunctions.

In this study references were made to the functional capacity and evaluation of Persons with Disabilities for the labour market, having regard to the Pomeranian Competences Centre. In this context, the self-assessment of clients of this Centre has become important.

The integral part of the content are the conclusions in which the authors present the main thoughts resulting from their research.

The study is the result of activities within the project ‘ERGO WORK - Joining academia and business for new opportunities in creating ERGOnomic WORK places. Programme: Lifelong Learning Programme, Erasmus (Project no.: 539892-LLP-1-2013-1-SI-ERASMUS-EKA, Grant Agreement no.: 2013-3750/001-001). Contractors of the project are the following organizations:

1. OZARA d.o.o. – Slovenia;
2. University of Maribor – Slovenia;
3. Kovinarstvo Bučar s.p. – Slovenia;
4. Siedlce University of Natural Sciences and Humanities – Poland;
5. Łuksja sp. zo.o. in Łuków – Poland;
6. Centrum Medyczno-Diagnostyczne spółka zo.o. in Siedlce – Poland;
7. Coventry University – United Kingdom;
8. Tender – Italy;
9. INFAD – Spain;
10. EASPD – Belgium.
The authors are aware that every reader can have a different experience in the range of Ergonomics and the labour market, and these experiences may differ from those represented in this book. However, it is worth noting that this is not about creating new theories or undermining the old ones but about convincing the reader that Ergonomics can be seen from many perspectives.

The work is intended for those recipients who are concerned with human resource management in the organization, also for people who are familiar with equalisation opportunities in the labour market. The content can also be useful for students in such fields as: Management, Economics and others which programmes include Ergonomics, Human Resource Management or Competence Management.

Jarosław Stanisław Kardas
CHAPTER 1

Ergonomics in Europe: the first overview on the situation through three standpoints

Sylvain Leduc

This chapter is focused on the development of ergonomics as a discipline and ergonomists as employees in Europe.

In the first part, we’re analysing the actual situation of Ergonomics development by using some data about the National Societies’ Ergonomics membership and the adoption of European Ergonomists title in 23 Countries in Europe. We used some data delivered by members of the Federation of European Ergonomics Societies (FEES), from the Centre for Registration of Ergonomics in Europe (CREE) and via the data delivered by Eurostat.

The second part is presenting a brief overview of the project headed by FEES since 2012 in order to contribute to the promotion of the discipline and the employment of ergonomists.

The third part is exposing an illustration of the practical value from Ergonomics on the specific topic of Personal Protective Equipment (PPE).

1.1. Analysis on the situation of Ergonomics in Europe

The data analysis from Table 1 shows a large difference of Membership numbers in different National Societies (NS). Three countries have concentrated more than 50%; Great Britain, France and

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1 Aix Marseille University, LPS EA 849, 13621, Aix en Provence, France, tel. +33 (0) 677 448 239, e-mail: sylvain.leduc@univ-amu.fr, Federation of European Ergonomics Societies (FEES).
Germany. In each of these societies, there are more than 400 members. This situation could be explained by the long history of this NS and is also related to the number of the whole population. But, it is not the only argument. For example, the case of the Croatian ergonomics society underlines some questions about the development of ergonomics in this country where the association was founded in 1974.

Table 1. Data on National Societies (NS) Ergonomics’ Membership and European Ergonomists® (Eur. Erg.) in Europe (2014)

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Membership</th>
<th>N.S. Membership Rate in Europe</th>
<th>Number of Eur. Erg.</th>
<th>Eur. Erg. rate in Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>25</td>
<td>1%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Belgium</td>
<td>90</td>
<td>2%</td>
<td>24</td>
<td>6%</td>
</tr>
<tr>
<td>Croatia</td>
<td>53</td>
<td>1%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Czech Rep</td>
<td>18</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Finland</td>
<td>146</td>
<td>4%</td>
<td>5</td>
<td>1%</td>
</tr>
<tr>
<td>France</td>
<td>606</td>
<td>15%</td>
<td>122</td>
<td>28%</td>
</tr>
<tr>
<td>Germany</td>
<td>446</td>
<td>11%</td>
<td>19</td>
<td>4%</td>
</tr>
<tr>
<td>Great Britain</td>
<td>1185</td>
<td>30%</td>
<td>43</td>
<td>10%</td>
</tr>
<tr>
<td>Greece</td>
<td>25</td>
<td>1%</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Hungary</td>
<td>53</td>
<td>1%</td>
<td>6</td>
<td>1%</td>
</tr>
<tr>
<td>Ireland</td>
<td>43</td>
<td>1%</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>Italy</td>
<td>220</td>
<td>5%</td>
<td>51</td>
<td>12%</td>
</tr>
<tr>
<td>Latvia</td>
<td>25</td>
<td>1%</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>255</td>
<td>6%</td>
<td>73</td>
<td>17%</td>
</tr>
<tr>
<td>Norway</td>
<td>120</td>
<td>3%</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Poland</td>
<td>125</td>
<td>3%</td>
<td>9</td>
<td>2%</td>
</tr>
<tr>
<td>Portugal</td>
<td>32</td>
<td>1%</td>
<td>7</td>
<td>2%</td>
</tr>
<tr>
<td>Russia</td>
<td>40</td>
<td>1%</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Spain</td>
<td>90</td>
<td>2%</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>Sweden</td>
<td>261</td>
<td>7%</td>
<td>37</td>
<td>8%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>157</td>
<td>4%</td>
<td>28</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4015</strong></td>
<td><strong>100%</strong></td>
<td><strong>436</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source: Federation of European Ergonomics Societies and Centre for Registration of European Ergonomists.
Today, there are about 50 members. This overview suggests there are several factors which influence the development of membership. We could make some hypothesis linked with the evolution and recognition of the discipline in the economic environment or with the social dialogue about working conditions. In France, several relevant factors are identified as the integration of the ergonomics approach in the Labour Code, the promotion of benefits from ergonomics towards the employees’ representatives, the development of a high level of training for ergonomists.

Regarding the adoption of European Ergonomists ® Certification, the situation is quite different and we could notice three countries where it is adopted more; France, the Netherlands and Italy. In each country, the dissemination of this professional certification is partly linked with the professional and social necessity of recognition in order to practice the occupation of ergonomist, even if there are no official requirements.

Moreover, the data analysis on Employment and Unemployment (cf. Table 2) shows that there’s no correlation with the adoption of the Eur. Erg. ® Certification. So, we could wonder what is driving people to adopt it.

In four countries, the Netherlands, Belgium, Italy and France, there are contrasting situations and no correlation with the economic situation indicated by the Employment/Unemployment’ rate. Therefore, the explanation should be found elsewhere.

By studying the concrete action headed by the National Assessment Board, we could note two factors; on the one hand the active promotion of the certification during the event towards NS’ membership and on the other hand a national movement of social normalization. In these countries, we may conclude that the adoption of this title becomes the norm and offers a professional identity which is more or less required in the case of the variety of senses according to the word ‘ergonomists’.

In the face of this difference, it is necessary to further analyse, in order to identify the relevant factors which contribute to the development of discipline and the profession. Furthermore, these
results could be a base to define a European strategy of promotion and recognition.

Table 2. Data on European Ergonomists versus Employment and Unemployment rate in Europe

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>0%</td>
<td>72%</td>
<td>5%</td>
</tr>
<tr>
<td>Belgium</td>
<td>27%</td>
<td>62%</td>
<td>8%</td>
</tr>
<tr>
<td>Croatia</td>
<td>0%</td>
<td>49%</td>
<td>15%</td>
</tr>
<tr>
<td>Czech Rep</td>
<td>0%</td>
<td>68%</td>
<td>8%</td>
</tr>
<tr>
<td>Finland</td>
<td>3%</td>
<td>69%</td>
<td>8%</td>
</tr>
<tr>
<td>France</td>
<td>20%</td>
<td>64%</td>
<td>11%</td>
</tr>
<tr>
<td>Germany</td>
<td>4%</td>
<td>73%</td>
<td>6%</td>
</tr>
<tr>
<td>Great Britain</td>
<td>4%</td>
<td>71%</td>
<td>8%</td>
</tr>
<tr>
<td>Greece</td>
<td>12%</td>
<td>49%</td>
<td>27%</td>
</tr>
<tr>
<td>Hungary</td>
<td>11%</td>
<td>58%</td>
<td>10%</td>
</tr>
<tr>
<td>Ireland</td>
<td>5%</td>
<td>61%</td>
<td>14%</td>
</tr>
<tr>
<td>Italy</td>
<td>23%</td>
<td>56%</td>
<td>12%</td>
</tr>
<tr>
<td>Latvia</td>
<td>12%</td>
<td>65%</td>
<td>13%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>29%</td>
<td>74%</td>
<td>6%</td>
</tr>
<tr>
<td>Norway</td>
<td>1%</td>
<td>75%</td>
<td>3%</td>
</tr>
<tr>
<td>Poland</td>
<td>7%</td>
<td>60%</td>
<td>11%</td>
</tr>
<tr>
<td>Portugal</td>
<td>22%</td>
<td>61%</td>
<td>18%</td>
</tr>
<tr>
<td>Russia</td>
<td>3%</td>
<td>69%</td>
<td>6%</td>
</tr>
<tr>
<td>Spain</td>
<td>2%</td>
<td>55%</td>
<td>27%</td>
</tr>
<tr>
<td>Sweden</td>
<td>14%</td>
<td>74%</td>
<td>8%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>18%</td>
<td>80%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Source: Centre for Registration of European Ergonomists and Eurostat.

1.2. Projects & actions headed by FEES since 2012

In August 2012, a new FEES board was elected in Stockholm. At this stage, it was an opportunity to rethink the priorities and to design and implement actions with maximum impact concerning the
promotion of Ergonomics. In this regard, three levels were defined: Internal, External and Partnership level.

At the internal level, the promotion of Ergonomics is based upon the collection and implementation of information via the FEES website (www.ergonomics-fees.eu). It is possible to find some material to support the NS in their mission (e.g. the European Month Ergonomics slide show on health topics and safety prevention).

At the external level, FEES organize some symposia and national conferences:

- a conference on applied ergonomics (June 2013, Budapest);
- a joint symposium IEA/FEES on the issue ‘ergonomics and sustainable development’ (SELF Conference, August 2013, Paris);
- a symposium on welding and ergonomics (January 2014, Budapest);
- three workshops were organized in the frame of the GfA congress in Munich (February, 2014);
- several symposiums on creativity and ergonomics are organized in Lisbon and Melbourne, and Paris Ergonomics’ conference.

In order to deal with the scientific product, the indexation and publication of the Bruges Conference proceedings is now available in the mega search engine EBSCO Host database.

Regarding partnership, several relations are developed with European Bodies, for example:

- the European Agency for Safety and Health at Work,
- the European Committee for Standardization (CEN TC 122 and CEN BT WG Comfort & Ergonomics),
- the European Safety Federation,
- the European Trade Union Institute.

The strategy is to strengthen relations with these bodies who are in a position of decision-making and influence at European level.
1.3. Illustration of one practical value from Ergonomics

In November 2014, 19\textsuperscript{th}, FEES was invited to participate in the European Safety Conference. It was the third conference; the previous were in 2008 and 2011. This event was organized by five associations which have an interest in Protective Textiles and Clothing.

A large assembly was welcome with about 200 participants (most of them from Belgium in first position (25%), Germany in second position (17%) and the Netherlands in third position (8%).

There was a variety of profiles:

- manufacturers (73%);
- researchers in a University or Technical Institute (8%);
- Association-Federation-Trade (7%);
- procurer (exclusively from the public market with police and firefighters) and European bodies (5%) from the European Commission (in majority) and from OSHA.

Regarding the presentation, there were 25 individual communications on various topics (technical aspects, 70%; scientific aspects, 20%; regulatory aspects, 10%).

The FEES’ presentation was built on 3 items: About the benefits brought by ergonomics to the issues of PPE in OSH prevention, we’ve underlined 2 points:

- Firstly, regarding the integration of PPE in a job situation, ergonomics could assess the impact of PPE for the performance of the task at work and more specifically on effectiveness, efficiency and well-being;
- Secondly, in studying the acceptance of PPE by workers, it's possible to understand the implementation determinant of PPE in real work situation.

One observes, that this presentation was very original considering the other, for two reasons: firstly because, none ergonomists attended this kind of event, so a major part of the attendance didn’t have a precise idea or definition about ergonomics and its scope. Secondly, the presentation was on a specific standpoint which was not necessarily in favour of PPE: several questions were
underlined about the performance and the adaptation of this kind of measure in OSH prevention. So, it was not exposed in the same and equitable way by the other presenters who think, in the majority, that PPE could contribute to OSH prevention.

Following this presentation, we could have retained several lessons:

- about the development of Ergonomics in Europe; there’s a variety of situations which are characterized by non-unity and singularity;
- on FEES’ projects and actions; some first steps are achieved but there are a lot of challenges to take up in order for FEES to become an indispensable partner for European bodies and the European commission on Ergonomics’ topics;
- regarding Ergonomics and PPE; it’s a concrete example on the role of ergonomists in health and safety prevention and moreover on workplace design.
CHAPTER 2

Humanisation of work & support for employers in the employment of disabled persons (Slovenian perspective)

Miodrag Petrovič\(^2\)
Nataša Rebernik\(^3\)

Given the complexity of the area of disability, which can be as elsewhere in the world, reflected in Slovenia, we wanted to present an understanding of ‘disability’ that affects the development of Slovenian policies and legal regulations in the field. Since disability and consequently social exclusion are phenomena of modern society, especially in the field of employment, we wanted to gain an insight into: the unemployment rate in Slovenia and the rate of unemployed and employed Persons with Disabilities, as well as development of measures in the field of training, employment, adaptation of work and the working environment, which provides disabled people with an equal inclusion as everyone else, participation and engagement in the work and other social environments.

2.1. Disability and its understanding in Slovenia

Disability (SI: Invalidnost) can mean physical, sensory, mental or psychological disability or mental health problems. A person may be

\(^2\) MSc, OZARA d.o.o.
\(^3\) OZARA d.o.o.
disabled from birth or the disability occurred in childhood, teenage years or later in life, including education or while employed. In Slovenia, in 1991 there was great confusion in the field of terminology in regards to persons with health and physical problems, affecting their reduced ability. Different terms were used, e.g.: functionally disabled people (SI: funkcionalno ovrirane osebe), disabled people (SI: invalidne osebe), physically handicapped people (SI: telesno prizadete osebe), handicapped people (SI: hendikepirane osebe), people with special needs (SI: osebe s posebnimi potrebami), and the like, but in the period after 2000, the following terminology has been settled: a disabled person (invalid), and disability (invalidnost).

The terms ‘disabled person/people’ (SI: ‘invalid/i’) and ‘disability’ (SI: ‘invalidnost’) is originally derived from the definition of physical disability, but has in the Slovenian disability concept a much broader meaning, indicating physical disability, and underlining further social disadvantages that people with permanent/long-term physical, sensory, intellectual and mental problems endure in their daily lives.

The above mentioned, had its impact on the use and formation of different definitions of the disability concept. Like elsewhere in the world, it is also in Slovenia that understanding of the terminology and the concept had an increasing transition from a medical to a social conception. Therefore, the significant changes in the definitions of disability in international documents and national literature in this area are understandable.

In a brochure of the Statistical office of the Republic of Slovenia the following definitions of ‘disability’ and ‘disabled people’ can be found:

**Definition of a disabled person:**

- **Convention on the Rights of Persons with Disabilities** states that ‘Persons with Disabilities include those who have long-term

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physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others⁶;

• according to the definition of Americans with Disabilities Act a disabled person is an individual with a physical or mental impairment that substantially limits one or more major life activities of such an individual’, where ‘... major life activities include, but are not limited to, caring for oneself, performing manual tasks, seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, breathing, learning, reading, concentrating, thinking, communicating, and working’⁷;

• according to the Disabled People's Organizations Act a disabled person is an individual who, in the environment where he or she lives, due to congenital or acquired impairments and barriers, deriving from the physical and social environment, cannot partially or fully meet the needs of personal, family and social life according to international classification;

• according to the Vocational Rehabilitation and Employment of Persons with Disabilities Act of the Republic of Slovenia a disabled person (man or a woman) is a person, who acquires the status of a disabled person under this Act or other regulations, and the person for which the decision of the competent authority established the lasting effects of physical or mental disability or disease and has much fewer opportunities to employ, retain a job, or advance in employment⁸.

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**Definition of disability:**

- in the *Annual EU human rights report* there is the following written about disability: to be a disabled person ‘means any person who, taking the age and the social environment, in which the person lives, into account, has due to long-term functional physical or mental disability, serious difficulties with their integration into the family, society, education or occupation, or in enforcing their human rights’;

- according to Article 60 of the *Pension and Disability Insurance Act* of the Republic of Slovenia (ZPIZ-2) ‘the disability exists if due to changes in health condition, which cannot be eliminated by treatment or medical rehabilitation measures and are determined in accordance with this Act, reduces the ability of the insured person to gain and keep a job or career progression’;

- in ICF definition of ‘disability’ (SI: zmanjšana zmožnost / invalidnost) it is described as a multidimensional phenomena and a result of a relationship between a person and his or her physical and social environment.

In Slovenia the definition used more and more is the one, that defines Persons with Disabilities as those with ‘long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others’.

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Definition of discrimination

To facilitate the understanding of the concept of an individual’s disability and solving related problems, especially since Persons with Disabilities are a group exposed to discrimination in the working and social environment, in Slovenian law the following definition of discrimination has been specified ‘discrimination on the grounds of disability can be direct or indirect and means any differentiation, exclusion or restriction due to diversity, which purpose or effect is lack of the equal recognition, enjoyment or enforcement of all rights and obligations in all key areas of life’\(^\text{12}\).

The criteria for defining the concept of the disabled in Slovenia

Based on the definition of the concept of the disability of an individual, one may reasonably conclude that Persons with Disabilities are the most heterogeneous population.

Due to the heterogeneity of the disabled population, both in type and degree of disability, several criteria and the standards for defining the concept of a disabled person are possible. This leads to a variety and diversity of definitions.

According to the Vocational Rehabilitation and Employment of Persons with Disabilities Act (ZZRZI) a person with disability is someone with an acquired status of a disabled person. Furthermore, Instructions for completing the application form for security for the disabled specify that the status of a disabled person in Slovenia can be acquired by a person who:

- ‘has acquired the status according to Article 10 of ZZRZI’;
- has been recognised with the characteristics of a person with disabilities under Article 6 of the Training and Employment of Persons with Disabilities Act (SI: Zakona o usposabljanju in zaposlovanju invalidov);
- has acquired the status of a disabled worker of the II. or. III. category under Article 34 of the previous Pension and Disability Insurance Act (SI: Zakon o pokojninskem in invalidskem

\(^{12}\) Ibidem.
zavarovanju) dated back in 1992, or under the regulations valid before the adoption of the afore mentioned act;

- has acquired the status of a disabled worker of the II. or III. category under Article 60 of the valid Pension and Disability Insurance Act (SI: Zakon o pokojninskem in invalidskem zavarovanju (ZPIZ–1));

- has been recognised with a physical impairment under the first (1st) and third (3rd) paragraph of Article 143 of the Pension and Disability Act – official consolidated text (SI: Zakon o pokojninskem in invalidskem zavarovanju - uradno prečiščeno besedilo (ZPIZ–1–UPB4)), or under the regulations valid before the adoption of the last amendment of the afore mentioned act (only certain categories, specified in Article 4 – at least 90% of physical impairment due to sight loss, 70% of physical impairment due to hearing loss, at least 80% of physical impairment, considering that the lowest percentage of an individual impairment being cumulated is at least 70%\(^{13}\);

- has acquired the status of a war disabled serviceman (SI: vojaški vojni invalid) under Article 2, the status of a peacetime disabled (SI: mirnodobni invalid) under Article 3, or the status of a civilian war-disabled (civilni invalid) under Article 4 of the War Disabled Act (SI: Zakon o vojnih invalidih);

- acquired the rights under the Act Concerning Social Care of Mentally and Physically Handicapped Persons (SI: Zakonu o družbenem varstvu duševno in telesno prizadetih oseb);

- has been classified on the basis of findings and the opinion of an expert committee for the classification of children and youth with physical and psychological development under Article 11 of the previously valid Education and Training of Children and Youth with Physical and Mental Disabilities Act (SI: Zakon o izobraževanju in usposabljanju otrok in mladostnikov z motnjami v telesnem in duševnem razvoju) – only certain categories, specified in Article 5 of this Instruction);

\(^{13}\) Navodilo za izpolnjevanje obrazca prijave v zavarovanje za invalide (Instructions for completing the application form for security for the disabled):
http://www.pisrs.si/Pis.web/pregledPredpisa?id=NAVO744 (10.05.2015).
• has been directed to a programme of education and schooling under Article 21 of the Placement of Children with Special Needs Act (SI: Zakon o usmerjanju otrok s posebnimi potrebami) – only certain categories, specified in Article 6;
• has acquired the status of a disabled person under the regulations of the member states of the European Union.

Slovenian regulations distinguish between the following categories of disabled persons: war disabled, disabled worker, disabled according to ZZRZI, disabled according to the Act Concerning Social Care of Mentally and Physically Handicapped Persons, and, children with special needs14.

Several types of disabled people also mean different legal arrangements and diversity of rights for each type of person with disabilities.

Legislation

Legislation is clearly the key to organization of the disability area, where an awareness, that Persons with Disabilities are equal members of society, is crucial.

During Slovenia's independence, there were a set of regulations adopted in the field of education, employment, health care, removal of communication barriers and obstacles in the environment, further on in the area of self-organization of Persons with Disabilities, and providing financial aid for the special needs of those with disabilities.

Key legislative provisions and programmes ensuring equal opportunities and elimination of discrimination based on disability are:

• The Constitution of the Republic of Slovenia, in Article 14 expressly states that in Slovenia there are guaranteed ‘equal human rights and fundamental freedoms irrespective of national origin, race, sex, language, religion, political or other beliefs, financial status, birth,

14 Navodilo za izpolnjevanje obrazca prijave v zavarovanje za invalide (Instructions for completing the application form for security for the disabled): http://www.pisrs.si/Pis.web/pregledPredpisa?id=NAVO744 (10.05.2015).
education, social status, disability or any other personal circumstance\textsuperscript{15};

- Implementing the Principle of Equal Treatment Act (SI: Zakon o uresničevanju načela enake obravnave);
- Employment Relationships Act (SI: Zakon o delovnih razmerjih);
- Social Entrepreneurship Act (SI: Zakon o socialnem podjetništvu);
- Vocational Rehabilitation and Employment of Persons with Disabilities Act (SI: Zakon o zaposlitveni rehabilitaciji in zaposlovanju invalidov);
- Prevention of Domestic Violence Act (SI: Zakon o preprečevanju nasilja v družini);
- Equalisation of Opportunities for Persons with Disabilities Act (SI: Zakon o izenačevanju možnosti invalidov);
- Pension and Disability Insurance Act (SI: Zakon o pokojninskem in invalidskem zavarovanju);
- The Act Concerning Social Care of Mentally and Physically Handicapped Persons (SI: Zakon o družbenem varstvu duševno in telesno prizadetih oseb);
- Construction Act (SI: Zakon o graditvi objektov);
- Slovenian Sign Language Act (SI: Zakon o uporabi slovenskega znakovnega jezika);
- Disabled Persons Organisations Act (SI: Zakon o invalidskih organizacijah) etc.

Here we should mention that in Slovenia there are around 60 acts and implementing regulations, aimed to establish a complete system for solving problems of Persons with Disabilities. They focus mainly on:

- creating a legal basis for holistic solutions in all key issues related to discrimination and equalization of opportunities of Persons with Disabilities;
- prevention and elimination of discrimination against Persons with Disabilities, especially since they are a group that has been traditionally exposed to discrimination;

\textsuperscript{15} Constitution of the Republic of Slovenia, Article 14.
creating equal opportunities for Persons with Disabilities in all areas of life;

- promoting, protecting and ensuring Persons with Disabilities full and equal enjoyment of all human rights and fundamental freedoms and to promote respect for their inherent dignity. With that, there has been the implementation of the fundamental purpose of the Convention on the Rights of Persons with Disabilities also in Slovenia put into force.

It is worth mentioning also, that:

- the Republic of Slovenia already on 30th November 2006, adopted the first Action plan for Persons with Disabilities 2007–201316, which was intended for all disabled persons regardless of the type of their disability or their age;

- the National Assembly of the Republic of Slovenia on the 37th sitting on 2nd April 2008 adopted the UN Convention on the Rights of Persons with Disabilities Ratification Act, which clearly indicated the efforts of the Republic of Slovenia in promoting human rights;


In Slovenia we clearly have a modern disability policy, based on human rights, comparable with developed European countries.

2.2. **State of the art on the employment of disabled persons in Slovenia**

In Slovenia there is app. 12–13% disabled inhabitants. Considering the total number of citizens this means app. 250,000 disabled persons (disabled workers, children and youth with special


needs, military and war disabled, persons with strong mental disability, and the heavy physically disabled. Of those app. 8% have a document confirming their disability according to different acts, and other app. 5% are, according to an assessment of disability organisations' membership, persons with severe physical impairment\(^{18}\). This means, that every 8th inhabitant is a disabled person. If we add two family members to each of these persons, we can conclude with a high certainty that more than a third of Slovenia’s inhabitants have been directly connected to disability.

According to the Institute of the Republic of Slovenia in February 2015 there were the following numbers registered: 797.356 employed, and 122.552 unemployed\(^{19}\).

Table 3. Registered unemployment in the years 2011–2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>No. of unemployed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>January</td>
<td>115.132</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>106.996</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>112.754</td>
</tr>
<tr>
<td>2012</td>
<td>January</td>
<td>115.965</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>105.441</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>118.061</td>
</tr>
<tr>
<td>2013</td>
<td>January</td>
<td>124.258</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>116.600</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>124.015</td>
</tr>
<tr>
<td>2014</td>
<td>January</td>
<td>129.843</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>112.460</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>119.458</td>
</tr>
<tr>
<td>2015</td>
<td>January</td>
<td>124.278</td>
</tr>
<tr>
<td></td>
<td>April</td>
<td>114.923</td>
</tr>
</tbody>
</table>


\(^{18}\) Ibidem (10.05.2015).

The highest rate of unemployment was in January 2014, when there were 129,843 unemployed persons registered\textsuperscript{20}.

It is interesting that in the years between 2011 and 2014 the highest unemployment rate was determined each January, followed by an oscillating decline with the lowest unemployment rate determined in August and September, again followed by a dramatic increase of unemployment reaching the same or even higher rate as in January.

A strong decline in economic activity in Slovenia during the economic crisis had a strong impact on labour market trends. In the meantime, the situation of young people, older people and people with lower education, deteriorated the most.

From information supplied by the Statistical Office of the Republic of Slovenia on the International Day of Persons with Disabilities, 3rd December 2014\textsuperscript{21}, we can see that there are around 4\% of employees with disabilities in Slovenia. The number of employees with disabilities in the regular working environments was around the same as in previous years; regular working environments cover all employment in the public and private sectors in the system of a compulsory quota scheme of employment of Persons with Disabilities (meaning the obligation of employers to employ a certain percentage of those with disabilities to the total number of employees). In the respective time, the share of unemployed Persons with Disabilities was 15.7\% and there was more than 17,500 people with disabilities among the registered unemployed. Among all the unemployed with disabilities there was approximately 80\% of long-term unemployment.

Also interesting to emphasise is that the 4\% of employed Persons with Disabilities between 2011 and 2014 stayed the same over the whole period. Despite the fact, that in Slovenia there are intensive programmes of employment of Persons with Disabilities carried out. From the information displayed it can be assumed that those with disabilities remain about the same number without employment as there are employed.

\textsuperscript{20} Employment Service of Slovenia: http://www.ess.gov.si/trg_dela/trg_dela_v_stevilkah/registrirana_brezposelnost, (10.05.2015).

\textsuperscript{21} www.stat.si/novica_prikazi.aspx?ID=6662, (10.05.2015).
Table 4. Number of employment events of disabled persons in the years 2011–2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of employment events of disabled persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>2.107</td>
</tr>
<tr>
<td>2012</td>
<td>2.694</td>
</tr>
<tr>
<td>2013</td>
<td>2.937</td>
</tr>
<tr>
<td>2014</td>
<td>2.929</td>
</tr>
</tbody>
</table>


2.3. Government directions and interventions for the employment of disabled persons in Slovenia

The problem of the employment of Persons with Disabilities can be summarized in the following findings:
- they are the most heterogeneous social group;
- have a disadvantage in the labour market;
- are being less included in the labour market;
- the unemployment rate is higher than the general unemployment rate;
- the duration of unemployment is longer than for the able-bodied population;
- low educational level;
- higher age;
- reluctance of employers in the employment of Persons with Disabilities.

As disability and a consequent social exclusion are dynamic phenomena, it is necessary to develop policies, that on the one hand, prevent disability (care for the health of employees, establishing appropriate working conditions, etc.), and on the other hand, take care of Persons with Disabilities by protecting them from economic and social issues they face in real life22.

Slovenia already in 1991 adopted a concept of the development strategy of a disability policy, especially important from the following five aspects23:

23 Ministry of Labour, Family, Social Affairs and Equal Opportunities: Action Programme for disabled 2014:
• it is the first document with a modern definition of disability, which is based on the philosophy of human rights and not just on the medical model;
• it has a holistic approach towards resolving issues related to disability. Thus, this document presents guidelines by areas: health care, training, education and schooling, employment, rehabilitation, cash benefits and tax relief, legal protection, the functioning of the state administration, status, financing and operation of disability organisations, etc.;
• the document underlines that Persons with Disabilities have the right to an independent living;
• the strategy defines the status and funding of disability organisations;
• the preparation of the document involved Persons with Disabilities, representatives of state and experts.

In 1999 the Government of the Republic of Slovenia adopted the Training and Employment of Persons with Disabilities Programme (SI: Program razvoja usposabljanja in zaposlovanja invalidov) for the period 1999–2002. Due to the impact of the transition processes, which led to the segmentation of the labour market and thus less access to work for certain groups, in 2001 the National Assembly adopted the National Programme for Labour Market and Employment Development (SI: Nacionalni program razvoja trga dela in zaposlovanja), whose primary goal is to ensure equal opportunities and activation of people. The Programme specifies the following measures for acceleration and integration of disabled people into the labour market:
• introduction of modern methodologies for identifying skills and disability;
• development of standards for safety at work and prevention of disability;
• timely and high-quality training of Persons with Disabilities;
• the introduction of a quota system;


implementation of integration at all levels of education and training of Persons with Disabilities;

- introduction of new forms of supported and sheltered employment (intermediate workshops, training firms, social enterprises, disability companies);

- development of new forms of training for work with an employer or in special training workshops;

- development of new forms of counselling and financial assistance to employers.

On the basis of existing legislation, the Government of the Republic of Slovenia adopts Active Employment Policy Programmes (SI: Programi aktivne politike zaposlovanja), arising from the priorities identified in the European and national development documents and the situation on the labour market in Slovenia. Disabled people are, due to flexible labour market policies, put in a disadvantaged position in accessing the labour market.

In addressing the employment of Persons with Disabilities issues, it is crucial to recognize that work and employment are important factors for the realization of the human rights of Persons with Disabilities, as well as important economic, cultural, social, political and other factors.

On the basis of the Vocational Rehabilitation and Employment of Persons with Disabilities Act (SI: Zakon o zaposlitveni rehabilitaciji in zaposlovanju invalidov) the Republic of Slovenia in 2004 adopted the Fund of the Republic of Slovenia for the Promotion of Employment of Persons with Disabilities Establishment Act (SI: Akt o ustanovitvi Sklada Republike Slovenije za vzpodbujanje zaposlovanja invalidov)\(^{25}\). The Fund decides on the rights and obligations of Persons with Disabilities and employers, especially regarding the following:

- monitoring over fulfilment of obligation to employ a certain number of Persons with Disabilities;

- wage subsidies for persons with those;

• payment of costs for adapting jobs and funds for the work of Persons with Disabilities;
• payment of costs of services in supported employment;
• exemption from payment of contributions for pension and disability insurance of employees with disabilities;
• bonuses for exceeding the quota;
• annual awards to employers for good practices in the employment of Persons with Disabilities;
• other incentives for the employment of Persons with Disabilities and preservation of jobs for those with disabilities;
• other development incentives.

Fund incentives for employers are related especially to:
• the choice of a person liable for fulfilment of the quota: fulfilment of the quota with employment of Persons with Disabilities; alternative fulfilment of the quota and payment of contribution for promotion of employment of those with disabilities;
• financial incentives for the employment of Persons with Disabilities:
  o reward for exceeding the quota;
  o the exemption from payment of contributions for pension and disability insurance, where beneficiaries are 1.) employers with at least 20 employees and exceed the quota, 2.) employers with less than 20 employees and employ Persons with Disabilities, and 3.) self-employed Persons with Disabilities;
  o payment of costs for adapting the workplace and work equipment;
  o payment of the cost of services in supported employment.

2.4. Health and health related areas for understanding disability and the needs for adapted workplace design

In the area of health and health related areas for understanding disability and the needs for adapted workplace design or adaptations in ones living environment there was a huge step made by the World
The Classification from 1980 differs between:

- **SI: Okvare or EN: ‘Impairments’,** concerned with abnormalities of body structure and appearance and with organ or system function, resulting from any cause’ (birth, accident, disease);

- **SI: Prizadetost or EN: ‘Disabilities’,** reflecting the consequences of impairment in terms of functional performance and activity by the individual’;

- **SI: Oviranost or EN: ‘Handicaps’,** concerned with the disadvantages experienced by the individual as a result of impairments and disabilities; handicaps thus reflect interaction with and adaptation to the individual's surroundings.

In the new Classification from 2001 the mentioned terms were replaced with:

- **SI Funkcioniranje or EN: Functioning’,** which refers to body functions, body structure, activity and participation;

- **SI: Invalidnost / Zmanjšane možnosti** or **EN: Disability,** which refers to impairments, activity limitations and participation restrictions;

- **SI: Zdravje or EN: Health,** which refers to individuals’ body, health/disease and health related conditions or dysfunctions, related to elements of quality of life, such as education, employment, sports and culture.

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28 Ibidem, 14.

29 In the area of legislation and politics related to social security in Slovenia there is most commonly used term ‘invalidnost’. As a direct translation of ‘disability’ is ‘zmanjšane možnosti’, the WHO approved the proposal, that in the ICF translation there are both terms used for the English term ‘disability’.
The three new ICF terms have a broader meaning. They define elements of health and health related areas, and originate from the aspect of an individual, his or her body and society, carrying the aim of creating a synthesis of different views on health from a biological, individual and social perspective.

**International Classification of Functioning, Disability and Health (ICF) and its usability**

An important recognition for us is, that the Classification ‘can be also used in other areas, such as insurance, social security, employment, education, business, social policy and general legislation development, and for environmental adaptations’\(^{30}\).

The ICF manual also includes detailed tables, where by direct observation of disabled persons, one can assess the individual's health and health related conditions, which influence his or her working and living opportunities for equal involvement into a working and social environment. The assessment can be made by observing:

- body functions, body structure and impairments of an individual;
- activity and activity limitations of an individual;
- participation or participation restrictions of an individual when trying to integrate into a working and social environment;
- and other personal and environmental elements having an impact on an individual's way of life and work.

\(^{30}\) MKF; Translation: Jecelj J., Kovačič I.; Inštitut za varovanje zdravja Republike Slovenije, Inštitut Republike Slovenije za rehabilitacijo, Ljubljana, 2006, p. 19.
‘An individual’s functioning in a particular area is the result of the interaction or complex relationship between one’s health condition and accompanying factors (that is, between the personal and environmental factors)’, which should be observed by any designer in developing new products, workplaces, working environment, access to the workplace and the working methods and techniques.

**Human customized design**

We can easily say, that the beginnings of human customized design go back to the times when a prehistoric man discovered that using tools can bridge some limitations of his body. As it was necessary to design tools and adaptations according to the needs and capabilities of an individual’s body, the compliance of tools largely depended on how well the designer knew the user. Where the designer was also the user, tools and adaptations were highly individualized.\(^{31}\)

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\(^{31}\) T. Kermavnar, M. Dodič-Fikfak, Oblikovanje po meri človeka, ilustriran učbenik iz ergonomije, 1. part: Univerzitetni klinični center Ljubljana, Klinični inštitut za...
With the development of crafts, and later with the industrial revolution and the introduction of mass production, the design of tools and adaptations separated from their production. The designers' target patrons greatly increased, which resulted in designers loosing contact with the users and he began to intuitively adapt the dimensions of the product to the ‘average’ user\textsuperscript{32}.

As during the Second World War a systematic study of human factors for the purposes of efficient design, production and use of military equipment first appeared, this period is considered the beginning of ergonomics as a scientific discipline, specifically a discipline that studies human characteristics, and uses the findings in the design of tools, devices, tasks and a working environment in order to ensure productive, safe, comfortable and efficient work\textsuperscript{33}.

Ergonomics at the forefront of their study raises a man who is either an experienced expert in the use of a tool or a layman, that uses a tool in his free time, a healthy young athlete or chronically ill person, a child in a classroom or an elderly person in a nursing home, but also the physically impaired, a blind or deaf person. Thus, when a man is brought to the fore, ergonomics assumes that all of the environmental and technological elements, created by a human need to serve the user and vice versa\textsuperscript{34}.

Despite above mentioned, the majority of planners and designers do not have adequate competences in the field of planning and design of appropriate personalized jobs, living and working environment, machines, tools and equipment for the work and life of Persons with Disabilities to enable them, on the same basis as everyone else, full and equal participation in working and social environments.

Such deficiency in the knowledge of industrial designers and planners, has already been detected by an American industrial designer Henry Dreyfuss, who in his book, \textit{Wheelchair users: Handicapped and Elderly}, first pointed out that the body of individuals

\footnotesize{medicino dela, prometa in športa: Akademija za likovno umetnost in oblikovanje, Ljubljana 2013, p. 2.}
\textsuperscript{32} Ibidem: pp. 2-3.
\textsuperscript{33} Ibidem, p. 4.
\textsuperscript{34} Ibidem, p. 6.
can deviate from the norm both in dimension and in response to the environment. In the aforementioned book he described the physical characteristics of the wheelchair user: the elderly and / or physically disabled person.

In the opinion of critics his theory is advanced, however it carries deficiencies, as it is trying to categorize physically impaired persons, meaning to establish a paradigm in the field which stands out of the norm in its very essence. In doing so, the critics forgot that most of the designers and planners develop products and conditions of working, accommodation and other living environment for the average/healthy person.

The development of appropriate adjustments is still in the major domain of people who are directly affected by disability, either with their own disability or the disability of their loved ones. But the fact, that the number of Persons with Disabilities, older persons and those with long-term health problems, whose needs are similar to the needs of disabled people, is increasing year by year, is often being neglected. The same goes for the fact, that ergonomics' basic aims are to reduce costs and increase profits and to a lesser extent or even non at all, to ensure conditions for disabled and all others with special needs, allowing them to fully and effectively participate in society equally as other people do.

Planning, design and adaptation of tools, equipment, tasks and environment to the needs and abilities of disabled individuals

The fifth paragraph of Article 2 of the Convention on the Rights of Persons with Disabilities explains ‘universal design means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. Universal design shall not exclude assistive devices for particular groups of Persons with Disabilities where this is needed’.

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35 T. Kermavnar, M. Dodič-Fikfak, Oblikovanje po meri človeka,... op. cit., p. 5.
For this kind of approach for the development of appropriately adapted products and conditions in the working and living environment, it is necessary to have a lot more motivation, knowledge and experience, especially as ergonomic planning and design is based on interdisciplinary collaboration of medicine, psychology, ecology and technology, as well as on the principles of ergonomic design of work, workplace and environment. ‘Cognitive Ergonomics recognises the stress and strain at work using scientific knowledge, whereas ergonomics implementation and findings of cognitive ergonomics are used in planning work and products customized to a man’.

The work, working tasks and working conditions need to be designed, or adequately adapted to the needs of the disabled employee, his or her functioning, reduced working ability and health, that is in a way, that he or she can without barriers successfully approach implementing the tasks for which he or she is truly qualified.

Approach to work and workplace design customized to an employee / disabled person includes adapting the workplace, products, working tools and working processes to the form and structure of ones body, body size and body impairments, mental strain and mental abilities. It connects the concept of reasonable accommodation with all the important areas of life on the basis of non-discrimination, therefore the design doesn’t refer only to the technical adjustments, but it is broader and also means working part-time, adapting communication methods, personal assistance, tutoring and the like.

This means that it is necessary to take appropriate measures according to a particular case, so that an employee/disabled person is provided access to his workplace, equal participation in the formulation and the implementation of policies of the organization and to activities for implementation of tasks, etc.
Education and training

In the international conventions and declarations, as well as in provisions of legal acts of the Republic of Slovenia, it is defined that Persons with Disabilities have the same right as others to quality education. There are also measures defined for the training and education of experts and others, so that these are able to actively and effectively contribute to ensuring the rights to equal opportunities and equal treatment of those with disabilities.

Within the ERGO WORK Project, funded by the European Commission and coordinated by OZARA Service and Disability Company Ltd. from Slovenia, there was an analysis of educational programmes and existing literature in the field carried out to identify the state of the art. The findings of the analysis for Slovenia showed that there are still shortcomings in the introduction of appropriate educational programmes and professional literature, which clearly has
an impact on gaining the relevant competences for quality and efficient work with disabled people, and for the development of environments adapted to their needs.

For Persons with Disabilities, work and employment are not only a source of survival, but also represent economic and social security, with a strong emphasis on the psychological and physiological values, where work is regarded as one of the most important conditions for social inclusion and healthy living.

Nevertheless, Persons with Disabilities remain one of the groups (in addition to women and older workers), which is in the working and social environment most exposed to discrimination. The reasons for this kind of treatment of Persons with Disabilities can be traced in recognizing that in the key conventions and declarations of the United Nations disabled people initially were not mentioned as a specially protected group of citizens. Even in the conventions of the World Health Organization (WHO) and the International Labour Organisation (ILO) the disabled have been considered merely as objects of rehabilitation and not as subjects, that are normal human beings with full rights.

The interests and needs of disabled people were ignored due to economic, political and social marginalization, but this is slowly changing, especially with the adoption of the Convention on the Rights of Persons with Disabilities which is a legally binding instrument of the United Nations in the field of disability policy.

Slovenia already in 1991 adopted a concept of the development strategy of a disability policy, where the modern definition of disability, based on the philosophy of human rights and not just on the medical model, was presented for the first time. For the enforcement of the principle of equal opportunities and equal treatment, and prevention of discrimination, in 2010 Slovenia adopted the Equalisation of Opportunities for Persons with Disabilities Act, the so called ZIMI (SI: Zakon o izenačevanju možnosti invalidov).

Regardless of the above mentioned, a lot still needs to be done in the field of training and education for professionals, aiming to obtain the relevant competencies in the design and planning for
development of appropriately customized products, conditions of working and living environment, as well as to acquire competencies in working directly with Persons with Disabilities.
CHAPTER 3

Education & support for employers in the employment of Persons with Disabilities (Polish perspective)

Marzena Wójcik-Augustyniak

The problem of disability is affecting more and more areas of society in our highly industrialised and technologically advanced world. In general, an increase in the average life expectancy, a decrease in infant mortality, often in infants with congenital defects, the disappearance of many diseases and the appearance of new ones, and a higher life intensity contribute to the fact that the majority of our society may not be referred to as able-bodied and active.

Therefore, politicians, scientists and entrepreneurs alike are becoming more and more concerned with disability issues. Multi-type strategies, programmes and guidelines are created which aim not only at helping Persons with Disabilities but also at including them in social and economic life.

The Europe 2020 Strategy clearly underscores the idea of integration and inclusion of people from marginalised social groups, amongst others – the disabled. Numerous states have designed their own Diversity Charters that bring up the issues of diversity (including disability) and equal employment opportunities.

3.1. Disability and its understanding in Poland

The definition used by WHO maintains that the disabled are persons with a long-term decrease in physical, mental, intellectual or

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sensory ability, which may restrict their full and effective participation in social life considered normal for a human being when encountering various barriers. Nonetheless, there is no single definition of disability binding all countries. As a consequence, a person considered disabled in Poland may not necessarily be deemed a disabled person in, for instance, Germany.

In Poland, at least two definitions of disabled persons are in common use: biological and legal.

The first and broad definition of disability is used for statistical purposes by the Central Statistical Office of Poland (GUS). It extends to all those who declare to have limitations when performing certain activities (the so-called biological disability) but do not hold an official certificate of disability.

The definition stems from legal regulations and corresponds to the legal basis of qualifying an individual as a disabled person. Under the provisions of the Professional and Social Rehabilitation and Employment of the Disabled Act, the disability is ‘a permanent or period incapacity to play social roles due to a permanent or long-term body impairment, in particular one leading to the incapacity to work’. Laying down detailed characteristics of the disabled when one applies for a disability pension, the Act provides as follows: „disabled persons are persons whose physical, psychological or mental condition permanently or periodically impairs, limits or prevents performance of social roles, and in particular, limits the capacity to work, providing that they have received a certificate of disability categorising them as one of three disability levels or a certificate of total or partial incapacity to work, or – for those aged under 16 – a certificate of the type and level of disability”.

At the end of 2009, in Poland there were 8.1 million disabled, i.e. people who due to health reasons had a limited ability to perform actions considered normal for a human being (both serious and less serious limitations were considered). An assessment of biological disability amongst adult (aged 15 and above) Poles at the end of 2009 indicates that it is at a slightly lower level (25%) than the Community average (nearly 26%). Many Central and Eastern European countries exhibit a much higher rate of biologically disabled persons, for example, Estonia and Hungary have nearly 29%, Latvia - 31%, and Slovakia - almost 33%.

The range of biological disability in Poland may be illustrated by data on the disabled including various disability types (Table 5).

Table 5. Biologically disabled persons by age, number and disability type in the year 2011

<table>
<thead>
<tr>
<th>Details</th>
<th>Total</th>
<th>One condition/impairment</th>
<th>Two conditions/impairments</th>
<th>Three conditions/impairments</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>4217596</td>
<td>2733979</td>
<td>788326</td>
<td>417155</td>
</tr>
<tr>
<td>Economic age groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-working age</td>
<td>187026</td>
<td>149636</td>
<td>18195</td>
<td>7508</td>
</tr>
<tr>
<td>Working age</td>
<td>1997171</td>
<td>1410829</td>
<td>312914</td>
<td>116784</td>
</tr>
<tr>
<td>Mobile</td>
<td>547139</td>
<td>419402</td>
<td>62096</td>
<td>17698</td>
</tr>
<tr>
<td>Non-mobile</td>
<td>1450033</td>
<td>991427</td>
<td>250818</td>
<td>99085</td>
</tr>
<tr>
<td>Post-working age</td>
<td>2033399</td>
<td>1173514</td>
<td>457217</td>
<td>292863</td>
</tr>
</tbody>
</table>

One condition/impairment

<table>
<thead>
<tr>
<th>Details</th>
<th>Total</th>
<th>involving movement</th>
<th>involving hearing</th>
<th>involving vision</th>
<th>involving the circulatory system</th>
<th>involving the neurological system</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>2733979</td>
<td>1101781</td>
<td>98981</td>
<td>155433</td>
<td>399298</td>
<td>375299</td>
<td>603188</td>
</tr>
<tr>
<td>Economic age groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-working age</td>
<td>149636</td>
<td>21689</td>
<td>8856</td>
<td>11541</td>
<td>8232</td>
<td>31699</td>
<td>67619</td>
</tr>
<tr>
<td>Working age</td>
<td>1410829</td>
<td>551447</td>
<td>43978</td>
<td>84336</td>
<td>173130</td>
<td>225353</td>
<td>332585</td>
</tr>
<tr>
<td>Mobile</td>
<td>419402</td>
<td>139650</td>
<td>18479</td>
<td>31860</td>
<td>19848</td>
<td>88549</td>
<td>121016</td>
</tr>
<tr>
<td>Non-mobile</td>
<td>991427</td>
<td>411797</td>
<td>25499</td>
<td>52475</td>
<td>153282</td>
<td>136805</td>
<td>211569</td>
</tr>
<tr>
<td>Post-working age</td>
<td>1173514</td>
<td>528646</td>
<td>46147</td>
<td>59556</td>
<td>217936</td>
<td>118246</td>
<td>202983</td>
</tr>
</tbody>
</table>

Source: Own research based on:

On the basis of its contents, we may say that the largest group of biologically disabled persons were those at post-working and working age with some sort of body movement impairment. The body movement impairment was the most frequent one across all age groups.

An in-depth diagnosis of the number of disabled in Poland would need to include the number of legally disabled aged 16 and older (Figure 3). The reason behind it is that this particular group will (or already have) become potential employees or owners of companies. From the perspective of this chapter, said group is then the main area of interest.

![Figure 3. The number of legally disabled aged 16 and older in thousands](source)


On the basis of data displayed in Figure 3, we may say that the number of legally disabled is falling year by year. In 2012 there was nearly a 18% drop when compared to baseline (1993). Despite the general downward tendency started in 1997, in 2012 there was a slight (0.6%) rise when compared with 2011.

The outlined definitions of disability should be supplemented with the idea of the level of disability, which is of particular importance in the case of employing and determining different rights.
of the disabled. The Act provides for three disability levels: severe, moderate, and mild\textsuperscript{42}.

Based on data presented in Figure 4, it may be concluded that the least numerous group of disabled aged 16 and older are severely disabled; however, the number in the analysed period is rising. On the other hand, the number of people with a mild disability significantly dropped in the years 2001-2013.

![Figure 4. The structure of disabled aged 16 and older by the level of disability in the years 2001–2013](http://orka.sejm.gov.pl/Druki7ka.nsf/0/910DDFBD8C0A74B0C1257D1700366185/%24File/2611.pdf).

3.2. **State of knowledge regarding the employment of the disabled in Poland**

The situation of the disabled in Poland may be depicted with the help of several indicators. According to the mid-year 2014 data, the professional activity rate for working age disabled persons was 27.2% (at 74.1% for the working age people in the 1st quarter of 2014), the employment rate was 22.8% (as compared to 67.2%), and the

unemployment rate was 16.0% (9.3%). Considering the positive results of the 4th quarter of 2014, one may say that in 2014 the situation of disabled persons on the job market stabilised after a slight reduction in professional activity recorded in 2013\(^3\).

Between 2001 and 2014 could be observed a constant drop in the number of economically active disabled persons (Table 6). In 2014 the drop was nearly 26% when compared with 2001. A positive phenomenon is a decrease in the number of unemployed (37.1%) and professionally passive (26.9%). A negative effect is a fall in the number of employed working age Persons with Disabilities (by 18.9%), although, it is not a consequence of a decrease in the total number of working age disabled.

Table 6. Economic activity of working age Persons with Disabilities in the years 2001-2014 (in thousands)

<table>
<thead>
<tr>
<th>Years</th>
<th>Total</th>
<th>Professionally active</th>
<th>Professionally passive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>Employed</td>
</tr>
<tr>
<td>2001</td>
<td>2563</td>
<td>668</td>
<td>535</td>
</tr>
<tr>
<td>2002</td>
<td>2555</td>
<td>658</td>
<td>523</td>
</tr>
<tr>
<td>2003</td>
<td>2462</td>
<td>584</td>
<td>471</td>
</tr>
<tr>
<td>2004</td>
<td>2458</td>
<td>576</td>
<td>446</td>
</tr>
<tr>
<td>2005</td>
<td>2386</td>
<td>570</td>
<td>444</td>
</tr>
<tr>
<td>2006</td>
<td>2280</td>
<td>503</td>
<td>416</td>
</tr>
<tr>
<td>2007</td>
<td>2259</td>
<td>511</td>
<td>439</td>
</tr>
<tr>
<td>2008</td>
<td>2213</td>
<td>528</td>
<td>460</td>
</tr>
<tr>
<td>2009</td>
<td>2068</td>
<td>508</td>
<td>443</td>
</tr>
<tr>
<td>2010</td>
<td>2023</td>
<td>521</td>
<td>441</td>
</tr>
<tr>
<td>2011</td>
<td>1991</td>
<td>523</td>
<td>442</td>
</tr>
<tr>
<td>2012</td>
<td>1953</td>
<td>537</td>
<td>450</td>
</tr>
<tr>
<td>2013</td>
<td>1918</td>
<td>524</td>
<td>430</td>
</tr>
<tr>
<td>2014</td>
<td>1901</td>
<td>516</td>
<td>434</td>
</tr>
</tbody>
</table>

1) No data for the years 1993-2000
Source: Own research based on:
BAEL – mid-2014 data for working age disabled persons.

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\(^3\) Job market: http://www.niepelnosprawni.gov.pl/niepelnosprawnosc-w-liczbach-/rynek-pracy/ (10.05.2015).
The percentage of disabled persons in the total number of people registered in the county jobcentres in December 2014 was 6.5%: it was 5.6% amongst persons registered as unemployed and 47.7% in those registered as looking for jobs. In 2014 entrepreneurs had 56,000 job offers for the disabled in county job centres, 14.0% (7.8 thousand) of which were for subsidised job posts.\(^{44}\)

The data displayed in Figure 5 clearly indicate that working age disabled persons are largely hired workers. The number of disabled having their own business activities was scant and ranged in the analysed period (2006-2014) from 4.09% in 2006 to 2.53% in 2014.\(^ {45}\)

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\(^{44}\) Ibidem.

3.3. **Government policy and interventions for the purpose of the employment of disabled persons in Poland**

The European Commission set eight areas of priority in the Europe 2020 strategy regarding EU member states operations for the benefit of supporting the social inclusion of the disabled. The above areas were selected based on the analysis of findings of the EU plan of operations for the benefit of the disabled for the years 2003 - 2010 and member states counsel. Amongst the specified areas were: accessibility, participation, equality, employment, education and training, social protection, health, external actions\(^{46}\).

Equality of all citizens in Poland is guaranteed by the Constitution of the Republic of Poland. The constitutional regulation stipulates that all are equal before the law, all have the right to be treated equally by public authorities, and that no one can be discriminated in political, social or economic life for any reason\(^{47}\). The principle of equal treatment by the rule of all people and a resultant ban on discrimination must be referred to the disabled, too. In Article 30 of the Polish Constitution, innate and inalienable dignity of every human being, notwithstanding one’s individual physical and psychological features, is deemed to be the source of all liberties and rights. The Constitution obliges public authorities to provide special healthcare to the disabled (Article 68(3)) and to determine by the means of legal statute any and all aid to the disabled in order to ensure their subsistence, adaptation to work and social communication (Article 69)\(^{48}\).

Under the Rights of Persons with Disabilities Charter, it is set forth that disabled persons have, amongst other things, the right to\(^{49}\):

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\(^{47}\) Art. 32, Constitution of the Republic of Poland, (Dz.U. of 1997 No. 78, Item 483, as amended).

\(^{48}\) http://www.tpsw.pl/aktualnosci-tpsw/osoba-niepełnosprawna/formalnie/ (10.05.2015).

\(^{49}\) Resolution of the Sejm of the Republic of Poland of 01/08/1997 Karta Praw Osób Niepełnosprawnych (Persons with Disabilities Charter), §1.
• work on an open job market according to one’s competences, education and abilities and to use career counselling and guidance, and - whenever required by disability and health condition - to work in an inclusive environment, adapted to the needs of the disabled;
• live in an environment free of functional barriers, including but not limited to: access to offices, polling stations and public facilities; free communication and common use of the means of transportation; access to information; interpersonal communication.

The executive, i.e. self-government authorities (region, county, commune), undertakes actions aimed at the realisation of these laws.

In view of various indicators (referred to hereinabove) we may conclude that such actions have effects. Recently, we could witness positive changes in the area of supporting the disabled. Self-governments set off to realise diverse tasks in the field of social and professional rehabilitation, so as to make the most comprehensive effort to meet the needs of various groups of disabled persons. Self-government bodies have strategies and programmes of actions aimed at providing equal opportunities to and integrating the disabled. These programmes include, amongst other things, the following issues:
• providing equal life opportunities to disabled persons by increased access to education, work, services and benefits;
• providing an equal level of social and medical services and other forms of support;
• helping families having disabled family members;
• creating a system of integrated rehabilitation and activation of disabled persons.

50 Program wyrównywania szans osób niepełnosprawnych i przeciwdziałania ich wykluczeniu społecznemu oraz pomocy w realizacji zadań na rzecz zatrudniania osób niepełnosprawnych na lata 2014–2020 (Programme for providing equal opportunities to disabled persons, preventing their social exclusion, and helping to achieve goals for the benefit of disabled persons for the years 2014-2020), pp. 6-7: http://niepelnosprawni.lublin.pl (10.05.2015).
As part of the support for stated actions, the Polish legislation provides for a series of rules enabling social inclusion of the disabled through various rights and entitlements for employers employing the disabled. Amongst the most important are:

- monthly subsidises to remuneration of a disabled employee;
- reimbursement of costs of adapting the workplace to the needs of the disabled;
- reimbursement of costs of equipping an inclusive workplace;
- reimbursement of costs of training disabled persons;
- reimbursement of costs for the employment of an assistant for disabled persons;
- exemption from PFRON fees.

Furthermore, Persons with Disabilities who decide to set up or are already conducting a business (or agricultural) activity may be granted subsidies for establishing a business or agricultural activity, or offered a social cooperative contribution, or they may apply for funding of up to 50% of a bank loan interest rate. Disabled persons conducting their own business activity, farmers with disabilities, or farmers obliged to pay contributions in the name of a disabled household member are entitled to reimbursement of social insurance fund contributions.

In Poland, every employer who meets the conditions set forth in the statute may apply for the status of a sheltered employment establishment (zakład pracy chronionej). As of 30 June 2010, there were

1,969 sheltered employment establishments, which employed a total of 197,156 severely, moderately or mildly disabled persons.

In addition, in Poland there are also vocational development centres (zakład aktywności zawodowej)\footnote{Employment of disabled persons: http://www.niepelnosprawni.gov.pl/zatrudnienie-osob-niepelnospraw-/zaklady-aktywnosci-zawodowej/; in: Art. 29 and 68 c(2) of the Professional and Social Rehabilitation and Employment of the Disabled Act of 27 August 1997 (Dz.U. of 2011, No. 127, Item 721 as amended); the Act on the amendment of the Professional and Social Rehabilitation and Employment of the Disabled Act and some other acts of 29 October 2010 (Dz.U. No. 226, Item 1475); Art. 38(2.2) of the Natural Persons Income Tax Act of 26 July 1991 (Dz.U. of 2010 No. 51, Item 307, as amended); Regulation of the Minister of Labour and Social Policy of 17 July 2012 r. on vocational development centres (Dz.U. of 24 July 2012, Item 850).}, which are organizationally and financially independent units established for the purpose of employment of severely disabled persons and the moderately disabled diagnosed with autism, mental disability or a mental condition. Vocational development centres may be established by: counties, communes, foundations, associations, and other social organisations with career and social rehabilitation of the disabled as their statutory goal.

As evidenced by the end-December 2014 data, in the System of Subsidies and Reimbursement Services (SODiR) maintained by the National Fund for Rehabilitation of Disabled Persons (PFRON) there were a total of 242.6 thousand disabled registered, including 103.3 thousand employed at an open job market and 139.3 thousand employed at sheltered employment establishments. In comparison with December 2013 data, there was a marked reduction in the disproportion between disabled employees from the mainstream and sheltered job market registered with SODiR PFRON. In December 2013, the percentage of employees of sheltered employment establishments in the total number of disabled employees registered with SODiR was 66.2%; in December 2014 it was 57.4\%\footnote{Job market: http://www.niepelnosprawni.gov.pl/niepelnosprawnosc-w-liczbach-rynek-pracy/ (05.05.2015).}.

Still, we need to mention that in addition to benefits (less and less attractive) which employers from the free job market receive in return for employing disabled persons, there are a number of requirements they need to meet in order to satisfy specific needs of
said persons, guaranteed by legislation, which include\textsuperscript{55}: entitlement to an additional break while at work, the right to an additional holiday, the right to use work leave, reasonable improvements, shorter working time.

In many cases these requirements drive employers away and make them reluctant to employ Persons with Disabilities.

\section*{3.4. Education in the field of Disability Management in the workplace}

Problems of the disabled should be solved not only at the general level, through adjustment of legal solutions, government support, or financial aid for the persons involved, but also for prospective and present employers.

It is vital that adequate organisational culture, full of acceptance, understanding, and support, and favouring those with specific needs, is created. Unfortunately, this will not come quickly if authorities of various organisations are not open to diversity and do not begin to see it as a method for one’s business. In theory (and in some states, in practice) the meaning of diversity management, which promotes ‘respect for differences and specificity of various groups of workers, such as: women, employees of different countries and cultures, disabled, elderly, or of other sexual orientation, is becoming more and more prominent. The purpose of management is to determine the specificity of said groups and treat such employees as valuable representatives of other surrounding groups’\textsuperscript{56}.

One constituent of diversity management is to allow for the specific needs of disabled persons as part of disability management. In

\begin{itemize}
\item\textsuperscript{55} Employment of disabled persons: http://www.niepelnosprawni.gov.pl/zatrudnienie-osob-niepelnosprawn/ (05.05.2015).
\end{itemize}
the Code of Procedure - Disability Management in the Workplace, the idea of disability issues management is defined as ‘a process occurring at a workplace, the purpose of which is to facilitate employment of disabled persons by coordinating efforts to include the needs of individuals, work environment, needs of enterprises and legal responsibility’.

The process of disability management starts with establishing a strategy that supplements the strategy of human resources development within organisations. It should underscore issues of proper communication amongst employees, aimed at raising awareness regarding the disability and needs of the disabled. Furthermore, what is necessary is a systematic evaluation of the effectiveness of a strategy pursued.

To minimise negative consequences of the lack of knowledge regarding disability, organisations should run adaptation courses for every new employee which would introduce him/her to, amongst other things, the rules of possible cooperation with disabled persons, including any potential difficulties incidental to the disabilities of particular co-workers. Moreover, to increase the work comfort of both the disabled and able-bodied employees, there should be outsourcing trainings for managers in the field of disability management in the workplace regarding the idea of diversity and an individual approach to employees.

Now, therefore, it seems that the next step on the way to increased understanding and correct use of disabled persons' potential is to extend educational offers to include training, courses or university courses in diversity and disability management.

Because of the fact that disability management includes issues, such as: human potential management, talent management, organisational culture, corporate social responsibility, universal

design, ergonomic design, disability or mental and physical health, both liberal arts, economic, technological or medical universities may contribute to the popularisation of solutions and better understanding of the issue of disability.

According to the Community definition, more than every fifth Pole is regarded as a disabled person. One-third of the above population are persons with serious impairments. As per the EU criteria, every third person in a group of people in their fifties and two-thirds of seventy-year-olds are regarded as disabled. What is more, two-thirds have moderate or mild impairments related to performance of activities. At the end of 2009, certificates of disability were awarded to every ninth Pole, irrespective of sex. Depending on the adopted biological criterion (or to be more precise, the level of limitations) the population of disabled persons in Poland according to the GUS criterion may be between 5.3 million and 9 million59.

In view of the above data, we need to conclude that disability-related issues will constitute a serious challenge to both those who establish and those who implement the law. Thus, it seems justified to be adequately prepared for the escalating problems of society's disabilities. It appears that actions aimed at introducing, raising awareness of, shaping and supporting right behaviour and skills directed at disabled persons, both future employees and prospective employers, should become a priority not only at the level of the law, but also in the workplace.

CHAPTER 4

Understanding workplace inclusion and employee needs in Europe – Can Ergonomics make a difference?

Louise Moody60
Janet Saunders61

Eighty million EU citizens, or 1 in 6 people, have a disability62. Across Europe, disabled people have much lower employment rates than able-bodied people, leading to greater social disadvantage. Those with low education levels, and higher levels of impairment or intellectual difficulties generally have the lowest levels of employment. EU Directives in 1989 and 2000 introduced the concept of ‘reasonable accommodation’ and the principle of adapting the workplace and/or job to the needs of employees.

It is likely that both mainstream and sheltered workplaces will need far greater adaptation and accessibility to enable more disabled people to work and to meet the European Disability Strategy 202063 target of 75% mainstream employment for all citizens. Ergonomics expertise could have a key role to play.

The ERGO WORK Project is focused on understanding barriers to the inclusion of Persons with Disabilities (PWD) in the workplace,

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61 Coventry University.
62 European Disability Forum:
http://www.edf-feph.org/Page_Generale.asp%3FDocID%3D13855 (05.2015)
and tackling these barriers through education and collaboration between academia and industry.

The initial phase of the ERGO WORK project was an investigation of:

- the needs of stakeholders (including individuals with and without disabilities, companies and higher educational institutions), in terms of knowledge and workplace improvements in respect to the inclusion of Persons with Disabilities in the workplace;
- the current position in each of the partner institutions in relation to the teaching of ergonomics for workplace design for Persons with Disabilities.

4.1. Method

This investigation was carried out through an online survey in all 6 partner countries (Slovenia, Poland, UK, Italy, Spain, and Belgium) and an in-depth analysis of curricula containing Ergonomics content, focusing on curricula in the UK, Slovenia and Poland, with additional input from the other 3 partner countries.

Stakeholder needs analysis

Stakeholder needs were gathered via an online survey, distributed throughout the networks of the 6 partner countries and completed by 480 participants across the 6 countries. The sample sizes completing the online survey differed between countries, Slovenia returning the largest number of survey completions. To prevent these differences skewing the data as a whole, the questions were analysed by country. The survey was completed by participants with, and without a disability, and there was also good representation from participants in positions of management responsibility, to provide the employer view.

Review of curriculum content

An in-depth analysis was carried out, of curricula containing Ergonomics content, focusing on curricula in the UK, Slovenian and Polish University partners, with additional input from the other
partner countries and institutions. The study has drawn together a summary of Ergonomics teaching from 13 HEIs, 17 faculties and 6 countries. The content of the courses taught at these institutions was explored through face to face and telephone interviews. We wanted to understand what was needed to improve training for ergonomists in tackling the needs of PWD in the workplace.

4.2. Results

Adaptations to workplaces

All participants were asked how well they thought their workplace was adapted for Persons with Disabilities. In the UK 69% of participants felt their workplace was adapted ‘fairly well’ or ‘very well’ with this figure at 53% for Poland, 51% for Slovenia, 39% for Belgium, 38% for Spain, 37% for Italy.

The most common adaptation in every country was physical adaptation to the buildings, and a general view of the data shows that most physical adaptation is perceived to have happened in the UK.

Across all countries, adaptations had also been made to jobs and the way they were carried out. The UK participants identified changes to job tasks, job role, pace and working hours, much less than stakeholders in the other countries. Interestingly, Slovenians were the most likely to identify changes to the job role and hours to suit the needs of PWD, whilst the Polish participants particularly recognized adaptations to the pace of work. Further exploration of the data and the broader context is needed to understand these differences and see where there might be practices that can be transferred between countries.

Considering adaptations for different kinds of impairment, it was not surprising to find that there was most knowledge about physical impairment, and low knowledge among all participants about hearing or visual impairment, with even less knowledge regarding mental health needs and intellectual disabilities.
Needs of PWD

Participants with disability themselves however, do not feel well-provided for in the workplace. When asked to agree or disagree with the statement 'disabled people are not well accommodated in terms of workplace design', half or more agreed with the statement, in all countries except the UK (Table 7).

Table 7. Perception of disabled participants

<table>
<thead>
<tr>
<th>Country</th>
<th>Agree or Agree strongly</th>
<th>Neutral</th>
<th>Disagree or disagree strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>60%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Italy</td>
<td>67%</td>
<td>33%</td>
<td>0%</td>
</tr>
<tr>
<td>Poland</td>
<td>39%</td>
<td>42%</td>
<td>18%</td>
</tr>
<tr>
<td>Slovenia</td>
<td>55%</td>
<td>27%</td>
<td>18%</td>
</tr>
<tr>
<td>Spain</td>
<td>50%</td>
<td>39%</td>
<td>12%</td>
</tr>
<tr>
<td>UK</td>
<td>36%</td>
<td>33%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Source: Own analysis.

Also, in all countries the PWD group rated their workplace lower, felt less included and were less happy at work than the non-disabled participants.

PWD were much less confident than employers as to the adequacy of knowledge about provision and adaptation in the workplace, and PWD felt that employers need better knowledge about their obligations and the possibilities of adaptation in the workplace. PWD felt that the design of the workplace was a barrier to employment opportunities; they were less happy in the workplace than other participants and there are still perceived barriers which prevent them from asking for improvements.

These results suggest that much more work needs to be done in all countries to make workplace adaptations that suit user needs.

PWD indicated the greatest barriers to asking for improvements were fears about job security and about being stigmatized or isolated, selected by over half the respondents in all countries. Other barriers included: lack of knowledge about what adaptations were possible, difficulty in finding the right person to ask, fears about cost to the
employer and worry about promotion. Relatively few participants thought there were ‘no barriers’ to asking.

Further differences in opinions between 'all respondents' and 'disabled respondents' indicates that many people are not aware of the issues faced by PWD, so we suggest that some awareness-raising is needed among all employees to improve the overall culture within the workplace.

There were some indications that there was a greater lack of confidence among the Polish disabled group and perhaps this indicates a greater lack of awareness and infrastructure in Polish workplaces to accommodate the needs of Persons with Disabilities. In addition, employers in the Polish group were less confident they had the knowledge and resources to adapt workplaces and to find advice and specialised equipment.

4.3. Needs of employers

In all countries except Poland, employers identified ‘Access to funding’ as the greatest barrier to making reasonable adjustment. For the Polish participants, access to funding was selected less often than other barriers – more frequently selected barriers were ‘finding out a problem exists’, ‘finding information’ and ‘access to experts’. Overall however, access to funding for adaptations is clearly perceived as a major issue. If there is funding available, the message is not getting broadcast effectively in all countries.

Employers seemed less confident overall about changing the ‘work process’ than they did about making physical adaptations, so there is evidently a need to raise awareness in this area.

Employer participants were asked if they were interested in training for themselves, or their organisations in creating ergonomic workplaces. In most countries the majority were very interested, except in the UK, where 71% selected ‘No’ to training for their organisation. This different response from UK participants probably indicates the maturity and significant training and awareness activities that have already taken place in the UK, although this still leaves around 30% who would be interested in more.
4.4. Analysis of Ergonomics Curricula

Training in Ergonomics is mostly taught at Masters Degree level. Of the partners included in this project, the UK appears to have the most mature development of Ergonomics academic training, and provides undergraduate as well as post-graduate dedicated Ergonomics awards. However, the multi-disciplinary nature of Ergonomics means that Ergonomics content is included in undergraduate and post-graduate programmes in a variety of disciplines in all the countries in this study. The taught content itself is likely to depend very much on the bias within the faculty where Ergonomics is situated.

When asked 'Are the needs of persons with a disability taught?', the dedicated Ergonomics or Human Factors awards were able to answer 'Yes', as also were some specific components such as 'MSc in Assistive Technology' (UK, Coventry, in Health & Life Sciences Faculty); 'Disability, ageing and inclusive design' (UK, Loughborough, part of Design Ergonomics); and Special Education Pedagogy components (Slovenia, Koper, Education Faculty). However, these are the minority and for the less dedicated curriculum components, the answer to this question was more likely to be 'Partly' or 'No'.

Where the approach is one of 'Inclusive Design', the approach and language are focused on raising students' awareness to the huge range of human capability and encouraging them to use appropriate methods to capture universal needs and design in such a way that ensures no groups will be excluded, but specific focus on PWD or the workplace is absent, unless students carry out detailed project work in this area.

4.5. Discussion

There are limitations to the data as it stands. The sample is small and variable across countries and employee groups. The evidence has therefore been used cautiously to point to broad conclusions, to suggest actions that might be taken to improve Ergonomics education
and to raise general awareness of a range of issues relating to PWD in the workplace in the various partner countries.

The study aimed to determine what a future curriculum should include in terms of the needs of PWD in the workplace. There are a range of subject areas that might be relevant, and they may be drawn from both within, and outside of ergonomics as it is currently taught within the surveyed institutions.

Our conclusion is that to improve training in Ergonomics for the needs of PWD in the workplace, existing Ergonomics teaching would need greater tailoring to the specific needs of PWD. Our investigations identified additional content that is specifically targeted at understanding and designing for PWD needs and this includes:

- inclusive design – ageing, different abilities, range of capabilities;
- empathic methods of design to raise awareness of students;
- some understanding of organisational behaviour;
- assistive technology knowledge;
- accessible environments knowledge;
- share knowledge about tools for inclusive design;
- include more knowledge about mental health needs – generally this area is neglected;
- focus on workplace interventions and PWD needs;
- incorporate knowledge from the ‘Occupational Health’ field and/or consider interdisciplinary cooperation.

Teaching empathic skills can be achieved through practical work, for example students using items such as a wheelchair, macular degeneration glasses, a ‘third age’ suit to simulate a disability, or age-related impairments such as visual, hearing, mobility, grip and coordination. The use of case studies and personas can also enhance students’ empathic skills and appreciation of the needs of disabled people. Another approach to teaching empathic skills is by direct contact with disabled people. This is an essential part of good practise in inclusive design and Occupational Therapy content, such that students will interact with disabled people as part of training in participatory design or co-design; talk to them to understand their
needs in a number of areas; and be taught ethnographic research methods such as shadowing participants.

The data presented here has shown a variable picture across the 6 European countries surveyed in terms of the adaptations made for Persons with Disabilities and the taught content available to ergonomics students. There is a need for better European collaboration and transfer of knowledge and practice in this area.

Building on the survey results, the ERGO WORK project has developed a new elective training module in inclusive workplace design for Ergonomics courses in Slovenia and Poland. The educational material has been informed by the needs identified through the survey and tailored to local conditions by Polish and Slovenian partners. It is specifically aimed at equipping students to improve jobs and workplaces for disabled people, and has been piloted through collaborative industrial projects.
CHAPTER 5

Ergonomics for disabled persons
in a real working environment –
implementation of Pilot Projects in Slovenia

Nataša Rebernik

Years ago, representatives of OZARA Service and Disability Company Ltd. and the University of Maribor from Slovenia at one of their occasions found an interesting topic to discuss: ‘Ergonomics for disabled persons’. An intensive discussion brought up several issues, among which there were mainly three deliberated. The first was a lack of specific ergonomic educational programmes involving ergonomics for disabled persons, the second was a lack of cooperation between higher education, research and real working environments, and the last was a lack of equal employment and working opportunities for disabled people. The idea about an international project arose, and the ERGO WORK project was born.

The project had applied for EU funding in 2013 and was approved. Financed from the Lifelong Learning Programme, supported by the European Commission, it has been an interesting two year experience for all involved stakeholders, namely project partners, involved students, involved disabled employees and many others.

During the project’s life time, there were numerous activities planned and realised, starting with a thorough analysis, followed by, an intensive higher-educational module development ‘Curriculum Ergonomics - Inclusive Workplace Design’. Further on the developed

64 OZARA d.o.o.
teaching contents were implemented and tested within the so called Pilot projects in two testing countries, Slovenia and Poland. Herein we are presenting a general concept of Pilot projects and specifically Pilot projects, carried out in Slovenia by two Multidisciplinary groups (MG1 and MG2).

5.1. ERGO WORK Pilot Projects – general introduction

Aims, goals and work plan for Pilot projects implementation

In Slovenia there were two pilot projects planned, Pilot project 1 in cooperation with two partner companies, OZARA d.o.o. (P1) and Kovinarstvo Bučar s.p. (P3), and Pilot project 2 in cooperation with OZARA d.o.o. and an associated partner Bodočnost Maribor d.o.o., a company for the employment of disabled persons.

The aim of the Pilot projects’ implementation, set in the project work plan under ‘Work package 5: Pilot projects’, was to test the teaching contents ‘Curriculum Ergonomics - Inclusive Workplace Design’ developed under ‘Work package 3: Curriculum Ergonomics – Supplementary modules’ in a real business environment facing real business needs and challenges in creating human, disabled employees adapted work places.

The pilot projects were planned to be (and were) implemented in 2 ‘testing countries’, Slovenia and Poland, where the partnership has established firm national alliances of Universities, partner companies and associated companies.

Selection procedure and starting point for Pilot projects implementation

The aim of the selection procedure set under ‘Work package 4: Setting the conditions for the Pilot projects’ was to define and establish all necessary conditions for the implementation of the Pilot Projects according to the work plan. This means that we had to define in more details which target groups would be involved in the pilot projects, and to define selection criteria for:
1. Product/service/work place selection
2. Disabled persons
3. Students
4. Teaching contents used in the PPs

The 1. The selection of Product/service/work place refers to the definition of all relevant parameters for ergonomic work place analysis and it’s adaptation to disabled employees involved in the project. This means that in some cases a new product development or a new service had been defined aimed at also designing new adapted work places for disabled people, and in other cases a few already existing work places had been selected, so that they could be ergonomically analysed and new solutions would be proposed.

The further two points, 2. The selection procedure for selection of students and 3. Selection of disabled persons had been implemented through a three stage process aimed at the formation of 4 multidisciplinary groups of at least 6 students and 3-4 experts coming from academia and business (2 groups in Slovenia and 2 in Poland). The process consisted of 1) presentation of the ERGO WORK Project, 2) interview with a student/disabled person, 3) signing the consent form and joining the project.

The last point, 4. The selection of teaching contents was done during the Pilot projects’ implementation itself, as the need occurred. The basic approach was to carry out short app. 2 hour introductory lessons in each of the five topics related to Ergonomics for disabled persons, which had been developed during the 6 months prior to the start of PPs:
1. Teaching content 1: Work Study and Ergonomics for PWD (Persons with Disabilities) – Understanding the workplace and job.
2. Teaching content 2: Characteristics of PWD in Working Environment – Understanding individual employees and their needs.
5. Teaching content 5: Mobility of PWD (Persons with Disabilities).

All the teaching materials with Power Point presentations and exercises have been available in the project consortium’s Dropbox and
were also evaluated by PMG members, students, professors, mentors etc. via an evaluation tool designed by an External project evaluator.

**Formation of Multidisciplinary groups**

4 Multidisciplinary groups (MG) were selected to implement the Pilot Projects within app. 3-4 months. 2 groups were formed in Slovenia and 2 in Poland.

Groups were planned to consist of 6 students + 3-4 academia and business staff, although the numbers at the end slightly differed according to specific PP situation. MG members’ role included:

- active participation in specific product design (chosen within the company);
- active participation in analysing specific needs of disabled employees;
- active participation in work programme design correspondent to the product design and the disabled employees’ needs;
- active participation in ergonomic work place design or re-organisation of existing work places for disabled individuals;
- active participation in training of disabled employees for adapted work places.

Members were responsible for:

- contribution in knowledge, ideas, experience, expertise exchange;
- contribution to effective need-solution approach;
- respecting good practice examples, tested models, expert opinion, innovative ideas for tailor made work place design;
- implementation of ‘accessible’ and ‘universal design’ approach;
- contribution to Report preparation;
- contribution to e-platform content development.

**5.2. Pilot Projects in Slovenia**

In Slovenia two Pilot projects were implemented. For both OZARA d.o.o. took over the coordination role and organisational role for most of the activities. During the selection procedure in
cooperation with the University of Maribor (P2) we needed to select at least 12 HEI students (6 per PP), and in cooperation with the companies involved we needed to select at least 4 disabled people (2 per PP). Results of the selection procedure were promising, as we had 12 students signing the consent form and joining PP1, and more than 15 students interested in PP2, of which 10 signed the consent form. Furthermore we had 3 disabled employees involved in PP1 and 4 in PP2. The outcome was a bit different as during the implementation phase some of the students resigned. After having discussions with them, they stated a number of reasons, of which ‘a lack of time’ was mostly presented, followed by a ‘lack of benefits gained from cooperation in the project’. The number of remaining students, who also successfully presented their work ended up with 9 students for PP1 and at the time of writing this chapter 10 students within PP2. Nevertheless, the last haven’t yet presented their work, so the number could decrease during the last month of PP2’s implementation.

As some of the students truly did a great job and provided companies with a series of interesting solutions for improving ergonomic parameters in working processes, it would be a shame not to present their work herein.

But first, let’s make a basic introduction into both PP1 and PP2 implementation in Slovenia in the time period from November 2014 till June 2015.

**Pilot Project 1 (PP1)**

**Name and characteristic of the Company:** Two partner companies were involved in PP1, namely the project coordinator OZARA Service and Disability Company d.o.o., and partner 3 Kovinarstvo, Drago Bučar s.p.

OZARA d.o.o. is a company dedicated to the training, employment, and social inclusion of persons with disabilities, including Employment and Vocational Rehabilitation Programmes, Social Inclusion Programmes, Project Management, and different Specialised Services. Disabled people are employed in cleaning
services, carpentry, sewing, green area maintenance, and various production and assembly activities.

Kovinarstvo Bučar s.p. is a family company with a tradition spanning more than five decades. They are one of the largest Slovene companies in the field of manufacturing standard serial sheet metal products and roofing accessories as well as various custom made sheet metal products by order. Their clients are tinsmiths, roofers and individual customers. Beside that they are an innovation oriented company with high quality standards, and high social responsibility, therefore they have closely cooperated with OZARA for years now, providing more employment opportunities for disabled employees.

**Characteristic of the product and workplace:** A non-standard 6-meter wooden pallet had been designed before the project started, with cooperation of both companies for special transportation needs of metal products at Kovinarstvo Bučar s.p. The production of the pallet was tested within the PP1 at OZARA d.o.o. involving two disabled employees, and one non-disabled employee, a qualified carpenter.

![Figure 6. 6-meter wooden pallet analysed during the Pilot project 1](image)

Source: Kovinarstvo Bučar s.p.
The scope of work at the analysed workplace: Production of a 6-meter pallet includes several phases, starting with sawing the wooden planks into different lengths, which is done by the carpenter, the wooden pieces are then manually drilled by the disabled employee with holes for nails, the long wooden planks put on the assembly spot, fixed with nails and glued as shown in the sketches, prepared by engineers of Kovinarstvo Bučar s.p.

Photo 1. Pilot project 1 at OZARA d.o.o. – Production of a 6-meter wooden pallet
Source: OZARA d.o.o.

Photo 2. Pilot project 1 at OZARA d.o.o. – Production of a 6-meter wooden pallet
Source: OZARA d.o.o.
Aim of the Pilot Project:

- product design with ergonomic work process and work places design, adapted for disabled employees.
- mobility analysis for different groups of disabled employees.

PP activities:

The first sessions took place at the end of November 2014, starting with introductory workshops, familiarisation with the companies, with disabled employees, with sketches and drawings of the product, continuing in January 2015 with observation and measuring of the working process and working phases, measuring of the working environment, analysis of logistics of the venue etc. The findings of the analysis were then introduced by students in March 2015 after the Exam period. The following seminar papers were presented:

1. Ergonomic Workplace Design - Standardisation and Improvement of Work.
2. Ergonomic Workplace Design - OWAS Analysis.
4. Mobility Analysis in the Working Environment

As the External evaluator is situated in Slovenia, several Evaluation visits were also carried out in March 2015. At the final meeting, all students presented their work, were awarded with a certificate that will bring added value in their career development and job search.

Multidisciplinary group No 1 working on PP1:

a) Researchers: Marjan Leber, Bojan Dolšak, Nataša Vujica-Herzog, Majda Schmidt Krajnc, Marko Renčelj, Vojko Potočan (University of Maribor);
b) Students (University of Maribor):

- under-graduate students at the Faculty of Civil Engineering: Aleš Horvat, Martin Postružnik, Niko Rojko, Ema Komar, Saša Stojko (with a certificate) + Matic Sernel, Jure Jevšenak (without a certificate);
• post-graduate students at the Faculty of Civil Engineering: Gregor Salobir, Rok Dolinšek, Aleksander Pagon, Aleš Petek (with a certificate);

c) Employees: Miodrag Petrovič, Janez Andrejč, Nataša Rebernik (OZARA d.o.o.), Boštjan Cafuta (Kovinarstvo Bučar s.p.);

d) PWD: Marija Štandeker, Darko Fabijan, Alojz Zelenko (OZARA d.o.o.).

Pilot Project 2 (PP2)

Name and characteristic of the Company: One partner company, namely the project coordinator OZARA Service and Disability Company d.o.o., and one associated partner, namely Bodočnost Maribor d.o.o. were involved in the Pilot Project 2.

OZARA d.o.o. is a company dedicated to the training, employment, and social inclusion of persons with disabilities, including Employment and Vocational Rehabilitation Programmes, Social Inclusion Programmes, Project Management, and different Specialised Services. Disabled people are employed in cleaning services, carpentry, sewing, green area maintenance, and various production and assembly activities.

Bodočnost Maribor d.o.o. is a company for the rehabilitation and employment of disabled persons. It represents one of most successful companies of this type in Slovenia. Its main activities represent production services in the areas of graphics, carpentry, metal, textile and others. A great number of disabled employees are employed in assembly production department, where cosmetic products for one of the main EU companies in cosmetics production are being packed.

Characteristic of the workplace: At Bodočnost Maribor d.o.o. ergonomic appropriateness of three work places along assembly/packaging line were analysed by a group of under-graduate students of the Faculty of Mechanical Engineering. The work places along the assembly line represent a chain of interconnected phases in the process of packaging cosmetic products such as hair dye, hair gels, face creams etc. The work places were selected following several observation sessions and identification of problematic parameters. The
work places were problematic in repetitiveness or difficulty of movement, heaviness of the burden/load, time consuming work or similar.

A number of disabled and non-disabled employees were involved in the analysis through interviews, observation of work etc., whereas four of the disabled employees agreed on participation in the project and were therefore more closely involved.

Besides the selected work places, additional analysis was carried out as follows:
1. Mobility of Disabled Persons in a Working Environment (by a group of post-graduate students of the Faculty of Civil Engineering).
2. Working Conditions and Satisfaction of Disabled Employees at Work (by a post-graduate student of the Faculty of Arts).

The scope of work at the analysed workplace: Ergonomic analysis of the selected work places was done on manual assembly line for packaging cosmetic products, which consists of various work places in different packaging phases. The work also depends on the specifics of a product, on the client’s order and limitations of disabled employees. During the PP2, students analysed three selected work places, which represent one or two packaging phases:
1. 1st work place: opening boxes before the assembly process starts;
2. 2nd work place: adding paper instructions on the neck of a plastic bottle already pre-inserted in a small box and a big transportation box;
3. 3rd work place: manual lifting the transportation boxes from the pallet to the working area and vice versa.
Aim of the Pilot Project:

- ergonomic work process and work place design with recommendations for improvements;
- mobility analysis for different groups of disabled employees with recommendations for improvements;
- analysis of working conditions and satisfaction of disabled employees at work with recommendations for improvements.

PP activities:

The first session took place at the end of March 2015, starting with an introductory workshop, familiarisation with the company, its production services and specifically with the assembly line for packaging cosmetic products. In April and May 2015 PP sessions continued with lectures related to ergonomics for disabled people (developed in the ERGO WORK Project), familiarisation with disabled employees, in-depth observation methods supported with video shooting, taking photos, making notes, talking to disabled employees and their mentors, talking to human resources staff, holding interviews, distributing questionnaires, synthesis of all the collected data, preparing a presentation, and proposing company management
with recommendations for the improvement of ergonomic principles at work. The following seminar works were presented by students:
1. Mobility analysis of the working environment.
2. Working conditions and satisfaction of disabled employees at work.
3. Ergonomic analysis of the selected work places.

Multidisciplinary group No 2 working on PP2:

a) Researchers: Marjan Leber, Bojan Dolšak, Majda Schmidt Krajnc, Marko Renčelj, Vojko Potočan (University of Maribor);

b) Students (University of Maribor):
   • post-graduate students at the Faculty of Mechanical Engineering: Mateja Knežar, Armin Turanovič, Luka Hošnjak, Adrijan Legčevič, Danijel Hojski, Jan Perša in Mitja Picej;
   • post-graduate student at the Faculty of Arts: Nina Fekonja;
   • under-graduate students at the Faculty of Mechanical Engineering: Jakob Marolt, Alen Auer, Matej Polovšek;

c) Employees: Cvetka Hanžič (Bodočnost d.o.o.), Miodrag Petrovič, Nataša Rebernik (OZARA d.o.o.);

d) PWD: Anica Škrjanec, Jožica Vake, Marija Diemat, Dijana Mauko (Bodočnost d.o.o.).

Pilot projects results

Herein only results of the Pilot project 1 (Seminar papers 1, 2, 3 and 4) are presented, as Pilot project 2 has been concluded after this article had already been prepared. Nevertheless, in the previous chapter there are some basic data presented about the process of work presented, and some photos of the students are included as well.

Furthermore, all the results have been regularly updated on the ERGO WORK web page (www.ergo-work.eu) and ERGO WORK social media (FB, Twitter, linked in).

Seminar paper 1: Ergonomic workplace design - standardisation and improvement of work

The analysis to be summarised herein was done by two students, namely Saša Stojko and Niko Rojko, under-graduate students at the
Faculty of Mechanical Engineering at the University of Maribor. The analysis consisted of:

- analysis of working environment parameters such as light, temperature, humidity, air flow on one hand, and
- analysis of the production process through time parameters.

Main methods used were observation, measurements with special equipment, calculations, interviews with involved employees and project staff, drawing sketches, presentation etc.

**Analysis of the working environment parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Appropriateness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>13,5°C (winter time)</td>
<td>Too low</td>
</tr>
<tr>
<td>Humidity</td>
<td>52%</td>
<td>OK</td>
</tr>
<tr>
<td>Air flow</td>
<td>low</td>
<td>OK</td>
</tr>
<tr>
<td>Light</td>
<td>170 / 248 / 470</td>
<td>Sufficient</td>
</tr>
</tbody>
</table>


**Analysis of the production process through time parameters**

The working process was divided into several phases (sawing different types of wooden planks and 10 assembly phases). For each of them there was a calculation of time made, assuming that workers’ effort was 100%. On Figure 7 there is a list of phases/events being observed, and in Table 9 there is a summary of time calculations.
Figure 7. Working process through phases
Source: After S. Stojko, N. Rojko, 2015, Project report (PP1).
Table 9. Working process time measurements

<table>
<thead>
<tr>
<th></th>
<th>Total time of sawing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$t_s = t_{n} \times (1 + K_n \times K_o) = 215.85 \times (1 + 0.20 \times 1.45) = 278.45 \text{ s}$</td>
</tr>
<tr>
<td>$t_i$</td>
<td>$t_i = t_{i} \times (1 + K_d) = 278.45 \times (1 + 0.13) = 314.65 \text{ s}$</td>
</tr>
<tr>
<td></td>
<td>$\Sigma t = 64.72\text{ min} = 3883.20 \text{ s}$</td>
</tr>
<tr>
<td></td>
<td>$t_s = t_{n} \times (1 + K_n \times K_o) = 3883.20 \times (1 + 0.20 \times 1.45) = 5009.33 \text{ s}$</td>
</tr>
<tr>
<td>$t_i$</td>
<td>$t_i = t_{i} = 5009.33 \text{ s}$</td>
</tr>
<tr>
<td>$t_1$</td>
<td>$t_1 = t_{i} \times (1 + K_d) = 5009.33 \times (1 + 0.13) = 5660.54 \text{ s} = 94.3 \text{ min}$</td>
</tr>
</tbody>
</table>

Source: After S. Stojko, N. Rojko, 2015, Project report (PP1).

Findings and proposed improvements

The two students working on the seminar paper came to several findings and proposed the following improvements:

Table 10. Ergonomic workplace design – Summary of findings and proposed improvements

<table>
<thead>
<tr>
<th>Findings</th>
<th>Proposed improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Temperature in the environment is very low (app. 13,5°C – winter time measurement).</td>
<td>Improved heating.</td>
</tr>
<tr>
<td>2. Waste deposit is too far from the sawing position.</td>
<td>Container for waste deposit next to the sawing position.</td>
</tr>
</tbody>
</table>
| 3. Wooden planks are on the floor and for each peace the employee needs to bend to pick it up. Wooden planks already cut on the saw are again being deposited on the floor, which causes another serious of bending when putting them down and again another when lifting them up for the next phase. | A stand for wooden planks next to the sawing position. A stand for already cut wooden planks.
Another position of the saw/machine for easier maneuvering with material. |
| 4. Working on the floor is not appropriate for a long period of time.   | Turning table for assembly works (see Figure ).
A movable chair next to the turning table with an adjustable height.
Cart for tools and accessories for assembly works. |
| 5. Drilling holes and fixing small supporting planks is done manually without any support, only with the help of marks drawn on the wood. | Holder for a drill and a drilling jig to guide the hand when drilling. |
| 6. Work places are not adjusted to disabled people.                    | See proposals above.                                                                   |
| 7. The work process needs a lot of improvisation.                      | See proposals above.                                                                   |

Source: After S. Stojko, N. Rojko, 2015, Project report (PP1).
Ergonomic Workplace Analysis in Pilot project 1 was done also through OWAS analysis by Ema Komar, an undergraduate student at the Faculty of Mechanical Engineering at the University of Maribor. She observed body postures during the working process of a 6-meter wooden pallet production.

Her main theses were:

- each posture/body position in time turns into a forced position;
- a person feels pleasant at work, when he or she is not cramped, can be relaxed and can choose to change body postures;
- forced postures appear mainly due to constructive deficiencies of machinery, equipment, tables, chairs and bad working approaches;
• each of the forced postures in the long term causes injuries, disease or has other unwanted consequences e.g.:
  o one way bending: formation of growths on the back causing pressure on the nerves, back pain etc.;
  o long term standing: high pressure in legs, varicose Veins, back pain etc.;
  o long term seating: indigestion, circulatory disorders, back pain etc.

The main methods used were observation of the working process, video shooting, analysing data through OWAS methodology (Ovako Working Analysing System) and proposing improvements and necessary measures. With OWAS analysis a series of different postures and movements was observed, followed by a calculation of % and time spent for each of the movements.

Finally the results were inserted in a scale which provides information about the necessity of measures e.g.:
• measures are not needed;
• measures are needed in a reasonable manner of time;
• measures are needed immediately;
• additional research is needed.

Analysis consisted of analysis of three phases:
• analysis of movements and postures when carrying wooden planks to the saw;
• analysis of movements and postures when drilling holes into wooden planks;
• analysis of movements and postures when assembling wooden planks into a pallet.

Measurements were done in intervals of 3 seconds. The analysis was done assuming that the working process lasts 4 hours (240 minutes).
Analysis of movements and postures when carrying wooden planks to the saw

Figure 9. Body postures and their duration in % of observed process time

Table: Body postures and their duration

<table>
<thead>
<tr>
<th>Seg.</th>
<th>HRBTENICA</th>
<th>ZGORNJA UDA</th>
<th>ROKI</th>
<th>SPODNJA UDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delitele</td>
<td>1.1</td>
<td>1.2</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>Število opažanj položaja</td>
<td>1488</td>
<td>1984</td>
<td>/</td>
<td>1984</td>
</tr>
<tr>
<td>pi [%]</td>
<td>27,3</td>
<td>36,3</td>
<td>/</td>
<td>36,3</td>
</tr>
<tr>
<td>Tpi [min]</td>
<td>65,5</td>
<td>87,1</td>
<td>/</td>
<td>87,1</td>
</tr>
<tr>
<td>Potrebnost ukrepov</td>
<td>□</td>
<td>●</td>
<td>/</td>
<td>▲</td>
</tr>
</tbody>
</table>

Figure 10. Body postures, their quantity, duration and necessity of measures
Figure 11. Body postures, their quantity, duration and necessity of measures

Analysis of movements and postures when drilling holes into wooden planks

Figure 12. Body postures and their duration in % of observed process time
Figure 13. Body postures, their quantity, duration and necessity of measures

<table>
<thead>
<tr>
<th>Seg.</th>
<th>HRBTENICA</th>
<th>ZGORNJA UDA</th>
<th>ROKI</th>
<th>SPONDNJA UDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dentiela</td>
<td>1.1 1.2 1.3 1.4</td>
<td>2.1 2.2 2.3 2.4</td>
<td>3.1 3.2 3.3</td>
<td>4.1 4.2 4.3</td>
</tr>
<tr>
<td>Število opažanj položaja</td>
<td>/ 72 / 4608 / 2808 1872 / 4392 / 144</td>
<td>4680 / /</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pi [%]</td>
<td>/ 1,5 / 98,5 / 60 40 / 94 / 3 100 / /</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tpi [min]</td>
<td>/ 3,7 / 235,3 / 144 96 / 225,2 / 7,4 240 / /</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potrebnost ukrepov</td>
<td>/ / / / / / / / / / /</td>
<td>/ / / / / / / / / / /</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 14. Body postures, their quantity, duration and necessity of measures

<table>
<thead>
<tr>
<th>Seg.</th>
<th>SPONDNJA UDA</th>
<th>GLAVA</th>
<th>SILA</th>
</tr>
</thead>
<tbody>
<tr>
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<td>5.1 5.2 5.3 5.4 5.5</td>
<td>6.1 6.2 6.3</td>
</tr>
<tr>
<td>Število opažanj položaja</td>
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<td></td>
</tr>
<tr>
<td>pi [%]</td>
<td>/ / / / / / / / 45,1 55,9 / 3,1 / / /</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tpi [min]</td>
<td>/ / / / / / / / 103,4 136,6 / 7,4 / / /</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potrebnost ukrepov</td>
<td>/ / / / / / / / / / / /</td>
<td>/ / / / / / / / / / /</td>
<td></td>
</tr>
</tbody>
</table>

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88
Analysis of movements and postures when assembling wooden planks into a pallet

Figure 15. Body postures and their duration in % of observed process time

Figure 16. Body postures, their quantity, duration and necessity of measures
Figure 17. Body postures, their quantity, duration and necessity of measures

Findings and proposed improvements

Table 11. Ergonomic workplace design – Summary of findings and proposed improvements

| Findings                                                                                                                                                                                                 | Proposed improvements                                                                                                                                                                                                 |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Quantity and frequency of bending for picking up and putting down wooden planks, tools etc., used in a process of production of a 6-meter wooden pallet. | High level transportation trolley for depositing and transporting wooden planks. High level shelves for planks and other tools, so that an employee doesn’t need to bend every time he or she needs to pick up a plank or a tool.                                         |
| The working surface in the process of drilling holes is extremely low. Although the employee is sitting, she needs to bend whenever she is drilling holes. The chair is fixed and causes frequent rotation and bending positions. | Higher, preferably a height adjustable desk for the sitting process of drilling holes. A swivel chair for the employee to be able to turn to all sides, pick up the wooden plank, drill holes in it and put it down again. A desktop drill or a manual hanging drill for the process of drilling holes at a desk. |
| Activities for assembling of wooden planks are actually being carried out on the floor, which causes frequent and long lasting bending positions. | Higher, preferably a height adjustable working area, where the assembly activities are carried out. Transportation trolley for tools. Waste bin next to the working area for depositing waste wooden planks. |

Seminar paper 3: Ergonomic product design - Numeric analysis of a wooden pallet

Ergonomic Analysis of the Product observed in Pilot project 1 was done by Aleš Horvat and Martin Postružnik, under-graduate students at the Faculty of Mechanical Engineering at the University of Maribor. Their analysis was done in great detail, taking into account several construction options of the 6-meter wooden pallet. Herein we are presenting only basic findings.

Their task was to perform a numerical conversion of the pallet, in order to determine whether the pallet is appropriately designed and, if is resistant enough to the load. To be able to come to the conclusion if the pallet is appropriately designed, we need to make a calculation of displacements and the resulting voltage. This voltage must be lower than the threshold voltage which the material is still resistant to.

In order to get suitable results, the study focused on 4 main analyses:

- the pallet is placed on the floor, and burdened only by its own weight products (1200 kg);
- the behaviour of pallets during transportation of products (1200 kg) by forklift;
- stacking two pallets on top of another - for storage purposes;
- stacking three pallets on top of another - for storage purposes.

Method used: Numeric analysis was carried out using the Finite Element Method (FEM). The whole method is based on a model which represents the geometry of the object prepared for analysis. The procedure involved the following steps:

- making a model (Software CATIA was used);
- networking and carrying out simulations;
- determining material parameters (humidity/dryness, irregular growth marks, the fibre etc.);
- analysis and calculations of displacements and the resulting voltage in the case of 4 versions of the basic model range in 4 different situations.
The calculation procedure is quite complex and presenting all its specifics and results is beyond the scope of this chapter, therefore the results are presented only in an illustrative way in Figure 18.

Figure 18. Comparison between results of numeric analysis of 4 different variations of a 6-meter pallet in 4 different situations

Seminar paper 4: Mobility analysis in the working environment

A mobility analysis in the working environment at OZARA, Service and Disability Company Ltd., where all involved disabled employees work, was done by a group of postgraduate students of the Faculty of Civil Engineering, namely Gregor Salobir, Aleš Petek, Aleksander Pagon and Rok Dolinšek.

There were two locations analysed:
- OZARA d.o.o. headquarters with production and professional services (Location 1: MELJE);
- OZARA d.o.o. carpentry workshop, where the production of the 6-meter pallet was tested (Location 2: STUDENCI).

As buildings on both locations have been built decades ago, accessibility for disabled persons is not ideal. But as OZARA d.o.o. is
a company for vocational rehabilitation, employment, social inclusion and training of disabled persons, the company constantly takes measures to improve current situation according to needs.

Actual findings of the group of students with a list of proposed improvements are presented in Table 12.

Table 12. Mobility at work - Summary of findings and proposed improvements

<table>
<thead>
<tr>
<th>Findings</th>
<th>Proposed improvements</th>
</tr>
</thead>
</table>
| Location 1 - MELJE:  
  - Two floor building  
  - The building is old and it’s not designed according to new construction legislation.  
  - The production services area is on the ground floor, accessible for wheelchair users by a ramp and a stair lift.  
  - The floor is in bad condition with irregularities and small level differences  
  - Door thresholds are a little bit too high, especially on the second floor.  
  - Transition areas are loaded with transportation pallets and cases with sharp edges  
  - The emergency area is not accessible for wheelchair users and others with heavy physical impairment. The stairway in the emergency area is too narrow.  
  - There are no toilets for the disabled on the second floor. | Location 1 - MELJE:  
  - Renovation of the floor due to irregularities and level differences.  
  - Defining minimum clearance gauge of the hallways in the production service area.  
  - Protection pads for sharp edges of pallets and cases.  
  - Improving identified discrepancies at the emergency exit area.  
  - Toilets for disabled on the second floor.  
  - Contrasting colours to be used in all areas and in all signs, info boards etc.  
  - Contrasting colours to be used to mark stairs on the stairway.  
  - Optimisation of the production process with reorganisation of some depositing areas and work places. |
| Location 2 - STUDENCI:  
  - Ground floor building  
  - The building is old and it’s not designed according to new construction legislation.  
  - Inappropriate parking  
  - The entrance to the building is narrow and has a high door threshold. Thresholds are not marked well enough.  
  - The floor is in a bad condition.  
  - In some areas there are very narrow hallways.  
  - There are no vertical or horizontal signs for blind and visually impaired or intellectually and mentally impaired. | Location 2 - STUDENCI:  
  - Parking area to be arranged.  
  - Renovation of the floor and door thresholds due to irregularities and level differences.  
  - Toilets for disabled to be arranged.  
  - Contrasting colours to be used in all areas and contrasting signs to be added etc. |

5.3. Discussion

Within the ERGO WORK project in Slovenia there were two Pilot projects implemented as a testing phase of newly developed teaching contents and a new approach in teaching students in a real business environment. In the two Pilot projects, namely PP1 and PP2 all together, approximately 22 students, 6 professors, 7 disabled employees and at least 5 non-disabled employees (mentors, HR or PM staff) were involved. The analysis undertaken by students with the support of mentors consisted of 1) Analysis and proposed improvements for an ergonomic work place design for disabled employees, 2) Ergonomic product design, 3) Psychosocial conditions at work, and 4) Mobility in the working environment for different disability groups, namely the physically impaired, blind and visually impaired, deaf and hard of hearing, intellectually and mentally impaired.

The results, presented in this article as a summary of students’ seminar papers in the form of ‘Findings and proposed improvements’ at the end of each section ‘Seminar paper’, are to say honestly stunning. Although the analysis was done in a disability, not a regular company, already employing approximately 50% of disabled persons and already integrating adaptations at work for their disabled employees, a serious of weaknesses were identified. Mostly there is a lack of adaptation and ergonomic design for the blind and visually impaired, as well as the deaf and hard of hearing, as there are only a few employees with these kinds of disability employed in the company. The reasons for the weaknesses were investigated further. More tangible arguments found are: 1) a lack of practical ergonomic and universal design knowledge in the company, 2) both companies analysed are based in a very old building, built in times when architects and designers were not very familiar with equality, accessibility, ergonomic and universal design principles, 3) the working process analysed is in one case a new working process, introduced in the company during the project’s life time and still needs lots of improvements to be integrated.

Although each of the analysed items/areas/processes could be analysed in more detail, we conclude that students have done a great
job. The findings and improvements have been presented to the MG members, summarised in a report, and introduced to the companies’ management. Not only, were the students involved in a real working environment and were faced with real working environment needs, they also gained a lot in understanding disability, disabled people, their needs, and especially their ability to contribute equally at work. Furthermore, HEI and companies’ staff had an opportunity to exchange knowledge and ideas for the present and future, and most importantly disabled employees gained more attention, more respect and an innovative opportunity to work in a team where everything was about their needs and abilities at work.
CHAPTER 6

ERGO WORK Pilot Projects in Poland

Marzena Wójcik-Augustyniak
Marek Szajczyk
Mariusz Cielemęcki

Pilot Projects implemented in the frame of ERGO WORK Project are small scale preliminary studies conducted in order to evaluate feasibility, time, costs and adverse events in an attempt to improve prior to performance, of a full-scale research project or regular study programme at a university.

There were four Pilot Projects implemented in four companies in Poland as a part of ERGO WORK Project, and they were a response to the following needs identified in the project:

- lack of cooperation between Higher Education Institutions (HEI) and Business (B) in Ergonomics in general and specifically for Persons with Disability (PWD);
- lack of specific contents, modules and approaches in addressing equal opportunities work place design for PWD in most Curricula Ergonomics + Lack of experts with specific knowledge in Ergonomics for PWD;
- lack of equal opportunities for PWD due to a) lack of ergonomic work places responding to PWD’s special needs, b) lack of awareness amongst employers about the potential work efficiency of PWD with adapted ergonomic work places.

The long-term objective of the project, aligned with Article 27 of the UN Convention on the Rights of PWD, was to set the foundation for a systematic sustainable cooperation between Academia and

65, 65 Siedlce University of Natural Sciences and Humanities, Poland
Business and all other relevant stakeholders in Ergonomics for PWD in order to foster Reasonable Accommodation at work. The projects followed the long term objective with Recommendations for system and policy making institutions including proposal for a long term cooperation between Academia and Business in order to ensure sustainable development of Ergonomics at HEI level and companies (employing or potentially employing) Persons with Disabilities.

Implementation of Pilot Projects was a key factor enabling development of the recommendations.

6.1. Introduction to the Pilot Projects in Poland

The aim of the Pilot Projects implemented in Poland was to conduct a study on reorganization of existing workplaces in Project Partners companies in a human friendly, ergonomic way, adapted also to the needs of Persons with Disabilities. Moreover two associated partners were invited for the project and also 2 analyses were made for two additional work places.

General characteristics of companies participating in the Pilot Projects in Poland

In the four Pilot Projects implemented in Poland there were four companies from Siedlce Region involved: Łuksja Sp z o.o.; the Medical and Diagnostic Center Ltd, ASAJ Sp. z o.o. and the Office of Technical Inspection (UDT).

PP3 - Łuksja Sp z o.o. is the company whose main activity is the production of highly processed ladies clothing. The company specializes in sewing outerwear. Among the company’s business partners are brands such as Burberry, Max Mara, Marc Aurel and Caterina. The company is a leading exporter in the region. The Company has the status of a sheltered workshop for the disabled. Current employment is 236 people, of which over 70% are Persons with Disabilities.

In Łuksja two workplaces were organized, one for an operator of a multi-ply spreading and cutting machine and the second one for the IT specialist. The choice of an additional workplace for analysis was created by a small range of possible re-organizational activities at the
workplace originally selected due to the fact that during the time of the project the company changed their location and moved to a new building which is ergonomically designed and meets the needs of persons with disability.

**Characteristic of the workplace:** a multi-ply spreading and cutting machine. Equipment on the workplace includes: machines (vertical cutters, tape cutters, gluing machines), a multi-ply spreading and cutting machine, cutting tables, shelves for storage of blanks, lay end-cutters of material layers. The CNC Cutter is a fully automated materials-cutting system in multilayer expenditures which, combined with specialized software creates an innovative and fully automated cutting room. The scope of work at the analysed workplace includes cutting or gluing items of clothing with the use of the machine and putting them away on a special mobile shelf. Processed materials are made of cotton, linen, wool, viscose, polyester and spandex.

Photo 4. A multi-ply spreading and cutting machine workplace – analysed workplace No 1
Source: Łuksja sp. z o.o.

**Characteristic of the workplace:** an IT specialist. Main responsibilities of the position, inter alia: administering computer network,
maintenance of computer hardware in motion, keeping records of software, ensuring the correctness of the internet and e-mail.

Photo 5. An IT specialist workplace – analysed workplace No 2, Source: Łuksja sp. z o.o.

**PP4 - Medical and Diagnostic Center Ltd.** is a Regional Leader in Ambulatory Medical Services in the districts of Siedlce, Mińsk and Łuków. Currently covers over 65 thousand patients in primary care, more than 10 thousand children within the medical care at schools, conducts 24 different specialist clinics. It has an extensive base of diagnostics accredited by the Ministry of Health, among others, analytical, ultrasound and electro-diagnostics laboratories, cardiovascular and central nervous system labs.

**Characteristic of the workplace:** call centre operator. Main goal: providing phone information and reservations. The scope of work at the analysed workplace includes handling incoming and sometimes outgoing calls (only in cases of cancer prevention programmes) Entering data quickly, informing patients about medical services availability and other important information, arranging patients visits (making reservations).
**PP5 - ASAJ Sp. z o.o.** is the largest network of electrical installation and lighting stores and warehousing in eastern and central Poland. Currently, the company has 21 subsidiaries and employs more than 300 people. Since 2003 Asaj is a member of an elite purchasing group ‘FEGIME’ - an organization of about 180 independent wholesalers in 12 European countries, and since 2013 a member of the BCC - a prestigious club of businesses and organizations of individual employers.

**Characteristic of the workplace:** Sales manager. Purpose of workplace: creation and implementation of trade policy of the Asaj company. The scope of work at the analysed workplace includes creating the commercial strategy of the Company, pricing and implementing trade policy, cocreating and coordinating the process of constructing the budget; supervising the implementation of the budget plans; analysing budgetary slippages and taking corrective action, shares responsibility with the Logistics Manager for the formation of new units and modernization of existing units, responsible for the
sales department personnel policy, shares responsibility with the Marketing Manager for action to support and intensify sales, responsible for the operational management of the subsidiaries, responsible for granting trade credit limits and vindication, responsible for developing procedures, regulations and instructions in the area of trade, responsible for the procurement of goods.

Photo 7. Workplace in ASAJ
Source: ASAJ Sp. z o.o.

PP6 - Office of Technical Inspection (UDT) is a state legal person acting in the field of technical equipment safety based on a number of legal acts. UDT continues over a hundred years of Polish technical inspection. UDT has 29 branch offices distributed throughout Poland. The technical Inspection Authority's mission is to ensure the safety of people, property and the environment through professional, efficient and socially responsible activities to prevent and eliminate the risks arising from the operation of technical equipment.

Characteristic of the workplace: An employee of the Administration Department – a multifunctional workplace on which training and administrative activities are carried out. The scope of work at the analysed workplace includes: conducting public procurement procedures, coordination of training for employees, organization of
training courses for customers, actions connected with environmental protection, keeping the warehouse of protective clothing and footwear, office articles, promotional materials, personal protective equipment, keeping records of employee leave; running the customer service office.

Photo 8. Workplace in UDT
Source: Office of Technical Inspection (UDT).

**General characteristics of Multidisciplinary Groups**

For implementation of the Pilot Projects in Poland, creation of two multidisciplinary groups was expected. In order to form multidisciplinary groups a recruitment and selection process was carried out. The recruitment process took place in October and November 2014. Students submitted application forms in which they motivated their decisions and presented rationale why they wanted to participate in the project. The recruitment was carried out among 1st year students of Management and Logistics.

As a result there were 16 application forms collected and as a second step interviews were carried out and 12 students were selected. Selection of students was done in November and December 2014 according to selection criteria defined within WP4. That enabled the creation of two Multidisciplinary groups for Pilot Projects in Poland. Moreover in each MG two employees and two PWD -
employed persons within the hosting SMEs participated. For each MG two Pilot Projects were assigned: For MG1: PP4 I PP5 and for MG2: PP5 I PP6. Figures 19 and 20 present the gender balance of students participating in the Pilot Projects.

![Figure 19. Gender balance of students participating in the Pilot Projects](image)

Source: Own analysis.

From data shown in Figures 19 and 20 it reveals that female students and students of Management were more interested in participating in the Project.

![Figure 20. Educational background of students participating in the Pilot Projects](image)

Source: Own analysis.
6.2.  **Work plan for the Pilot Projects in Poland**

The purpose of the Pilot Projects was to implement at least 2 Pilot Projects in Poland for the re-organisation of existing work places in a human friendly, ergonomic way, also adapted to PWD (within 2 partner and 2 non-partner companies.

The goal of the Pilot Projects was the acquisition of knowledge and skills related to ergonomics by students participating in Multidisciplinary groups, so that the students know how to apply the knowledge.

The Pilot Projects were oriented towards ‘workplace user-led adaptations’ rather as ‘providing solutions’. PPs sessions were also focusing on involving PWD and workers and in the process of work place adaptation and the teaching of inclusive design and an ergonomics approach.

The objective of the Pilot Projects was to carry out courses – 96 hours for Project Partner companies and 48 hours for associated partners which included theoretical and practical training for both multidisciplinary groups.

Resources provided for the implementation of PP by the University:

- financial budget – 8000 Euro;
- university personnel;
- consultants;
- buildings or rooms;
- access to library and the special resource centre;
- computer and Internet access;
- professors or other individuals who could help.

Constraints identified during the implementation of the Pilot Projects:

- the pre schedule of PP sessions was too crowded that is why the implementation of PPs took a longer time;
- lack of prepared teaching materials for the Pilot Project sessions
- organization of a means of transportations for students in order to participate in practical sessions;
- availability of employees in the Pilot Project companies.
6.3. Implementation of the Pilot Projects details

Teaching sessions

As a first step of the Pilot Project there were organized introductory workshops in December 2014. The Pilot Project sessions were planned as 96 hour workshops for PP3 and PP4 – Łuksja and CMD. 50% of sessions were planned as theoretical sessions and 50% practical sessions. For two associated partners the Pilot Project sessions were planned as 48 hours workshops for PP5 and PP6 – Asaj and UDT. 50% of sessions were pre-planned as theoretical sessions and 50% practical sessions. The first sessions took place in December 2014 and considered familiarization with the production processes and a preliminary description of the analysed workplace. Figure 21 and 22 present the number of sessions carried out by months and number of hours in the Pilot Projects.

According to data from Figure 21 it can be observed that in all the Pilot Projects more than 50% hours occurred at the University, and were theoretical. The percentage of theoretical and practical sessions varies from 29% to 42%.

![Theoretical and practical sessions in Pilot Projects (in hours)](image)

**Figure 21. The pilot Projects sessions, 2014/2015**

*Source: Own analysis.*
The data shown in Figure 22 reveals that the most intensive months for all the Pilot Projects were April and May. The session in June was focused on a seminar and preparing final reports of the Pilot Projects.

![Number of sessions for Pilot Projects](image)

Figure 22. The pilot Projects sessions, 2014/2015
Source: Own analysis.

**Teaching content**

As one of the main parts of the Pilot Project implementation the teaching content, prepared by members of ERGO WORK Group from Slovenia and Poland, was presented during the theoretical sessions. It included the following topics:

1. The role of Humans in Production Systems. The role of humans in production systems has been changed in modern conditions. Previously it was seen only as one of the factors of production, today the human has become a major strategic resource, the main achievement of a company in competition. This is due to the ability of human creativity and innovative spirit that is now becoming a major and crucial factor for the success of any business. In this regard, the costs associated with personnel, begin to be seen as long-term investments in human capital, which now is recognized as a major source of income. Therefore, the development of the staff potential of an organization becomes one of the key strategic
objectives that will ensure its strengthening of the competitive position. Sessions were focused on the theoretical perspective on human factors and ergonomics (HFE), defined as a unique and independent discipline that focuses on the nature of human-artefact interactions, viewed from the unified perspective of the science, engineering, design, technology and management of human-compatible systems. Such systems include a variety of natural and artificial products, processes and living environments.

2. Workload, Effort and Productivity - studying working activities, effort and productivity in different respects. Analysing cases when concrete or imaginary objects are converted into a product (service) as a result of working activities. This part of the study focused on decrements in performance of the specific task. The study of the manufacturing system, implicit and explicit conceptions in engineering of the role of production. Identification of the extent to which post-Taylorism principles of management apply.

3. Work System Human-Machine – sessions were focused on defining boundaries of the system in order for it to be possible to determine which activities take place within the system and which takes place in environment.

4. Working environment – sessions included eight topics: adaptation of architectural objects and workrooms; lighting and visual signalling; acoustics and audible signalling; physical load of the employee and spatial organization of the workplace; safety use of equipment and other technical devices; microclimate; work organization and psychological stress.

5. Ergonomic workplace design – anthropometry – sessions focused on the questions how the best compromise dimensions should be chosen for equipment to be employed by a range of users and at what point it should be concluded that adjustability is essential. For optimising decisions information on the anthropometric characteristic of the workplace user was needed. The sessions on Anthropometry included practical measurements.

6. Ergonomic workplace design – occupational safety – sessions were focused on approaches and solutions which foster a safe and healthy work environment, and issues concerning the protection of
co-workers, family members, employers, customers, and others who might be affected by the workplace environment. Moreover the sessions included some aspects on the prevention of hazards as well as the Legal basis of occupational health and safety. For the sessions on this subject there was a specialist engaged.

7. Work organization in accordance with ergonomic principles – sessions included basic information on: ergonomic principles for designing workplaces, machines, equipment and tools; ergonomic principles for work design in the workplace; ergonomic principles for timekeeping (breaks and exercise); ergonomic principles for working with materials and tools, ergonomic principles for designing working environments.

8. Introduction of disability categories – during the session the definitions of disability and a social model of disability were introduced, types of disabilities according to different classifications were presented to the students. Moreover statistics on disabilities and different scales used to assessing physical performance were discussed, for example: ADL (Activities of Daily Living), Berg Balance Scale; European Stroke Scale.

9. Integrating PWD into the workplace – background, socio-demographics and employability of PWD; tools and programmes through integration is supported by the state. The sessions also included issues on the Social inclusion of PWD: participation in organized community activities; community involvement of PWD when employment is not feasible; participation in social groups and/or volunteering; access to new opportunities and new skills; strengthened individual personal support and social networks.

10. Mobility of PWD – sessions included issues related to the rights of transport for passengers with reduced mobility; information on accessibility for passengers with reduced mobility; assistance for persons with reduced mobility.

Findings and improvements

As a result of the Pilot Projects reorganization improvements for five analysed workplaces were expected. Due to the fact that in three out of five workplaces there were employed Persons with Disabilities, findings and proposed improvements were developed for their
specific disabilities, all of them for persons with physical impairments. In the two other workplaces there were no employed Persons with Disabilities, so the improvements were proposed for different types of disabilities.

The summary of findings and proposed improvements are shown in Table 13.

Table 13. Ergonomic workplace reorganization – Summary of findings and proposed improvements

<table>
<thead>
<tr>
<th>Project Pilot</th>
<th>Workplace</th>
<th>Findings</th>
<th>Proposed improvements</th>
</tr>
</thead>
</table>
| PP3 (1)       | Multi-ply spreading and cutting machine | • too high worktable for persons with physical impairments,  
• too high place of visual screens, not possible to change the positions of the screens,  
• not available panels controlling the production line for persons on a wheelchair,  
• no visible transport road along the worktable,  
• no alarm button for help inside the toilets. | • installation of a mobile chair along a table,  
• lowering the visual screens and setting them at an angle corresponding to the line of sight of a person on a wheelchair,  
• the use of the panels controlling the production line in the form of portable tablet device;  
• marking with yellow horizontal lines along the worktable transport road.  
• installing the ‘HELP’ button with the lights outside the room toilet. |
| PP3 (2)       | IT specialist’s workplace | • too high and not appropriate table top,  
• the desk without slide-out shelf for keyboard and mouse,  
• not ergonomic chair (too small seat),  
• printer stands on the table – not accessible from the chair | • lowering the table top (or use a height-adjustable table) to the level of free access to the monitor and auxiliary equipment,  
• the use of slide-out shelves for keyboard and mouse,  
• replacing the chair for a more ergonomic one,  
• placing the printer off the table and setting it on the container within arms’ reach. |
| PP4           | Call centre position | • non-adjustable desk  
• insufficient number of regulations of the chair  
• inadequate legroom under the desk due to placing the station under the desk  
• lack of holder for crutches  
• lack of air conditioning  
• lack of designated parking spaces in front of the building  
• toilet unsuited to the needs of persons with disability | • installing an adjustable desk  
• changing the current chair for one that will have more regulations.  
• Changing the PC station for a modern one – with station integrated with monitor, including the installation of an adjustable monitor arm.  
• installation of holder for crutches  
• installation of air conditioning  
• designation and marking parking spaces for a person with disabilities  
• toilets should be equipped with handrails, adequate labelling and installation of the ‘HELP’ button with the signal lamp outside the toilet room. |
| PP5           | Sales manager position | • lack of designated parking spaces in front of administrative buildings  
• non-adjustable desk | • installing ergonomic height-adjustable tables for computers in windows, where computer stations are located there should be mounted verticals or curtains to protect against excessive light radiation |
<table>
<thead>
<tr>
<th>PP6</th>
<th>An employee of the Administration Department</th>
</tr>
</thead>
</table>
| • toilet unsuited to the needs of persons with disability  
• no alarm button for help inside the toilets. | falling on the monitor while working with your computer  
• designation and marking parking spaces for a person with disabilities  
• reconstruction of toilets: transforming the current two cabins into one that provides enough space for person moving on a wheelchair.  
• toilets should be equipped with handrails, adequate labelling and installation of the ‘HELP’ button with the signal lamp outside the toilet room |
| • lack of designated parking spaces in front of administrative buildings  
• toilet unsuited to the needs of Persons with Disabilities  
• non-adjustable tables  
• immobile furniture  
• no alarm button for help inside the toilets. | • installing ergonomic height-adjustable tables for computers  
• In windows, where computer stations are located there should be mounted verticals or curtains to protect against excessive light radiation falling on the monitor while working with your computer  
• designation and marking parking spaces for a person with disabilities  
• reconstruction of toilets: transforming the current two cabins into one that provides enough space for person moving on a wheelchair.  
• toilets should be equipped with handrails, adequate labelling and installation of the ‘HELP’ button with the signal lamp outside the toilet room  
• reconstruction of entrance stairway in a way as to allow the installation of a stair-climber.  
• installation of castors to the tables on which projectors stand, to enable That tables to be easily moved. |

Source: Materials developed by multidisciplinary groups MG1 and MG2.

### 6.4. The results of the Project

Participation in the Pilot Projects resulted in different kinds of benefits for all groups of participants: students, PWD, researchers and companies.

For Students – students were directly involved as active participants in the implementation of the Pilot Project. Together with professors and company staff they participated as members in Multidisciplinary groups (MGs). They were working almost 6 months in a working environment for the re-organisation of workplaces according to the needs of PWD. Students gained experience from their
collaboration in resolving real-business issues regarding PWD employment and work place design. During the Pilot Projects they prepared reports, and received a grade for their seminar work.

Students gained specific new knowledge, direct real-business environment experience, as well as references and a network of potential employers. As future experts with specific expertise in Ergonomics for PWD they are expected to receive more employment opportunities. Training sessions which were offered for students gave them in-depth instruction on planning and conducting an adaptation of different work places.

For Persons with Disabilities (PWD) Persons with Disabilities were involved in the project as a ‘study case’ within the implementation phase. They worked together with the MGs in order to provide them with enough information on their specific disability and their needs in working environments.

For each workplace where Persons with Disabilities were employed in, a set of parameters of re-organising the existing work place was developed and adapted to his or her needs, respecting ergonomic and universal design principles. PWD involved during the life time of the project will directly benefit in gaining the adapted working environment.

For researchers at the University in Siedlce – four researchers/professors from UPH were directly involved in the implementation of the Pilot Projects. They gained extensively from the knowledge exchange. Potentially interested HEIs with their staff will also be indirectly addressed through a series of dissemination and sustainability activities. Implementation of the Pilot Projects enabled the preparation of recommendations in incorporating inclusive design teaching into different specializations of study programmes, which is critical in the training of future managers capable of a ‘workplace user-led approach’.

For SMEs/Companies and Company staff - company staff was directly involved within the participating SMEs, hosting MGs for the Pilot Projects implementation. They acquired knowledge from the exchange, new ideas and approaches in product development, added value in the company’s production and/or services processes and new
solutions in designing PWD adapted work places. Within the dissemination and sustainability activities other companies were addressed in order to promote Ergonomics, Universal design and employing PWD as equal employees.

The four Pilot projects implemented in Poland within ERGO WORK Project were carried out as a testing phase of a new approach based on a new teaching content and innovative teaching methods. Two multidisciplinary groups which worked on the Pilot projects met the challenges of studying a new, multi-faceted issue which is ergonomic and universal design of a workplace and adaptation to the needs of person with disabilities. The teaching content taught in the classrooms was strongly related to practical sessions which took place in the companies, therefore a significant increase of specific knowledge was found but also an enhancement of overall knowledge among students. The user centred adaptation approaches applied during PP workshops, helped students appreciate worker-PWD capabilities, needs, and expectations. All the pilot projects were carried out as an interactive process and participants could provide feedback about the teaching content during all project sessions. As far as participating in the Pilot Projects was a voluntary initiative not related to the programme of study, it is difficult to say about increases in the scores of students. Consistent findings emerged across all the pilot projects suggested that teaching instructions were effective in meeting the project objectives – set of improvements proposed for 5 workplaces in four companies and the results were presented to the companies participating in the Pilot Projects.
CHAPTER 7

Recommendations to the system and policy makers on Ergonomic work places for Persons with Disabilities

Asel Kadyrbaeva$^{68}$

Inclusive employment is one of the main priorities set by the European Union’s Europe 2020 ten-year jobs and growth strategy. This target aims to boost inclusive growth by facilitating the participation of people of all ages and skill levels in the labour market. It is important to note that different people have different needs, but the needs of some groups are not always met in the employment sector. In order to avoid the social exclusion of such groups, it is important to take extra measures to accommodate their needs. The current article looks specifically into the ways in which the needs of workers with disabilities can be met in the context of workplace ergonomics.

If we take into account that all people are different, the need for individual ergonomic support in the work place becomes a necessity. Employees carry special ergonomic needs due to their disability, age or other specific personal conditions. The aging population and the increasing period of employment contribute to a growing number of employees with special needs, either with special visual, hearing, physical or other needs. A holistic ergonomic approach at companies supports these human factors and the increasing diversity of employees, and as such contributes to the economic efficiency of the company. It is recognized that ergonomic measures minimize absence from work (less injuries, less work related diseases), increase the

$^{68}$ European Association of Service Providers for Persons with Disabilities (EASPD).
attendance and the satisfaction and efficiency of employees. Taking all these into account, intensive campaigns focused on decision makers inside organisations/companies need to be promoted, supported and initiated.

Based on the findings of studies conducted as part of the European Union-funded ERGO WORK project, namely the deliverables ‘Recommendations for Multidisciplinary Curriculum Ergonomics’ and ‘Report on In-depth Analysis,’ as well as in-depth discussions with experts from the Standing Committees on Employment and Education of the European Association of Service Providers for Persons with Disabilities (EASPD), this article provides a list of recommendations to system and policy makers on improving workplace ergonomics for Persons with Disabilities (PWD). The recommendations aim to furnish a contribution to the future development and innovation of the employment sector in the partner countries of the ERGO WORK project and in the European Union. In the debate about disability, quality of life should always be at the core of every decision regardless of the field. It is of the utmost importance to recognise that in the employment sector every person has different support needs and different goals in his or her life and individual choice should be fostered and respected as much as possible.

The chapter is structured in the following way: subchapter 7.1 provides an overview of the ERGO WORK project. The following subchapter lists the main findings of the in-depth analysis, conducted as part of the ERGO WORK project, of Ergonomics curricula at higher education institutions in 6 European countries in terms of the employment of PWD. Subchapter 7.3 explains the EU and Member State competences in terms of employment and job opportunities for PWD. Subchapter 7.4 elaborates on the key factors enabling equal employment opportunities and quality work environment for PWD and subchapter 7.5 provides recommendations for system and policy makers on the EU and national levels.
7.1. ERGO WORK Project overview

‘ERGO WORK – Joining academia and business for new opportunities in creating ERGOnomic WORK places’ is a European project launched in October 2013 under the Lifelong Learning Programme (Erasmus). It aims to improve the ergonomic design of jobs and workplaces for Persons with Disabilities. The project promotes knowledge, skills and ‘social cohesion’ in order to create reasonable accommodation at work for all employees, including (PWD). A total of 10 partners from six countries – Slovenia, Poland, the United Kingdom, Italy, Spain, and Belgium – are involved in ERGO WORK.

The project is founded on the view that the labour market can significantly benefit from greater inclusion of Persons with Disabilities. It maintains that the multidisciplinary field of Ergonomics can help and support inclusion through improved design and adaptation of the workplace to cater for diverse needs.

The long-term objective of the project is to set the foundation for a systematic sustainable cooperation between Academia and Business and all other relevant stakeholders in Ergonomics for Persons with Disabilities in order to foster Reasonable Accommodation at work. The project as a whole aims to update the existing Ergonomics teaching contents at partner universities, particularly in Poland and Slovenia.

As part of one of the project’s work packages, the partners developed the ‘Recommendations for Multidisciplinary Curriculum Ergonomics’ (ERGO WORK, 2014) based on a study entitled ‘In-depth Analysis of existing Curricula Ergonomics’ (ERGO WORK, 2015). The study produced important findings on the existing Curricula in partner countries in the field of Ergonomics and specifically showed how different study programmes, subjects, teaching contents, or modules address: a) Multidisciplinary issues – which disciplines are included or need to be; b) PWD needs – how well specific contents on ‘PWD adapted work place design’ are represented within the curriculum.
7.2. Key Findings of ERGO WORK in-depth analysis for improving Curricula Ergonomics

An in-depth analysis of Ergonomics curricula taught by 17 faculties from 13 higher education institutions from 6 countries (focusing on the UK, Slovenia and Poland) has revealed the following findings (ERGO WORK, 2015):

- Curricula for Ergonomics programmes need to include the following topics in order to accommodate the needs of PWD at work: inclusive design; empathetic methods of design; introduction to organizational behaviour; assistive technology knowledge; and accessible environments knowledge.
- Awareness should be raised among students of the various needs of PWD in general, rather than placing the focus on specific groups and their needs.
- Empathic skills are crucial in raising students’ awareness in relation to PWD. Empathic skills can be taught through practical work, for example, by using a wheelchair or glasses that simulate a disability. This way, students can empathise with the user experience and design accordingly.
- Teaching content about mental health needs, including stress, depression and schizophrenia, is rare in the curricula covered by the study. There is a need to include more knowledge on the aspect of mental disability in relation to workplace ergonomics for PWD.
- Workplace intervention in Ergonomics courses is not always related to the needs of PWD at the workplace. In theory, such needs are included in Ergonomics training, but the practical application is rare;
- Knowledge sharing in terms of the tools used by training programmes can improve the effectiveness of teachings.
- It is important to use the knowledge and practices developed within other disciplines, for example, organisational and occupational psychology. The needs of PWD at the workplace should not be covered only through the physical design of the
working environment. Adaptation can also be made in terms of scheduling, type of work, daily tasks, etc.

7.3. Inclusive employment in the European Union

As stated in Article 27 of the UN Convention on the Rights of Persons with Disabilities and the European Union’s 2020 Strategy, employment and job opportunities are a key priority for all Governments in Europe. Although mainly a policy area that belongs to the competence of Member States, it is also of importance to the European Union, which acts as coordinator, initiator and innovator.

While it is recognised that employment on the open labour market is the preferred option, it should also be acknowledged that many PWD are in other labour schemes for reasons depending on different support needs and/or because of a lack of adequate structures in the open labour market.

EU Member States have developed work and employment schemes according to their respective historical background of disability care. According to its specific framework, each Member State has developed its range of structures and programmes as well as its own definitions - hardly comparable as they imply different concepts.

For the reason on multi-level approach towards policy making in the area of employment for PWD, it is necessary to address decision-makers both on national and supranational levels. The current article provides separate sets of recommendations for targeting these groups.

7.4. Key factors enabling equal employment opportunities and quality work environment for Persons with Disabilities

Employment of Persons with Disabilities is important for inclusive growth and economic efficiency. The factors enabling equal employment for PWD have been summarized in the EASPD (2014) Employment Declaration. Therefore, it may be in the interest of the labour market to develop inclusive environments meeting the demands of persons with various support needs, ranging from low to high levels of assistance. All forms of employment can add value to
economic activity and should be equally valued according to their role in social, health and employment policies. In order to achieve this efficiency, job opportunities for Persons with Disabilities should address their individual needs and respect their abilities.

Another important point is that the rights of PWD should be equally protected. Regardless of physical or mental abilities, people’s free choice of work in a preferred environment needs to be respected. This freedom can be reached through the provision of reasonable accommodation and universal workplace design, which are crucial in providing real access to work and employment positions. Reasonable accommodation and workplace design concepts should be fully implemented in the labour market to allow PWD to have concrete chances to find and keep a job in the labour market. Support must be made available in all phases of working life (recruitment, retention and end of work).

Furthermore, it is important to note that inclusion of PWD in the employment sector may not be achieved only through the physical adaptation of the workplace. Not only tools and/or adaptations may be needed to perform job-tasks, but also the availability of human support and support services could overcome barriers faced in the working environment. Accessibility of the work place and accessible transport is the first step to enable admittance to the labour market. The second step is to raise awareness among employees and employers about the specific workplace-related needs of PWD.

In order to achieve these improvements in the access to employment for PWD, it is crucial to provide support to employers and help them create their own Corporate Social Responsibility plans and implement ergonomic workplaces. Therefore, cross-sectorial cooperation between all stakeholders working in the field of disability, ergonomics, workplace design and employment is essential to establish sound support frameworks and to identify and tackle any issue with an adequate response. Accessibility and universal design should be given a broad definition to cover all types of disability.

Apart from the direct implementation of ergonomic solutions at the workplace, more attention needs to be paid to vocational education and training (VET). VET programmes should be adapted to the needs
of Persons with Disabilities; Persons with Disabilities should be involved and trained as educators when and where possible.

The concepts of reasonable accommodation, workplace design and ergonomics should be part of the curricula in VET and higher education for students in different fields of study such as Psychology, Engineering and Occupational Health.

New learning methods, teaching methods and contents about Ergonomics should be made available and mainstreamed in VET and higher education. Cooperation between educational institutes is crucial.

7.5. Recommendations

As mentioned earlier, employment-related policies are under the competences of Member States in the European Union. Therefore, it is important to provide recommendations to the system and policy makers on both European and national levels. The following sections of this chapter address both of these levels.

Recommendations to the European Commission

Inclusion of PWD in the open labour market is a high-priority objective for Europe. Addressing the special needs of disabled employees through tailored ergonomic solutions and workplace adjustments is one of the ways in which this objective can be achieved. Therefore, the European Commission (EC) and the European Parliament need to take the lead in stimulating fully inclusive employment conditions by Member States. With reference to the EASPD Thessaloniki Declaration (2009), the following set of recommendations for the European institutions has been developed.

- The institutions should promote the development of employment opportunities for PWD in the framework of the European Employment Directive and the European social dialogue.
- The institutions should extend the spectrum of employment opportunities for PWD in terms of Public Procurement. The European Social Fund and the opportunities given by the General Block Exemption Regulation can also be used to develop ergonomic
working environments for PWD. Furthermore, the European Commission should encourage Member States to use structural funds for developing fully inclusive workplaces.

- The institutions need to encourage better European collaboration and transfer of knowledge and practices in the field of ergonomics and workplace adjustment for PWD. It is crucial to identify and promote models of good practice with regard to policies and approaches providing adapted workplaces and workplace design.

- A further development of a European Network in the field of workplace ergonomics for PWD is an important element for strengthening collaboration among European countries. Hence, a stakeholder network that focuses on structural relations between stakeholders at local, regional, national and European levels needs to be further developed and financed. At the EU level, the network would ideally include, in addition to political authorities, service providers, academia representatives, workplace design and ergonomic developers, and employers.

- It is further recommended to foster the development of professionals specialized in ergonomic solutions for PWD. Specifically, it is crucial to promote multidisciplinary ergonomics curricula in universities, with the focus on inclusive, accessible and universal design. Specialists with specific knowledge in the fields of ergonomics and workplace design for PWD are essential for creating adapted working environments.

- The Erasmus+ programme should tackle the promotion and the development of training opportunities for ergonomics specialists focused on the needs of PWD. It should support the accessibility of training concerning workplace adjustments for people with all types of disabilities.

- The full potential of the ‘flexicurity approach’ – flexible employment schemes – should be used and promoted. This approach aims at tailor-made job opportunities addressing the needs and abilities of PWD while providing them with the necessary security, including flexible social protection schemes.

- Instruments to collect accurate and comparable data on employment and on the situation of PWD in employment must be
developed. Close cooperation with Eurostat is needed, and closer collaboration with researchers and the academic world should be put in place, especially regarding Ergonomics. Data collection should add value for employers when implementing ergonomic workplaces. The data should be used to influence employers and to raise awareness.

- In order to have a clear overview of the needs of PWD in terms of employment, it is crucial to involve representatives of the disability sector and the academic world in political consultations on relevant topics. The European Commission needs to consider the impact of any European policy on related schemes for people with disability.

**Recommendations to the national authorities in the piloting countries**

While the European Union recognized employment and social policy as a priority sphere, the area remains in the competence of Member States. Therefore, the issue of inclusion of PWD in employment also needs to be addressed at national level. Following is a set of recommendations for the national authorities in piloting countries.

- In order to ensure and protect the rights of Persons with Disabilities, a legal framework is always fundamental. Therefore, the partnership recommends that the Member States promote a legal framework guaranteeing adapted and fully accessible workplaces of high quality.

- It is also necessary to raise awareness among employers, able-bodied employees and the public in general about the specific needs of PWD. Improvements need to be made in terms of information and the overall culture at workplaces. Employers need to be aware of their obligations and of different types of disabilities that require greater tailoring of workplace adaptation. General awareness of the topics of ergonomic design, universal design, inclusive design and accessible design needs to be raised through the involvement of experts and training.

- In addition, better information is also needed for disabled employees. They need to be conscious of their rights, of EU
provisions for meeting their needs, and of what adaptations are possible to facilitate them. It would be useful to launch a campaign targeting their associations in order to spread this type of information.

- Furthermore, more research needs to be done into assistive technology and accessible environment solutions, as well as into the specific needs of disabled people, particularly in areas often neglected in workplace design. These include mental health needs and intellectual disability. In addition, better knowledge is imperative about adaptations that go beyond purely physical adaptations to buildings. There is more scope for modifications to individual work areas, furniture, environment, IT equipment, software, and attitude training, to allow PWD to do jobs without the need for changes in role, hours or pacing.

- Policies based on ‘career thinking’ as a precondition for sustainable employment should be developed, because employment is not only about finding a job. It is essential to build up a new Life-long Learning strategy as a very important step forward, including adapted work places and workplace design strategies. Sustainable and inclusive employment is only possible when Life-long Learning is organised and implemented in such a way that Persons with Disabilities can benefit from it.

- Sustainable employment of Persons with Disabilities needs to be facilitated by providing incentives for employers to hire disabled people, and to cover the costs linked to adjusting the work place. Pilot countries should also provide information to employers about the possibilities to receive subsidies to make adaptations.

- National authorities should also promote the establishment of (supported employment) agencies that assist employers in adapting the work place, coaching, job design, job creation and all other services required to support Persons with Disabilities in employment. In addition, the Member States should provide financial means for supported employment schemes to enable them to exchange models of good practice in order to fulfil their role as a bridge between labour demand and supply. It is also necessary to
note that better publicity is needed for organizations working with PWD.

- Employment and career prospects for Persons with Disabilities in the labour market could clearly be improved by opening up the public sector at local, regional and national levels. The public sector needs to set an example by providing adapted and accessible work places for PWD. A specialised agency might be needed to help public employers introduce disability-friendly solutions in workplace design.

- To achieve these goals, the Member States should include in their Action Plans measures to combat discrimination and social exclusion. Plans with clear targets should be set and achieved on the reduction of unemployment rates and the increase of employment rates of Persons with Disabilities through improvement in workplace design and adaptation.

The inclusion of PWD in the labour market is not possible without insuring their ability to physically access their working places. The working environment needs to be adapted to meet their specific needs and facilitate their day-to-day operations. Ergonomic solutions at the workplace can not only ensure equal opportunities for people regardless of their abilities, but also improve the economic efficiency of companies. It is clear that universal design at the workplace that provides these equal opportunities is beneficial from many points of view. However, to achieve inclusive employment opportunities it is crucial to provide specific training to students studying workplace ergonomics. Specialized training that focuses on the needs of PWD should provide comprehensive knowledge of the topic area. For this reason, it is important that decision makers at both European and national levels take the recommendations presented in this chapter for future policy actions.
CHAPTER 8

Adaptation of the
Centrum Medyczno-Diagnostyczne Sp. z o.o.
Outpatient Clinic to the needs of
Persons with Disabilities

Martyna Chudzicka\textsuperscript{69}
Tomasz Włodarczyk\textsuperscript{70}

8.1. Centrum Medyczno-Diagnostyczne – background

The Centrum Medyczno-Diagnostyczne Sp. z o.o. (CMD) company was established in 1998. It has been offering medical services for 17 years now. It has 24 branches across six counties: siedlecki, miński, łykowski, sokołowski, garwoliński and ostrowski. The area of CMD operations in the Mazowieckie and Lubelskie Provinces is displayed in Figure 23.

Figure 23. Area of CMD operations
Source: Own research.

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\textsuperscript{70} Tomasz Włodarczyk, Centrum Medyczno-Diagnostyczne, ul. Niklowa 9, 08-110 Siedlce, tel. + 48 517 203 717, e-mail: tomasz.wlodarczyk@centrum.med.pl

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Table 14 presents all health centres in which CMD conducts its activities.

Table 14. CMD branches

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<thead>
<tr>
<th>SIEDLECKI COUNTY</th>
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<tbody>
<tr>
<td><strong>Siedlce City</strong></td>
<td><strong>Wodynie Commune</strong></td>
<td><strong>Paprotnia Commune</strong></td>
<td><strong>Domanice Commune</strong></td>
</tr>
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<td>Serocznyn</td>
<td>Hołubla</td>
<td>Domanice</td>
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<td>Oleśnica</td>
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<td></td>
<td>Zakład Opiekuńczo-</td>
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<td>-Leczniczy w Oleśnicy</td>
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<td><strong>Latowicz Commune</strong></td>
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<td>Latowicz</td>
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<tr>
<td>ul. Spółdzielcza 8</td>
<td>Wielgolas</td>
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<tr>
<td>ul. Olsztyńska 2</td>
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<tbody>
<tr>
<td><strong>Łuków City</strong></td>
<td><strong>Łuków Commune</strong></td>
</tr>
<tr>
<td>ul. Międzyrzecka 41</td>
<td>Aleksandrów</td>
</tr>
</tbody>
</table>

| Sokolowski County |  |
| Bielany Commune | **Ceranów Commune** |
| Bielany | Ceranów |
| Rozbity Kamień | |

| Garwoliński County |  |
| Garwolin City |  |
| ul. Korczaka 35/3 | |

| Ostrowski County |  |
| Nur Commune |  |
| ul. Drohiczyńska 8 | |

Source: Own research.

CMD provides care for 64,000 patients (as of 30 April 2015), including 55,000 patients in the Mazowieckie and 9,000 in the Lubelskie Provinces. The main scope of CMD activities is provision of health care services contracted and financed by Narodowy Fundusz Zdrowia (National Health Service). In addition, CMD offers paid services to companies and individuals.
The company's activity is most of all Primary Care, whereby medical services are provided by doctors, nurses and midwives. They include, amongst other things, the following: access to general practice, home visits, health check-ups, vaccination, surgical interventions, treatment, prevention, nurse family visits, and appointments as part of antenatal education. Furthermore, under Primary Care we carry out preventive screening programmes (breast and cervical cancer prevention, cardiovascular disease prevention).

What is more, the Company provides access to a number of consultants in Specialist Outpatient Care, who offer consultations, diagnostic services, and interventions.

Proof of the competitive advantage and high quality medical services provided by CMD are achievements in the field of preventive screening programmes CMD operates.

They involve the following tests and examinations:
- cervical screening test (aimed at women aged 25 to 59 who had the test performed more than three years before);
- screening mammography (aimed at women aged 50 to 69 who had the test performed more than two years before);
- cardiovascular disease preventive screening (aimed at patients aged 35, 40, 45, 50 and 55).

CMD has developed mechanisms (such as creating an operational planning model and preventive screening programme management) which allows for the realisation of preventive screening tests in the covered population at a level significantly above the state average, and at the same time equal in the quality of conducted tests to Scandinavian countries, referred to as exemplary in conducting analogous preventive programmes.

Performance of preventive medical tests in CMD patients of the Provincial Mazowiecki and Lubelski NFZ Branches since implementation of the preventive screening model are presented in Tables 15 and 16 against the average values for the Mazowieckie Province and all-Poland.
Statistics indicate that the implementation of an original operational prevention model in addition to high employee involvement in preventive tests performance has been successful. Test performance in CMD population is at a much higher level than the provincial and all-Poland average. One characteristic feature of CMD activities is great concern with preventive tests in rural areas. Communes, in which one of the CMD branches operates, rate highest in preventive screening performance indicators.

Another distinctive feature of CMD is special care provided to patients with cardiovascular diseases (CVD). CVD patients account for ca. 17.6% of the population covered with primary care in CMD.
branches. Aiming at reducing CVD incidence, morbidity and mortality rates in the covered population, CMD designed and effectively implemented a CVD patient care project. As a consequence, CVD care is extended to about 90% of all eligible patients.

Table 17. Preventive screening performance in communes where a CMD branch provides healthcare services (as of 1 April 2015)

<table>
<thead>
<tr>
<th>Commune</th>
<th>Cervical Screening Test</th>
<th>Mammography</th>
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<tbody>
<tr>
<td>Paprotnia</td>
<td>56.28%</td>
<td>61.05%</td>
</tr>
<tr>
<td>Wodynie</td>
<td>57.80%</td>
<td>65.14%</td>
</tr>
<tr>
<td>Domanice</td>
<td>50.33%</td>
<td>58.24%</td>
</tr>
<tr>
<td>Latowicz</td>
<td>53.28%</td>
<td>49.84%</td>
</tr>
<tr>
<td>Bielany</td>
<td>53.83%</td>
<td>48.83%</td>
</tr>
<tr>
<td>Ceranów</td>
<td>49.89%</td>
<td>59.93%</td>
</tr>
<tr>
<td><strong>Average For Poland</strong></td>
<td><strong>21.70%</strong></td>
<td><strong>43.51%</strong></td>
</tr>
</tbody>
</table>

Source: Own research based on SIMP data.

Moreover, the Company runs the Residential Medical Care Facility (Zakład Opiekuńczo-Leczniczy, ZOZ) in Oleśnica. The objective of the ZOL is to provide 24-hour care to patients requiring hospitalisation, whose health condition does not allow for a home stay, to improve patient health condition, to prevent disease- and hospitalisation-related complications, to reduce effects of physical impairments, and to prepare patients for social and family life. CMD also runs its own laboratory with a complete range of analytical tests and X-ray/mammography rooms.

We should underscore CMD collaboration with leading hospitals, research hospitals and clinics in Poland (The Institute of Cardiology in Warsaw, Children’s Memorial Health Institute in Warsaw). We are also cooperating with the Medical University of Warsaw, the Pomeranian Medical University, the Jan Kochanowski University in Kielce and the University of Natural Sciences and Humanities in Siedlce.

CMD has been applying the strategy of sustainable development – both in the meaning of the type of services it offers, the population covered with its medical services, and in terms of geographical
expansion – ever since it was established. The strategy continues to be the main indicator for other company trends development.

On the one hand, the company’s target is to increase its potential in rural areas; on the other hand, so as to guarantee sustainable development, CDM starts up and redevelops currently existing rural facilities.

Our priority when designing new locations and adopting already existing facilities is to account for the needs of Persons with Disabilities (PWD). We implement ergonomic solutions for CMD disabled employees and disabled patients. The solutions we use concern removal of all architectural barriers, creation of employment opportunities for PWD and unlimited access to medical services to PWD. When erecting or adapting buildings to the needs of disabled employees and patients, the matter of overriding importance for CMD is to create an ergonomic, PWD-friendly environment.

CMD employs 19 disabled persons. Thanks to PWD-profiled ergonomic solutions, CMD can increase employment opportunities for Persons with Disabilities and effectively train them for work. Participation in the ERGO WORK project has contributed to an increase in the level of coordination and management of the implementation of the above solutions. A survey conducted amongst our employees showed high awareness in terms of PWD needs. Respondents indicated some specific needs and issues that require changes with regards to inclusive workplaces.

8.2. Inclusive workplace and building design

The primary issue associated with the implementation of disabled employee - and disabled patient - friendly solutions is to adapt specific solutions when designing or adapting a medical facility to eliminate any architectural barriers.

The obligation to apply such solutions is provided for by the law, for instance:
- Construction Law Act of 7 July 1994 (Ustawa z dnia 7 lipca 1994 r. - Prawo budowlane) (Dz.U. 1994 no. 89 Item 414);
• Regulation of the Minister for Infrastructure on technical conditions to which buildings and their location should conform, of 12 April 2002 (Rozporządzenia Ministra Infrastruktury z dnia 12 kwietnia 2002 r. w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie) (Dz.U. 2002 no. 75 Item 690);

• Regulation of the Minister for Health on detailed requirements to which rooms and equipment of any entity providing medical services should conform, of 26 June 2012 (Rozporządzenia Ministra Zdrowia z dnia 26 czerwca 2012 r. w sprawie szczegółowych wymagań, jakim powinny odpowiadać pomieszczenia i urządzenia podmiotu wykonującego działalność leczniczą) (Dz.U. 2012 Item 739).

The following standards may also be of assistance:

• PN-Z-80101:2007 Accessibility Of Objects and Devices For Disabled People - Signs Of Public Information (Dostępność obiektów i urządzeń dla osób niepełnosprawnych. Znaki informacji publicznej);

• PN-EN ISO 7731:2009 Ergonomics - Danger Signals For Public And Work Areas - Auditory Danger Signals (Ergonomia – Sygnały bezpieczeństwa dla obszarów publicznych i obszarów pracy – Dźwiękowe sygnały bezpieczeństwa);

• PN-92/N-01256-02 Safety signs – Evacuation (Znaki bezpieczeństwa. Ewakuacja).

The above regulations are applied when erecting and equipping public use buildings, workplaces and external devices aimed at facilitating access to buildings. Buildings should be accessible to all on an equal basis. Therefore, much attention is paid nowadays to the idea of inclusive design and adaptation of already existing buildings so that people with various types of disabilities can use them in a way that able-bodied individuals do.

The main architectural problems included in the above provisions relate mainly to the following areas:

• manoeuvring space, with particular concern over the needs of wheelchair-users in different parts of buildings;

• routes (amongst other things, traffic routes and their width, accessibility, lifts, ramps and stairs);
- sanitary rooms;
- workstation adaptation.

Manoeuvring space areas are located in various parts of the building. Their adequate distribution determines the ability to move around using a wheelchair. A standard manoeuvring space is determined by a minimum area required by a wheelchair-user to turn around. The size of the area is between 0.9 and 1.80 m and may overlap in all parts of the building except for the lift doors. To allow one to turn around in every room, the area needs to be at least 1.50 x 1.50 m.\(^{71}\) Figure 24 shows the minimum space required for turning around and its location in a demonstration diagonal entry space.

It is vital to give one an opportunity to turn around in every room. Such space ought to be created, for example, on the landing, at both ends of a ramp for PWD, in passageways, or in halls by main entrances. These regulations pertain to, in particular, the manoeuvring space in front of medical equipment (such as an exam table or a bathtub). They are also applied in sanitary rooms.

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Routes connecting to other rooms and parts of the building should account for the special needs of disabled persons. In order to ensure unrestricted movement to PWD, ramps may be used at various levels. The maximum grade of the slope for wheelchair users and other PWD should not be more than:

- 15%, when the ramp is up to 0.15 m high;
- 8% (non-roofed outdoor ramps), 10% (indoor ramps or roofed outdoor ramps), when the ramp is up to 0.5 m high;
- 6% and 8% respectively, when the ramp is more than 0.5 m high;
- any ramps more than 9 m long should be divided into shorter sections with minimum 1.4 m long landings.\(^\text{72}\)

Figure 25 represents a diagram of a demonstration ramp with manoeuvring space.

Figure 25. Diagram of a ramp and maneuvering space
Source: K. Kowalski, *Projektowanie bez barier - wytyczne*, p. 13:

Adequate handrails design and finishing (distance between handrails should be between 1.0 and 1.1 m) is another important issue.

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\(^{72}\) Rozporządzenie Ministra Infrastruktury z dnia 12 kwietnia 2002 r. w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie (Dz.U. 2002 no. 75 Item 690).
Double handrails should be fixed at the level of 0.75 m and 0.9 m from the movement surface. In the case of handrails on stairs and ramps, they should be fixed a minimum 0.05 m away from the walls. When designing traffic routes, one should also consider removal of any thresholds and a doorway that is at least 0.9 m wide.

Sanitary rooms should include a minimum one toilet for the disabled. The height of the seat must be between 45 and 50 cm. In addition, a sanitary room must provide adequate manoeuvring space at the washbasin and the toilet bowl. The doors may not open inwards. A demonstration layout of a sanitary room with adequate manoeuvring space and equipment is presented in Figure 26.

![Figure 26. Layout and fittings of a demonstration sanitary room](http://www.niepelnosprawni.pl/files/www.niepelnosprawni.pl/public/rozne_pliki/projektowanieBB21.pdf (14.05.2015)).

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Above, we have presented the main aspects of architectural design. In addition to those already mentioned, there is a number of other issues, such as placing switches at 0.8-1.1 m height, placing the reception desk at an appropriate height, adequate land development outside the building (e.g. specifically marked off and well-marked parking space for a disabled person, separated and easy route connecting to the building, lack of kerbs and other architectural barriers on the way to the building, adequate finishing materials, adequate lighting).

All of the discussed aspects are crucial to new outpatient clinic design and adaptation of already existing buildings. However, we may not forget that even the most perfect standards and legal regulations, setting forth detailed requirements for improvements related to disabled persons, will not substitute a holistic approach in creating an environment that is, most of all, CMD employee- and patient-friendly.

Another important issue is industrial safety law binding in Poland. Industrial safety (in Polish: bezpieczeństwo i higiena pracy) is regulated by the following provisions: Regulation of the Minister for Labour and Social Policy on general provisions of industrial safety of 27 September 1997 (Rozporządzenie Ministra Pracy i Polityki Socjalnej z dnia 27 września 1997 r. w sprawie ogólnych przepisów bezpieczeństwa i higieny pracy) (Dz.U. of 2003 No. 169, Item 1650, of 2007 No. 49, Item 330, of 2008 No. 108, Item 690).

The regulation determines, amongst other things, the organisation of workstations, the operation and use of machines, tools and other technical devices, in-company transportation and storage, noise protection standards, standards for providing sanitary rooms and facilities, or the provision of drinks and personal hygiene products for employees.

In addition to the general guidelines concerning the workplace, Article 48 of the Regulation sets forth that any employer employing disabled persons should make any necessary improvements in the workplace to address their needs and abilities resulting from reduced fitness.
Legal provisions regarding employment of disabled persons may also be found in the Professional and Social Rehabilitation and Employment of the Disabled Act of 27 August 1997 (Ustawa z dnia 27 sierpnia 1997 r. o rehabilitacji zawodowej i społecznej oraz zatrudnianiu osób niepełnosprawnych (consolidated version: Dz.U. of 2010 No. 214, Item 1407). Article 4(5) refers only to moderately or severely disabled people employed on the mainstream market, i.e. outside vocational development centres and sheltered employment establishments. It further stipulates that the fact that a person is considered moderately or severely disabled does not prevent his/her employment in a non-sheltered workplace, provided that: an employer adapts a given workstation to the needs of the disabled person or employs a PWD in a form of telework.

Thus, under the binding Polish law, unless a disabled person requires a workstation, his/her employment without adaptation is possible.

Disabled CMD employees are entitled to special employee benefits, depending on the degree of disability. They mainly include:

- shorter working time (for moderately and severely disabled – 7 hours/day and 35 hours/week);
- an additional break (15 minutes);
- additional annual leave (for moderately and severely disabled).

As a consequence of providing employment to an adequate number of disabled employees, any adaptations of workstation or additional entitlements are subsidised every month by the National Fund for the Rehabilitation of Disabled Persons (Państwowy Fundusz Rehabilitacji Osób Niepełnosprawnych, PFRON).

The overview of legal matters related to PWD employment should be supplemented with the provisions of the Regulation of the Minister for Economy, Labour and Social Policy on Disability Evaluation and Disability Levels of 15 July 2003 (Rozporządzenie Ministra Gospodarki, Pracy i Polityki Społecznej z dnia 15 lipca 2003 r. w sprawie orzekania o niepełnosprawności i stopniu niepełnosprawności) (consolidated version Dz.U. 2003 no. 139 Item 1328), where § 32(1) lists all possible impairments and (2) – their respective symbols (e.g. 01 U – intellectual
disability, 02 P – mental disorders, 04 O – eye disorders, 05 R – mobility impairment). Symbols laid down in the Regulation indicate any contraindications to work. For instance, a disabled person with an eye disorder should not perform any work that requires distance evaluation or eyesight precision. Additionally, s/he should not work at heights, drive or operate machinery of high voltage.

In view of the above, the Polish legislature does not provide for detailed requirements regarding a PWD workplace tailored to specific needs. As a result, employers often have concerns about employing a disabled person, mainly because of a lack of knowledge regarding workplace adaptation. The situation presented above has been identified also by PFRON and the Central Institute for Labour Protection - the National Research Institute (Centralny Instytut Ochrony Pracy – Państwowy Instytut Badawczy, CIOP-PIB), which in 2014 - under academic editing of dr hab. inż. Wiktor M. Zawieska developed general guidelines regarding building and room design and workstation adaptation to the specific needs of the disabled.

8.3. Adaptation of branches to the needs of disabled persons

CMD is a dynamically developing company that year by year increases the number of its branches, and thus, employment opportunities (also for disabled workers).

We develop our network of branches both through erecting new buildings or finishing new rooms, and by adapting pre-existing buildings and rooms.

Old buildings in which the company opens its new branches frequently prevent implementation of all improvements needed by disabled persons, including the elderly. In some cases they require complete, costly refurbishments. On the other hand, whenever a new branch is built up from scratch, CMD can attend to the varied needs of

patients and employees at project design, which allows inclusion of all employees, irrespective of the type and level of disability.

Below you will find an analysis of the adaptation of already existing buildings to the needs of disabled persons and of a new building developed with the above needs in mind.

The first example is the Health Outpatient Clinic in Bielany (Przychodnia Zdrowia w Bielanach) (a rural centre). The clinic had been run by another medical entity prior to its acquisition by CMD. The building in which the activity is conducted is leased from the Bielany Community. Originally it was not adapted to the needs of disabled patients and employees. The building was erected in the late 60s according to a standard project which allocated utility rooms, a laundry room, and storage on the first storey. Doctor's surgeries, treatment rooms and a dispensary were located on the first floor. The project did not provide access for disabled persons to the first floor. As part of the Health Clinic takeover, the Company Management Board pledged to renovate the building and adapt it to the needs of disabled persons.

Below, photos are presented of the Health Clinic in Bielany after adaptation.

In photo 9 we can see a platform bought and installed by CMD, fitted for the purpose of adapting the workplace to the needs of disabled persons and patients. Before the renovation, no physically handicapped person could access the building unassisted.

Photo 9. Platform for the disabled
Source: Own research.
Another barrier to disabled employees and patients was a very small bathroom which impeded free movement and prevented PWD access. Therefore, as part of the adaptation project, we refurbished the bathroom and adapted it to the needs of the disabled. The manoeuvring space was preserved (1.5 m in width and depth) and the toilet bowl (upper part) was fitted at the height of 45-50 cm. The bathroom was fitted with adequate handrails. A washbasin without pedestal or cupboard was fitted at the height of 85 cm. In addition, a suitable tap was installed.

The Bielany clinic project includes suitable resting areas near traffic routes. The finishing materials used are non-glossy. The colours of the walls and floors are contrasting. Both solutions jointly facilitate movement and support the sense of direction to persons with sight dysfunctions. The finishing materials used for floors, stairs etc. guarantee stable support and are anti-skid. We spared no effort to situate all details in the communicating zones at the same level.
Storage areas are designed for a disabled person (employee, patient) to have everything at hand. Lighting was planned in accordance with the rule that the source of light should not be located behind the serving person. We also provided lighting enabling the deaf to lip read. We eliminated any unbalanced lighting in connecting rooms to prevent dazzling a person moving between them. What is more, we designed a specially adapted parking space.

To present the scale of all the necessary changes and improvements to suit the needs of disabled employees and patients, we will present the Nur Health Clinic. Initially, medical activities there were conducted by a different entity. The building is leased from the Nur Community. It is a building constructed in accordance with a project similar to the Bielany Clinic project. It was developed also in the late 60s. When CMD started its operations there, the only improvement to the building was an external ramp for people with physical disabilities.

As already mentioned, clinics taken over by the company often fail to be adapted to the needs of PWD. The building in Nur had no PWD improvements apart from the ramp. Adaptation of buildings according to the standards and regulations presented in subchapter 2 is often associated with thorough construction works, significant architectural modifications, and high costs. In photo 12 you can see a pre-existing bathroom in the Nur Clinic. It is now being renovated and adapted to the needs of the disabled.

As you can see in photo 12, the bathroom does not meet any of the criteria stipulated in subchapter 2. Therefore, it requires a complete refurbishment, including enlargement.

As part of the adaptation, construction works and finishing works will be performed pursuant to all standards and regulations presented in subchapter 2.
Photo 11. Ramp for the disabled persons
Source: Own research.

Photo 12. Pre-existing bathroom in the Nur Clinic
Source: Own research.
The issue of including disabled persons’ friendly solutions in the case of newly constructed buildings is much different. A new building of a CMD clinic is now under construction in Strachówka.

The Strachówka building is a one-storey detached building with direct access from the ground level (there is no need to add a ramp for disabled persons).

The construction of the clinic from the start allows one to include all guidelines and legal provisions regarding building adaptation and equipment necessary for disabled patients and employees already at the design stage.

In the case of the Strachówka clinic, the following aspects of PWD needs have been taken into consideration:

• design and development of a bathroom adapted to the needs of disabled persons (1.5 wide/deep manoeuvring space, adequate fittings). The inclusion of this aspect is displayed in Figure 27 A, the final effect - in Photo 13;
• direct access to the Clinic from an outer pavement (Figure 27 B and Photo 14); traffic routes inside the building are at one level and do not impede PWD movement;
• doctors’ surgeries and treatment rooms are designed to meet more than all and any requirements regarding the manoeuvring space and to guarantee comfort to disabled patients and employees (Figure 27 C);
• analogously to the Bielany Clinic, the surfaces are finished with non-glossy materials and in contrasting colours (floors, walls). The finishing materials used for floors, stairs etc. guarantee stable support and are anti-skid. The final effect is presented in Photo 15;
• proper lightning following the requirements and standards presented in subchapter 2 and implemented e.g. in the Bielany Clinic (see above);
• suitable storage areas.
As demonstrated in the photos below, CMD spares no effort to adapt the clinic to people with diverse needs.
Joining the ERGO WORK Project offered CMD new opportunities and a new outlook on the issue of the employment of disabled persons. During the project we created a job for a disabled person at a Call Centre: Directory Enquiries Operator. We employed a physically disabled person, initially without any improvements to the workstation. Next, we conducted a job role-related need analysis including the specificity of the disability in question on the basis of comments from the employed person, legal provisions, and standards.
The next step, when the project is ready and the needs are thoroughly analysed, will be to adapt the workstation to the requirements of the employed disabled person.

The provision of adequate working conditions in conformity with industrial health regulations, construction law, and many other legal articles presented here, on many occasions suffices to create a safe and efficient working environment tailored to the needs of disabled persons. Nevertheless, these requirements are general and minimum, and may not correspond to all types of disabilities. Therefore, it is crucial for the employer to pay more attention to specific needs of individual employees and to add suitable improvements to workstations. Additionally, we ought to remember that buildings and rooms must be suited not only to the needs of employees but also those of any other disable person (e.g. patients). What is more, it is essential to receive support from institutions caring for the disabled on a regular basis. It is their assistance that the employer counts on when creating a workstation for a disabled person, suited to his/her specific needs.

As can be seen from the example of CMD, it is possible to develop a system of adaptations allowing for the simultaneous inclusion of the needs of disabled employees and disabled patients (of various disability types). Despite high cost, such solutions are and will be implemented in every CMD branch. At the same time, we would like to underscore that an adaptation of a pre-existing building is a task far more complicated and costly. The CMD example further demonstrates that in many cases, in addition to the standards and regulations, one ought to include, most of all, the need to create an environment that is disabled employee- and disabled patient-friendly. Frequently, the achievement of said goal does not require any considerable financial outlays, but it is also not covered by standards and the law. First and foremost, one should consider the real needs of particular employees and create workstations which correspond to them.

The goal of CMD for the years to come will be the gradual adaptation of subsequent clinics to the needs of employees and patients with all types of disabilities, for at present the majority
of actions is limited to persons with physical disabilities. The company will also take all the necessary steps to adapt its clinics to the needs of blind and deaf patients and employees.
CHAPTER 9

Functional Capacity Evaluation of Persons with Disabilities for the labour market in the Pomeranian Competences Center

Katarzyna Jach

9.1. Functional Capacity Evaluation

Functional Capacity Evaluation (FCE) was defined originally by Abdel-Moty at al. in 1993 as ‘an assessment process that translates finding in physical, physiological and functional measures into performance potential for activities of daily living and work tasks’. According to a more contemporary definition, FCE is a systematic, comprehensive performance test used to determine the actual performance of activities of daily life, including work, on the basis of the physical capacity of an individual. FCE is provided supplementary to a medical examination. The purpose of FCE has also been defined as

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providing an objective measure of a patient’s safe functional abilities compared to the physical demands of work\textsuperscript{79}.

Functional Capacity Evaluations are used commonly to determine readiness for work or return to work\textsuperscript{80} as well as for impairment or disability rating, job task matching and occupational matching\textsuperscript{81}.

FCE has been recognized as a valid and reliable tool in making decisions regarding physical capacity, readiness to work, return to work, employment and rehabilitation needs all over the world\textsuperscript{82}. In some countries FCE is used for compensation and complaints measure\textsuperscript{83}. It is noticeable that for each client the consistency of FCE is checked. On the other side, the reliability of FCE depends significantly on qualification of persons providing the assessment\textsuperscript{84}. The Functional Capacity Evaluation can be provided by physicians, but usually it is made by physiology therapists (PT) or occupational therapists (OT) specialized in vocational rehabilitation. In order to be certain of a good standard of safety, reliability, validity, practicality and utility of FCE, some specific guidelines must be accepted\textsuperscript{85}. In the Pomeranian Competences Center the occupational therapist offers Functional


\textsuperscript{85}D.L. Hart, S.J. Isernhagen, L.N. Matheson, Guidelines for functional capacity..., op. cit.
Capacity Evaluation and ergonomic consulting. The Pomeranian Competences Center (Pomorski Ośrodek Kompetencji – POK) operates within the framework of the Voivodeship Labour Office in Gdańsk as an innovative test center.

9.2. Functional Capacity Evaluation and Persons with Disabilities

In the context of disability, the focus of functional capacity evaluation is finding the effect of the examinee's impairment on his or her ability to perform purposeful tasks\(^\text{86}\). This approach is consistent with AMA Guides to the Evaluation of Permanent Impairment, which distinguish impairment and disability. As impairment is ‘a loss, loss of use or derangement of any body part, organ system or organ function’ and disability is defined as ‘an alteration of an individual’s capacity to meet personal, social or occupational demands because of impairment’, the person with an impairment may or may not have a disability\(^\text{87}\), and a similar distinction was shown by Matheson\(^\text{88}\). Moreover, the presented approach.

The value of Functional Capacity Evaluation for nonworking populations, like handicapped, elderly and unemployed people were established\(^\text{89}\). However, the feasibility of providing full FCE for Persons with Disabilities (PWD) is often infinitesimal due to contraindications and precautions. For example, in Gross\(^\text{90}\) investigation of persons with chronic low back pain, few patients (4\%) only were found to pass all FCE tasks. Therefore, the modification of procedure or partial withdrawal of FCE tests is needed. As in the Pomeranian Competences Center the American FCE system called WorkWell has been applied, according to WorkWell instructions, in POK the second solution was implemented. One should notice that

\(^{86}\) W.T. Jahn, L.N. Cupon, J.H. Steinbaugh, Functional and work..., op. cit.
\(^{87}\) T. Mitchell, Utilization of the functional capacity..., op. cit.
\(^{90}\) D.P. Gross, M.C. Battié, J.D. Cassidy, The prognostic value of ..., op. cit.
generally in Functional Capacity Evaluation no distinction is made between healthy and disabled individuals, although during FCE diagnosis some differences can be observed.

It is worth noticing that the diagnosis of people with mental disabilities with FCE can be provided sometimes, also the results are not completely reliable. For example, Ratzon\textsuperscript{91} investigated Youth and Adolescents with Special Needs (YASN). Though most YASN are hired for blue collar jobs, the authors investigated basic job demands, like dynamic strength, hand strength and fine motor skills. Results showed slower and reduced performance among YASNs in comparison to healthy young adults, although not all differences were statistically significant. Moreover, no differences between both groups were found in the heart rate while performing FCE. According to the author’s personal experience, Dutch occupational therapists avoid accessing people with mental disabilities with the FCE protocol, unless it is not needed for specific job requirements. In such cases, only few FCE tests are provided, like manual dexterity tests or material handling tests only.

9.3. PWD in the Pomeranian Competences Center

The Pomeranian Competences Center (Pomorski Ośrodek Kompetencji – POK) operates within the framework of the Voivodeship Labour Office in Gdansk as an innovative test centre. Its main activity is the evaluation of the psychological competences and functional capacities of clients and giving them motivational, psychological and ergonomic advice. One of the main goals of POK is the activation of unemployed PWD on labour market. This is a serious problem in Poland, because the activity rate of PWD on labour market is about two times lower than the healthy (27,1\% vs 56,3\% at the end of 2014)\textsuperscript{92}. Detailed information about the functional capacity and ability

to manage the work demands given to individuals is supposed to be a good motivator to work.

As mentioned above, for Functional Capacity Evaluation in POK, the WorkWell system is used. The system is classified as a controlled actual simulation system\(^93\). That means that the system’s authors give detailed instructions to the test providers in terms of test operating and interpretation of results. Moreover, the tests are an actual simulation of physical demands according to the FCE classification made by Tramposh\(^94\). This allows for a relatively easy reliability and validity assessment\(^95\). According to WorkWell system procedures, no distinction between healthy and disabled people is made. Additionally, for functional capacity evaluation in POK, no distinction between Persons with Disabilities with or without an official statement of disability is made. Up to December 2014, 31 persons with an official statement of disability were tested in POK. Their basic characteristics are shown in Table 18.

It is noticeable that almost half of the tested cases are people with motor impairment, which is well above the percentage among PWD in Poland (16.7% in 2000\(^96\)). Additionally, 21 Persons with Disabilities without an official statement of disability were identified among all 105 analysed cases. The including criteria were: a feeling of strong pain (strong pain or excruciating pain), pain affecting physical activity or constant analgesic medicines ingestion reported by client, Spinal Function Sort questionnaire result at the level of 100 or below or the recommendation made by the occupational therapists. According to these criteria, 21 persons were identified. In most cases, few encompassing symptoms were shown simultaneously. As the result of the nature of functional capacity evaluation as well as the including criteria mentioned above, most found PWD are motor impaired (see Table 18). Classification Codes in tables 18 and 19 are presented

\(^93\) T. Jones, S. Kumar, Functional capacity evaluation of..., op. cit.
\(^95\) T. Jones, S. Kumar, Functional capacity evaluation of..., op. cit.
\(^96\) According to S. Kostrubiec, Osoby niepełnosprawne na..., op. cit.
according to Polish Classification of Disability\(^{97}\) made on the basis of The International Classification of Functioning, Disability and Health\(^{98}\).

Table 18. Disability classification of PWD in the Pomeranian Competences Center

<table>
<thead>
<tr>
<th>Disability Classification Code</th>
<th>Interpretation</th>
<th>Number of cases</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>With OSoD</td>
<td>Without OSoD*</td>
</tr>
<tr>
<td>02-P</td>
<td>mental health disorders</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>03-L</td>
<td>disorders of voice, speech, and hearing</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>04-O</td>
<td>eye diseases</td>
<td>4</td>
<td>1 (complex disability with 05-R)</td>
</tr>
<tr>
<td>05-R</td>
<td>motor impairment</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>06-E</td>
<td>epilepsy</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>07-S</td>
<td>respiratory and circulatory systems disorders</td>
<td>2 (complex disability with 05-R and 10-N)</td>
<td>2 (1 complex disability with 05-R)</td>
</tr>
<tr>
<td>08-T</td>
<td>disorders of the digestive system</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10-N</td>
<td>neurological disorders</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>11-I</td>
<td>others</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>31</td>
<td>21</td>
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</tbody>
</table>

OSoD – official statement of disability.
Source: *Classification on the basis of authors’ opinion.

As shown in Table 19, Persons with Disabilities with and without an official statement of disability were of similar age, but different gender. Among PWD without an official statement of disability, over three quarters were women. Most of the clients with an official statement of disability were at a minor or moderate degree of disability.

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\(^{97}\) Rehabilitation Act (Ustawa z dnia 27 sierpnia 1997 r. o rehabilitacji zawodowej i społecznej oraz zatrudnianiu osób niepełnosprawnych), 2011. The unitary text: Dz.U. 2011 nr 127 poz. 721.

Table 19. Basic characteristics of PWD in the Pomeranian Competences Center

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of cases</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With OSoD</td>
<td>Without OSoD</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>15</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>female</td>
<td>16</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Age [years]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>average</td>
<td>42,8</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>min</td>
<td>21</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>max</td>
<td>63</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>Degree of disability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>minor</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderate</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>significant</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OSoD – official statement of disability.
Source: Own research.

Further analysis was conducted in order to state if it is possible to provide the full FCE procedure with Persons with Disabilities according to the WorkWell system protocol. The very first screening is an interview with a client in order to eliminate contraindications, like i.e. acute pain or pregnancy. The second screening used in the Pomeranian Competences Center is a Physical Activity Readiness Questionnaire (PAR-Q). The questionnaire consists of 7 simple questions according to a prevailing health condition, especially focused on the cardiovascular state. If the PAR-Q result is poor, no FCE is provided. If the PAR-Q result is moderate, some tests are omitted. In some situations, additional restrictions are involved, like excluding or limiting material handling tasks. As Gross showed, performance on a single material handling test (the floor-to-waist lifting) was as predictive as the number of failed tasks in the entire Functional Capacity Evaluations protocol. Though, the elimination of material handling tasks from FCE can cause weaker results and not so strongly validated. Another reason for not omitting FCE tests is that some tests add consistency to the tested procedure and verify the results of previous tests.

---

100 D.P. Gross, M.C. Battie, J.D. Cassidy, The prognostic value of..., op. cit.
101 E. Roy, Functional capacity evaluations and..., op. cit.
The main elements of Functional Capacity Evaluation are shown in Table 20.

Table 20. Tests provided by PWD in the Pomeranian Competences Center

<table>
<thead>
<tr>
<th>Test name</th>
<th>Description</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>With OSoD</td>
</tr>
<tr>
<td>Preliminary tests</td>
<td>balance (4 different trials)</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Squats</td>
<td>27</td>
</tr>
<tr>
<td>Postures</td>
<td>Sitting</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Standing</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>overhead work</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>forward bend standing</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Crouching</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Kneeling</td>
<td>27</td>
</tr>
<tr>
<td>Hand</td>
<td>coordination - a set of three tests</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>hand grip strength</td>
<td>30</td>
</tr>
<tr>
<td>Activities</td>
<td>Walking</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>stairs climbing</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>static push and pull</td>
<td>27</td>
</tr>
<tr>
<td>Material handling</td>
<td>3 different test for lifting and carrying</td>
<td>18</td>
</tr>
<tr>
<td>Questionnaires</td>
<td>Spinal Function Sort expectable results (not reliable results in brackets)</td>
<td>19 (4)</td>
</tr>
<tr>
<td></td>
<td>Hand Function Sort expectable results (not reliable results in brackets)</td>
<td>29 (6)</td>
</tr>
<tr>
<td>Total number of tested persons</td>
<td></td>
<td>31</td>
</tr>
</tbody>
</table>

OSoD – official statement of disability.
Source: Own research.

The key information is the number of individuals among PWD, which were able to provide the test. If the test was broken down according to the procedures of FCE, the case was not excluded. If the test was substituted with another one (i.e. one leg kneeling instead of kneeling), the case was not excluded as well, because the FCE protocol allowed some tests exchange. It can be noticed that most tests were possible to perform by both groups of PWD. The only tests which were omitted for 46% of PWD with an official statement of disability were material handling tests.
9.4. Self-assessment of the Pomeranian Competences Center clients

A separate problem is self-assessment of the Pomeranian Competences Center clients. The self-assessment of functional capacities was checked by a questionnaire. The 19-item questionnaire focuses on functional abilities identified in accordance with a model of work content used by The Occupational Information Network (O*NET) developed under the sponsorship of the United States Department of Labour. It was created to check the consistency of client self-assessment with the assessment made by occupational therapists (OT) as well as objective results of Functional Capacity Evaluation tests. The same questionnaire was fulfilled by the client at the very beginning of FCE and by the occupational therapists, usually after FCE. The functional capacities were assessed by a 7-point scale. It was assumed that if the difference between the self-assessment and OT assessment was smaller than 0.5 point, the results were consistent. If the self-assessment was 0.5 point or higher than the OT assessment, the elevated self-assessment was stated. Reversely, the self-assessment 0.5 point or lower than the OT assessment testified for a low self-assessment. The results are presented in Figure 28.

![Figure 28. Self-assessment of Persons with and without Disabilities.](chart)

Cases with incomplete data were excluded

OSoD – official statement of disability

Source: Own research.
The 40% assessment consistency was stated for persons without disabilities. The elevated self-assessment was observed among persons without disabilities (38%) and PWD with an official statement of disability (42%). The low self-assessment was easily observed especially for persons with injuries, which affected their work capacity. It is worth noticing that half of PWD without any official statements of disability self-reported much lower capacities than objectively assessed by an occupational therapist. Moreover, some people with a low self-assessment were positively surprised with their performance during FCE tests. Though, it seems that objective test results as well as feedback given by the occupational therapist after FCE allow people a more realistic self-assessment.

According to Lydell\textsuperscript{102} investigation, the most significant factors determining the return to work of an injured individual are ‘an optimistic / pessimistic outlook on life, the degree of rigidity concerning work tasks, the degree of social assistance, and self-image’. Functional Capacity Evaluation can affect two of the above mentioned factors: the outlook on life and the self-image, especially if it is connected with a psychological assessment and motivational activities. These forms are practiced altogether in the Pomeranian Competences Center. According to POK clients’ experience, it was found that FCE can significantly increase the client’s self-esteem. The low self-assessment was easily observed especially for persons with injuries which affected their work capacity. It is worth noticing that especially PWD without an official statement of disability self-reported much lower capacities than objectively assessed by an occupational therapist. Probably, this FCE effect causes a faster return to work for such people.

Functional Capacity Evaluation is widely used for capacity assessment of PWD\textsuperscript{103}. It proved to be a useful tool for evaluation of


Persons with Disabilities in Polish conditions, both for people with and without official statement of disability. It can be recommended for wider use, not only for occupational matching and ergonomic advising processes, like it is provided in the Pomeranian Competences Center, but also for vocational evaluation and rehabilitation.
Summary

Analysis of the undertaken Ergonomic problems included in the book made it possible to draw the following conclusions:

- in the case of Persons with Disabilities, work and employment are not only a source of survival, but also represent economic and social security, with particular emphasis on the psychological and physiological effects. Work is considered to be one of the most important conditions for social inclusion and healthy life of Persons with Disabilities;
- Persons with Disabilities remain one of the groups that are most vulnerable to discrimination in the workplace and social environment;
- the basic pillars of a labour market model are: an effective structure of job placement and vocational activation, flexible forms of employment, continuing education and social security systems;
- development of the modern labour market model seems to be one of the principal paths leading to improvements in the employment of Persons with Disabilities;
- inclusion of Persons with Disabilities into the labour market is not possible without ensuring the possibility of physical access to the workplace;
- the working environment must be adapted to meet the specific needs of Persons with Disabilities and to support their daily functioning by developing competencies;
- the strongest action affecting the competitive position of the employee in the labour market is to develop key competences and thereby creating a competitive competence profile;
- each person is a carrier of accumulated human capital – unemployment causes the waste of the human capital amassed in the unemployed and funds spent on their education;
- the effectiveness of an integration processes increasingly depends on the access to knowledge and skillful management;
- there is still much to be done in the area of the education and training of professionals striving to obtain adequate competences.
and skills in the design, planning and development of properly customized products, working conditions and the living environment and methods of direct work with Persons with Disabilities.

It should be added that the disability management process begins with the creation of a strategy aimed at raising awareness of disability and the needs of Persons with Disabilities. As a consequence, it is necessary to systematically assess the effectiveness of implemented policies and on this basis design effective solutions.

It is believed that participation in ERGO WORK Pilot Projects has brought a number of benefits for the participants, i.e. for students, Persons with Disabilities, researchers and companies. Besides, universities and the staff of the organizations had the opportunity to exchange information (including ideas) that can be used in the future.

It was important that workers with disabilities attracted the attention, thus gained the interest of employers in the level of their work potential through expressed opinions and repeatedly innovative ideas. We are glad that organizations have recognized their needs and, more importantly, their ability to work effectively.

Jarosław S. Kardas
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