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*“Education for Equal Opportunities at Croatian Universities – EduQuality”*

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# **TEACHING PROCESSES AND LEARNING OUTCOMES**

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## 1. ABOUT THE HANDBOOKS

This handbook is one in a series of handbooks entitled *Students with Disabilities* created as part of the TEMPUS project Education for Equal Opportunities at Croatian Universities – EduQuality (Nr: 158757-TEMPUS-1-2009-1-HR-TEMPUS-JPGR) led by the University of Zagreb.

The series aims at equalizing the opportunities of students with disabilities to access higher education by informing, training and raising awareness of the academic and non-academic staff at Croatian universities and their constituents with regard to the specific needs of such students within Croatia's higher education system.

We consider students with disabilities to include students with vision and hearing impairments, motor impairment, chronic disease and learning difficulties such as dyslexia and ADHD, as well as students with mental disturbances and disorders. By categorizing these students as students with disabilities our intention is by no means to stigmatize or brand them, but rather to emphasize the need for accommodation of academic content to such students, as well as to present some examples of good practice.

The handbooks were written by members of all partner institutions in the project: the academic and non-academic staff of the University of Zagreb, Josip Juraj Strossmayer University in Osijek and the Universities of Rijeka, Zadar, Split and Dubrovnik; students with and without disabilities; and a representative of Croatia's Institute for the Development of Education. Particularly invaluable was the help we received from our colleagues from partner institutions abroad (the University of Århus, Masaryk University, the University of Strathclyde and the University of Gothenburg), who offered concrete advice and guidelines based on their vast experience in supporting students with disabilities.

Each handbook covers an important aspect of students' academic life, defining it and explaining its importance with regard to the acquisition of necessary professional competences. At the same time, the handbooks point to some obstacles that can exist with regard to accessibility, in an attempt to identify the preconditions for overcoming such obstacles without compromising the defined academic standards. By emphasizing the rights of all students to equal access to higher education and by proposing measures that can equalize opportunities, often in a simple way and at

no additional cost, these handbooks aim at contributing to the definition of clear accessibility standards for students with disabilities at the national level.

I would like to use this opportunity to thank all the contributors who took part, either directly or indirectly, in the creation of these handbooks. I am particularly grateful to former, current and future students with disabilities who have used and will continue to use their perseverance, courage, patience and great motivation to build the much-needed support system for students with disabilities in Croatia's higher education by pointing out their specific needs and simple ways in which these needs can be met. However, their efforts would continue to be in vain if it had not been for a large number of academic and non-academic staff members who have provided support to students with disabilities in practice, often without the existence of clear guidelines and relying only on their empathy and wish to improve the situation. I believe that these handbooks will provide them with clear and systematic guidelines that will facilitate their future work.

Dr. Lelia Kiš-Glavaš, Project Leader

## 2. FOREWORD

*Anita Vulić-Prtorić, Valentina Kranželić, Andrea Fajdetić*

The aim of this handbook is to provide university teachers and their assistants with suggestions of how to make their teaching content comprehensible and accessible to all students, regardless of their diverse abilities, motivation, interests, and physical and social skills.

The demanding task of presenting such an extensive topic in brief is a great challenge for every author. The authors of this handbook are themselves teachers who work with students on a daily basis. For this reason, working on this handbook provided them with an opportunity to reassess their own teaching methods and attitudes towards their students. As a result, the authors have drawn on their students' suggestions for many of the guidelines presented in the handbook.

The textbox below presents the conclusions of a workshop in which students with disabilities also took part. Their message is particularly relevant for this handbook, as it reminds us that, in addition to the specific needs for architectural and educational accommodations, the needs of students with disabilities for support are mostly similar to those experienced by their abled peers.

### EXAMPLE OF GOOD PRACTICE

On Wednesday, June 4, 2008, a workshop entitled "Students with disabilities – personal experiences" was held at the Student Counseling Center of the University of Zadar. The workshop leaders had an opportunity to hear about the experiences of their colleagues from the University of Zagreb with regard to students with disabilities and some organizational changes they had introduced. The University of Zagreb had 200 students with disabilities of the total of 65,000 students enrolled that year. The University also had the Office for Students with Disabilities and a UNICA coordinator. UNICA is a network of universities based in European capitals. Two student associations were also mentioned, Šišmiš and Korak. The former is an association of blind and visually impaired students, and the latter of students with physical disability.

Students with disabilities take a longer time to complete their studies than the average student population, and they need different kinds of support, depending on their type of disability and impairment rating – blindness or low vision, motor impairments, deafness, chronic illnesses. Among

the typical problems they face during their time at the university are architectural barriers. Unfortunately, some university constituents still do not have accessible approach for wheelchair users. The issues of reading materials in Braille, audio books and sign language interpreters were also raised.

The aim of support is to grant students with disabilities the right to choose and to help them become as independent and as competent as possible for academic and professional lives in the broadest social environment. The students with disabilities present at the workshop pointed out that they would benefit from the following: social skills training, training in efficient learning methods and techniques, preparatory courses for the university, individualized educational plans, educational support during their time at the university, support during practical classes and student training, and student counseling in problem or crisis situations.

Josip Ćirić

Zadar, March 14, 2008

Based on the idea that flexible teachers will develop and apply adequate teaching methods in order to motivate all of their students, including students with disabilities, this handbook deals with four main topics.

The first topic is covered by Dr. Lelia Kiš-Glavaš, who provides a brief outline of the framework within which the teaching process can be designed. Universal design for learning is based on the principle that each student enters the process of studying with a large variety of skills, needs and interests. However, the changes in the teaching process that will ensure better comprehension and acquisition of the teaching content should not compromise the existing academic standards. All students have the right to high standards and high quality education. If teachers “go easy” on a student – even with the best of intentions – they are not helping, but rather discriminating against that student.

The next chapter presents some contemporary findings in the area of teaching methods and techniques. The chapter was co-written by several authors: Dr. Anita Vulić-Prtorić and Andrea Fajdetić provide suggestions on how to enrich the usual teaching methods; Dr. Sanja Lončar-Vicković presents some guidelines for preparing PowerPoint presentations; Dr. Josip Ćirić covers the

topic of e-learning; Andrea Fajdetić, Dr. Sarah Czerny, Asja Barić and Ksenija Romstein highlight some considerations with regard to practical classes and student training.

In Chapter 6, the authors Dr. Rosanda Pahljina Reinić, Dr. Valentina Kranželić and Elizabeta Haničar deal with the topic of assessing the learning outcomes. All teachers ask themselves the same questions: Am I an objective assessor? How should I design the tests in order to find out how much my students really know? How can I examine and evaluate a blind student? And so on.

At the end of the handbook the reader will find a glossary of frequently used terms and their definitions, as well as an extensive list of references with suggestions for further reading.

We hope that the texts in this handbook will encourage university teachers and their assistants to design their teaching process in a different way.

To all the authors, who worked hard and contributed to the creation of this handbook, our heartfelt thanks!

The Editors

### 3. UNIVERSAL DESIGN FOR LEARNING, AND ACADEMIC STANDARDS

*Lelia Kiš-Glavaš*

#### 3.1. What is universal design for learning?

According to the Convention on the Rights of Persons with Disabilities (<http://www.un.org/disabilities/convention/conventionfull.shtml>), “universal design means the design of products, environments, programs and services to be usable by all people to the greatest extent possible, without the need for adaptation or specialized design”. The Declaration points out that “universal design shall not exclude assistive devices for particular groups of persons with disabilities where this is needed”.

The concept of universal design began to be developed in the United States in the 1970s. It encompasses the vision and attempt to plan and design the whole environment (public areas), buildings (public and private) and products (utility items) in such a way as to be usable by everyone – children, the elderly, people of different sizes and physical and/or intellectual abilities, persons with and without disabilities – to the greatest extent possible.

The concept of universal design was developed precisely on the basis of design for persons with disabilities, as a kind of generalization. The basic idea is making products, communications, and the built environment usable by a large number of people at little or no extra cost.

The concept targets all people of all ages, sizes and abilities, and draws on the notions of equal status, equal treatment and equal merit, with the inherent ideal that everyone should have the same opportunities as others to participate in different areas of life ([www.inkluzija.org](http://www.inkluzija.org)).

An example of universal design is the automatic door. Such doors facilitate entry for persons who use wheelchairs, but also for the elderly, mothers with baby carriages, persons carrying bags, and so on. However, such doors can sometimes hinder the orientation of the blind, which shows that it is not always easy for universal design to meet everyone’s needs.

The starting point of universal design is the principle of equality. It also implies multidisciplinary, i.e. joint work of experts in planning, architecture and design. It includes the participation of representatives from various population groups because this increases the level of expertise and ensures that their needs are taken into account in the early stages of planning, thus increasing the possibility of achieving universal design and equal opportunities in the use of products and services.

Although it was originally developed for the purpose of spatial design, universal design is increasingly being applied to the design of services and content (information) as well. This leads us to the notion of **universal design for learning** (or inclusive design, as it is also referred to, since it facilitates inclusion), which can be defined as an approach that removes the major obstacle preventing all pupils/students from achieving success. This obstacle is the rigid educational program designed for the average student, which unintentionally sets obstacles to effective learning (CAST, 2008). In the context of education of students with disabilities, it is the authors' opinion that our educational programs are "disabled" more often than students.

Universal design for learning helps teachers cope with the challenges of diversity in the educational system, proposing the use of adaptable teaching materials, techniques and strategies that can aid teachers in meeting such various educational needs of many pupils and students.

As everyday practice shows, some accommodations in the teaching process made with the purpose of equalization of opportunities for students with disabilities have proved to be more than useful for *all* students. For example, some students with dyslexia, students with ADHD, as well as students with hearing impairments who lip- and face-read have major difficulties following spoken lectures, especially if they are not familiar with the topic. If the teacher makes the handouts available to these students a few days in advance, they can prepare for the class and follow the lecture much more efficiently. However, this has turned out to benefit other students as well. If handouts are made available to all students several days in advance, the students will be better prepared and will be able to participate in classes much more efficiently, and as a result they will be more successful in achieving the learning outcomes. This is certainly one of the features that constitute universal design for learning.

Universal design for learning therefore comprises flexible teaching methods (materials, techniques, strategies) that enable efficient achievement of learning outcomes for as many students of different educational needs as possible. Due to their specific needs, universal design for learning does not preclude additional accommodations for some students with disabilities.

### **3.2. What are academic standards?**

Academic standards are the main criteria for assessing quality in higher education. In fact, the notion of quality assurance in higher education involves processes and activities that ensure quality maintenance in higher education in accordance with the defined academic standards (Center for Quality Assurance and Internal Evaluation, <http://www.qa.untz.ba/web/>).

Academic standards represent the demonstrated ability to acquire certain levels of academic achievement. It is usually the measured competence of a person in achieving the specific (or implicit) goals of a course, operationalized as performance in a particular task (Office for the Promotion of Quality of the University of Rijeka, <http://free-ri.htnet.hr/zile/kvaliteta/odrednice.htm>).

Academic standards describe what knowledge and skills are required, how they should be acquired and at what level of studies. The standards are defined in order to enable process and variability control, comparability, and defining the minimum level of achievement (Center for Quality Assurance and Internal Evaluation, <http://www.qa.untz.ba/web/>).

Academic standards are, in fact, public statements of what students should know and be able to do when they complete their (higher) education (Teaching to Academic Standards, [www.thirteen.org/edonline/concept2class/standards/index.html/](http://www.thirteen.org/edonline/concept2class/standards/index.html/)). These are public, written statements about the expected learning outcomes (Teaching to Academic Standards, [www.thirteen.org/edonline/concept2class/standards/index\\_sub1.html/](http://www.thirteen.org/edonline/concept2class/standards/index_sub1.html/)).

**Academic standards describe educational goals, the destination at which a student should arrive at the end of a particular level of education.** Academic standards do not describe how to get the students to this “destination”; that is determined by the curriculum. Standards do not prescribe

any particular curriculum: the national standards do not mean that the ability to choose teaching materials and methods is compromised. The teacher is the one who chooses whatever curriculum he or she finds appropriate to help the students meet the standards.

Curriculum can be defined as a plan of action or a written document that includes strategies for achieving the desired, pre-set educational goals (Domović, 2009). The basic principles of curriculum development include defining the goals, defining the learning experience appropriate to the goals, organizing the learning experience so that it has a cumulative effect, and the assessment of learning outcomes.

Academic standards are the WHAT of education, while curriculum is the HOW (Teaching to Academic Standards, [www.thirteen.org/edonline/concept2class/standards/index.html/](http://www.thirteen.org/edonline/concept2class/standards/index.html/)).

Academic standards are applicable to all students (gifted students, students with specific learning disabilities, students with disabilities, etc.).

There are two types of academic standards: content standards and achievement standards. Content standards indicate what students should know and should be able to do, while achievement standards measure how well a student's work meets the content standard.

Proponents of standards in education claim that without established standards educational institutions actually implement a selection system and do not guarantee the right to education for all: approximately 20% of students always meet the high achievement standards, while the rest of the students cannot successfully participate in the educational system conceived in such a way.

And precisely because there are no "standard" i.e. "average" students, it will take some students longer to achieve the required proficiency. Proponents of academic standards believe that, given the right opportunities, all students have the ability to learn. Those who use standards want to make the shift from a system where it is believed that the educational content and its presentation are fixed (and so some students can acquire it, while the others cannot) and that achievements vary as a result (those who can make it and the others "drop out"), towards the system in which methods of mastering the content which are in accordance with defined learning

outcomes vary (some students need more time and different teaching methods), and in which students' achievements and results are fixed.

The teaching process itself begins long before the teacher enters the classroom (Vizek Vidović and Vlahović-Štetić, 2005c). All activities aimed at designing the teaching process that precede first-hand work with students are called teaching planning. Planning can be described as a complex preparation for teaching, which includes setting the teaching goals, the selection and organization of the teaching material, determining the order and manner of implementing classroom activities, the choice of teaching resources, as well as ways to assess students' achievements (Vizek Vidović and Vlahović-Štetić, 2005c). In the planning process, it is certainly necessary to clearly define the learning outcomes in line with the learning outcomes at the level of a study program.

**Learning outcomes** (i.e. what a student is expected to know, understand, be able to do or assess as a result of the learning process) should be attainable for everyone, and teachers can see the quality of their own educational competences by looking at their students' progress (Teaching to Academic Standards, [www.thirteen.org/edonline/concept2class/standards/index\\_sub5.html/](http://www.thirteen.org/edonline/concept2class/standards/index_sub5.html/)). Academic standards provide a point of reference for evaluating all aspects of education. For example, they can indicate whether a university textbook is good or not. It is good if it provides opportunities for students to meet the academic standards. Is a staff development workshop worthwhile? It is if the teachers learn some techniques for getting students to academic standards. And so on. All teaching resources, materials, curricula and assignments could be judged by this criterion: If we do this or that, will our students achieve the defined standards?

### **3.3. Academic standards in Croatia**

The national qualifications system refers to all procedures and instruments that lead to the recognition of learning outcomes in a particular country. Accordingly, the Croatian Qualifications System, CQS, is a qualifications system in the Republic of Croatia which includes the responsibility for the clarity of the system, as well as the access, progression, acquisition and assessment of learning outcomes, and the awarding of qualifications within the framework of institutional procedures for quality assurance, in accordance with the Croatian Qualifications Framework (Croatian Qualifications Framework, 2009).

In Croatia, the changes have been initiated at all levels of the education system. The basic guideline for the change is to improve the quality of the education system at all levels.

**The Croatian National Education Standard (CNES)** has been introduced in order to develop “student-oriented schools”, as a basis for changes in curriculum development and in the functioning of primary education. CNES has unburdened the curriculum by removing the excessive educational content, and introduced a modern way of teaching that is based on project work, individual and group work, and on applicable knowledge and skills. This commitment made by Croatia and its national educational policy to creating and developing a knowledge society is contained in the Education System Development Plan 2005–2010, a document which the Croatian Government adopted on 9 June 2005 (The Croatian National Education Standard for Primary Schools, <http://public.mzos.hr/Default.aspx?sec=2199/>).

The Croatian National Education Standard is a set of norms that include the following: educational content norms, educational achievement norms, teaching norms, norms for monitoring and assessing students’ achievements, and norms for vocational and professional teacher training (Croatian Qualifications Framework, 2009).

Through its education policy, Croatia has also opted for the creation of the National Curriculum Framework for Preschool Education, General Compulsory and Secondary Education, which ensures that all components of the system connect meaningfully and seamlessly into a single, interconnected whole.

The creation of the **National Education Curriculum** was preceded by a series of activities that demonstrate the continuing effort of the Croatian education policy to improve the quality of education. The key feature of the National Education Curriculum is the transition to the competence-based system and students’ achievements (learning outcomes), as opposed to the former, content-based system (National Curriculum Framework for Preschool Education, General Compulsory and Secondary Education, <http://public.mzos.hr/Default.aspx?sec=2685/>).

The National Curriculum Framework defines the fundamental educational values and goals, the principles and goals of particular fields of education, the assessment of student achievements, as well as the assessment and self-assessment of the national curriculum implementation. It determines the expected student achievements in the fields of education in particular cycles, and indicates the subject structure of each field of education.

The National Curriculum Framework forms the basis for the development of curricula, that is, for defining the optimal student workload and the development of subject curricula based on detailed achievements in particular fields of education.

Furthermore, the **State Pedagogical Standard** was created in Croatia for three levels of the education system – preschool, primary and secondary – and it was passed by the Croatian Parliament at the proposal of the Croatian Government on May 16, 2008.

State pedagogical standards determine the optimal spatial, personnel-related, medical, technical, ICT and other norms that serve as guidelines to ensure uniform working conditions in educational institutions. The purpose of the pedagogical standards is to enhance, pursuant to the prescribed criteria, the overall activity based upon the principle of uniformity and standardized working conditions of educational institutions. Standardized working conditions are a prerequisite for ensuring high-quality education (Primorac et al., 2008).

Croatian universities and their constituent units, as autonomous organizations, are governed by the scientific and professional criteria developed within the academic community. This means that there is no externally determined educational framework (e.g. a national framework, in the sense of national educational standards), but rather the higher education institutions have the autonomy to choose their courses and content. Nevertheless, they also have to ensure the acquisition of specific professional competences required for entering the labor market.

On the other hand, the Croatian system of higher education sets clear standards, i.e. criteria for the selection of teachers to research/teaching and teaching positions, and it clearly determines which position is required in which segment of the teaching process and at which cycle of education. However, there is no requirement stipulating that teachers should be trained in teaching methods and procedures or in improving the quality of the teaching process and implementing the educational goals, i.e. the learning outcomes.

One of the reasons for this situation may be the traditional way of creating study programs and courses that is still prevalent in Croatia, which is based on content or the structure of the scientific discipline. Teachers decide which content they will teach, how they will teach, and how they will evaluate the extent to which the students have learned that content. This approach focuses on teacher input, and the evaluation measures how well a student has “absorbed” the content (Domović, 2009). This approach falls within the scope of content- and teacher-oriented

planning, while nowadays there is an increasing trend of implementing the student-oriented teaching approach. The latter model focuses on what the student is expected to be able to do at the end of the module or program, in other words, it focuses on learning outcomes.

### **3.4. Students with disabilities and compliance with the academic standards**

Diversity is a rule, not an exception. Each community must recognize and respect diversity and cherish it. Educational institutions are one of the places where this is of particular importance (Kiš-Glavaš and Pantić, 2002).

When our study programs are designed to accommodate the average student and thus exclude students with different abilities, learning styles, backgrounds, and even preferences, we fail to provide all individuals with fair education and equal opportunities to study (CAST, 2008).

Universal design for learning helps us tackle the challenges of diversity, pointing to the flexible teaching materials, techniques and strategies that can help teachers meet the different needs of their students in the educational process. Curricula created in accordance with universal design are designed to meet the needs of the majority of students.

Universal design for learning rests upon three fundamental principles (CAST, 2008):

- Providing multiple means of presentation: Learners differ in the ways that they perceive and comprehend information that is presented to them. For example, those with sensory disabilities (e.g., blindness or deafness); learning disabilities (e.g., dyslexia); language or cultural differences, and so forth may all require different ways of approaching content. Others may simply grasp information quicker or more efficiently through visual or auditory means rather than printed text. In short, there is not one means of representation that will be optimal for all learners; *providing options for representation is essential.*
- Providing multiple means of action and expression: Learners differ in the ways that they can express what they know. For example, individuals with significant movement impairments (e.g., cerebral palsy), those who struggle with strategic and organizational abilities (executive function disorders), those who have language barriers or use a different medium for writing (e.g., Braille), those who have difficulties expressing themselves in writing (e.g.,

dyslexia), will demonstrate their achievements very differently. Some may be able to express themselves well in written text but not speech, and vice versa. In reality, there is not one means of action and expression that will be optimal for all learners; *providing options for action and expression is essential.*

- Providing multiple means of engagement: Learners differ markedly in the ways in which they can be engaged or motivated to learn. Some learners are highly engaged by spontaneity and novelty while other are disengaged, even frightened, by those aspects, preferring strict routine. In reality, there is not one means of engagement that will be optimal for all learners in all contexts; *providing multiple options for engagement is essential.*

By defining learning outcomes, teachers actually define academic standards within their courses. With regard to specific qualities of students with disabilities, it would be useful to determine the following (Teachability, 2004):

- Is the systematic attendance of students in classes (lectures, seminars, exercises) necessary for the attainment of learning outcomes or for the acquisition of competences, and therefore mandatory?
- Which accommodations could be made without compromising the academic standards or other prescribed standards, such as the (professional) competences prescribed by the professional bodies (chambers)?
- Which accommodations could be made systematically in the design and implementation of courses without the need for *ad hoc* accommodations and coordination with the individual needs of current students?
- When necessary, how is the need for accommodation going to be communicated to the teacher?

**Ethical issues:**

*Who should be informed about the student's nature of disability? Coordinators for students with disabilities perform that role at many European universities, be it on the level of the university, faculty or department. They inform the teaching staff only about the necessary accommodations, without additional explanation. Although it protects the students' personal data and privacy, some experts believe that this procedure is not adequate because it can lower the teacher's sensitivity and motivation in addressing the educational needs of their students.*

*In what way and to what extent will other students be informed about the accommodations put in place for a student with a disability?*

“What is it that I want my students to know, and what is the best way for them to acquire that knowledge? Are there different ways of producing the same outcome?” These are the questions each teacher should ask in defining the educational outcomes.

Students with disabilities have the right to high standards and quality education, as do all students. Therefore, exempting them from doing certain activities required in the curriculum of a course (for example relieving a stuttering student from doing an oral presentation), even though often motivated by good intentions because the teacher does not want to put the student under unnecessary stress, is in fact indirect discrimination. This also applies to assessments with lowered standards (for example giving students with dyslexia easier tasks in a test) in relation to accomplishments. This not only lowers students' motivation, but also degrades them and discriminates against them.

The teacher is the one who sets the academic standards, implements accommodations if necessary, and ensures that the academic standards are not compromised. (Therefore one should never go below what is necessary to achieve the academic standards.)

If students with disabilities do not acquire competences equal to those of other students, they will be in an inferior position in the labor market; in other words, they will not be competitive enough. Letting them off easy or “cutting them slack” is in fact doing them a disfavor.

If we do not implement reasonable accommodations, that is, those which do not compromise the academic standards of a given course or study program, the information will not be conveyed in full or in adequate fashion to students with disabilities. The lack of accommodations will produce a situation in which students with disabilities will not be equally competent, and therefore again in an inferior position in the labor market compared to their peers, which will negatively affect their overall success in life.

For these reasons it is important to ascertain that no discrimination of students with disabilities has taken place, and in order to do that the following documents may be consulted: the Constitution of the Republic of Croatia (1990), the Anti-Discrimination Act (2008), the UN Convention on the Rights of Persons with Disabilities (2007) and the National Strategy to Create Equal Opportunities for Persons with Disabilities 2007-2015 (2007).

When it comes to students with disabilities, the question should not be if all or some of them should take part in the system of higher education, but whether they can realize their full potential in a system conceived in this way, with such curricula and mode of assessment of acquired competences. It is our task to ensure that they can do so.

In the contemporary education system, the teacher is responsible for implementing accommodations in accordance with the individual student needs, while not compromising academic standards and ensuring the acquisition of learning outcomes in an adequate fashion.

Often teachers will note that the accommodations, when implemented for all students, have lead to a better teaching process, and that all their students are better at acquiring the learning outcomes.

Which accommodations can be made? Here are some examples:

Take the example of a student who encounters difficulties during public oral presentations because s/he stutters. Can individual oral presentations be replaced with guided group discussions where the students can decide how much, when and how they will participate? It would also be useful for the student to know the topic of discussion in advance so that s/he can prepare a draft and write down questions. Of course, this is only possible if it does not compromise the academic

standards, that is, if “demonstration of oral presentation skills” is not one of the educational outcomes of the course.

Another option would be for the student to write a paper instead of doing the oral presentation, and to demonstrate in that way the acquisition of the learning outcomes. On the other hand, one should always consider whether the exemption from doing the oral presentation will in fact aggravate the student’s difficulty. With every presentation the student’s anxiety lessens, but in order to accomplish that, the teacher has to create an atmosphere that promotes acceptance of diversity.

Another example would be a student who, because of a difficult period in the course of a mental condition, cannot at the moment take part in practical work with a group of participants in a program, which would involve an analysis of relations within the group. Can such a student do the task by analyzing video recordings instead?

Teachers experience most difficulties making practical classes (exercises, student training, volunteering) accessible to students with disabilities, because they believe such classes to be the source of students’ subject-specific competences. In other words, teachers often assume that if practical classes are not done in an adequate fashion, the student will not acquire the desired and planned competences.

Is it possible to acquire the competences in an alternative fashion? The general consensus is that if there is an understanding of theory, then the main goals of practical work are to observe and analyze the process rather than the development of practical skills. Therefore the learning outcome can be achieved by alternative methods, for example by observation or virtual practice (Teachability, 2004).

Dyslexic students often have problems in producing written assignments (essays or term papers) due to the nature of their condition. If the learning outcomes do not include the demonstration of literacy or writing skills, can the student hold an oral presentation instead writing a paper?

Students suffering from ADHD, dyslexic students and hearing impaired students will benefit greatly from having access to class materials (for example, handouts) before class, because they will be able to prepare in advance. In addition, teachers will soon notice that such a policy is helpful to

other students as well, and that it results in the students' being more willing to participate in the discussion. This does not compromise the academic standards in any way.

E-learning courses make the learning process easier for all students, but also for the teacher. The course materials are available at all times and every student can adapt them to their individual needs that will be accessible and suitable for use.

Hearing impaired students often attend classes simply to meet the class attendance requirement, unless a sign language interpreter is present. Could they do the analysis of class materials by themselves instead, at home, and afterwards discuss the work done in tutorial with the teacher by lip-reading (which is almost impossible if there are several interlocutors in the room)? Another possibility would be to allow them to complete the coursework in the form of a written assignment.

When using video material in class, hearing impaired students will see the image, but will not hear all, or any, narration, which is sometimes very important. Can the material in question have subtitles?

If the material is in written form, blind students will not be able to participate. Can the material be made available in digital format, so they can adapt it on their own and thus make it accessible?

Dyslexic students, but also students with visual or motor impairments, will probably not be able to present what they know in the allotted time in a written exam. In that case it would be very helpful to extend the duration of the exam. Are we trying to measure the students' ability to do a task within limited time, or simply their ability to do the task (their knowledge)? In other words, what are the learning outcomes? Notifying students about written exam dates in advance, and perhaps providing some exam questions is very helpful for all students. If their level of knowledge is what we are measuring, these methods are in accordance with the learning process goals, and allow the students to focus on what is important.

**Example of good practice:**

*The extended time for the completion of a task depends on the individual abilities of a student. Nevertheless, the general recommendation is to extend the duration of the exam for at least half of the time normally allotted to other students.*

For some students, extending the time is necessary only for written exams. Others need more time also for writing essays, term papers, drawings and so on. Is it possible (and for how long) to extend the allotted time if it does not compromise the academic standards? Or can the students be informed about the assignments and deadlines in advance? In fact, this would be helpful to all students. It would be best to present the coursework timetable and the deadlines to students at the very first lecture.

What if we use demonstration in the teaching process, and have a blind student in class? The only way for the student to participate would be to have the demonstration done on that student.

As for the theoretical classes – lectures – blind students greatly benefit from being allowed to make audio recordings, which makes the lectures fully accessible afterwards. This procedure can also be helpful for dyslexic students.

What if a student has a chronic condition or a motor or sensory impairment, and is forced to participate in a rehabilitation program during the semester and therefore cannot attend lectures regularly? Does this necessarily lead to the student's failing the course and losing the necessary ECTS points? Can such a student receive alternative or additional assignments, for example, an analysis of a literary work or an additional paper focusing on the topics done while s/he was unable to attend the classes?

Hearing impaired students, even those who can lip-read relatively well, are unable to take part in a group discussion. It is important that the participants of a discussion do not talk all at the same time, but rather one after the other, in an established order. A pen which stands for the permission to talk and goes from hand to hand will help a deaf person to participate. This kind of controlled discussion will be more efficient.

Even a little additional assistance will be of great benefit. For example, one should briefly introduce oneself to a blind student and indicate that one is talking to him or her. In addition, a brief description of the space around the blind student, and a short introduction of all those present will make it easier for him or her to participate in class activities.

A hearing impaired student or a dyslexic student will sometimes be accompanied by a person (student assistant) assisting with note taking. It is important for student assistants to introduce themselves to everyone before the lecture starts. Feel free to prompt them to do so.

The teacher should go over all the necessary accommodations with students with disabilities; they are the ones that know best which accommodations ensure the accessibility of the educational content, and whether they have been effective. Nevertheless, the teacher knows best if the accommodations in question have ensured the acquisition of educational goals.

The teacher should not forget to inform other students (especially if the accommodation pertains to exams) about the ways in which accommodation was made and the reasons why it was made (only the necessary information should be shared). They have to know that students with disabilities are not discriminated against, albeit positively.

The guiding principle in implementing accommodations should be the participation of students with disabilities to the maximum extent possible in all class activities. These students should be included in all curricular and extracurricular activities. It is the only way to gain experience, build professional and personal competences and acquire the learning outcomes, thus becoming fully fledged members of our academic communities.

***Good practice recommendation:***

*Students with disabilities should participate in all academic activities to the maximum extent possible, with the implementation of reasonable accommodations.*

### **3.5. Conclusion**

Using universal design for learning, or inclusive design, we can ensure the highest standards and quality of higher education for the largest number of students, including students with disabilities. This means that **it is possible to ensure the accessibility of content and activities in**

**higher education for students who experience difficulties accessing information or fulfilling some academic activities**, and who are prevented by the traditional system of education from participating fully in the educational process.

This, of course, does not mean that it is necessary to reduce the content of higher education or abandon some teaching methods, but rather that the content and methods of some courses and study programs should be determined only after clear and achievable learning outcomes of a course and study program have been defined. In other words, it is necessary to clearly define what the teaching process aims to achieve, and which academic and generic competences that ultimately constitute subject specific competences of future scientists and experts, the students are expected to develop. It is precisely by defining the learning outcomes that the teacher sets the academic standards in his or her course, and that is the criterion against which the quality of higher education is measured.

It is important to emphasize that the learning outcomes must be in accordance with the instructional content and activities, and that the methods of achieving the learning outcomes and their assessment are as important as the content. But in doing so **one should not go below the set academic standards and competences**, which ultimately constitute the qualification of a student (a set of competences which is typical of the same level of education and specific for each vocation).

This goal can be accomplished by determining as many different ways as possible in which the same learning outcomes can be achieved. Therefore it is necessary to anticipate the need for, and to use various teaching methods and types of the teaching process, in order to ensure that the largest possible number of students can access the content and processes of education in an adequate fashion.

It seems that, if we really want to achieve high academic standards and quality, we will have to re-assess and change our teaching methods often. But is that not our main professional duty and one of our biggest professional challenges?

## 4. CURRICULAR APPROACH TO EDUCATION – THE STARTING POINT IN DESIGNING THE TEACHING PROCESS

*Sanja Lončar-Vicković and Lelia Kiš-Glavaš*

The fundamental starting point of higher education in first world countries is the national curriculum, which clearly states the principles, values, goals and outcomes that an educational system promotes. The national qualifications framework and the national curriculum are the two elements that affect the creation of study programs. **The main feature of the national curriculum is the competence based approach to higher education.** The starting point for the planning of educational programs involves defining the competences of students who have completed the study program. The development of competences is the main goal of every educational program. This kind of approach to the development of an educational system is called the **curricular approach to education.**

The curricular approach emphasizes the importance of educational outcomes, that is, what every student has to learn during their education, what they have to know and be able to do, and which values they have to accept. This approach to education is broader than the one which sees the university as a place of acquiring knowledge and transferring information. The curriculum approach emphasizes that the university is a place of integral personal and social development of students.

The curriculum gives an integral response to the question of why, what and how to study. The learning outcomes of a study program (or a group of similar courses, a single course, a set of lectures which form a unit or a single lecture) provide the answer to the first question. The content of the study program provides the answer to the second question, and the account of procedures which ensure the acquisition of necessary competences provides the last answer.

The curriculum encompasses all the facets of the planned education in a precise and systematic fashion, a scientific approach in determining the goals, assignments, content, plans and programs, the organization and technology of implementing results, as well as different ways of assessing the outcomes (Previšić, 2007). It is a relatively reliable, precise and optimal way of implementing a flexibly planned process of learning, education and competence acquisition. The curriculum can be thought of as a catalogue of elaborated content which is transferred by means of

syllabi into the teaching process, as organized and active acquisition of knowledge, skills and competences (Marsh 1994). According to recent curriculum research, the key terms, words, categories and modules are the following: goal, purpose, assignments, content, organization, methods, development, assessment, competence, relations and others.

The planning of higher education curricula is done on the state level (the national curriculum), university level (the university curriculum) and course level (the course curriculum). How those three levels of curriculum relate one to another is mostly determined by the structure of national curricular documents.

National curriculum development is a complex and long-lasting process which requires thorough preparation, including a detailed analysis of all elements of the process of its making and implementation, and implies the participation of education policy makers, curriculum development experts, teachers, students, parents and legal guardians, administrative staff, experts in given subject fields, employers, local community representatives, trade union representatives and other stakeholders.

The national curriculum consists of syllabi for compulsory education and of content common to various types of education. Therefore, when intervening in the curriculum, such interventions should be in line with other elements: the goals, teaching conditions and the results of empirical evaluation.

The university curriculum includes activities which complement, enhance or expand the educational program.

Along with the educational content, the curriculum includes a number of other elements, such as the teaching methods and activities aimed at achieving the objectives and learning outcomes, the teaching materials, the assessment of educational achievement, and the university value system.

The document sets the general objectives and learning outcomes which describe the knowledge, skills and values that every student is expected to acquire in order to be prepared for lifelong learning, to develop their potential and take an active and productive part in social life.

Some questions can help the administration in planning the university curriculum or individual study programs: What do we know about the students studying at our university (their previous knowledge and skills, the characteristics that might affect their academic achievement, but also their employability after graduating from the university, their options for further education)? What do we want to teach them and how do we achieve the best results (the selection of appropriate pedagogical methods, resources and tools, the integration of experiences inside and outside the classroom)? How can we determine whether we have succeeded in implementing our plans? (Outcome-Based Approaches in Teaching and Learning, 2005) We should keep in mind that some students will be able to follow parts of the curriculum content only with certain accommodations, that is, in a different way. This will not compromise the objectives and goals of the curriculum, but rather contribute to its universality, which is the basic premise of human rights, especially the right to education of particular groups of students, such as students with disabilities.

Vlahović-Štetić (2009) discusses two concepts of teaching in our education system: teaching as transmission of knowledge and teaching as construction of knowledge. According to the concept of transmission-based teaching, teachers are those who possess the knowledge (information) and they transmit it to their students. The teacher is an authoritative source of expert knowledge, responsible for guiding the students, and it is the students' duty to remember what they see or hear from the teacher and reproduce the knowledge on demand. According to the constructionist view of teaching, students construct knowledge through activities, with different sources contributing to that construction (teachers, tests, experts, student discussions etc.). Students share the responsibility for learning with the teacher, who guides them, and the group of students forms a learning group (Vlahović-Štetić, 2009).

Although the following steps are intended for curriculum development (Taba, 1962; as cited in Domović, 2009), they can also prove very useful to all teachers in creating and revising their own course syllabi and study programs:

- Diagnosis of need: Identifying the needs of students for whom the curriculum is created (this may and should be supplemented with an analysis of the needs of employers);
- Formulation of objectives;
- Selection of content;
- Organization of content;

- Selection of learning experiences (methods);
- Organization of learning / teaching experiences;
- Determination of what to evaluate and the ways and means of doing it.<sup>i</sup>

The study program can be seen as a curriculum of a specific study (Domović, 2009). A concept narrower than that of a curriculum is the educational plan and program, which contains a selection of courses, and their schedule and duration over the study period.

At the level of courses, a syllabus is developed. It defines the objectives of a course, its content, the teaching methods and techniques, and the methods of measuring the achievements and assessing the outcomes. The syllabus must take into account the student workload and determine the number of ECTS points accordingly.

At the micro level, unit plans are developed, which define the following (Domović, 2009): the objectives of a particular thematic unit or topic, the teacher and student activities that will lead to the achievement of intended objectives, the materials required for individual teaching units, the choice of teaching methods and techniques, and the methods of monitoring student progress.

All of these elements might require thinking about various types of accommodations for students with disabilities, for example different teaching methods. Many teachers still consider lectures the best teaching method which allows the presentation of the course content within a set time frame. But if lectures are not combined with other techniques, even the highly motivated students will not be able to concentrate for longer than 15 minutes. According to Fry, Katteridge and Marshall (2003; as cited in Divjak, 2008), students find it helpful when teachers use certain teaching techniques during lectures, such as showing the overview of the lecture at the beginning, using written materials, allowing students to take notes, making short breaks for clarification and questions, repeating important facts and summarizing the lecture at the end.

At the beginning of each lecture the objective and the expected learning outcomes should be emphasized, in order for students to know what to focus on. At the end of the lecture the teacher should summarize the main points, briefly reflect on the content and highlight the conclusions.

As noted above, assessment should also be directly related to learning outcomes, and there should be a genuine link between them. On the other hand, assessment should be reliable, transparent and fair. However, the most important feature of good assessment is that it should enable and encourage further learning (Divjak, 2008a). By means of learning outcomes students are told what is expected of them, adequate teaching methods are chosen, and also methods of monitoring and evaluating progress. For example, if one of the learning outcomes of a course in a helping profession is to create and implement a rehabilitation or education program, it is best to check the learning outcomes in a real life situation, observing the student's activities and commenting on the implementation of the program in a concrete situation, with real people. Not only is this the most appropriate way to assess the learning outcomes, but also this situation – serving primarily to examine what has been learned – itself becomes a learning opportunity (and every opportunity to learn is a good opportunity).

In their four handbooks for teachers, the authors Vizek Vidović and Vlahović-Štetić cite examples and descriptions of teaching techniques that can encourage active learning and critical thinking among students in higher education and can be incorporated into lectures (Vizek Vidović and Vlahović-Štetić, 2005) and also tackle the issues of reading / writing techniques and discussions which stimulate critical thinking (Vizek Vidović and Vlahović-Štetić, 2005a). They deal with the techniques of collaborative and experiential learning applicable in higher education settings (Vizek Vidović and Vlahović-Štetić, 2005b), and with methods of monitoring and testing students' knowledge (Vizek Vidović and Vlahović-Štetić, 2005c).

***Suggestions for further reading:***

Vizek Vidović, V., Vlahović-Štetić, V., (2005): *Aktivno učenje i kritičko mišljenje u visokoškolskoj nastavi, Priručnik za nastavnike, 1. dio: Aktivno učenje i ERR okvir za poučavanje*. Forum for Freedom in Education, Zagreb.

Vizek Vidović, V., Vlahović-Štetić, V., (2005a): *Aktivno učenje i kritičko mišljenje u visokoškolskoj nastavi, Priručnik za nastavnike, 2. dio: Čitanje, pisanje i rasprava za poticanje kritičkog mišljenja*. Forum for Freedom in Education, Zagreb.

Vizek Vidović, V., Vlahović-Štetić, V., (2005b): *Aktivno učenje i kritičko mišljenje u visokoškolskoj nastavi, Priručnik za nastavnike, 3. dio: Suradničko i iskustveno učenje*. Forum for Freedom in Education, Zagreb.

Vizek Vidović, V., Vlahović-Štetić, V., (2005c): *Aktivno učenje i kritičko mišljenje u visokoškolskoj nastavi, Priručnik za nastavnike, 4. dio: Planiranje, praćenje i ocjenjivanje*. Forum for Freedom in Education, Zagreb.

The teacher, as the course coordinator, is the most competent person to determine the academic standards (a more appropriate term might be “competence standards”) i.e. to define the learning outcomes of an individual course and determine the educational content. S/he can then choose the teaching methods and materials accordingly, along with the methods of monitoring the students’ progress and achievements. When developing and selecting the teaching materials and organizing the lectures, exercises or seminars, the teacher should always take into account the students’ different learning styles, as well as the abilities and potential limitations of students with disabilities.

After defining the learning outcomes, the teacher selects the teaching methods, courseware, teaching aids and methods of examination. At that point, it is important for the teacher to determine whether that is the only way of achieving the set learning outcomes.

#### **4.1. Competences**

The starting point for planning a curriculum based on learning outcomes is determining the competences of graduates. The concept of competence includes the knowledge, skills and attitudes which qualify the individual to carry out a particular job.

Competences represent a combination of knowledge and its application (skills), attitudes and responsibilities that reflect the learning outcomes of the educational program.

Competences are expressed as a set of skills and knowledge, and the associated autonomy and responsibility. There are several different ways of depicting the competences that an individual

has acquired through learning. In almost all countries, competences are depicted as knowledge, the application of the acquired knowledge, and their achieved employment. The achieved employment refers to the conditions in which the concrete knowledge and skills are employed, including spatial, temporal and other conditions. (Croatian Qualifications Framework, 2009).<sup>ii</sup>

According to the findings of the project entitled “Tuning Educational Structures in Europe” (Tuning, 2006; as cited in Vizek Vidović, 2009), competences include:

- Knowledge and understanding (theoretical knowledge in an academic area, the ability to learn and understand);
- Knowing how to act (practical application of knowledge to specific situations);
- Knowing how to be (values as an integral part of perception and life with others in a social context).

There are several classifications of competences. This handbook lists the competences defined in the Tuning project (Gonzales and Wagenaar 2005), where competences are divided into general/generic and subject-specific.

**Generic competences** should be acquired by all students who complete a certain level of education regardless of their subject field or profession (e.g. knowledge of a foreign language, the application of knowledge in practice, computer or information literacy).

The Tuning project (Gonzales and Wagenaar, 2005) defines three groups of general competences – instrumental, interpersonal and systemic (Table 1).

Table 1: Overview of generic competences (Gonzalez and Wagenaar, 2005)<sup>iii</sup>

INSTRUMENTAL COMPETENCES	INTERPERSONAL COMPETENCES	SYSTEMIC COMPETENCES
<ul style="list-style-type: none"> <li>• Capacity for analysis and synthesis</li> <li>• Capacity for organization and</li> </ul>	<ul style="list-style-type: none"> <li>• Critical and self-critical abilities</li> <li>• Teamwork</li> </ul>	<ul style="list-style-type: none"> <li>• Capacity for applying knowledge in practice</li> <li>• Research skills</li> </ul>

planning <ul style="list-style-type: none"> <li>• Basic general knowledge (of the field)</li> <li>• Grounding in basic knowledge of the profession</li> <li>• Oral and written communication in your native language</li> <li>• Knowledge of a second language</li> <li>• Elementary computing skills</li> <li>• Information management skills (ability to retrieve and analyze information from different sources)</li> <li>• Problem solving</li> <li>• Decision-making</li> </ul>	<ul style="list-style-type: none"> <li>• Interpersonal skills</li> <li>• Ability to work in an interdisciplinary team</li> <li>• Appreciation of diversity and multiculturalism</li> <li>• Ability to work in an international context</li> <li>• Ethical commitment</li> </ul>	<ul style="list-style-type: none"> <li>• Capacity to learn</li> <li>• Capacity to adapt to new situations</li> <li>• Capacity for generating new ideas (creativity)</li> <li>• Leadership</li> <li>• Understanding of cultures and customs of other countries</li> <li>• Ability to work autonomously</li> <li>• Project design and management</li> <li>• Initiative and entrepreneur spirit</li> <li>• Concern for quality</li> <li>• Will to succeed</li> </ul>
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According to the results of the Tuning Questionnaire conducted at 101 universities, graduates and employers consider the following competences to be the most important: *capacity for analysis and synthesis, capacity to learn, problem solving, capacity for applying knowledge in practice, capacity to adapt to new situations, concern for quality, information management skills, ability to work autonomously and teamwork.*

**Subject specific competences** are defined for each profession or field of study and in that sense they are narrower than the generic competences.

Subject specific competences are associated with a specific academic area and they are characteristic of individual study programs. Defining subject specific competences requires a dialogue and consensus within a particular profession in order to achieve mutual recognition of curricula and of parts of the study program or final qualifications with a view to facilitating student

mobility. Harmonization does not mean making identical curricula or syllabi, but rather refers to agreement with regard to defining the outgoing generic and subject specific competences at an acceptable level (socially acceptable level).

In addition to the division of competences into generic and subject specific, there are a number of other classifications, for example, an important one is related to lifelong learning. Key competences acquired during education are those that provide the foundation for an individual's life and work. Therefore, they include vocational and technical competences as well as social and personal competences necessary for people to work together and to achieve success and happiness in life. The emergence of information and communication technologies requires constant reevaluation of basic competences and their adaptation. The European Union countries recognize the key competences in the following areas as common goals of compulsory education and training in the knowledge-based economy (Council Resolution, 2001): functional literacy in one's native and foreign language, numeracy, ICT competences, entrepreneurship, mathematics and science, interpersonal and civic competences, learning-to-learn and cultural expression.

**In order to develop students' competence, we need to determine** the type of **knowledge** (educational content) they need, the **skills** they require for the application of that knowledge, the **attitudes** that are necessary for the field of knowledge, the appropriate methods and procedures for their implementation, the method of assessment of the effective acquisition of competences, and the educational aids.

### ***Suggestions for further reading:***

Vizek Vidović, V. (ed.), (2009): *Planiranje kurikuluma usmjerenog na kompetencije u obrazovanju učitelja i nastavnika*, Faculty of Humanities and Social Sciences, University of Zagreb.

## **4.2. Learning outcomes**

The literature dealing with learning outcomes provides a number of similar definitions:

- Learning outcomes are statements which express what students should know, understand and/or be able to demonstrate after the learning process has been completed (Kovač and Kolić-Vehovec, 2008);

- Targeted learning outcomes are a statement of expected knowledge, ability to understand and/or competences that a student should be able to demonstrate upon completion of the learning process, and a description of specific intellectual and practical skills acquired and demonstrated upon successful completion of a teaching unit, program or study (Glossary of Key Terms and Definitions in the Area of Quality Assurance in Higher Education, 2007);
- Groups of competences, expressing what the student will know, understand or be able to do after the learning process has been completed, regardless of its duration (ECTS Users' Guide, 2004).

Learning outcomes are sets of competences that define what students will know, understand or be able to do upon completion of the educational process.

Learning outcomes may refer to a period of study (first cycle or second cycle), to a single course or a module. The learning outcomes of individual courses contribute to the learning outcomes of the entire program.<sup>iv</sup>

Learning outcomes, or results, are therefore the knowledge and skills and the associated autonomy and responsibility which a person has acquired by learning and which the person proves after the learning process is completed. Learning outcomes denote all that which is acquired through learning, that is, the assessed and positively evaluated knowledge and skills. Learning outcomes belong to a specific person and it has been proven (assessed or evaluated) in a socially accepted way (e.g. by means of exams) that the person possesses them (Croatian Qualifications Framework, 2009).

The curriculum defines learning outcomes as broad competences. The method of assessment depends on the level of study (undergraduate, graduate, postgraduate) and year of study. It is clear that in the later years of study monitoring and assessment becomes more complex, and learning outcomes are examined at higher levels of functioning in cognitive, affective and psychomotor areas (Vlahovic-Štetić, 2009). At the level of courses, however, learning outcomes are very specific.

Well-defined learning outcomes should fulfill the following three conditions (Erjavec, 2008):

- Student activity must be visible;
- Student activity must be performed;
- Student activity must be measurable.

Unfortunately, very often teachers think about learning outcomes only at the end of their course, when they have to examine the students' knowledge, skills and values (Vlahović-Štetić, 2009). Learning outcomes should in fact be considered when designing a study program, a course or a teaching unit because they are clear and measurable goals toward which teaching and learning should be directed, and according to which the assessment of student progress should be planned.

Therefore, course design should start with a clear picture of the learning outcomes. This is referred to by Biggs and Tang (2007; as cited in Vlahović-Štetić, 2009) as constructive alignment, and by Kovač and Kolić Vehovec (2008; as cited in Vlahović-Štetić, 2009) as constructive connectivity. In fact, only when a teacher has a clear vision of what students will be able to do after completing the course is it possible to plan the instructional and assessment methods. In the teaching process care should be taken that the content and the activities encouraged during the teaching process should be in line with the outcomes that will be measured. Therefore, the assessment of learning outcomes should be consistent with the planned outcomes.

Teachers can choose between different assessment methods, depending on their preferences but also on the abilities of their students, particularly students with disabilities. However, it is important that the chosen method can measure the planned outcomes.

### ***Useful tips***

*It is advisable to talk to visually impaired students in order to determine the most suitable way of assessing learning outcomes. If a written assignment is needed for the evaluation of a specific learning outcome, the teacher should find out what kind of assistive technology the student possesses and uses, and in what format the student would like to submit the assignment. Certain types of content (mathematics, physics, chemistry) can be assessed only in writing, using the*

*traditional means of writing Braille (Braille typewriter). It should be kept in mind that written tests also provide an insight into general competences (e.g. native language literacy).*

### **4.3. Link between learning outcomes, competences and qualifications**

Learning outcomes are essential elements of any curriculum and the stepping stone for a fundamental change in the education process despite the fact that in practice their formulation often comes down to satisfying the form prescribed by the Bologna process. Unlike the traditional, teacher-centered teaching, recent approaches are oriented towards the student and the learning process (not the teaching process). New approaches to the educational process put the competences acquired by the student after completing the study program in the forefront.

By combining the two concepts, learning outcomes and competences, we can claim that **learning outcomes are statements about which competences the student should have acquired upon completion of the teaching process.**

It must be mentioned that the acquired competences can also surpass the established learning outcomes (ECTS Users' Guide, 2004). By achieving the defined learning outcomes in the course of university education, the student develops and acquires competences necessary for employment. Students develop competences in the course of the learning process. Competences are developed by different teaching units and acquired on different levels of the educational cycle.

Learning outcomes are described as competences the student acquires after fulfilling all the obligations of a study program.

Learning outcomes are defined by teachers on the level of study programs, and competences are acquired by the person studying.

The level of acquired competences is expressed by a grade (mark).

There is a difference between competences and learning outcomes. Learning outcomes show the portion of the described competences acquired by a student, and grading is a method of evaluating the quality of that portion. **The desired learning outcomes and the estimated student workload are defined by the teacher** (in accordance with the number of ECTS credits). This

represents a foundation for the development of a teaching strategy and learning strategy, for setting the number of credits in a course and for the evaluation of what is learned. **The learning outcomes achieved** at the end of a study program depend on several factors. These are individual; they can include the desired learning outcomes (but may not, as when a student has not succeeded in mastering a course); there can also be some unforeseen positive learning outcomes.

The difference between learning goals, learning outcomes and competences should also be explained. *Learning goals* define what the teacher wants the student to learn and understand. The advocates of student-centered approach to teaching prefer to use the concept of learning outcomes in the organization of the teaching process (Divjak, 2008). By achieving the learning outcomes through the process of university education the student acquires *competences* for employment and self-employment.

Another term used in the field of higher education is *qualification*. This is a formal term for a set of competences at a defined level, scope, profile and quality, which is proven by means of a certificate, academic degree or any other public document issued by a competent authority.

The qualifications framework refers to integrating the levels of education in a single unit; however, it does not elaborate on the output competences of a particular study program (Vizek Vidović, 2009). For this purpose professional or qualifications frameworks are developed on a national or international level as a result of consultations between professional associations or bodies, and are based on determining the types and levels of competences necessary for practicing a particular profession and meant to serve as a reference point to employers, employees and creators of educational programs. These competences are also described on a relatively general level and are later translated into concrete and measurable learning outcomes on the level of an academic profile (Vizek Vidović 2009). The academic profile defines the academic goals, requirements and outcomes in a specific academic field.

The competences included in the academic profile of a specific study program or a group of related study programs are subsequently built into particular parts of the program – modules, courses and thematic units – and are described as recognizable and measurable learning outcomes. Learning outcomes are then directly connected to student workload (expressed in hours) and ECTS credits. Defining the learning outcomes and workload is essential for further development of the curriculum with regard to the chosen teaching approach, learning strategy and methods of testing the professional competences (Vizek Vidović, 2009). It is at this level that room can be found for

accommodations to the abilities of disabled students of the teaching methods and techniques and of the assessment methods used to measure of the level of acquired competences. Not granting students with disabilities access to the educational content and processes constitutes a breach of their right to (quality) education.

#### 4.4. Defining learning outcomes

When defining the learning outcomes, the teacher should **state in advance his/her expectations** of what the students will be expected to demonstrate to prove that they have learned or understood particular content or acquired particular skills. Terms used to define learning outcomes and demonstrate students' achievements are the following: *define, list, name, invoke, analyze, calculate, design, etc.*

Following the 1948 Convention of the American Psychological Association (APA), the American psychologist Benjamin S. Bloom formulated a classification of the goals of the educational process (Bloom, 1956). He considered learning a process of upgrading previous knowledge in order to develop complex levels of understanding.

Bloom (1956) proposes some action verbs that characterize students' ability to demonstrate their achievements (Table 2).

Table 2: Key verbs for defining learning outcomes<sup>v</sup>

<i>precise verbs</i>	<i>imprecise verbs</i>
analyze	know
describe	understand
define	appraise
make	memorize
compare	become acquainted with
differentiate	learn
argue	recall

By defining the cognitive processes, the teacher begins to reflect on how the student will approach the kind of learning process that results in achieving a certain outcome, and how to organize teaching situations and individual student activities that will efficiently lead to the desired learning outcome.

According to Bloom's Taxonomy<sup>1</sup>, learning outcomes are categorized in three interconnected domains (Bloom, 1956): cognitive domain of knowledge and comprehension, affective domain of attitudes and psychomotor domain of skills.

### (1) **Cognitive domain** of knowledge and comprehension

Knowledge is defined as a systematic overview of acquired and permanently memorized facts. Cognitive knowledge is defined as knowledge connected to mental ability or function. Within the **cognitive domain of knowledge and comprehension**, Bloom (1956) distinguishes among six successive hierarchical learning levels (learning level = educational result). The lowest levels are the least demanding for students and constitute more simple learning approaches. Higher levels are more demanding for students and imply using learning approaches that are more complex.

Starting from the most simple to the most complex, these levels are the following:

- **Knowledge**

Acquiring factual knowledge is the lowest educational goal. At this level, knowledge is defined as recollection of previously learned content. It refers to the basic knowledge the student must acquire in order to understand the sense of the subject s/he is studying. This recall refers to a wide range of content: from acquiring terminology and recalling specific facts to memorizing complex theories. All that is required at this level is to recall a particular piece of information, which does not necessarily mean understanding. The student should be able to memorize, define, describe, label, list or recognize.

- **Comprehension**

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<sup>1</sup> Taxonomy (Greek *tassein* – arrange; *nomos* – method) is a scientific discipline that categorizes and classifies taxonomic units in groups based on similarities and differences.

Comprehension is defined as the ability to reflect on the meaning of the acquired facts. This cognitive category of knowledge can be demonstrated by interpreting the memorized facts, summarizing, explaining or predicting effects or consequences. The educational goal on this level is higher than the previous, simple recall of information, and represents the lowest level of comprehension. At this level of knowledge, for example, the student should be able to interpret pictures, maps, tables and charts, turn verbal tasks into formulas, predict consequences on the basis of facts, give example(s), interpret, and paraphrase.

- **Application**

Application refers to the ability to use the memorized principles, laws, methods or theories in new, concrete situations. At this level, for example, the student should be able to solve a math problem, create a graph or a curve, or demonstrate the correct use of a certain method or procedure.

- **Analysis**

At the analytical level of knowledge, the student has to be able to separate the content into its constituent parts and understand its organizational structure. In the process, the student should be able to specify the constituent parts and the relations among them, as well as the organizational principles. This educational goal is higher than the levels of comprehension and application because, at this level of knowledge, it is necessary to have a combined comprehension of the content and of the organizational structure of the material. At this level, for example, the student should be able to compare, contrast, recognize implicit assumptions, differentiate between facts and conclusions, differentiate between causes and consequences, assess the relevance of information, analyze the organizational structure (e.g. of a work of art, piece of music or literary work).

- **Synthesis**

To synthesize means to create a whole out of separate parts. This educational goal highlights creative behavior, with emphasis on the formulation of new patterns or structures. Some examples of educational goals at the synthetic level of knowledge are the following: the ability to combine, set hypotheses, plan, reorganize, write a well organized paper, deliver a well organized speech (lecture), creatively write a story, poem or song, or design an experiment.

- **Evaluation**

Evaluation is the ability to purposefully assess the value of given material (e.g. a poem, novel, speech, investigative report or project). Evaluations must be based on precisely defined criteria. Educational goals at this level are the highest in the cognitive hierarchy because they contain elements of all previous levels with the addition of the ability to assess value, based on precisely defined criteria. Examples of educational goals at this level of knowledge are the following: assessing the adequacy of conclusions derived from given information, assessing the value of a piece (of music, art or literature) by using external standards of excellence, or assessing the logical consistency of a written material or a lecture.

## (2) **Affective domain** of attitudes

**The affective domain of attitudes** comprises feelings, values, appreciation, enthusiasm, motivation, and attitudes. The domain includes five levels listed from the simplest forms of behavior to the most complex:

1. Receiving
2. Responding
3. Valuing
4. Organizing
5. Characterizing

## (3) **Psychomotor domain** of skills

**The psychomotor domain** includes physical movement, coordination, and the use of motor skills. The development of these skills requires practice and is measured in terms of speed, precision, distance, procedure or execution techniques. The domain consists of five levels listed from the simplest to the most complex:

1. Imitation
2. Manipulation (established performance pattern)
3. Precision (accuracy and adaptation to different circumstances)
4. Naturalization (coordination and flexibility in the process of application)
5. Articulation (practiced routine movements)

### **Suggestions for further reading:**

Vizek Vidović, V. (ed.), (2009): *Planiranje kurikuluma usmjerenog na kompetencije u obrazovanju učitelja i nastavnika*. Faculty of Humanities and Social Sciences, University of Zagreb.

Divjak, B. (ed.) (2008): *Ishodi učenja u visokom školstvu*. TIVA and Faculty of Organization and Information Sciences, University of Zagreb.

Lončar-Vicković S., Dolaček-Alduk Z. (2009): *Ishodi učenja - priručnik za sveučilišne nastavnike*. University of Josip Juraj Strossmayera in Osijek.

### **4.5. Socially acceptable level of student achievement**

The acceptable level of students' efficiency refers to the values students have to acquire upon completion of a course or at the end of their education. The values are described by means of educational goals and learning outcomes, and refer to the activities students will be able to perform upon successful completion of a given study program at a level acceptable for society.

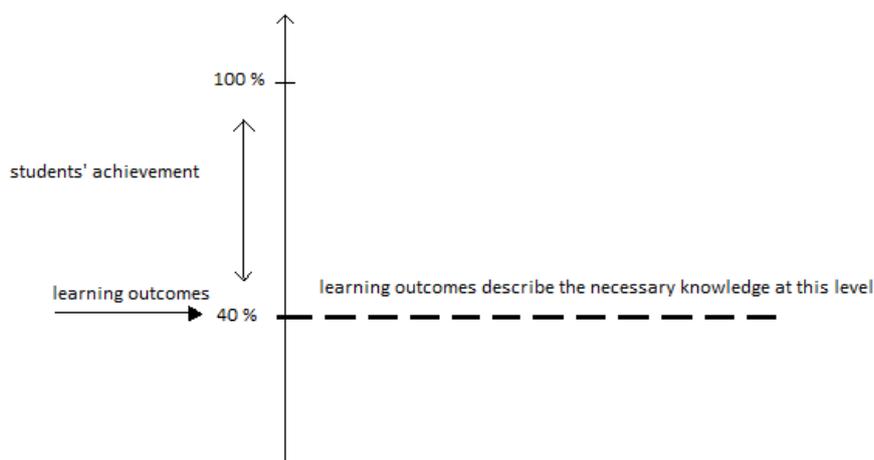


Figure 1: Illustration of the socially acceptable level of students' achievement (Moon, 2004)

Figure 1 is an illustration of students' achievement on a scale from 0 to 100 percent. The pass level is determined by defining the pass/fail threshold with the help of the **minimum learning outcomes**. This means that the learning area is specified by the learning outcomes, and that the described level must be achieved. The learning outcome, defined as a threshold, indicates to students what they have to learn in order to pass an examination (students have to be presented with a clear standard that they have to achieve in order to pass). The pass threshold is set for an average student, and this raises the question of the definition of average, whether it is 55 per cent or 65 per cent.

While defining the grading criteria, one should keep in mind the difference between the expected and maximum learning outcomes. For a passing grade it is necessary to fulfill the expected learning outcomes (socially acceptable level), and for the highest grade it is necessary to fulfill the maximum learning outcomes. The criteria for the remaining grades can be easily defined between these two criteria (the lowest and the highest). This span can be used to express the quality of higher education achieved by students' learning processes and approaches to the teaching process.

The following elaboration of students' achievements can also be found in professional literature<sup>2</sup>:

0-39 % – limited grasp of relevant ideas and issues;

40-49 % – the grasp of relevant ideas and issues is evident, although limited;

50-59 % – analytical in style and approach at times, although descriptive and prescriptive for the greater part;

60-69 % – analytical in style and approach, with some critical interpretation;

70-100 % – highly analytical in style and approach, with critical understanding and interpretation.

In addition to the minimum learning outcomes, **desirable learning outcomes** are also used in practice. They define what the teacher expects from an average student with regard to the level

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<sup>2</sup>[www.campus.manchester.ac.uk/medialibrary/tlao/MAP2/Guide%20to%20writing%20aims%20and%20intended%20learning%20outcomes.doc](http://www.campus.manchester.ac.uk/medialibrary/tlao/MAP2/Guide%20to%20writing%20aims%20and%20intended%20learning%20outcomes.doc) (A guide to writing aims and intended learning outcomes)

of achieved competences. In practice, this approach based on desirable learning outcomes is preferred, as it is more suitable for the European culture of learning and teaching.

#### 4.6. Conclusion

The chapter on learning outcomes provides an overview of guidelines necessary for putting the teaching process in the framework of the curriculum approach proposed by contemporary authors. It must be emphasized that this chapter contains guidelines for designing any kind of course, and as such it can be referred to as promoting universal design. Since this handbook is intended primarily for teachers who will design their courseware and the content of their course in such a way that they are accessible to all students, including students with disabilities, several important facts should be mentioned:

- No aspect of the concept, form or content of the course that we wish to make accessible to students with disabilities should in any way **threaten to compromise the academic standards**, meaning that the learning outcomes should be the same for all students, including students with disabilities;
- There are several ways to accommodate a course, that is, **make it accessible**: by concentrating on the way that particular students reach the learning outcomes, the way that they demonstrate the acquired level of learning outcomes during the learning process, and the way the teacher evaluates the acquired learning outcomes at the end of the teaching process;
- Any accommodation or intervention in the teaching process that makes the course more accessible should primarily be **agreed on with the students with disabilities** who require such accommodations in order to reach the set learning outcomes because they know best what they need in order to achieve the planned learning outcomes;
- While defining the learning outcomes, special attention should be paid to the likelihood of their being reached by **different groups of students**; when defining the learning outcomes, it is advisable to define the outcomes in such a way that they encompass all potential differences between students;
- What is accessible to one student may be completely inaccessible to another; learning outcomes planning is a creative and long process.

Learning outcomes as the goal of teaching are guidelines that enable the focus to be placed on students, not only on the teacher or teaching. This means that focus should be placed on all students, and for this reason the main purpose of this chapter has been to encourage thinking about the diversity we may encounter in classrooms. Being prepared for this diversity and knowing how to respond to it means acknowledging human rights and respect for dignity and integrity of every individual. The right to education is one of the fundamental rights that have to be respected, and this approach opens up new possibilities even when it seems that all options have been exhausted. We should keep in mind that the revision of study programs and course syllabi in terms of content and teaching methods is crucial in providing some students with new opportunities. That is essential, and makes all our efforts worthwhile.

## 5. TEACHING TYPES, METHODS AND TECHNIQUES

*Anita Vulić-Prtorić, Andrea Fajdetić, Sanja Lončar-Vicković, Josip Ćirić, Sarah Czerny, Asja Barić, Ksenija Romstein*

University education is a process that includes young persons of different abilities, characters, and motivations, who come from different family and cultural backgrounds. In addition, the same process includes teachers and other university employees that differ in their attitudes, motivations, knowledge, abilities, teaching styles, dedication to work and support they receive in their work. This encounter of different and unique people raises the question of whether the university is a place that can recognize, respect and utilize this wealth of differences. Will the teachers be ready to teach in such a way that their classes encourage students' motivation and interest in the content of their course, in such a way that it makes students focused on learning that content not merely to be able to reproduce it (at superficial level) but also to seek the sense and the meaning of what they have learned, in such a way that it keeps students hungry for more?

Do we pay enough attention to the differences among our students or do we treat them as a single, homogenous group? Is it merely because there are so many of them in the classroom and because we have so little time to deal with particular course topics?

In the past three decades, encouraging flexibility in teaching has become necessary in order to respond to the changes in higher education. An increasing number of school leavers continue their education at university level, which has contributed to increasing diversity in terms of abilities, learning skills, study expectations, and motivation for studying and achieving scientific careers. These changes demand of teachers flexibility and changes in teaching methods in order to encourage students to apply the learning strategies that would help them understand the educational content better, relate this content with knowledge in other areas and reflect on the purpose of learning and the meaning of what they are learning.

Different frameworks for encouraging diversity and putting it to use have been described in previous chapters. Universal design for learning is based on the fact that with every student comes a great variety of skills, needs and interests in learning. In order to make the most of such diversity and be able to offer quality teaching to *every student*, more profound changes in the selected teaching approach need to be made. That implies that merely adding to the didactic aspect of

teaching will not suffice unless it is accompanied by a deeper consideration and understanding of such changes.

### ***Example of good practice***

*Most students are likely to enjoy the use of visual aids in teaching, especially films and videos. However, it is interesting to note that most of them sit through films/videos rather passively unless given an assignment which makes them observe more closely, keep track and take notes. This kind of behavior might serve to illustrate to all students the difference between receiving information actively and passively: they could first be shown a film without additional instructions, and then be given specific tasks in terms of observation, assessment or notes for later discussion before watching the film again.*

It is also important to add that the discussion after watching a film might be an opportunity for the teacher to learn which students did not find this type of visual presentation stimulating, or that some students had trouble following it.

### ***Useful tip***

*In case there are visually impaired students in the class, they should be ensured a place to sit close to the television set or the screen on which the video is projected. It might be a good idea to ask those students whether the lighting in the room is adequate, and to adjust the lighting to make the content on the TV screen more visible. In case there are blind students in your class, it is necessary to provide an assistant to describe to them the visual content of the film, read the subtitles if there are any and, if necessary for understanding the context, give additional explanation to all auditory information. If there are deaf students, the video materials should be subtitled, or an interpreter of sign language provided.*

A recent study has also shown that students may have a slightly negative attitude towards a contemporary method of teaching that is otherwise considered attractive – online learning (Burger, 2003). In this study, conducted on a sample of 500 students of different faculties of the University

of Zagreb, students had a more positive view of traditional teaching methods than of online learning. However, these data do not suggest that online learning is not a good teaching method. It is a specific method with requirements different from those of traditional teaching methods, because it requires a certain degree of computer literacy from both the teacher and the students, and also from the university in ensuring that the all the technical requirements are met. Weaknesses in any of these links in the chain will translate into weaknesses of online learning as such.

**Useful tip**

*New technologies used by blind and visually impaired students enable them to be actively involved in classes and they significantly contribute to the equalization of opportunities for the blind and the visually impaired. With the help of assistive technology, the blind and the visually impaired can participate in online learning activities on an equal footing with other students.*

Nowadays there are many attractive methods of content presentation (a large number of creative methods have already been published in the handbooks *Aktivno učenje i kritičko mišljenje u visokoškolskoj nastavi 1 – 4* mentioned above) which can enrich the classes of any flexible teacher. For this reason, every teacher should assess their own preferences and willingness to change and add to their way of work. The *I as a Student* and *I as a Teacher* questionnaires have been designed for that purpose (Table 3).

Table 3: Teaching method self-assessment scales

**Please circle YES or NO for each question**

***I as a Student: What is your opinion of yourself as a student?***

1. Are you a naturally gifted learner?	YES/NO
2. Does being aware of the importance of the subject matter for you personally make learning easier?	YES/NO

3. Would you feel threatened if you were expected to change your perception of yourself as a gifted learner?	YES/NO
4. Is it easier for you to learn when you do not think about how you would feel in case of failure?	YES/NO
5. Do you feel that you are better at detecting relations and connections when you are not under great external pressure to perform successfully?	YES/NO
6. Do you feel that you really learned something only if you have had the chance to put it to use?	YES/NO
7. Is it easier for you to acquire knowledge when you are given greater planning freedom and responsibility in the learning process?	YES/NO
8. Are you more self-confident and creative when you rely less on the evaluation of others?	YES/NO
9. Is it easier for you to learn when you feel positively about the subject matter?	YES/NO
10. Do you believe it is possible to “learn how to learn”?	YES/NO

***I as a Teacher: What is your opinion on teaching your students?***

1. Do you feel that most of your students are gifted?	YES/NO
2. Do you ever try to talk with your students about how what you teach in your course may be important for them?	YES/NO
3. Do you make sure to let your students know, either verbally or non-verbally, that you believe they have the abilities necessary to complete your course?	YES/NO
4. Do you let them know that you are ready to help them go through whatever difficulties they may have that might be slowing down their progress?	YES/NO

5. Do you adjust your work pace when you notice that some students are having trouble mastering a particular section of the content?	YES/NO
6. Do you give your students enough opportunities during class to try to find answers to questions and come up with solutions by themselves?	YES/NO
7. Do you give them the option to choose the type of practice materials themselves?	YES/NO
8. Do you give them enough opportunities to state freely their hypotheses on possible problem solutions or their opinions on different issues?	YES/NO
9. Do you try to stimulate their interest in the subject matter?	YES/NO
10. Do you give them room to discuss the strategies they used in solving certain problems?	YES/NO

#### CHECK:

- Was YES or NO the predominant answer in the first part of the questionnaire? What about the second part?
- Can you conclude, based on the analysis of your answers, whether you think of your students as similar to you or different from you?
- Does that in any way affect the way you treat them when you teach them and evaluate their work?
- How did your teachers treat you when you were a student?
- How did that affect your learning and your self-confidence?
- Can you tell from your answers to which of the two previously described approaches to teaching you are more inclined?

Questionnaire taken from Vizek Vidović, V., Benge Kletzien, S., Cota Bekavac, M. (2002): *Aktivno učenje i kritičko mišljenje u visokoškolskoj nastavi*, pp. 12-13.

By analyzing the answers to the questionnaire in Table 3, any teacher can make a quick assessment of their own work style and determine to which of these two groups they belong:

- 1. Content-oriented teacher.** Teachers from this group think of teaching as a transfer of information, and they put an emphasis on content. This approach usually implies one-way teaching and, to transfer knowledge and skill, this kind of teacher most often uses traditional teaching methods, such as oral exposition, reading, *PowerPoint* presentations, work on texts, writing etc. Although the teacher's speaking accounts for over 70% of total verbal activity in class, it should be noted that these are the most commonly applied teaching methods. On the other hand, the knowledge acquired by these methods is often incomplete, strictly verbal and formal, and it does not encourage students' active involvement, interest, independence or working habits.
- 2. Process-oriented teacher.** Such teachers see teaching as a way to shape students' experience. Their goal is to enable better understanding and encourage students to make sense of what they are being taught. To accomplish that, two-way methods have to be used, more effort put into preparation for classes and the assessment of learning outcomes, and teachers should be thought of more as guides and less than as lecturers.

Does this mean that the teachers from the first group have a bad style of work which should be changed no matter what? Of course not. It is very difficult to change one's style of teaching, especially after many years of practicing it. But it is the duty of every teacher to enrich, adapt and perfect their style. Students are quick to show (most often through non-verbal cues) whether they find their teacher's methods interesting and stimulating. They are very grateful for every chance to be included in the teaching process, and teachers can learn a lot from this type of interaction.

### **5.1. Oral expositions**

Teachers who prefer oral expositions may try to make those more interesting for both themselves and the students and maintain the students' attention span for longer than the first 15 minute of the class (which is the average of how long students usually actively focus on the lecture) by some of the following interventions:

1. They can start the class by asking the students, for example, how they feel or what they think about some of the topics that will be covered in the lecture, what they know about them from other courses or (even better) ask them about their personal experiences.
2. From time to time during lectures, it might be interesting to mention some impressive facts that the students may not be familiar with. That might be another opportunity to hear their opinions.
3. Sometimes the amount of new information in a lecture is so large that the students can no longer grasp the bigger picture and how the new information fits in it. It might be a good idea to pause for a moment and remind them how the new information is related to previous lectures and why it is important for future ones.
4. All lesson content may be illustrated by anecdotes or interesting stories from everyday life, which takes up less than a minute of lecture time, and significantly raises the students' level of alertness.

These are just some of the short interventions which can have a significant effect on the students' focus and their satisfaction with the quality of the classes. More suggestions such as these can be found in *Presenting to Win* (Weissman, 2003).

### ***Useful tips***

*When using images and illustrations during an oral presentation, it is advisable to describe or explain the content of the images so that the visually impaired students in your class may know what they show.*

*If you have a blind or visually impaired student in your class, do not hesitate to use verbs such as "look" or "see", or other words that refer to visual features. Words such as "look" and "see" have their meaning in the vocabularies of visually impaired students, who see through all other senses (hearing, touch, smell etc.). You will not hurt the feelings of your visually impaired students by using these words.*

*Make sure you are facing your hearing impaired students when speaking. Check whether they are following the lecture successfully by occasionally asking them questions and including them in discussions.*

## 5.2. Printed materials

Printed materials are always a useful integral part of classes, whether the teacher relies mostly on oral exposition or applies more practical and visual methods of teaching. When designing printed materials, it is advisable to follow instructions on accommodating text to the needs of people with reading difficulties. Printed materials designed in this way will be easier to understand not only for students with reading disabilities (i.e. dyslexia), visually impaired students, hearing impaired students and students with ADHD, but for all students, because anyone is susceptible to eye fatigue when reading. When we spend a while trying to focus on a particular part of a text, the words can begin to appear blurry due to fatigue or eye strain, and tired people often make reading mistakes.

Here are some simple instructions which can help every reader, particularly visually impaired students, to benefit from reading as much as possible. However, it is always the best idea to consult particular students when making individual accommodations.

- **Text appearance:** It is recommended to use shorter sentences and paragraphs, and to indent the first line of every paragraph to divide the text into smaller units. Bullet points and numbered lists are preferred over continuous text.

*Line spacing is just as important. It is easier for the visually impaired to go through a text if the line spacing is set to 1.5 or 2. The accommodations that help dyslexic students can also help the visually impaired students who use their residual eyesight regularly.*

*When preparing printed materials, adequate **contrast** between the text and the background should be achieved. The difference in color is not the only thing to bear in mind when setting the contrast, because some pairs of colors that may seem to be in contrast can be perceived as nearly identical to someone with color vision deficiency (red and green, for example).*

- **Letters and symbols:** The use of sans-serif fonts (fonts that do not have additional strokes at the end of the main strokes of the letters) is recommended. Recommended fonts are *Arial*, *Verdana* and *Comic Sans*. It is also important to remember to select an appropriate font size, 12 pt or larger (no less than 11 pt). Also, it is useful to emphasize parts of the text by making them bold or highlighting them, while italics and underlining should be avoided. Underlining

titles and sequences of words can visually make words appear connected. It is not recommended to use several font types within a single text.

*Font size significantly affects reading speed and proneness to fatigue, especially if the selected font size is not adequate. Students with decreased visual acuity who do not suffer from visual field loss will set the font size to 16 or 18 pt. Students who use 20, 22 or 24 pt font size are advised to change their primary medium of education and rely more on Braille or other alternative formats to access information. Although most visually impaired students need their materials to be in enlarged print, students who suffer from the loss of peripheral vision are likely to prefer the usual font size (12 pt) or smaller.*

**Presenting information:** It is advisable to use color paper instead of white, although there is no general recommendation as to the specific paper color because different people prefer different backgrounds (most prefer light brown/cream-colored paper, which some might describe as yellowish or light yellow). Graphs are always useful for pointing out important information. The sections below provide further advice on text formatting that enhances readability.

### ***Examples of good and bad practice***

#### **Contrast**

Example of good contrast

Example of good contrast

Example of bad contrast

Example of bad contrast

### Font type and contrast

Example of good font type and contrast – Arial

Example of good font type and contrast – Arial

Example of bad font type and contrast – Lucida Calligraphy

### Font type and font size

Example of good font type and adequate font size – Arial, (16 pt)

Example of good font type and adequate font size - Arial (18 pt)

Example of bad font type and font size – Lucida  
Calligraphy (24 pt)

Example of bad font type and font size – Lucida Calligraphy (8 pt)

## Line spacing

Example of good line spacing (1.5 line spacing)

Example of good line spacing (1.5 line spacing)

Example of good line spacing (1.5 line spacing)

Example of bad line spacing (single line spacing).

Example of bad font type, font size, contrast and line spacing (single line spacing).

Example of bad font type, font size, contrast and line spacing (single line spacing).

Example of bad font type, font size, contrast and line spacing (single line spacing).

Example of bad font type, font size, contrast and line spacing (single line spacing).

### **Useful tip**

*Although there are general principles on how to adapt materials for the visually impaired, it must be noted that there are no two people who see in the same way.*

*If there are visually impaired students in the class, it would be best to find out which accommodations they find particularly important, and to arrange in advance the delivery of the materials to those students (e.g. by e-mail before the class or accommodated handouts). Some visually impaired students who lost their eyesight later in their lives might use text magnification or voice software instead of Braille or standard print. Such students might prefer to be given the materials in electronic format (pdf or Word documents).*

## **Written material for students with visual impairments**

Students with visual impairments may use different ways to access written information, and materials printed in Braille are one of the options that they use. Braille materials are used by a small number of visually impaired students. It should be noted that the most recent approach to Braille, which develops the alphabet in two directions, is both inclusive and complete. Fajdetić (2011) defines two forms of Braille, tactile and grapheme, taking into account its tactile and visual features as well as the right of both sighted and blind people to equal use, and explaining that in the 21<sup>st</sup> century this script loses its exclusivity and becomes the script that everyone can use. The Braille alphabet is written using Braille tactile graphemes (tactemes) (Fajdetić, 2010, 2011) and it has a visual variant when it is written in the grapheme form, using Braille graphemes (written in different Braille fonts). The Braille alphabet gets its tactile form using the tools for writing Braille and new technologies (used to access written information). Specific tools and aids that enable written communication and the use of Braille are slate and stylus, Braille writers and hardware accessories (the Braille line and Braille notebook).

If blind students are literate in Braille, they can also use written material published in Braille during their studies. However, it should be noted that, in comparison with other means of accessing information, Braille has its own advantages as well as disadvantages, such as the difficulty of storing and transporting Braille materials due to their bulkiness.

Why some blind students are literate in Braille and others are not is something that should be investigated. However, the fact remains that attitudes to Braille differ significantly, and the experts are divided in this respect. There are various definitions and approaches to the Braille alphabet found in the literature and Fajdetić (2009) singles out some of them: the script of the blind, a specific rehabilitation program, the primary education medium, a communication medium or curriculum.

### ***Useful tips***

*Among the positive results of inclusive education of blind students is also the fact that there are more sighted people who read and write Braille than there are blind ones.*

Although it is easy to learn Braille, university teachers are not expected to read and write Braille. However, if the assessment of learning outcomes requires the testing of literacy, or if the assessment involves various calculations that are easier to do in the traditional way, using the Braille writer, it is advisable for university teachers to choose – in consultation with the student – adequate support during the learning outcomes assessment. The support may be provided by a rehabilitator or typhlo-educator from a specialized rehabilitation center for the blind, a non-governmental organization, a student association or a university office for students with disabilities. If the above-mentioned forms of support are not available, the written Braille material can be read by the student.

Table 4: The Croatian national Braille notation system in the literary context (Fajdetić 2011)

1. skupina										
	a	b	c	d	e	f	g	h	i	j
	(1)	(12)	(14)	(145)	(15)	(124)	(1245)	(125)	(24)	(245)
2. skupina										
	k	l	m	n	o	p	q	r	s	t
	(13)	(123)	(134)	(1345)	(135)	(1234)	(12345)	(1235)	(234)	(2345)
3. skupina										
	u	v	x	y	z	i-znak (najčešće u nazivima tvrtki)	šestotočka	otvorena uglata zagrada	ž	zatvorena uglata zagrada
	(136)	(1236)	(1346)	(13456)	(1356)	(12346)	(123456)	(12356)	(2346)	(23456)
4. skupina										
	č	lj	ć	đ	š	nj	dž	otvorena i zatvorena kosa zagrada	nema navedenu funkciju	w
	(16)	(126)	(146)	(1456)	(156)	(1246)	(12456)	(1256)	(246)	(2456)
5. skupina										
	zarez	točka zarezom sa	dvotočje	izostavnik (apostrof)	upitnik	uskliknik	otvoreni i zatvoreni navodnik	otvorena okrugla zagrada	zvjezdica	zatvorena okrugla zagrada
	(2)	(23)	(25)	(256)	(26)	(235)	(2356)	(236)	(35)	(356)
6. skupina										
	kratkosilazni naglasak	dugosilazni naglasak	predznak za simu brojkau (povišena razina)	nema navedenu funkciju	paragraf	predznak za arapske brojke	predznak za veliko slovo	predznak za kosa (kurzivna) slova	kratkosilazni naglasak	dugosilazni naglasak
	(4)	(45)	(34)	(345)	(346)	(3456)	(46)	(456)	(5)	(56)
7. skupina										
	točka	crtica spojnica ili	raznješnica							
	(3)	(36)	(6)							

*The meaning of Braille graphemes varies and changes depending on the context of use. Braille is most commonly used in the literary context. Table 4 shows the single cell Braille code.*

### **5.3. Visual presentations (presentations in PowerPoint)**

Are teachers required to know this when they prepare graphic materials for their students? Do they need to be polyvalent experts in various areas, such as ophthalmology or information and communication technology? These guidelines are intended to assist teachers in the preparation of visual educational presentations which should help students with different levels and types of visual impairments, as well as students with dyslexia, to follow the educational content. Although preparing this type of educational materials presents the greatest challenge to teachers who teach visually impaired students, these accommodations may also be useful to other students and make it easier for them to access information (an example of universal design).

The human eye perceives colors in a specific way: e.g. it reacts differently to red than it does to blue. The color red is evoked by light consisting of longer wavelengths, and blue by light consisting of shorter wavelengths. When placed side by side in a presentation, on the screen or on paper, these two colors create an illusion of three-dimensionality and our eyes begin to strain.

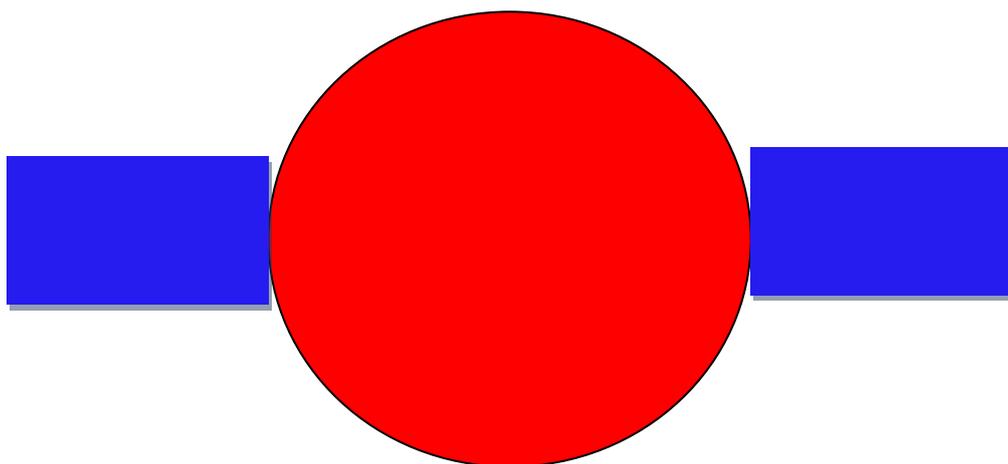


Figure 2: The colors blue and red placed side by side

*Description: The figure shows a red circle placed between two blue rectangles which touch the circle with one of their edges.*

The guidelines primarily concern the presentations used in class that are viewed on screen, but they are not limited to particular software programs. To make the guidelines easy-to-consult, they have been organized according to the elements that should be considered:

1. Text material:

- Font type and size;
- The quantity of text on a single slide;

2. Background of the presentation:

- Colors;
- Contrasts;

3. Illustrations:

- Pictures, photographs;
- Drawings, graphs;

4. Animation;

5. Sound;

6. Link between the visual and oral components of the presentation;

7. Additional presentation material.

### 5.3.1. How to present text

To make it easier for visually impaired and dyslexic students to follow the presentation, there should be only a few lines of text on a slide, ideally no more than five to seven. Each line should consist of about five to six words, with left alignment. There should be enough space between the lines (1.5 line spacing) to prevent *crowding* effects during reading and, for the same reason, each slide should have appropriate margins on all four sides of the screen.<sup>vi</sup>

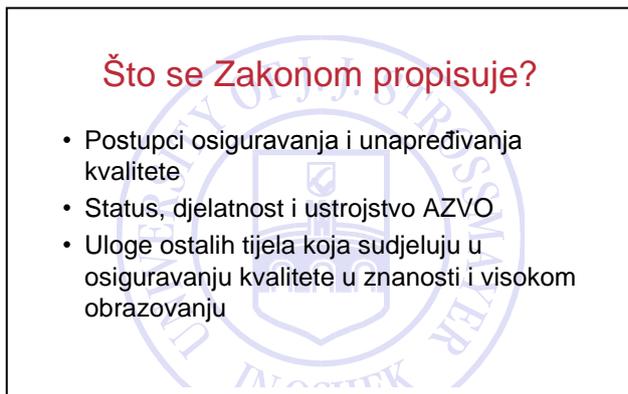


Figure 3: An example of how to create a good presentation

*Pros: six lines of text per slide, no more than six words per line, 32 point used as the smallest font size, Arial font type, only one font style per slide, emphasis is achieved by using boldface.*

*Cons: white background, patterned background.*

*Description: The figure shows a PowerPoint slide with a title written in large font and three bullet points written across a light-toned background.*

Font size must be large enough to be read by most visually impaired students sitting in the first rows and by students with normal vision in the back of the lecture hall. For this reason the recommended font size is 48 point, and it should never be less than 32 point.

It is better to use sentence case as it is easier to follow than a text written in uppercase.

As when preparing printed materials, sans serif font types (Comics Sans, Arial and Verdana) and other font types that are more legible than e.g. Times New Roman, should be used. Italics should be avoided as this style is difficult to read for people with visual impairments.<sup>vii</sup>

### **5.3.2. Presentation background – colors and contrasts**

First of all, it is important to note that there is no ideal screen color combination, as students have different levels of vision, or experience different difficulties in following visual presentations.

When defining the background of a presentation it is essential to combine contrasting colors. Desirable combinations include a white text on a dark background or dark text on an off-white background. A pure white background creates uncomfortable glare for people with low vision and dyslexia.<sup>viii</sup> Multi-colored backgrounds also make visual presentations hard to follow.



Figure 4: Examples of a presentation that is hard to follow due to its multi-colored background pictures

*Description: The figure shows two PowerPoint slides. In the slide on the left hand side, a dark-colored photograph is set as slide background and the text is written in black font. In the slide on the right hand side, a white text is written over a photograph with light and dark tones used as slide background.*

There are two ways to achieve contrast between text and background: with brightness and with colors. The highest brightness contrast is between black and white. The highest color contrast, on the other hand, is achieved by using complementary colors (red - green, yellow - blue). It should be noted that color blind people cannot discriminate color contrast, so the main contrast in a slide should come from brightness and not from color.<sup>ix</sup> Moreover, presentations designed like the one shown in Figure 4 are difficult to follow even for students with normal vision.

Many people suffer from glare and the best way to reduce it is to use dark colors (low brightness) for the background and bright colors for the text. This is helpful to visually impaired and elderly people<sup>3</sup>. A white font on a deep blue background is a very good combination.<sup>x</sup>



Figure 5: Examples of slides with a high brightness font on a dark background

*Description: The figure shows how the legibility of a presentation can be affected by contrast. The slide on the left hand side is a combination of white font and blue background, while the slide on the right hand side is a combination of yellow font and blue background.*

Students with impaired color vision have particular difficulties with red-green perception, e.g. when reading green text on a red background. Therefore, a red background is generally not recommended, but in cases when it is important to have a red background, it would be helpful to use dark red and apply white fonts.<sup>xi</sup> Moreover, black letters on a red background as well as red letters on a black background should be avoided. When using a green background, choose light green tones and a black font.

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<sup>3</sup> Artists and designers often use low contrasts; however, under poor light conditions, such combinations may be difficult to read even for people with normal vision.



Figure 7: Examples of a presentation that is difficult to follow

*Description: The content of the slide on the left hand side is presented in a diagram. The content of the presentation on the right hand side is presented in a multi-colored table.*

The examples in Figure 7 show how too much information, various colors, a considerable amount of text and a small font make the presentation badly designed, which makes it difficult for students to follow the lecture and the presented content.

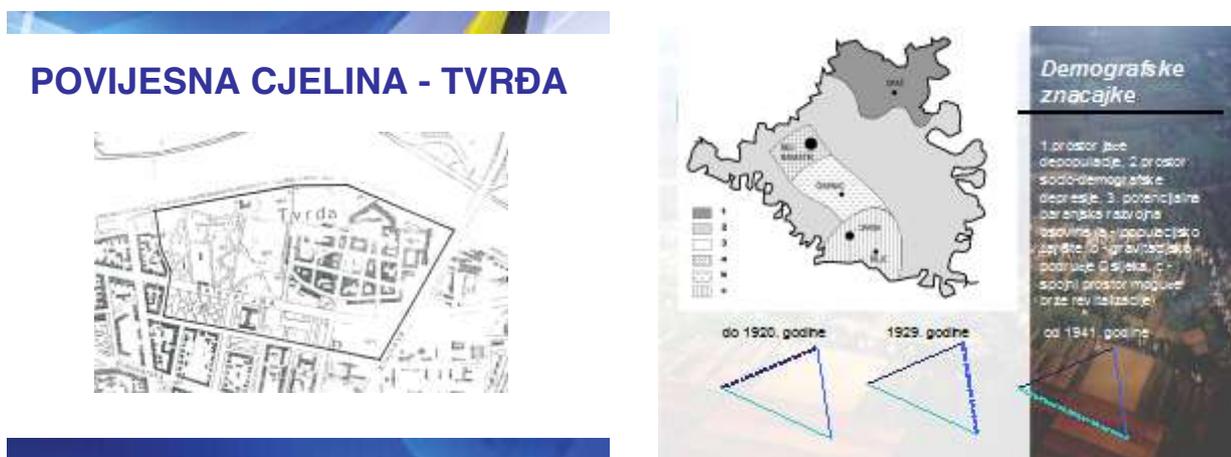


Figure 8: Examples of a well designed slide (on the left) and a badly designed slide (on the right)

*Description: The slide on the left hand side shows a plot plan of a historic site, positioned under a title. The slide on the right hand side shows the demographic characteristics of a geographical area.*

The slide on the left hand side in Figure 8 is an example of a well designed slide: a single illustration, a clearly-visible title, appropriate contrast between the text and the background and appropriate font size. The slide on the right hand side is an example of a badly designed slide: there is too much information on the screen, too many colors and backgrounds, an excessive amount of text, and the letters are too small, all of which makes the presentation difficult to follow.

### ***Useful tips***

*Since students with sight impairments differ in their visual functioning, the need for accommodations also differs from one student to another. It is desirable to ask the student which accommodations s/he prefers and finds most helpful for viewing the presented material.*

#### **5.3.4. Animation**

Dancing text effects, letters that descend on the screen one after another, rotating text, illustration effects, etc. make the presentation extremely difficult to follow, and are also potentially irritating. It should be noted that animation involving rapid changes and light effects (such as flashing, blinking, etc.) may cause epileptic seizures. If presenting the content in this form cannot be avoided, students should be warned and informed in advance.

### ***Useful tips***

*Since the use of animation in a presentation may present a problem for students with visual impairments and dyslexia, animation effects should be kept to a minimum or not used at all.*

#### **5.3.5. Sound in presentations**

Sound can be used in presentations so that students with visual impairments know when a new slide is shown. However, in such cases it is important to choose pleasing sounds that will not become irritating after a while (recommended *PowerPoint* sounds are *click*, *whoosh*, *chime* or *camera*). Students who have hearing impairments should be notified in advance about presentations containing audio materials. If they can face- or lip-read, the teacher should relate the content of the material; if not, a sign language interpreter should be provided.

#### **5.3.6. The link between the visual and oral presentations**

At the beginning of each presentation, the teacher should explain the type, length and purpose of the presentation and define when s/he will take questions (i.e. during the lecture or at the end).

The teacher should explicitly state the topic of each slide. It is helpful to explain the precise position of the sentences and illustrations that s/he is referring to on the slide (e.g. “In the lower left corner of the screen you can see...”). Although pointing with a light pointer (laser pen) to the region of interest is helpful for fully sighted people, it is not sufficient for those with visual impairments or a restricted viewing field, since it cannot be identified quickly (or even at all.)

The teacher should read aloud all the text that is presented on the slides so that it is easier for blind, visually impaired and dyslexic students to follow the lecture. Figures, illustrations and graphs should be individually explained because these students, as well as students who are slow readers, may have difficulty orientating themselves to find where to start reading or viewing. Some elements of a figure or graph, such as legends, are always difficult to discern and interpret, even for people with normal vision. Thus, it is helpful to explain each section of the graph (e.g.: “On this slide, the results are summarized in a graph. The horizontal axis shows elapsed time and the vertical axis the achieved strength of the concrete.”).

Some students have difficulty reading a long text presented on a slide within a given time. Therefore, the teacher should read the text slowly and clearly, without skipping any words. The teacher should also make sure that all students who want to read the text themselves have enough time before moving on to the next slide<sup>4</sup>. This is especially important for students with hearing impairments.<sup>xii</sup>

### ***Useful tips***

*If a visually impaired student informs the teacher that s/he has low contrast sensitivity, it is helpful to allow (additional) adjusted lighting, reduce glare from objects in the environment and provide materials that have high contrast. The highest contrast is between white and black or blue and yellow. Therefore, when preparing PowerPoint presentations, it is helpful to choose a black and yellow, blue and yellow or black and white background (the slide design should be as simple as possible), and to reduce the amount of information on each slide. The application automatically selects a larger font size for a smaller number of bullet points per slide, which is also helpful.*

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<sup>4</sup> If a long text is very important for the lecture, the teacher should refer to additional written materials for later re-reading. The materials may be sent to students by e-mail or some other means before or after the presentation.

### **5.3.7. Additional presentation material**

It is especially important to provide all hearing and visually impaired students, as well as students with dyslexia, with additional printed materials, as these can be a useful point of reference during the lecture. Additional presentation materials should be distributed before the lecture, and, if possible, they should contain additional information which is not mentioned in the presentation.

The supporting text should not be printed in grayscale, and the same principles regarding maximum brightness contrast between text, illustrations and background should also apply to the preparation of printed material.

For students with visual impairments and dyslexia, full page copies of presentation slides should be provided.<sup>xiii</sup>

For blind students, written materials should be printed in Braille or available in the appropriate format on a CD or memory stick so that they can follow the presentation on their laptops.

### **5.4. The use of the Internet in education (e-learning)**

*In my academic practice, I have had some experience with students with disabilities. A few of them had dyslexia, which made it very difficult for them to follow classes in Logic. One student had severe physical disabilities and a speech impediment. A friend of mine graduated from the university in spite of his blindness.*

*As a true geek, I was absolutely thrilled when I first came to use the Moodle platform five years ago. The possibilities were endless: apart from the usual uploading of presentations, links and other learning materials, the platform enabled students to submit their term papers, and with some effort even testing could be automated. Because of its high modularity, the platform is very useful to students with disabilities as well (a repository of video and audio materials, the possibility of video conferencing).*

*Dr. Josip Ćirić, Department of Information Sciences, University of Zadar*

### 5.4.1. What is e-learning?

Even at its earliest stage, the emergence of the computer was inspiring in terms of its impact on the education process. The works of science fiction between the two World Wars imagined a completely individualized learning program for children and caring robot mentors. Although we are still far from Asimov's robot Robbie, computers have contributed greatly to the diversity of learning and the inclusion of people with disabilities.

E-learning is a form of learning supported by digital tools and content. It may take place at a distance, e.g. by using the web, which is the case of online learning, or it can take place live in the lecture hall, by way of interaction between teachers, students and software.

There are five generations of distance education, and e-learning belongs to the latest one (Table 5). Two-way communication and interactivity, as well as the options for accommodations for students with disabilities, have increased over time.

Table 5: Generations of distance education (Babić et al., 2007)

Generations of distance education	Associated technologies	Type of communication
1 <sup>st</sup> generation	printed materials; delivery by mail	one way
2 <sup>nd</sup> generation	audio technology: radio, audio tapes amateur radio, telephone	one way two way
3 <sup>rd</sup> generation	video technology: film, television, videotapes videoconferencing	one way two way
4 <sup>th</sup> generation	computer-mediated learning	one way
5 <sup>th</sup> generation	e-learning: web, video streaming videoconferencing	one way two way

E-learning comprises multiple use of different types of information and communication technology (ICT), such as web based teaching, which uses a learning management system (LMS) and a virtual learning environment (VLE), such as WebCT or Moodle. Some benefits of the latter are the price (free) and the open source community, which enables additional adaptability of the package to a specific population, as it is possible to create modules and plug-ins without paying and/or breaking the copyright, unlike the commercial programs. In Croatia, there are several e-learning pilot experiments for primary and secondary schools, while LMSs such as Moodle are increasingly used at the university level. The e-Croatia Program (Central State Office for e-Croatia, 2010)<sup>xiv</sup> envisages a transformation of education hand in hand with the transformation of the Croatian society into an information society.

More information about e-learning can be found on the following websites:

- The skole.hr portal (Ministry of Science, Education and Sports, 2011) features e-learning materials made by teachers;
- The “Nikola Tesla” National Distance-Learning Portal (Ministry of Science, Education and Sports, 2011) provides teachers with an opportunity to learn about working with new technologies;
- The CARNet WEBrochure (CARNet, 2011) offers a good, concise introduction to creating school websites (as well as an accompanying course for working in CMS, a web content management system), and deals with the issue of accessibility for students with disabilities.

### ***Useful tip***

*Visually impaired students can be included in e-learning activities on condition that the materials are prepared in formats accessible to blind and visually impaired persons.*

#### **5.4.2. A model of organizing e-learning**

All teaching and learning systems should be built on two foundations: (1) the needs of the intended students and (2) the learning outcomes of the course or program (the knowledge, skills, and attributes that students want) (Davis, 2005). Regarding the operationalization of a course, the strategy for almost every course is to focus on the learning process (Anderson-Inman, 1999). Technology in general encourages some kind of productivity, and in the context of education we speak of the effective encouraging of student learning. Procedural facilitation tools enable students

and their educators to perform meaningful cognitive and academic tasks and they facilitate the process of guiding learners in the performance of some process (Scanlon, 2009).

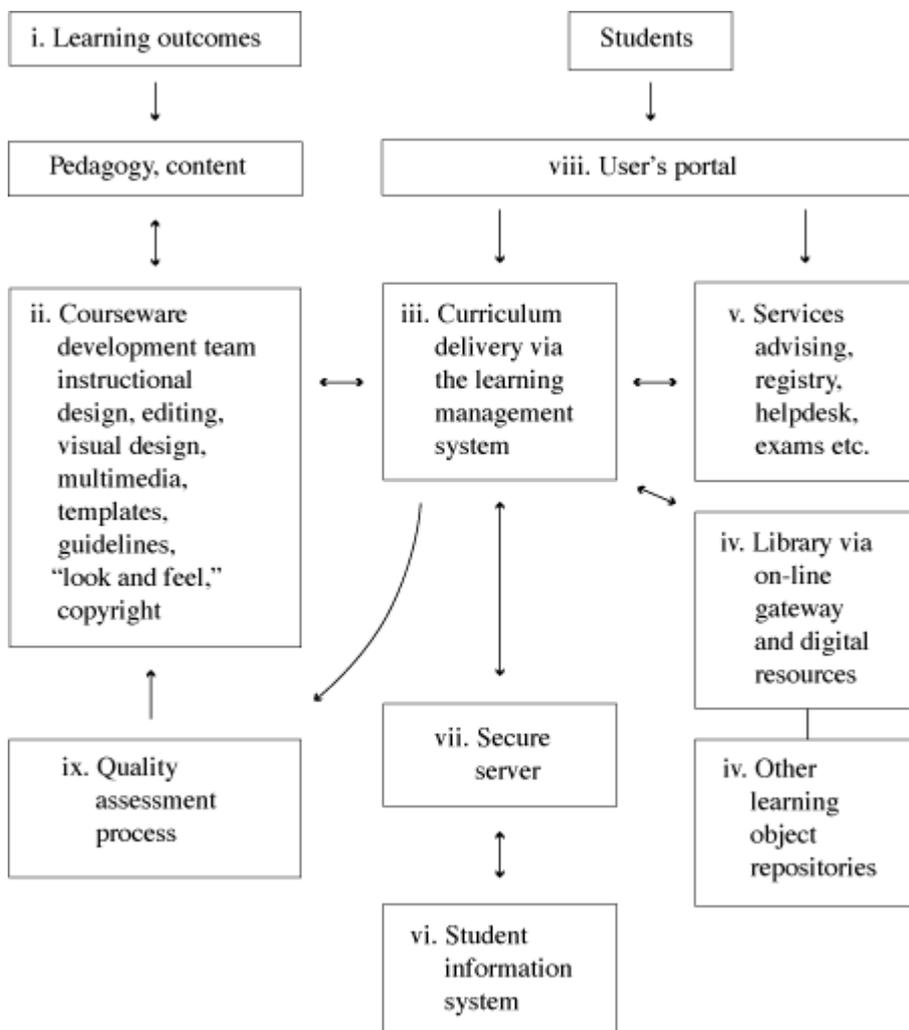


Figure 9: E-learning organization framework (Davis, 2005)

When modeling an e-learning system, technical performance ideally follows the learning goals and the students' needs. After an appropriate way of teaching has been chosen and the individual units have been identified, the job is delegated to the development team, which covers everything from instructional design (technical teaching solutions) to final design<sup>5</sup>. Likewise, there is

<sup>5</sup>Here the concept "design" is used as an umbrella term for editing the visual and interactive part of the interface, which are not necessarily tasks performed by a single person. Generally, one can distinguish between the programmer, the visual designer, the multimedia designer and the instructional designer.

quality assessment feedback, which should be done by an independent unit within the organization. The core team consists of an expert in the field of teaching who is also a teacher, a programmer and a designer; larger teams include experts in each role in the process. From the users' perspective, students access the user portal, identify themselves with a password and select the desired service: the LMS/VLE learning system, which offers the possibility to access the student information system (administration, student administration office, grades; access via a secure server to the student information system – SIS) and the digital library or another repository (video and audio materials, images, specialized software). Helpdesk can also be accessed via the portal.

For example, Strathclyde University in Glasgow uses Moodle as their LMS platform, but it is integrated into a specific information system called PEGASUS (Portal Engine Giving Access to Strathclyde University Systems). Students have to go to the student administration office only to pick up or hand in the required documents, while all requests and administration work is done via the electronic system.

#### **5.4.3. E-learning stakeholders**

In addition to the many models and problems related to describing e-learning, there are also many lists of key stakeholders in that process. For the purposes of this handbook, the following stakeholders will be distinguished: students with disabilities, teachers, learning technologists, student support services, staff developers and university administration. Each stakeholder makes specific demands of e-learning.

Students with disabilities are e-learning end users. Depending on the model, their role is more or less that of the service recipient. The typical problems they encounter are related to the lack of access to content and technical support (e.g. text-to-speech software is not installed on every computer; visual materials do not have accompanying textual descriptions); unseen difficulties (e.g. dyslexia, sight problems related to diabetes etc.); labeling (e.g. a student must have special identification to use accessible computer equipment; fear that after declaring one's disability, the student will have problems establishing equal relationships with colleagues and will be perceived as less capable of having a reciprocal relationship; fear of patronizing attitudes); institutional procedures (e.g. in some countries students have to identify themselves as persons with disabilities in order to claim accommodated courseware; elsewhere registering is mandatory; there is a lack of access to resources); financial issues (accessible equipment can be very expensive,

and not all countries have additional funding for such expenses). Students' success often depends on their own stamina, will and perseverance, and on discovering personal strategies for overcoming problems. An integrated e-learning system should minimize the differences in starting positions for students with disabilities.

In general, the positive experiences of students with disabilities with e-learning are threefold: (1) the use and availability of generic technologies (computer study rooms on campus and the computer network, e-mail, laptops); (2) the use and availability of assistive technology (screen magnification software, screen readers, electronic note takers), (3) the availability of electronic and non-electronic alternatives (e.g. presentations and their text versions; video materials and transcripts; charts and textual descriptions). Negative experiences are also threefold: (1) the use and availability of generic technologies (e.g. unavailability of computers, badly edited web files navigation, courseware that contains too many graphics or too much text formatting), (2) the use and availability of assistive technology (e.g. lack of such technology or outdated technology), (3) administrative issues (lack of funding for specialist technological solutions for students with disabilities, delays in acquiring them).

In the e-learning system teachers have to focus their activities around these two questions:

(1) *What can I do to make my courseware accessible to students with disabilities?*

(2) *In doing so, what are my specific roles and responsibilities?*

Studies have shown that only a small number of teachers make high quality accommodations to their materials in order to achieve better accessibility, from adhering to standards (e.g. World Wide Web Consortium<sup>6</sup>) to using accessibility validation tools. It is equally problematic that the majority of teachers are not familiar with different pedagogical approaches to organizing e-learning, such as the principles of backward design<sup>7</sup>, inclusive design, universal design for instruction (UDI), and proactive and flexible design. To illustrate, the basic features of universal design are the following (Seale, 2006, 71-2):

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<sup>6</sup> The first version of the W3C recommendation for adapting web content was published in May 1999. (URL: <http://www.w3.org/TR/WCAG10/>), the second in December 2008. (URL: <http://www.w3.org/TR/WCAG20/>). The checklist for accessibility validation according to WCAG 1.0 standards is available at <http://www.w3.org/TR/WCAG10/full-checklist.html>.

<sup>7</sup> Backward design is the approach to curriculum creation where the goals of education are determined first, and then the content and the activities, so as to reach better understanding.

- Equitable use: The design is useful and marketable to people with diverse abilities;
- Flexibility in use: The design accommodates a wide range of individual affinities and abilities;
- Simple and intuitive: Use of the design is easy to understand, regardless of the users' experience, knowledge, language skills or current concentration level;
- Perceptible information: The design communicates necessary information effectively to the user, regardless of ambient conditions or the users' sensory abilities;
- Tolerance for error: The design minimizes hazards and the adverse consequences of accidental or unintended actions;
- Low physical effort: The design can be used efficiently and comfortably with a minimum of fatigue;
- Size and space for approach and use: Appropriate size and space is provided for access, reach, manipulation and use regardless of the user's body size, posture or mobility.<sup>xv</sup>

Despite the limitations and the discouraging situation in the field, teachers should be aware of two things: (1) accommodations in accessibility are feasible from both the pedagogical and the technical viewpoint, (2) from the teachers' perspective, the fundamental principles of accessibility are proactiveness and flexibility.

From the position of the learning technologist, i.e. the person in charge of the technical implementation of courseware into the e-learning environment, the problems of accessibility are primarily of a technical nature. While in the US there is a union that has established the principles of accessibility with a special article of law, in Croatia the teacher is often the person who is responsible for the technical aspect of the e-learning environment as well. Unfortunately, it has been shown in practice that American learning technologists are not particularly familiar with these guidelines either (54% of them have little or no knowledge of Article 508; only 29% of all institutions have created courseware conforming at least to some degree to Article 508).<sup>8</sup> Luckily, with the technologists familiarizing themselves with the principles of universal design and user-centered design, an upward trend of compatibility is expected, which will certainly benefit from the existence of an increasing number of tools for evaluation, repair and validation of websites (e.g. LIFT, Bobby, AccVerify, InFocus, PageScreamer, A-Prompt).

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<sup>8</sup> Article 508 of the Rehabilitation Act (2001) requires of the US federal offices the development, spreading, maintenance and use of electronic and information technology whose goal is access to information for persons with disabilities (more information at: [www.justice.gov/crt/508/508home.php](http://www.justice.gov/crt/508/508home.php)).

The two key questions regarding accessibility from the perspective of student support staff are the following:

(1) *How to efficiently help a student with a disability to use e-learning materials?*

(2) *How to organize the student support service in order to help students to use e-learning efficiently?*

The answers to these questions are in the use of assistive technology (AT), whether it means acquiring it (e.g. Braille line or Braille writer, text-to-speech software such as JAWS, specially designed computer mice, trackball or keyboards with accessible keys or masks, portable electronic thesauri, programs for making mind maps and cognitive maps), assessing the students' needs for such technology, or providing training in basic skills for its use. Particularly important are accommodations in libraries, as all students have to use their services. The first issue is the existence of accessible materials (e.g. digitized books, audio books), the second issue is the accessibility of the electronic catalogue, where the same mistakes as in creating courseware are often repeated: illogically placed links, lack of descriptions of pictures or links, use of frames, navigation that prefers the use of a mouse rather than a keyboard.



Figure 10: Some assistive technology devices

*Description: The photograph shows several assistive technology devices: a numeric keypad with cursor movement keys, two keyboards with large letters printed in contrast (a white keyboard with black keys and white letters, and a black keyboard with yellow letters), a keyboard mask, a miniature keyboard, portable translators, three anatomically adapted mice.*

Staff developers, in this case the coordinators for students with disabilities, have the task to assist the staff in raising awareness about students with disabilities and accessibility problems. The usual way of completing this task, which has also proved to be the least effective, is the workshop. While there is resistance among the teaching staff to another quality assessment procedure, such workshops are often seen as a necessary evil. Except raising awareness about students with disabilities, staff in charge of professional training should organize training in working with assistive technology, determine good practice models, recognize the results of AT financing models and communicate with the users, who can be a very heterogeneous group when it comes to AT and accessibility. In addition to the workshops and the carrot-and-stick approach, creating strategic partnerships with parts of the university (groups of teachers, services) has proven to be more effective, as have online courses<sup>9</sup>.

The final stakeholders are the members of the university administration. Their focus on the topic of e-learning and accessibility is in directing the influence they wield in their institution to identify the existing and introduce new systems. Although their influence is considerable, little research has been done on this part of the academic community.

#### **5.4.4. Practical aspects of e-learning for students with disabilities**

Some aspects of creating materials adapted for students with disabilities which show how e-learning works in a virtual environment based on a learning management system can be illustrated using the example of Moodle. Moodle has been chosen because it is a very widespread LMS package at universities; it is an open source project, which enables enthusiasts to modify it to meet specific demands, and, no less importantly, it is free of charge. Furthermore, if we consider personal computer operating systems, we can find a lot of integrated solutions<sup>10</sup> for facilitating the work of persons with disabilities: screen reader, speech recognition, magnifier, predefined settings

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<sup>9</sup> Some online courses resources for increasing accessibility are TechDis (URL: [ww.techdis.ac.uk](http://ww.techdis.ac.uk)), Skills for Access (URL: [www.skillsforaccess.org.uk](http://www.skillsforaccess.org.uk)), ALERT: Accessibility in Learning Environments and Related Technologies (URL: <http://www.dur.ac.uk/tel.us/index.php?action=artikel&cat=30&id=62&artlang=en>), EASI (URL: <http://people.rit.edu/easi/>), Web Aim: Web Accessibility in Mind (URL: [www.webaim.org](http://www.webaim.org)), National Center for Accessible Information Technology in Education – AccessIT (URL: [www.washington.edu/accessit/index.php](http://www.washington.edu/accessit/index.php)), ATRC: Adaptive Technology Resource Centre Canada (URL: [www.utoronto.ca/atrc](http://www.utoronto.ca/atrc)), WANAU: Web Accessibility Network for Australian Universities (URL: <http://wanau.org/>).

<sup>10</sup> Not all of them are free if the OS is commercial, but they are included in the distribution. There are free versions of open source OSs, e.g. Ubuntu, which has the same options. More information on the availability of Ubuntu can be found on <https://help.ubuntu.com/community/Accessibility>.

of high contrast colors, assistance with working with the keyboard (the sticky keys in MS Windows), etc.

### ➤ Experiment

Maybe the best way for teachers-cum-web-designers to see if their website is (un)friendly to users with disabilities is a simple experiment: open your homepage or a web page with courseware in a browser and try to follow the links **without using the mouse**, i.e. using only the TAB key to move and the SPACE key to activate the link (like a mouse click). An even better way is to check how the page sounds when read by screen reader software, such as *Jaws*. The usual frustrating detail is the lack of description next to links or images (*Alt* option in HTML tags `<img>` and `<a href...>`). On the other hand, there are cases of exaggeration when images used only for the spatial layout of visual materials in the web document are named even though they carry no information, which is additionally confusing to a partially sighted or blind user.

### **Useful tips**

*Two good strategies when organizing e-learning materials are redundancy and informativeness. If teachers have or expect to have students with impairments, they should get informed about how to make the necessary accommodations. Some accommodation demands may be contradictory, e.g. more textual content suits blind and partially sighted students, but dyslexic persons would prefer minimalism in the visual and textual content. Redundancy helps in these situations: students should be offered multiple courseware versions. For example, presentations in MS PowerPoint or LibreOffice Impress can be stored on a website as a textual file. All that needs to be done is select the option "save as". Likewise, if chart descriptions are used, content will be more accessible to partially sighted and blind students. The use of frames is not advisable: much as they make web design easy, they are not compatible with screen readers. Basic guidelines on how to increase website accessibility can be found in CARNet's WEBrochure.*

Moodle is an extremely modular LMS, which makes adaptation to the teacher and student requirements easy. Apart from the usual options for uploading the courseware, calendar, integrated forum and e-mail service, the service can be used as a repository; students can submit papers, follow their course progress, as well as take a completely automated quiz different for each student, based on a question bank. Teachers have at their disposal tools ranging from planners to

software detecting instances of plagiarism in uploaded papers. The fact that this is distance learning presents an advantage for students with motor impairments. Every course item can contain a description, which facilitates navigation. The modules developed by a large community cover many aspects of teaching, from additional tools for math, foreign languages or learning through play, to integrated audio and video conferencing. As in an operating system, Moodle has predefined visual settings with large letters and a high contrast color scheme. The modules include several other interesting options:

- Live distance presentation (all users can follow the presentation while they are connected to Moodle Desktop);
- Live Teaching for holding classes live, webinars and office hours via video conferencing, with the option to integrate Skype;
- VoiceThread, a collaboration service that enables comments for multiple users to be used in the same multimedia presentation;
- Podcasts<sup>11</sup>;
- Mind maps, including those made in FreeMind<sup>12</sup>;
- A module for creating Leitner system flashcards;
- A module for creating an individual learning plan;
- Modules for voice recording and uploading to Moodle (e.g. teacher commentary, lecture recording).

In conclusion, technology is not a magic wand, but with a well thought-out teaching plan it can considerably facilitate the starting position of students with disabilities and offer them an opportunity for more active participation in the education process. Designing an effective e-learning program is a job for experts from various fields and requires constant accommodations. Good planning, communication with students about specific needs and a little extra effort can make any course more accessible.

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<sup>11</sup> A podcast is a means of distribution of digital audio or video content via a special web service. The application makes a list of all uploaded content on a podcast channel, which can be downloaded at will. The same application updates the list. It is similar to radio or television topical shows, the difference being that the user is not limited by the time of broadcast.

<sup>12</sup> This is a free, open source program for creating mind maps. Generally speaking, this type of application is particularly suitable for dyslexic students as it offers them a better visualization of knowledge. The program is available at <http://freemind.sourceforge.net/wiki/index.php/Download>.

### *Useful links*

*More information on creating accessible documents for blind and partially sighted students is available at the following links:*

University of Dundee

<http://www.dundee.ac.uk/ics/services/disability/accessibledocumentguide/>

Queens University

<http://www.queensu.ca/equity/content.php?page=accessibledocuments>

## **5.5. Practical classes**

Various out-of-classroom teaching formats are often offered by higher education institutions. The terminology describing such formats includes the following terms: exercises, practical classes, student training, fieldwork, etc. As any other teaching format, out-of-classroom teaching has general and clearly defined topics, content, goals and outcomes.

Some universities are creating new study programs complementary to the current focus of education. Contemporary approaches in higher education are based on defining goals that largely focus on practical outcomes that include honing students' practical skills. Diverse forms of practical training and practical work are becoming an integral part of study programs at undergraduate and graduate levels. According to Gibbs (2006), the significance of the new approach is evident in creating new possibilities, especially early use of qualifications in the working environment.

Combining theoretical knowledge and practical experiences should be employed as a planned activity, taking into account general and specific competences of each qualification level. In order to ensure competence development, it is crucial to carefully define the goals of practical classes. Defining the goals of practical classes and ways of achieving them are two essential parts of the process that need to be meticulously planned to make sure that student activities in practical classes are relevant (White, 1979) and performed in accordance with the study program. Practical classes enable and contribute to the following: (1) acquiring new and polishing existing skills; (2) helping students adapt to the working environment; (3) combining theoretical and practical knowledge; (4) connecting universities, faculties, academies and non-governmental sectors/citizen

initiatives; (5) focusing the topic of students' graduation theses; (6) increasing student employability.

The goals of practical classes are defined in accordance with the goals of a particular study program and/or specific course. Examples that follow may be similar to some of the goals of your own programs. Some goals of practical classes may include the following: (1) becoming familiar with the tools, equipment, devices or techniques; (2) applying some of the teaching methods/techniques; (3) facilitating the development and adoption of certain theoretical terms and concepts; (4) providing experience in the working environment; (5) assuming a variety of professional roles; (6) gaining experience in particular job positions.

As noted above, different study programs envisage a variety of formats of practical classes. The most common format of out-of-classroom teaching activity in higher education are the so-called exercises. Activities conducted in exercises allow students to gain direct experience and develop a range of practical skills. In addition to exercises, activities performed in student training, practical classes or fieldwork provide students with the same or similar wealth of experience. Activities conducted in practical classes can be organized during shorter or longer periods of time, during a single semester or in all semesters of the study program. Practical classes can also be organized as once-weekly exercises within the framework of a particular course. Students can make use of their gained experience for their graduate theses or for further studies. This traditional form of university classes offers an opportunity for students to acquire a range of practical skills important for their successful integration into the working world. Research results confirm the immediate benefit that students obtain through their participation in modules that are based on practical work (Nicholls, 2007).

One should not ignore the fact that student training creates a wider social impact in that it links different sectors: (1) universities and the business sector; (2) universities and the entrepreneurial sector; (3) universities and non-governmental organizations; (4) universities and other educational institutions.

The active involvement of students in carefully selected and appropriate activities of various organizations, institutions or companies facilitates the sensitization of potential employers. Practical training for students with disabilities raises disability awareness among individuals and the general public (employers, corporations), and confirms the fact that people with disabilities can compete for particular job positions, depending on their acquired qualifications. Direct involvement

in practical activities allows the employer to access students' competence and helps people without disabilities change the attitudes about the capabilities of people with disabilities. Direct work experience provides something of a guarantee that students with disabilities will have equal opportunities for carrying out certain tasks upon completion of practical training activities.

In addition, work experience offers students with disabilities the opportunity of early consideration about desired features of a future employer.

Timely sensitization of the working environment is further fostered by the student's mentor or training leader being well prepared. Preparatory activities may be conducted at workshops, conferences or by means of informative materials. Moreover, it should be noted that direct interaction between the training leader and the course coordinator is of considerable importance, owing to the fact that it provides the employer with an opportunity for timely planning and preparation as well as for introducing accommodations to the workplace for people with disabilities.

Despite the fact that students' experiences with practical training are mostly positive, contemporary literature refers to situations that constitute a challenge to the organization and planning of practical training. Negative attitudes cultivated by employers and training leaders, an unrealistic set of expectations about students with disabilities and their capabilities, along with students' reactions to new situations are some of the factors that make practical training a highly dynamic system fraught with challenges.

Students' reactions to new forms of higher education are one of the challenges of practical training. Students with disabilities may experience increased anxiety or low self-esteem as a reaction to the change of circumstances during the transition phase from the university to the workplace. Although practical training is not really a part of the transition process, some students might nonetheless experience similar emotions. Arguably, anxiety might surface during the administrative procedure of applying for student training, but also during the training. Such manifestations could be interpreted as a consequence of students' lack of experience and of having a small window of opportunity for developing self-esteem through proving themselves in different tasks. Lucas (2005) claims that a variety of factors affect the incidence of anxiety in students with disabilities: (1) students may think that revealing their disability status and placing an emphasis on it could have a negative impact on their employment opportunities; (2) students may be unrealistic about what might happen in the workplace and what is expected of them. Students' negative

experience of practical training could be enhanced by the attitudes of others. The third reason why students with disabilities might suffer from anxiety is that some of them believe that their disability is the reason for being turned down or not finding employment. Research indicates the existence of certain ethical doubts in this regard (Lucas, 2005). Some career development advisors express uncertainty about the fairness of singling out students with disabilities in the preparation of practical training and in providing them with support during the training.

### **5.5.1. Planning of student training**

The planning of student training is an important step, crucial for the successful implementation of this teaching format. Practical training is riddled with challenges that depend on the structure of the study program and desired competences. Study program coordinators and course coordinators whose teaching formats bind their students to taking part in practical training should do the following: (1) consider what job positions they would like to incorporate in their practical training; (2) make sure to carry out the analysis of the workplace and risk assessment; (3) define potential challenges and obstacles; (4) consider the kind of safety measures required for conducting practical training; (5) make sure that accommodations to the workplace have been made; (6) make sure that the contractual relationship between the university (faculty) and the institution/company where the training is to take place is established on time and that the contract features a privacy clause; (7) consider and optimize the realization of training activities with regard to transportation, student workload, tempo, rest, etc.

It is important that the preparatory stage of planning a course includes the process of defining potential difficulties, challenges and obstacles. Planning the needed accommodations that help facilitate the inclusion of students with disabilities in practical training is highly recommended. The implementation of training is directly organized by the training leader together with the course coordinator. If, within the framework of the study program, there is no one in charge of practical training, it is advisable to appoint a person responsible for student support during the organization and implementation of practical training. The training leader may participate in the first discussion with the employers and mentors aimed at making arrangements for reasonable accommodations required for students with disabilities.

Student training may be conducted at various locations. The choice of institutions depends on the goals of a particular study program. Practical training can be conducted in offices, laboratories, clinics, museums, archeological digs, schools, etc. Moreover, it should be noted that the choice of institutions depends on what is common practice at each university or faculty. In some cases it is common practice for a single faculty to find institutions in which students can fulfill their training obligations, while in other cases a group of faculties coordinates all the activities required for practical training.

In cases where teachers of a particular study program select and propose the institution or company where practical training will take place, it is recommended that they consider in advance what fundamental, legitimate and reasonable accommodations are required for students with disabilities. Some workplaces that have been selected are not easily modified, but require major accommodations.

It goes without saying that a diversity of practical experiences contributes to one's personal and professional development. In some cases, due to the required accommodations, the same places of practical training are repeatedly selected. Students with disabilities are referred to the same positions, which reduces the range of practical applications of theoretical knowledge. The reason for that lies with the organizers of practical training and their choosing the path of least resistance. Training leaders know in advance that particular workplaces are accommodated to students with disabilities and they refer their students to those organizations. Riddell et al. (2007) give an example of a course that students with dyslexia often enroll in because they know that those involved in running the course are sensitized to the needs of students with dyslexia.

Finally, it can be concluded that a theoretical approach to a scientific field is not sufficient for acquiring all competences and practical skills of a profession. Practical classes enable students to sharpen their existing skills as well as develop new and additional skills that complement the theoretical knowledge of a particular study program.

### ***Useful tip***

*Even at the stage of creating a study program, it is desirable to design and plan the most appropriate forms of practical training. Direct practical experience undoubtedly yields a range of positive outcomes.*

Direct working experience gives students an opportunity to test their own competences, which can help with the selection and narrowing down of topics for their graduation theses or final papers. Practical training serves to crystallize students' theoretical knowledge, which leads them in a desired direction and helps them focus their topic, as is desirable when working on a graduation thesis or final paper.

Having work experience for the first time and starting a professional career constitutes a challenge for every student.

### ***Useful tip***

*Each working environment has its own specificities and characteristics. It is desirable to create conditions for the adoption of skills and the development of ways to use different tools, resources, methods and techniques that can contribute to finding and keeping a job. For all the goals of practical training to be attained, it is necessary to select the tools, resources and activities whose characteristics fit the goals of a particular study program. It is advisable to avoid selecting the same positions (workplaces) for students with disabilities, and to ensure instead that practical training is held in diverse workplace environments.*

### **5.5.2. Assessment of training location and risk assessment**

With regard to workplace specificities and accommodations made to practical training in accordance with the nature and extent of students' disabilities, it is recommended to conduct an analysis which includes the assessment of each workplace and the entire working environment used for practical training. The purpose of the analysis is to glean insight into the adequacy of the workplace and its available resources, and to identify and minimize possible risks to students' health. The assessment is carried out jointly by the student with a disability, the training leader or course coordinator and the person selected to supervise the training. This serves to achieve coordination and shared responsibility.

Each discipline or study program have their own specific learning outcomes and student responsibilities which affect the risk assessment of practical training. This diversity makes is unlikely

that universal instructions and guidelines for risk assessment in all types of practical training will be created. Some disciplines, such as chemistry, engage students in laboratory work. In other disciplines, such as archeology and geography, students are expected to travel and take part in field activities.

It can be concluded that there is a wide range of risks and protection measures. Since practical training and different types of exercises constitute an integral part of some courses, each study program that includes practical classes can and should involve risk assessment and determine the appropriate protection measures prior to the beginning of practical training.

### **Useful tip**

*In order to select an appropriate place of student training, it is desirable to estimate the distance between the training location and the university. A convenient location of practical training facilitates transportation and reduces the amount of time needed to get from the university to the workplace. The proximity of the workplace can facilitate the movement of wheelchair users (students with impaired motor function) and white-cane users (students with sight impairments). In some cases there are poor connections between the place of practical training and the university. If the possibility exists, and if the student expresses the desire, practical training can be conducted in the student's permanent place of residence. Such an arrangement can be made as it enables students to actively participate in their local community, and due to the assumption that students with disabilities will seek employment in their permanent place of residence.*

*A student in a wheelchair will prefer to attend practical training in a physically accessible building. Attending training in a building without an elevator or a wheelchair ramp is likely to be difficult. It is desirable for the selected location to have disabled parking spaces for wheelchair users and spacious rooms which they can freely navigate.*

*The assessment of physical accessibility (for instance the existence of a wheelchair ramp, anti-slip tapes or elevators for students with restricted mobility), the accessibility of working areas and of tools/equipment/resources and material can help select a workplace for student training. It is therefore desirable that the training location has disability accommodations. The required accommodations depend on students' needs. **(More information on this topic can be found in the Physical Accessibility handbook).***

### **5.5.3. Accessibility of information and literature required for courses that involve practical classes**

Study programs which oblige students to attend any form of practical classes should underscore in all publications (guides, websites, etc.) that the practical component of a course or courses is obligatory. It would be advisable for the contact details of the person responsible for organizing practical training to be available before the beginning of the course (Ryan, 2004). This is important for students to be able to obtain additional information with regard to what is expected of them in practical classes. All course information should be available in an accessible format.

#### ***Useful tips***

*During the evaluation and selection of tasks and activities within the framework of practical classes, it is advisable to take into account the type of disability that the students who attend the classes have, and the learning outcomes of a particular course. In order to select appropriate activities, it is advisable to analyze tasks and activities and decide on appropriate accommodations, that is, ways to make information more accessible. The accommodations to practical activities can be focused on modeling alternative tasks, devising activities which result in developing the same relevant professional competences, on resources/tools required for performing tasks and activities, the materials used while performing tasks and activities, etc. The accommodation of tasks and activities is a continuous process. Therefore, it requires monitoring task and activity performance of students with disabilities. It is desirable to provide a variety of methodological/organizational types of activities and thus give students an opportunity to demonstrate their motivation and creativity, while stimulating their greater involvement in practical work.*

*In order to check whether the accommodations in practical training activities have been successful, students can be given the option to conduct self-assessment and assessment activities. They can also be encouraged to take notes on any difficulties faced during the practical classes. Similarly, a written record in the form of a journal can provide a valuable source of information about students' observations and experiences made in practical classes, which can contribute to and ensure a greater availability of accessible literature and practical training activities.*

#### 5.5.4. Defining potential challenges

Challenges while planning and implementing practical classes are often universal and easily recognizable. Recognizing the challenges and potential difficulties can be the result of the analysis of the place of practical training and/or the analysis of planned outcomes. The challenges can be directly related to: (1) the planned learning outcomes; (2) the preparation and accommodations in the place of practical training; (3) the preparation of the mentor and/or the training leader; (4) the preparation of the employer or company owner; (5) the preparation of students with disabilities; (6) the provision of necessary support.

#### **Useful tips**

- **Learning outcomes**

*If you are thinking about learning outcomes, it is advisable to bear in mind that the careful planning and defining of learning outcomes contributes to the clearer picture as well as to the guidelines that help with the implementation of practical classes.*

- **The preparation and accommodations in the place of practical training**

*The most common challenges in the preparation and accommodations in the place of practical training are related to the transport to the place of practical training, the accessibility of the building, the accommodations in the activities and the use of technology.*

- **The preparation of the mentor and/or leader of practical training**

*Teachers' negative attitudes can present a considerable challenge in the implementation of practical classes. A negative approach discourages, for example, students with disabilities to choose studies in chemistry (American Chemical Society, ASC). University teachers can have (stereotypical) attitudes towards students with disabilities, e. g. teachers with very little experience in teaching students with disabilities believe that sight impaired students cannot become scientists, for example chemists. According to Jones et al. (2006), many sight impaired students have the same cognitive abilities as their peers without sight impairments, but there is a considerable gap between the teachers' views on students' abilities and the resources that can allow students to realize their potential.*

*It is desirable for the person responsible for monitoring and guiding students during practical classes to plan and make appointments for meetings between students and mentors or student tutors in practical classes. One-on-one tutorials are extremely important for solving issues or enabling accommodations. It is desirable to provide one-on-one tutorial hours (for more information see the handbook entitled "Mentorship and Consultations"). It is desirable for the leader of practical training to make arrangements with the student about the office hours via e-mail, SMS, telephone or in person.*

- ***The preparation of the employer or company owner***

*Potential employers of students with disabilities can have doubts or fears. It is the student's responsibility, as well as the responsibility of the leader of practical training, to anticipate possible questions and to present the competences and the accommodations for enabling, for example, sight impaired students to get actively involved in immediate work activities. Or, to give another example, the employer needs to become acquainted with the way students with ADHD function, that is, be warned of their difficulty in staying focused, of their need for more frequent breaks while working, as well as of their need for rest and movement, and cautioned about the restlessness that could occur.*

- ***The preparation of students with disabilities***

*Sometimes care is not taken to prepare students with disabilities for practical training. The preparation can be carried out during a one-on-one conversation, in which the leaders of practical training help and guide students with disabilities towards a realistic and informed selection of the place of practical training. During the conversation the student is informed of possible barriers and accommodations. In situations when students need to present a CV or be interviewed, the leader of practical training should help and encourage them to emphasize their abilities and skills. For example, students with ADHD need to be prepared for the expectations and requirements in practical classes. It would be useful if students were to visit the place of practical training before the beginning of the training itself, in order to get acquainted with the environment and staff. In this way they can prepare in advance, with their mentor's help, for the working environment and for establishing good social relations.*

- ***The provision of necessary support***

*Depending on the capabilities of particular universities or faculties, different modes of support are available to students with disabilities. The student can be supported by student assistants, student tutors, employees of the student counseling center of a particular university, university teachers – generation mentors and/or others.*

#### **5.5.5. Accommodations in the place of practical training**

It should be emphasized that planning and careful thinking about accommodations for students with disabilities often results in improvements that are useful to all students.

The accommodations involve the following: (1) accommodations in transport to the place of practical training, (2) accessibility adaptations at the place of practical training, (3) accommodations in the access to information, (4) accommodations in activities and (5) accommodations in technology.

#### ***Useful tips***

- ***Accommodations in transport to the place of practical training***

*If a sight impaired student or a wheelchair user is to travel to a new location, it is crucial to consider the issue of transport. How will the student travel? Is there a possibility of using public transport? Is there an appropriate parking lot for those students who use cars as a means of transport?*

- ***Accessibility adaptations at the place of practical training***

*If the student has chosen a new location and if the information on the accessibility of the building has not been collected yet, it is necessary to carry out an assessment of accessibility standards and to implement reasonable physical accommodations. All stakeholders should be involved in the process of selecting reasonable accommodations, and the conclusions should be made available in writing.*

*While organizing introductory lectures it is necessary to ensure appropriate furniture arrangements in the room in order for the students who use wheelchairs to have access. If the sight impaired*

students use the help of a guide dog to get around, it is necessary to provide for a place suitable for the dog.

Noise and illumination levels should be assessed for hearing and sight impaired students. Noise level assessment is also important for students with Asperger syndrome, who might be disturbed by the noise. In this case, it would be advisable to find a place with quieter working conditions.

- **Accommodations in the access to information**

Hearing impaired students can use the help of a sign language interpreter during introductory lectures. It is desirable for the room to be well lit, so that these students can follow the lecture more easily. Information access will be additionally facilitated if the content of the lectures or presentations is prepared and sent by e-mail in advance.

- **Accommodations in activities**

Accommodations should not compromise the learning outcomes of a course, and it is therefore necessary to give consideration to the selection of the kind of accommodations that will be implemented. Reasonable accommodations may include: (1) accommodations in the workload and timetable, (2) accommodations in the length of the breaks, (3) accommodations in the modes of support.

It is advisable to arrange accommodations in the workload and timetable in such a way that they do not compromise the learning outcomes of particular courses. The change of environment can sometimes be stressful, and the activities can be tiring. Sometimes it is advisable to allow a part-time working day. Some students may need a day off to see a doctor or physical therapist, or simply to rest. Some students may find it easier to fulfill their practical training obligations on a part-time basis, and have them extended over the summer holidays.

During the training students should keep a journal. It is desirable for the leader of practical training to instruct students on how to keep the journal and provide them with the necessary information.

- **Accommodation in technology**

If assistive technology is required for particular assignments in practical classes, it is advisable to collect information on the following: (1) which hardware/software is required, (2) whether the students may have their own equipment or not, (3) whether it is possible to borrow the assistive

*technology from the university, faculty or academy or from another source for the purposes of practical classes.*

*The basic assumption is that the training is well prepared in advance. However, despite all the preparation and planning, unpredictable situations can occur. In such cases it is advisable that the student should have all contact numbers (the training leader's, the institution or company supervisor's) for necessary decisions to be made. It is desirable to determine the preferred way of maintaining contact between the student and the leader of practical training (by e-mail, by telephone) in advance.*

#### **5.5.6. Safety during student training**

The purpose of protection at work is to provide safe working conditions in order to prevent injuries and accidents during the training. Before the work activities begin, the training leader has to give safety at work regulations to the students, so that they could read them and follow them during the training. It is important to ensure adequate safety measures during the training.

Certain universities require that their students should get directly involved in professional activities as part of their courses or practical work. Such experiences can be positive (Gomez et al. 2004), as they prepare students for life after the university, instruct them to think about career development and provide opportunities for making contacts that make future careers possible (Fell and Wray, 2006). Precisely because of the fact that student training is not held at the university, many questions arise concerning the accessibility of particular courses to students with disabilities and the provision of adequate protection.

The employers and institutions that take students on for practical training can have their own rules (Teachability, University of Strathclyde) and attitudes towards what constitutes accessibility for people with disabilities and protection at the place of practical training. Because of that, preparations regarding the workplace, the activities and safety during the training should be done in advance. The obligations of employers, students and universities should be clearly defined at the initial stage of arrangement making (Atkinson and Hutchinson, 2005; Lisi, 2005). This approach enables recognizing potential barriers and necessary accommodations before the beginning of practical training.

## **Useful tips**

### **Laboratory (chemistry)**

*When making preparations for classes to be held in a laboratory, it is desirable to organize a meeting between teachers and students who will attend the classes. During the meeting the following accommodations can be arranged: (1) If pair work or group work is planned, it is desirable to choose a suitable partner or support person for the student with a disability; (2) If the student needs extra time, it should be provided, in such a way that extended time for carrying out a particular activity is tolerated. It is desirable to provide students with the opportunity to become well acquainted with the laboratory (emergency exits, safety equipment). It is important to ensure a passage wide enough in case of emergency. The vials containing chemicals should be marked with large print or Braille. Furthermore, depending on the planned activities, it is obligatory to provide all the protective clothing necessary.*

*Gravestock (2011) suggests that all instructions should be available both in written and oral form. It is desirable to provide written instructions in advance for students with ADHD and to go through them in the laboratory before the start of the training in order to demonstrate the instructions in a natural situation.*

*Source: The Center for Assistive Technology and Environmental Access.*

Students who have difficulties with motor skills of their upper limbs can take part in laboratory activities, although particular situations in the laboratory are challenging. How to include students with motor impairments? Different accommodations can facilitate their involvement in laboratory experiments. While working with liquids and solid material it is not necessary for all measurements to be precise; in other words, higher goals should be set while planning. It is advisable to provide and allow the following: (1) deviations in measuring liquids and solid material, (2) the fixing of materials to prevent slipping, (3) the use of holders and devices for taking and holding laboratory glassware, (4) the use of laboratory glassware made of plastic, (5) allow minimal hand use and give permission for the use of automated laboratory procedures. For measuring temperature it is advisable to allow the use of alcohol thermometers because they do not require precise positioning during use. Alcohol thermometers are much safer than mercury ones.

Sight impaired students can take part in laboratory activities, although particular situations in the laboratory are challenging. It is necessary to plan in advance how to get sight impaired students involved and how to ensure both safety and high quality during the training. While making various measurements it is desirable to: (1) present the content orally, (2) allow data collection via touch. For example, rulers and measuring tools with labels in large print or Braille, as well as voice rulers, can be used.

While measuring liquids it is desirable to: (1) use accessible equipment, (2) accommodate the content to enhance its visibility (increase the content), (3) present and describe the content orally. For example, it is desirable to provide the use of accessible equipment in the following way: (1) instruments with predetermined volume (1 teaspoon: 5ml, 1 tablespoon: 15ml, 1 cup: 240ml), (2) liquid level sensor (the auditory signal warns that the chosen laboratory vessel is full).

The activities of pouring, carrying and mixing liquids are particularly challenging for sight impaired students. In order to conduct experiments in a simple and safe way, it is desirable to provide: (1) the stabilization of materials (anti-slip surfaces fix the object to the surface, which makes the object easier to find), (2) unbreakable laboratory glassware; glassware made in a way to minimize the possibility of spilling, (3) the use of various accessible tools.

Sometimes assignments involve weighing. Sight impaired students can use the following accessible scales: (1) talking scales, (2) large display scales. Some scales allow tactile checks and can be used by reading tactile signs.

During the training in which sight impaired students are to measure temperature, they can do so by inserting the thermometer in a stopper (to make it stand still), or they can use an accessible thermometer, such as: (1) an alcohol (colored) thermometer, (2) a talking thermometer or (3) a large display digital thermometer.

Sight impaired students can take part in the activities of measuring time as well. It is desirable to present the information aurally and to increase task visibility to a maximum degree. The use of talking stopwatches and large display stopwatches should be provided for measuring time.

When doing calculations, sight impaired students can use talking calculators. They can use a Braille compass for orientation.

**More information on laboratory accommodations can be found on the following web pages:**

Center for Assistive Technology and Environmental Access,

<http://barrier-free.arch.gatech.edu/>,

<http://barrier-free.arch.gatech.edu/lab-motor.php>,

<http://barrier-free.arch.gatech.edu/lab-vision1.php>.

### **Fieldwork**

Geography and archaeology are examples of disciplines which involve a lot of practical experience and fieldwork. Simple accommodations will make it possible for students with disabilities to take part in fieldwork (Geography Discipline Network, <http://www2.glos.ac.uk/gdn/>):

*It is important to provide enough time, so that students with disabilities can have an opportunity to take a break or to take their medication. It is advisable to hold shorter meetings and to use visual and aural information to clarify materials prepared in advance. It is necessary to provide simple instructions, and to find out about the needs of particular students in order to make most of their abilities to hear or see.*

*In order to provide active learning it is advisable to use different teaching methods and to suggest different learning methods, that is, the use of different perceptual channels for the collection and analysis of information.*

*The basic assumption of successful inclusion of students with disabilities in fieldwork activities is to provide all forms of support (accommodations of materials and the environment, student assistants, etc.).*

*In order to minimize risk situations during the fieldwork, it is necessary to clearly divide the roles, to have a well developed responsibility system, as well as to delegate responsibility (to the leaders of practical training, mentors etc.). Each member of the teaching staff who is involved in the fieldwork participates in the creation of a safe environment.*

### **5.5.7. Contractual relationships and privacy assurance**

Some universities, faculties and academies regulate relationships with the institutions and companies which provide the implementation of student training. Sometimes the student and the company enter into a contractual relationship. By means of a contract between those two parties, interrelations are defined in the company where the student attends the training, in terms of rights and obligations of both parties. In order to enable the defining of contractual obligations as well as the signing of the contract, it is necessary to choose the place of practical training in good time.

Authorized persons are obliged to: (1) inform the students of their rights and duties during the training, and the required safety measures; (2) inform the mentors of their obligations as mentors; (3) inform the institutions or companies about the obligations of institutions that implement student training; (4) define all of the above in the contract, and ensure the privacy of students with disabilities.

At the meeting of the employers, students and leaders of practical training, the roles and responsibilities should be defined in a written document (Briel and Gretzel, 2001). It is important that everybody who is included in the process of practical training should have a clear picture of their responsibilities and obligations.

The disclosure and publishing of information on students' disability is a sensitive issue and a matter of personal choice. As already mentioned, some students are hesitant to disclose information on their disability for fear of getting their application rejected. Ryan (2004) suggests that students do a self-evaluation with the aim of reaching conclusions and getting a clearer picture of how their disability could affect their career development, which will ultimately help them to make decisions.

#### ***Useful tips***

*If the faculty usually signs contracts, the obligations and responsibilities can be defined in the contract. The responsibilities are usually divided into three areas: (1) workplace accommodations (who is responsible – the employer or the university, who will ensure access to work, which actions will be taken if accommodations are not implemented), (2) confidentiality (who is to be informed of the disability of students taking part in the training, what information is to be given to the*

employer), (3) financing (who will finance the accommodations if they are necessary; whether funds are available to finance accommodations and where the necessary information can be found).

*It is desirable to provide instructions for the training and the application materials. It is advisable that the instructions and application forms should be accessible. If possible, there should be an employee at the faculty who will help the student to fill in the forms, send the application and define the contractual relationships in a simple way.*

*It is important that the first conversation should be pleasant and that the student should get as much support as possible. During the initial conversation it is necessary to provide hearing impaired students with a sign language interpreter or a note taker. If an interpreter is not available, speech should be slow and intelligible, so that the student can interpret the uttered content. In any case, it is useful to check whether the student has understood everything.*

*If sight impaired students are at the training location for the first time, the navigation route and the environment in general are unfamiliar. Ask the students if they need help getting around and help them by acting as the seeing guide.*

*It is important to avoid discriminating students by determining in advance or repeating the same place of practical training, or by disclosing information on their disability without their consent.*

*Contemporary resources which deal with the topic of disclosing and publishing information on disability confirm that the teaching staff should encourage students to reveal their disability in order to be able to provide reasonable accommodations. Naturally, confidentiality (privacy) of information should be respected in the process. If a student wants to protect his or her privacy by taking into consideration all relevant factors, requirements and difficulties of the workplace, the leader of practical training should warn the student of possible difficulties.*

#### **5.5.8. Optimization of practical classes**

##### *Breaks*

A regular switch from work activities to rest periods is important during the implementation of practical activities. This is especially important for students with disabilities.

Depending on the type and degree of a student's impairment, additional breaks lasting for a longer time may be needed. Students in need of a longer break can back up their requests with medical documentation.

Duration of breaks is arranged with the person in charge of practical classes.

For example, partially sighted students need short breaks during the activities that require the reading of large quantities of written material.

When it comes to students with motor impairments and chronic diseases, the characteristics of impairment or disease, as well as the therapy, may cause a constant or temporary disharmony of physical and/or psychological status. This could result in a lowered energy level (fatigue). For example, moving from one room to another or the very act of coming to the classroom can cause fatigue for students with cerebral palsy or muscular dystrophy, and they might need a shorter adaptation period before the class begins so that they can follow the lessons. Breaks between the lectures that are too short and coming late to class can present a difficulty. Taking notes during lectures (with or without aids) as well as handling objects can require a lot of effort because of spasms, contracture of joints and muscular weakness, so the student will spontaneously take a break while taking notes. Sitting for a longer period of time can also cause difficulties so students might occasionally feel the need to take a walk and/or stretch their muscles. Students with chronic diseases may feel pain, as well as fatigue, or have concentration problems (because of their medicines, or as a consequence of surgery). With regard to these students, the teacher should tolerate their leaving the classroom from time to time or their lowered concentration levels during lectures. At the end of the lesson the teacher may check with students whether there is a part of the material that was skipped and whether an additional explanation is necessary.

### ***Useful tips***

*Some students with motor disorders or chronic diseases will need breaks and sometimes also medical care during the daily work duties. Flexible working hours and/or work in shifts should be made possible if that suits them better.*

## 5.6. Conclusion

One of the most important academic activities is devising and using adequate methods and techniques for university teaching. Depending on each teacher's qualities, the implementation of the teaching process can be expected to vary from one teacher to another. Some teachers will favor traditional teaching methods and techniques, while others will be more inclined to introduce and test innovative teaching methods.

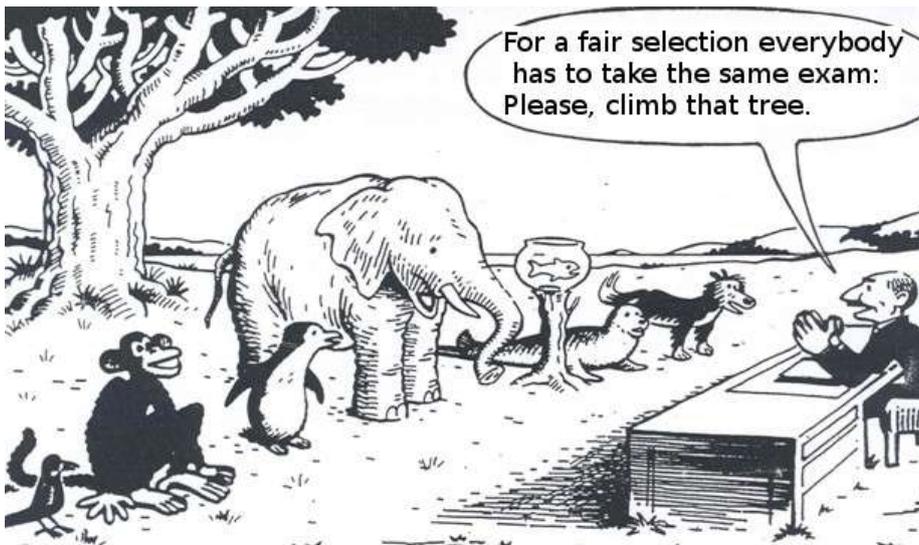
**Flexibility in teaching becomes an essential and indispensable characteristic of classroom work for every university teacher who should choose adequate and modern teaching strategies in order to make teaching motivating and accessible.** Adequate methods used in accessible teaching processes enable all students with disabilities to study successfully.

The content of this chapter provides university teachers with information and tips on creating and implementing ideas about reasonable accommodations by using adequate teaching methods and techniques. **The teacher should be able to steer students in the right direction to help them use modern learning methods, but also to inform them about the possibilities of becoming members of different support groups and about using support tools and services.** The development of a support system for people with disabilities is precisely what will enable this population to become a larger and more successful part of the Croatian student body.

## 6. ASSESSMENT AND EVALUATION OF LEARNING OUTCOMES

*Rosanda Pahljina Reinić, Valentina Kranželić, Elizabeta Haničar*

Putting students with disabilities into a separate category when it comes to higher education would be unfair. They are rather a part of a continuum which is characterized by differences in learning. They share similar challenges and difficulties with other students; sometimes the obstacles faced by students with disabilities are more serious, but sometimes they are not. This is also the case when it comes to evaluation and assessment (Healy and Roberts, 2004).



*"I cannot think of anything more unfair than... to treat all students as if they are the same, when they so manifestly are not (Elton, 2000; Healey and Roberts, 2004)."*

*Description: The cartoon shows a man sitting behind a rostrum in front of which there are animals standing in a line: a bird, a monkey, a penguin, an elephant, a fish in a fish bowl, a seal and a dog. Behind the animals there is a tree. The man addresses all of them and says: "For a fair selection everybody has to take the same exam: Please, climb that tree."*

### **6.1. Assessing and evaluating learning outcomes: An introduction**

Academic assessment is a key component of the learning process which, by measuring one's performance in tasks and activities defined in advance, determines the level of specific learning outcomes that have been achieved by a student. In addition to ensuring objective evaluation of formal learning outcomes, it also ensures that academic and professional standards are upheld. It must be accurate, objective, consistent and fair.

The assessment of learning outcomes is also the key factor that uses evaluation, support and feedback given to students about their work to determine their learning experience. In relation to this, the concept of "assessment for learning" is used to refer to assessment that is planned and carried out with the purpose of stimulating students' learning (Holden et al., 2008). Encouraging excellence in learning is achieved by improving the assessment process as follows:

- By encouraging students to participate in the learning process;

- By ensuring that assessment is in line with the learning outcomes and teaching methods;
- By placing a greater emphasis on approaches to assessment which increase opportunities for feedback;
- By supporting assessment with effective and timely feedback;
- By making students and teachers less burdened with assessment.

The purpose of assessment is to establish and show the current level of students' acquisition of knowledge, skills and attitudes, or whether the planned level has been achieved. There are three main purposes of assessment (Lončar-Vicković and Dolaček-Alduk, 2009):

- To enable students to move on to a higher level of education or to obtain a degree;
- To categorize students on the basis of their achievement;
- To improve students' learning.

Assessment results can be used for the purposes of broadening students' knowledge or for the purposes of evaluation. Assessing students' development or improvement is called formative assessment. Assessment which is done with the purpose of evaluation is called summative assessment. Grading is the assessment of all important facts about students' accomplishments during the course and is expressed in a grade.

Since assessment is carried out on the basis of learning outcomes, well-defined learning outcomes also contain more or less explicitly defined assessment methods. The way of formulating learning outcomes by using active verbs suggests the method of testing the achievement of desired learning outcomes. Different assessment methods correspond to different learning outcomes, and when learning outcomes are written down, the verb usually provides an indication about the assessment technique. Table 6 shows the assessment methods for each level of students' achievement (Lončar-Vicković and Dolaček-Alduk, 2009).

Table 6: Link between levels of achievement and assessment methods (Lončar-Vicković and Dolaček-Alduk, 2009)

Level of achievement	Assessment methods
memory	essays, written exams, oral exams
comprehension	essays, term papers, written exams, oral exams
application	performance assignments, presentations, written reports, essays
analysis	discussions, essays, term papers
evaluation	discussions, essays, term papers
synthesis	performance assignments, essays, term papers, graduation theses

Together with traditional assessment methods (oral exams, written assignments, tests) the following methods should also be used (Lončar-Vicković and Dolaček-Alduk, 2009):

- Assessment of students' work on a project (which shows students' abilities to work systematically on a research project, offer solutions to a problem and respond to specific needs);
- Assessment of individual student's contribution in group work;
- Student portfolio (notes about individual work and demonstrated skills);
- Essay assessment;
- Creative tasks on a specific topic;
- Assessment of specific communication and working skills;
- Attitude assessment.

In order to ensure and improve the quality of students' learning experience, learning, teaching and assessment must be considered interrelated. At the basis of this holistic approach to learning, teaching and assessment, there is a need for clearly defining the learning outcomes (what a student needs to know, understand and/or be able to demonstrate at the end of the learning

process), the learning and teaching methods (activities that stimulate successful learning), and the assessment and evaluation of the learning outcomes (ways of finding out what and how much the student has learned). Figure 11 shows a model of the cycle of teaching planning (Bingham, Drew and Pettigrew, 2005).

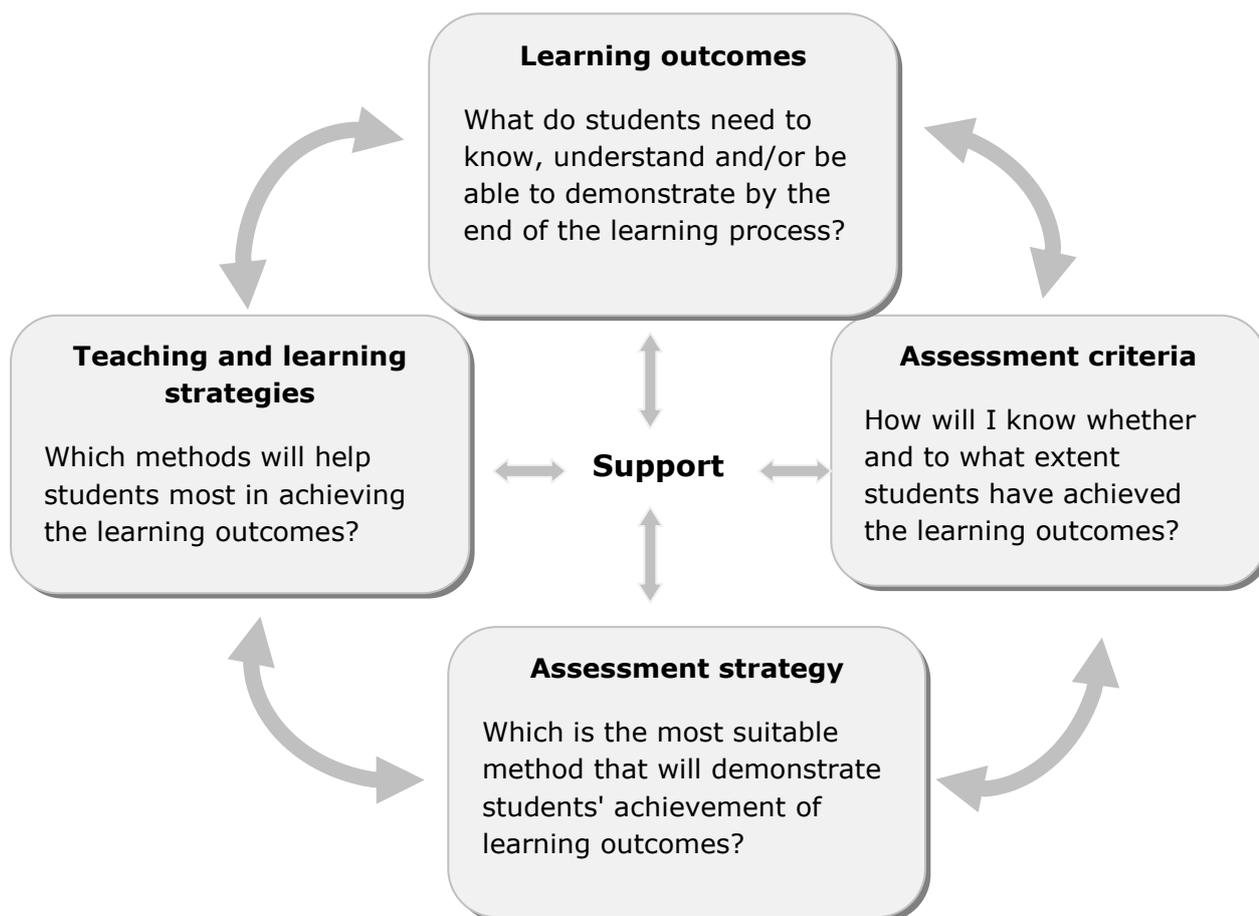


Figure 11: The cycle of teaching planning (Bingham, Drew and Pettigrew, 2005)

### 6.1.1. Methods of assessing learning outcomes

Assessment is a process in which the teacher tests the outcomes (results) of a student's learning by using tests or quizzes and different types of assignment. It also includes the context in which the teacher carries out this process, as well as the communication with different users.

Therefore, the goals of assessment include the evaluation of learning outcomes, communication with students and their employers, motivating students for future work and learning, and the organization of transfer from one phase of studying to another (Walvoord and Anderson, 1998; as cited in Divjak, 2009).

**Assessment should be directly linked to learning outcomes, and that link should be real and significant. On the other hand, assessment should be accurate, transparent and fair.**

Nevertheless, the characteristic of assessment that is probably the most important is that it enables and encourages further learning. Learning outcomes inform students about the level they are expected to reach. On the basis of learning outcomes, teaching methods are selected, as are the methods of monitoring students' improvement and the assessment of their achievement.

The efficiency of an assessment method depends on the learning outcomes that are being assessed and on specific assignments, and not only on the assessment method. Methods of assessing learning outcomes can be divided into two categories:

- Subjective assessment methods;
- Objective methods of knowledge measurement.

### **Subjective assessment methods**

Subjective assessment methods are processes that assess students' answers and work, and they include the assessment of oral answers, presentations, essays and term papers, performance assignments and essay-type assignments in written exams. Subjective methods are used to assess factual knowledge, as well as conceptual and procedural knowledge. They are especially useful for assessing a student's ability to consider and analyze complex problems for which all levels of education goals in the taxonomy of cognitive tasks might be required.

### **Objective methods of knowledge measurement**

Objective knowledge measurement is carried out by using objective assignments which require the recognition of facts, such as:

- Alternative assignments (deciding whether a statement is true or false);

- Multiple-choice assignments (choosing among several answers to a question);
- Matching assignments (matching the elements of two sequences of words or sentences);
- Ordering and sorting assignments (ordering sentences on the basis of a criterion) or recalling facts;
- Simple recall assignments (questions which require an answer consisting of one or several words or statements with gaps that should be filled in);
- Correction assignments.

Objective tasks are mostly used to test the first two levels of accomplishment: knowledge of facts and their comprehension.

## **6.2. Assessment of learning outcomes based on the principle of equal access for all students**

Individualized assessment procedures imply a respect for specific qualities and needs of each and every student with a disability. Its aim is to provide students with disabilities with equal opportunities to demonstrate their knowledge, skills and abilities during the assessment as those offered to other students. This must not mean imposing additional requirements, rules and accommodations on the students, but rather carrying out the assessment in such a way that suits particular students and was prearranged with them, and only if they express the need for individualized assessment (Commission for Students with Disabilities, 2008).

**Providing assessment accessible to all students without compromising academic standards can be quite a challenging task.** Until recently the practice included the application of a standard set of accommodations on a relatively restricted range of assessment activities, and accommodations were understood as an additional entity, separate from the teaching process. Recently that kind of approach has been replaced by the development and application of a more proactive and more coherent approach to assessment, within which the development of an assessment strategy accessible to all students can be presented through the following steps (The Open University, 2006):

- Defining the learning outcomes which do not prevent students with difficulties in reaching them without a good reason;

- Choosing the task (e.g. a question or an activity) that will be completed by students in order to demonstrate that they have achieved the required outcomes; it would be advisable to offer alternative tasks among which students will be able to choose;
- Choosing the method of fulfilling the task (e.g. a written answer, a presentation, a practical activity); it is useful to ensure alternative methods for students to fulfill the task for assessment;
- Identifying the obstacles which students with a disability could encounter while dealing with chosen tasks or applying chosen methods;
- Ensuring the alternatives or accommodations to chosen tasks or methods when necessary or justified without lowering the academic standards;
- Ensuring accessible physical surroundings and a convenient time schedule (time frame) for completing the task;
- Ensuring appropriate and accessible assessment feedback.

Assessment strategy, including accommodations for students with disabilities, should be an integral part of the formal process of curriculum design together with other accessibility issues concerning the learning and teaching processes.

### **6.3. Ways of accommodating assessment to the needs of students with disabilities**

Considering the need for ensuring opportunities for the demonstration of knowledge, skills and abilities of students with disabilities, it is necessary to plan the accommodations meticulously, by applying a flexible approach and at the same time keeping academic standards intact in order to ensure an impartial assessment that rules out unfair privileges or special treatment. The extent to which particular assessment accommodations are appropriate depends on the method of assessment, the student's needs and the learning outcomes.

It is possible to single out four types of accommodations for assessing the learning outcomes of students with disabilities (Freewood, Cunliffe-Charlesworth and Hewson, 2003).

#### **a) The change of assessment circumstances**

The assessment as such, as well as the learning outcomes and assessment methods remain unchanged. **However, standard assessment circumstances are supplemented** because otherwise many students with a disability would find themselves at a disadvantage.

Examples:

- Students with visual impairments dictating their answers in written exams to a scribe.
- Students with dyslexia requiring in a written exam a text in font size 14 printed on a cream background or in the form of an audio recording. Another option is to have an exam read out by a reader or personal assistant.
- Students suffering from ADHD requiring extended time for written exams and accommodations to text similar to those for students with dyslexia.

### ***Useful tips***

*As was mentioned before, ensuring assessment accessible to all students without compromising the academic standards can be quite a challenging task. For students with visual impairments, opting for a change in assessment circumstances should be done with a good reason and in line with reasonable accommodations. If a student with a visual impairment uses written communication (the Braille alphabet, large print) accommodation by means of dictation is not justified.*

## **b) The change of assessment**

**An aspect of assessment is changed** in order to satisfy the needs of students with a disability. The learning goals usually stay the same while some of the assessment criteria are changed.

Examples:

- Individual presentation or a videotape of a presentation made by a student with psychological disturbances who cannot give a presentation in front of a group, i.e., in class.
- Describing information represented in a diagram or a graph, or assigning an alternative, but similar task that is not based on a visual analysis in case of blind students.

### ***Useful tips***

*Although it is contradictory to what is mentioned above, if a diagram or a graph can be accommodated or presented in an alternative format, there is no reason why a blind student should not be assessed in the usual way, with adequate support and extended time.*

#### **c) Alternative assessment**

**Alternative assessment replaces standard assessment.** Assuming that they are formulated in a way that does not prevent students with disabilities in achieving them, the determined learning outcomes remain unchanged. However, the assessment criteria are changed.

*Example:*

- Since students with severe difficulties in using their writing hand or severe speech impediments are not in a position of taking part in a time-limited written exam on an equal footing with other students, it is necessary to consider an alternative form of assessment in terms of ensuring an extended time for work.

#### **d) No change**

**In extraordinary circumstances it can be justified to completely rule out the possibility of accommodation,** but that decision requires a careful consideration of each individual case. An argument for not making the change is usually related to the need for keeping the academic standards intact, e.g. in essential learning outcomes for courses or modules, or to the requirement for achieving external professional standards.

*Using new technologies in assessment*

The National Strategy to Create Equal Opportunities for Persons with Disabilities 2007-2015 (Official Gazette, 13/03) lists as one of its measures the use of new technologies with the purpose of increasing the independence and improving the quality of life of people with disabilities. Computer and Internet technology has a potential of offering help to students with disabilities by

providing them with access to a multitude of professional, educational, social and economic resources (Gorski and Clark, 2002; cited in Livazović, 2008). The accessibility of new technologies enables students with disabilities to take part in social trends on an equal footing (Vučić, 2009). If there is a need, students should be offered support for autonomous use of information and communication technology. One of the basic principles of new technologies is to increase the use of one's capacities to the fullest (Čop and Topolovec, 2009).

New technologies that are used as a part of exam technology should enable equal demonstration of knowledge and should not undermine the validity of the exam or put a student with a disability in a privileged position (Horvatić, 2007b).

Accommodations to exam technology depend on the type of exam and on the impairment rating of a student with a disability. The accommodations should not put students with disabilities in a privileged position in comparison to other students (Horvatić, 2007b).

### *Examples*

While sitting for an exam, students with sight impairments can use a computer with additional equipment, such as the Braille line and/or speech unit and/or portable computers for the blind – electronic notebooks (Horvatić, 2007a). Nevertheless, it should be stressed that the computer used in the exam should not be the student's own computer, in which all data and materials from the course are saved. Students use personal computers to take notes during lectures, and they have Internet access and access to teaching materials in an accessible format. Therefore, when a student is taking an exam, an "empty" computer should be made available, i.e., a computer without any files. In ideal circumstances, every faculty should have an accessible computer which could be used for exams.

Writing exams on a computer should also be made possible for students with dyslexia/dysgraphia (Horvatić, 2007a).

### **6.3.1. Written assessment<sup>xvi</sup>**

Written assessment can include essays, assignments, reports, dissertations, diaries, portfolios and workbooks. It may take place as course work or in an examination. The following reasonable adjustments may be employed, depending on the needs of the individual.

#### **Coursework essays and reports**

Written coursework difficulties may relate to organization and writing skills, fatigue, accessibility of resource materials or the availability of assistive technologies.

The amount of writing required may need reducing, either by amending the type of essay required or by providing alternative methods of presentation. You could consider setting alternative essay titles or set tasks in which students work intensively on a few selected texts rather than having to read widely.

Some students with mental health difficulties or specific learning difficulties have difficulty meeting deadlines and may require more time to complete their written coursework. You could consider negotiating an alternative deadline with the student, but extreme flexibility or open-ended arrangements are likely to be unhelpful and may even be counterproductive because the student may fall behind the rest of the group.

Hearing impaired students and students with specific learning difficulties may take longer to do the reading for an assignment and to produce a well-written essay, so they may need to ask for an extension. Without the support of a tutor for students with hearing impairments or a dyslexia tutor, their essays may contain mistakes of syntax and grammar. It may be appropriate to consider alternatives to long pieces of written work, such as final papers and/or graduation theses, for such students.

*Students with visual impairments may use assistive technology and submit their papers via e-mail or some other media (USB stick, CD). Remember, this group of students may also need extensions.*

## **Timed written examinations**

Making appropriate adjustments for disabled students in a written examination can require specialist knowledge as it is very important that students' preferred requirements are fully considered.

As a rule, only a small number of disabled students may be unable to do written examinations. If rest breaks and additional time allowances add up significantly then an alternative form of assessment may be more appropriate. Depending on students' particular needs, you could consider giving a seen exam paper or assess learning outcomes by replacing a written exam with an additional piece of coursework<sup>xvii</sup>.

Depending on students' specificities, you could take into account the following good practice suggestions for written examinations applicable to all student groups:

- Exam questions should be clear, direct and phrased using short, unambiguous sentences.
- Tests and any supporting materials should be written using the previously mentioned guidelines for presentation accommodations. Old and original source materials that may be difficult to read (e.g. because they are handwritten or because the print is unclear) should be transcribed.
- Provide exam papers, instructions and any supporting materials (e.g. texts in open-book exams) in appropriate alternative formats.

Here is a short outline of recommendations or guidelines for disabled students undertaking written examination.

### **Venue**

Whenever possible, written examinations should be held in fully accessible venues. Disabled students need not be separated from other students. This type of accommodation may be used in extreme situations and at a student's request. For instance, providing this accommodation may be all that is required for a student with certain mobility difficulties, such as a wheelchair user.

Sometimes it is necessary to provide a separate venue for students (e.g. for students with attention deficit disorder or ADHD, if requested). This may be in a room with other students who also have different examination arrangements, i.e. testing accommodations, or in an individual

room with an invigilator. Students with certain medical conditions may need to do their examination in a room with easy access to a nearby toilet.

### **Additional time**

Students may require an additional time allowance in an examination for a variety of reasons. A student with specific learning difficulties (e.g. dyslexia, dysgraphia, ADHD) may process ideas more slowly, a person with writing difficulties may write slowly and with difficulty. Students with reading difficulties may require additional time for reading exam papers and any supporting materials as well as reading back and checking their own work. Students with ADHD (attention deficit disorder) may require additional time due to reading and writing difficulties. Where additional time is required for writing, the actual amount of time may depend on the individual student's needs and whether they are writing by hand or typing.

### *Examples*

*Testing time for students with hearing impairments may be extended by up to 100%.*

*Testing time for students with visual impairments may be extended by up to 100%; however, doubling testing time is not a reasonable accommodation if the written exam has a simple layout (text only) without any images or complicated diagrams and if the student has acquired the skills needed for using the available new technologies.*

*Testing time for written assignments may be extended by 50% for students with dyslexia, dysgraphia, dyscalculia and ADHD (Horvatić, 2007b). For courses where spelling is essential, e.g. foreign language courses, it is necessary to extend testing time by at least 50% so that students may check their work and, if necessary, correct any mistakes in writing or spelling. Any subsequent correction should be accepted. You may consider deadline extensions for the submission of papers by up to 25% in comparison to other students (Draft Guidelines for Equal Study Opportunities for Persons with Dyslexia, 2010).*

### **Rest breaks**

Some students may require rest breaks, for example those who experience pain and fatigue or who have difficulties concentrating on a task for a longer period of time. Visually impaired

students, in particular students who are almost completely blind or those with highly impaired vision who use large print instead of Braille in their education, experience eyestrain after longer periods of looking at something. They may therefore need breaks to rest or relax by looking through a window or observing nature (green grass surfaces and trees relax and “rest” the eyes).

Rest breaks may be scheduled in, for example as ten minutes per hour, or “stop the clock” break arrangements can be used to allow the students to get up and walk around, rest or use the toilet as they need to. This may be a useful strategy for dealing with medical requirements, anxiety, pain or fatigue.

### **Assistive technology**

Students may require access to a computer, with or without specialist software, or other equipment in a written examination. In this respect, visually impaired students tend to use screen reading technology that includes speech output for each action and navigational element. On the other hand, students with specific learning difficulties are helped by text to speech programs that have speech output for text only in the reading window. For instance, dyslexic students who use text to speech software to proofread essays may also require access to it in a written examination. Visually impaired students are also likely to need access to the same assistive technologies that they normally use. However, they should be provided with headphones so as not to disturb other students undertaking written examination.

Hearing impaired students and those with dyslexia may have difficulties constructing answers in written language and may need access to a dictionary and a spell checking software. Some students, particularly those with visual impairments, may need to receive the exam paper and any supporting materials in electronic format, so that they can use magnification software<sup>13</sup> or screen reading software with voice output. The use of specialist equipment may in itself require an extra time allowance. Furthermore, some students may require access to non-IT equipment in exams. In this respect, hearing impaired students and those with dyslexia may be allowed access to a dictionary or a handheld spellchecker. Visually impaired students may need aids such as additional lighting, an electronic magnifier (CCTV) or writing paper with thick lines. Students who have difficulties using a standard chair and desk could use a back supporting chair, a height adjustable desk or writing slope. It is important to emphasize that all of the above mentioned

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<sup>13</sup> Magnification software – a program that enlarges screen content.

accommodations may and should be employed if they do not bring into question academic standards and learning outcomes. The element being accommodated and the one being assessed cannot be the same, which means that all elements of a written exam may be accommodated except those under assessment, i.e. those prescribed by learning outcomes.

### *Examples*

*For some students with visual impairments, exams (fill-in-the-blanks questions or similar) may have to be provided in large print on yellow/cream or white matte paper. Font type and size, as well as line spacing, are defined in agreement with the student.*

*Exam format may have to be accommodated for some students with ADHD. The font should be slightly enlarged (14 or 16 points) and spaces between questions should be larger. Questions should be printed in bold capital letters on yellow/cream or white matte paper.*

In general, all elements of a written exam may be accommodated except those being assessed, that is, those elements prescribed by learning outcomes. However, it should not be forgotten that “accommodating parts of a written exam” does not mean to completely replace all written examinations with oral ones.

### **Scribes and readers**

Students who have difficulties with the process of writing may require a scribe or amanuensis to write or type to dictation in a written examination. These are usually students who have difficulties transferring thoughts to paper (e.g. dyslexic or dysgraphic students, students with hearing impairments), those whose handwriting is illegible due to manual dexterity difficulties or dyspraxia or those who can only write slowly and with difficulty. Visually impaired students are unlikely to be able to read materials if these are not adequately accommodated or if the students do not have access to adequate assistive technologies. Therefore, they may need help with reading questions or writing down answers.

These days students who may have needed to use a scribe in the past may choose to use assistive technologies instead.

If a disabled student requires human assistance to do an assignment, the help of a personal assistant or student tutor may be provided. Personal assistants or tutors must undergo training during which they receive detailed instructions on how to help disabled students in a part of an exam or during the whole exam depending on the student's needs. Assistance may take the form of reading the questions, turning pages, handing over pieces of equipment or setting the accommodated/specialist equipment, drawing, partially assisting disabled students to finish project work according to their instruction, or writing to their dictation. If a disabled student is being assessed in a separate room, both the teacher and the personal assistant must be present (Horvatić, 2007a, Horvatić, 2007b).

### *Examples*

*Students with visual impairments may receive full or partial help of a personal assistant or peer tutor. The personal assistant or peer tutor may help with reading the questions, sketching and drawing, writing down answers and doing project work according to the instructions of a disabled student when this is in compliance with the learning outcomes. Depending on the preferred type of access to information, the assistant may focus on making or preparing those materials that best present all the information and interpreted content.*

*For hearing impaired students a sign language interpreter (if the student uses sign language to communicate) has to be present in oral examinations. It is also important to ensure that instructions are simply phrased, and to provide written instructions if possible.*

*When it comes to hearing impairments, the following accommodations may be needed:*

- *Verbal instructions by the invigilator may need to be given in writing;*
- *Consider replacing long essay-type examination questions with objective short answer questions.*

*Personal assistants or tutors help students with physical disabilities to do an assignment or project work partially or completely, according to students' instructions. Furthermore, they can help with the reading of questions, turning pages, handing over pieces of equipment or setting the accommodated equipment, sketching and drawing according to students' oral instructions and writing to their dictation.*

## **Timetable**

Some disabled students may require their exams to be rescheduled, i.e. changes to the existing examination timetable need to be made. For a variety of reasons, some disabled students may not be able to do morning exams and the exam should be re-scheduled for later in the day. Some students may not be able to tackle two exams on one day. For others, additional time allowances may make it impossible to sit an exam on the following day.

Written examinations may be particularly stressful for students with mental health difficulties and dyslexic students, so it may be agreed that an alternative form of assessment of learning outcomes is more suitable.

Depending on the student's individual needs at the time of the examination, arrangements may be made to use a room with a smaller number of students or an individual room or to use a known invigilator or allow the presence of a buddy.

### *Example:*

*Depending on the nature of their disease (e.g. asthma, diabetes, epilepsy, Crohn's disease, etc.) students with chronic diseases should be granted flexibility in scheduling the exams (only in the morning or in the afternoon, and similar) if necessary, and allowed to take breaks during the examination.*

*If visually impaired students use materials transcribed in Braille or assistive technology, it is customary to double the testing time. However, this recommendation should be understood as an option rather than a general rule for all visually impaired students.*

### **6.3.2. Oral assessment<sup>xviii</sup>**

Oral assessment might take the form of a presentation or viva voce examination. Depending on the type of difficulty, some disabled students find oral assessment an easier way of demonstrating learning outcomes than written assessment. However, oral assessment may present significant difficulties for students with certain impairments who may require access to an alternative type of assessment that still provides an acceptable test of learning outcomes. Students

with other impairments may be able to undertake oral assessment but may require some adjustments in order to do so on an equal footing.

### *Examples*

*Students with visual impairments and those with manual dexterity or mobility impairments may need additional equipment or human assistance to support them in the delivery of a presentation. For some, assessment criteria may need to be modified if they relate to body language and engagement with the audience. During individual consultations ways in which to improve personal presentation skills may be suggested.*

*Specific individual arrangements will be needed for students with hearing impairments who use spoken language or lip and face reading to communicate and for those whose speech is difficult to understand.*

*Many students with specific learning difficulties find oral assessment relatively easy to manage as long as they are well prepared. However, some can become too anxious to take part. In these situations it would be advisable to refer them to one of the student counseling centers found at many Croatian universities (e.g. University of Zagreb, University of Zadar and University of Rijeka) or those run by nongovernmental organizations.*

*Some students with mental health difficulties find the stress and anxiety of presentations intolerable and so, if learning outcomes are tested through a presentation, it may be particularly difficult to assess their achievement fairly. Peer assessment may be particularly problematic as students with mental health difficulties may not have good social relations with their peers. If no suitable adjustments can be made, an alternative assessment activity should be considered.*

*Oral assessment is often used as a testing accommodation for visually impaired students. It is justifiable if it does not compromise the assessment of targeted outcomes, for example written expression, text formatting, access to information and the like. However, if written assessment is completely substituted by oral assessment in all stages of education and the visually impaired student has acquired the necessary writing skills, the validity of using only the latter type of assessment is questionable.*

The following are some examples of reasonable accommodations of oral assessment of learning outcomes.

### **Changing the format of oral assessment**

- Students who have problems giving a presentation in front of other students may be allowed to give their presentation in front of the student assistant or use a video recording of the presentation;
- When it comes to students who find longer oral exams particularly exhausting due to difficulties concentrating, pains, fatigue or getting tired when speaking, oral exams should be divided into several parts with adequate breaks in between.

### **Assessing skills and performance**

- Assessment of presentation in which presentation skills and techniques are under assessment (for example, speech clarity and making eye contact with the audience) should be handled with extreme caution.
- Involuntary and inappropriate body movements, speech impediments or grimaces should not be assessed as a part of the presentation style.
- Some students should be allowed to give their presentation while seated.
- For students who do not speak in a clear manner, longer time for giving the presentation should be ensured because of the need for repetition and explaining certain parts of the presentation.

### ***Useful tips***

*Students with vision impairment, like all other students, acquire presentation skills and techniques. The presentation style of these students can be significantly improved if they are given feedback and if they are instructed in detail what they need to change in their presentation in order for it to be adequate. For example, it is advisable to advise students (on one-on-one basis) on the appropriateness of certain body movements, positions, etc. which they may be making or adopting during the presentation.*

### **Using additional supporting strategies**

- Students may need additional assistance in their presentation, such as a PowerPoint presentation, or a presentation handout.
- In situations where students are allowed to consult notes during their oral exam, notes in an appropriate alternative format should be provided.
- Students that use a communication aid in their presentation should prepare the answers to questions in advance and keep them on the aid so that they may use them during the assessment.

### **Specific adjustments for students with hearing impairment and communication difficulties**

#### **(for example, speech impediments)**

- Oral assessment of students who, due to their speech impediments, work with a communicator or a person who speaks in their place, may require more time.
- In some cases it is necessary to have a room with an induction loop or an FM system installed in order to achieve easier reception of speech information.
- It should be kept in mind that 70 % of the content received through lip reading involves guessing what the speaker said.
- Deaf or hard of hearing students often misinterpret or misunderstand the question during oral exams. For this reason they should be allowed additional time for the exam so that the question can be repeated or explained. It is advisable to check if the student has understood the question correctly by asking them to repeat the question.

### **Language assessment**

- Oral assessment where students are required to speak a foreign language may be replaced by or supplemented with written assessment.
- In most students with hearing impairment, it is not possible to make an aural assessment of foreign language comprehension by using an audio recording. Instead, an appropriate alternative can be provided. For example, if the audio track is on a CD, the person who is there may repeat it, thus enabling lip or face reading.
- It is important to mention that study program coordinators should carefully consider the implications of the accommodations in oral and aural language assessment because they can

affect the purpose of the assessment and by doing so influence the achievement of the learning outcomes.

### *Example*

*With regard to students with hand motor impairment, thought should be given to ways in which the learning outcomes in a course dealing with the Croatian Sign Language could be modified so that an acceptable level of acquisition of course content is achieved. For example, this can mean that, if a student is unable to achieve complete production of sign language, the focus can be placed on the reception, interpreting from sign language and transcription. In this way the student can achieve some of the learning outcomes necessary to reach an acceptable level of accomplishment in the course.*

*Students with vision impairment can fully participate in the language teaching programs. There is no reason to skip written language assessment even if the student with vision impairment is blind.*

### **6.3.3 Practical assessment**

Practical assessment includes the assessment of practical exercises in the form of workshops or practical exercises in laboratories and the assessment of field work or work on a research project. To assess the work done in practical activities, we should carefully consider potential obstacles and determine appropriate accommodations in order to satisfy the needs of all students. A large number of accommodations related to practical assessment are similar to those implemented during the written assessment of learning outcomes. Some circumstances demand the usage of an alternative to practical assessment, that is, the usage of an appropriate back-up method of learning outcomes assessment.

Some possible adjustments to practical learning outcomes assessment are described further in the text.

- Practical assessment should be carefully planned because of the need for additional time and breaks.
- Additional time for performance should be ensured for the whole group when assessing collaborative practical exercises and activities that include other students.

- Work under the tutorship of a student assistant should be ensured in practical activities involving students with endurance difficulties, students with vision impairment or students who are not able to handle or use equipment due to motor difficulties.
- When necessary, accessible tools and aids should be made available.
- In some circumstances, when this does not affect the learning outcomes and when it is not possible to carry out assessment in any other way, students should be allowed to simply describe the way in which an assignment should be performed instead of asking for a demonstration of the practical assignment.
- With regard to students with hearing impairment, giving verbal instructions while students are performing a practical assignment should be avoided.

#### **6.3.4. Online assessment**

Online assessment includes computer assessment and exercises, presentations by using a CD or web-page content and the assessment of optical character recognition. In certain circumstances online assessment should be replaced with an appropriate alternative method of learning outcomes assessment. From the student's point of view, an important advantage of online assessment has to do with reduced levels of exam anxiety, especially in situations when the assessment assignment can be done at home and at any desired time. However, online assessment can also be used in exam situations. As in the case of practical assessment, some of the adjustments to online assessment are similar to those implemented during written assessment of learning outcomes.

Similar to providing access to information presented online (see EduQuality handbook entitled "Access to Information and Services"), when it comes to adjustments to online assessment, the following recommendations should be considered:

- The supporting software should be compatible with the online learning environment.
- All video and audio clips should have subtitles or transcripts for students with hearing impairment.
- If audio alerts are used to inform students about an error or to warn them that they are performing an illegal operation, visual alternatives should be ensured for deaf students.

- When there is a time limit to online assessment, students who have a legitimate reason to need additional time should be given that option.
- Computer assessment should be accessible by means of the keyboard because some students are unable to use the pointing device (mouse).
- In cases where the student is anxious due to having to use the computer in an exam situation, alternative assessment on paper can be provided.
- Some students experience increased anxiety during the assessment of optical character recognition because this calls for a very precise placement of symbols and it is in this respect useful to provide students with training or with a person who would do the marking for them (or provide symbols in a larger format, for example links).
- If online assessment is not available to students who use technology for access, appropriate alternative method of assessment should be used. If this option is available, trial assessment should be arranged so that students can become familiar with the use of supporting equipment for accessing online assessment.

#### **6.4. Evaluation and feedback**

Giving feedback about achievement is, generally speaking, similar for all students. Nevertheless, there are certain issues that require consideration when it comes to evaluation and giving feedback to students with disabilities.

For example, in the case of literacy, every difficulty specific to an impairment should be taken into account during evaluation:

- Spelling and grammatical errors, poor sentence structure and difficulties in formulating answers in students with hearing impairment or students with specific learning difficulties (for example, students with ADHD, students with dyslexia/dysgraphia).
- Limited vocabulary in students whose first language is not the official language of the study program and deaf students.
- Poor or variable handwriting in some students with dyspraxia, motor difficulties or vision impairment, ADHD and dyslexia/dysgraphia.

These characteristics should not be the subject of evaluation or influence the grade, unless they are specified as such in the learning outcomes, in which case they will be evaluated.

The difficulties mentioned above can be more pronounced in time-limited exam situations. Spelling and grammatical errors in written answers to essay questions can be corrected by specialized computer software, while this is not always possible with other exam questions and exercises.

Feedback should be given in a format that conforms to the principle of accessibility for students with disabilities. Students with dyslexia can have problems reading a hand-written feedback, which blind students also cannot use in this form. The appropriate alternative is additional verbal feedback, which can be either given in person or technology-mediated.

Some students, such as students with dyslexia or a mental illness, have a low perception of self-efficacy with regard to their writing skills due to previous experience of failure. It should be kept in mind that students who have difficulties writing generally need to devote a significant amount of time and effort to complete a written assignment.

It is recommended that feedback on students' work should first include a comment pointing out positive aspects of the work, then a comment that indicates weak points and finally a general comment on the work as a whole.

## **6.5. Conclusion**

Every assessment in the teaching process involves defining the goals and learning outcomes, the preconditions of which are created by using various teaching methods.

**Various methods and types of assessment that will be used when dealing with particular students or groups of students should not lower or compromise the academic standards.**

This means that at the end of the teaching process all students should demonstrate to what extent they have acquired the learning outcomes, but the way in which they will demonstrate this will differ according to their specific abilities. In this way, all students will get the opportunity to show their competencies in a manner most suitable to their abilities.

In addition to respecting the fundamental human right to education by designing accessible courses and programs, we should also pay attention to ways in which students will be allowed to demonstrate the acquired competences. Flexibility and creativity that will not jeopardize the

integrity of a study program or course are feasible, and can be found in partnership with students with disabilities.

Creating conditions for the achievement of learning outcomes and for acquiring competences includes creating conditions for their demonstration. In this way, higher education can also create new opportunities when it comes to employing persons with disabilities. The employer's perspective can thus be enriched by experiences in higher education and this is something that should be aspired to. This will ensure equal opportunities for everyone, not only in education, but also in fulfilling their potential as independent, active and contented individuals in society.

It should be kept in mind that students without disabilities, that is, all students, can benefit from the legislation on students with disabilities. Many accommodations, such as well prepared handouts, combining written and verbal instruction, publication of courses online, variations and flexibility in methods of assessment, are good teaching and learning practices that are useful to all students.

## 7. GLOSSARY OF TERMS

**Academic assessment** is one of the key components of the learning process determining the level of a student's achievement of specific learning outcomes through performance in predefined assignments and activities.

**Academic standards** are the demonstrated ability to reach certain levels of academic achievement. The term refers to the measured competence of a person in reaching specific goals in a course, operationalized through performance in a specific assignment.

**Bloom's taxonomy** refers to outcomes of the teaching process categorized in three interrelated domains of learning: (1) cognitive domain of knowledge and comprehension, (2) affective domain of attitudes, (3) psychomotor domain of skills.

**Competences** refer to a set of knowledge and skills and the associated independence and responsibility.

**Croatian National Educational Standard** is a set of norms that encompass the following: educational content standards, educational achievement standards, teaching standards, standards for monitoring and assessing the student's achievement and standards for teachers' professional training.

**Curriculum** is a written document that encompasses the strategies for achieving desired, previously defined educational goals.

**Educational goals** refer to what students should know or be able to do at the end of a learning period that they did not know before.

**Evaluation** is the assessment of all important facts about a student's achievement in a course, expressed by means of a grade (mark).

**Flexibility in teaching** is an essential and indispensable teaching characteristic of every university teacher, who should make lessons stimulating and accessible by using appropriate and modern teaching strategies.

**Formative assessment** refers to assessing students' development, that is, their progress.

**Generic competences** should be acquired by everyone who completes a certain level of education regardless of their chosen scientific field or profession (for example, knowledge of a foreign language, practical application of knowledge, or information or computer literacy).

**Individualized assessment** means respecting the unique qualities and needs of every candidate with a disability with the aim of equalizing their opportunities for displaying knowledge, skills and abilities during assessment to those of other students.

**Learning outcomes** refer to what the student is expected to know, understand, do or assess as a result of the learning process.

**Objective knowledge assessment** is implemented by objective assignments which require the recognition of facts. Objective assignments mainly test the first two levels of achievement: the knowledge of facts and their understanding.

**Online assessment** includes computer assessment and assignments, presentation by using a CD or web content and the assessment of optical character recognition.

**Oral assessment** is done on the basis of a student's oral presentation or oral exam.

**Out-of-classroom teaching** refers to various types of classes, including exercises, practical classes, training, fieldwork, etc.

**Practical assessment** encompasses the assessment of practical exercises in the form of workshops or practical assignments in laboratories, as well as the assessment of fieldwork or work on a research project.

**Qualification** is the formal name for the set of competencies of a certain level, scope, profile and quality, which is proven by a diploma or degree or another public document issued by an authorized institution.

**Students' adaptation to studying** is a significant predictor of their academic achievement. The quality of adaptation to studying is most frequently described in three aspects: academic, social and emotional.

**Studying** is a process which includes young people of different abilities, characteristics and motivations and of different family and cultural backgrounds. On the other hand, the same process includes teachers and other university employees who differ from each other in their attitudes, motives, knowledge, abilities and teaching styles, their commitment to work and the support they receive in their work.

**Subject specific competences** are defined for every profession or field of study and in this respect have a narrower meaning than generic competences.

**Subjective methods of assessment** are methods of assessing students' answers and their work. They include the assessment of oral answers, presentations, essays, papers, results in performance assignments and essay-type questions in written exams.

**Summative assessment** is the assessment of knowledge implemented for the purpose of value judgment.

**Support** is a logical extension and addition to methods used in class. Support can be organized in the form of available courses which develop academic skills (e.g. Academic Skills Practicum, available to students of the Faculty of Education and Rehabilitation Sciences at the University of Zagreb; Studying Skills at the School of Medicine at the University of Zagreb) or provide other types of support, such as the courses Peer Support and Student Mentor Project.

**The acceptable level of student performance** refers to values that students need to acquire after taking a course or at the end of their education.

**Universal Design for Learning** refers to flexible teaching methods (materials, techniques, strategies) which enable effective achievement of learning outcomes for as many students as possible who have different educational needs. Because these needs are so specific, the Universal Design for Learning does not exclude additional accommodations for some students with disabilities.

**Written assessment** can include essays, assignments, reports, graduation theses, journals, portfolios and workbooks. It can refer to students' activities in class or in the exams.

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<sup>i</sup> Smith, M. K. (1996, 2000) "Curriculum theory and practice". *The encyclopaedia of informal education*. <http://www.infed.org/biblio/b-curric.htm>.

<sup>ii</sup> Beljo Lučić, Ružica et al. *Croatian Qualifications Framework: Introduction To Qualifications*. Government of the Republic of Croatia Ministry of Science, Education and Sports, 2011. Print.

<sup>iii</sup> Gonzalez, Julia. *The Tuning Methodology*. [http://www.sefi.be/technotn/?page\\_id=9](http://www.sefi.be/technotn/?page_id=9).

<sup>iv</sup> Gonzalez, Julia. *The Tuning Methodology*. [http://www.sefi.be/technotn/?page\\_id=9](http://www.sefi.be/technotn/?page_id=9).

<sup>v</sup> Taken from <http://www.clemson.edu/assessment/assessmentpractices/referencematerials/documents/Blooms%20Taxonomy%20Action%20Verbs.pdf>.

<sup>vi</sup> Taken from the International Federation of Library Associations and Institutions' website (*WBU PowerPoint Guidelines*). <http://archive.ifla.org/VII/s31/pub/wbu-visual-presentations-guidelines.pdf>.

<sup>vii</sup> Taken from the International Federation of Library Associations and Institutions' website (*WBU PowerPoint Guidelines*). <http://archive.ifla.org/VII/s31/pub/wbu-visual-presentations-guidelines.pdf>.

<sup>viii</sup> Taken from the International Federation of Library Associations and Institutions' website (*WBU PowerPoint Guidelines*). <http://archive.ifla.org/VII/s31/pub/wbu-visual-presentations-guidelines.pdf>.

<sup>ix</sup> Taken from the International Federation of Library Associations and Institutions' website (*WBU PowerPoint Guidelines*). <http://archive.ifla.org/VII/s31/pub/wbu-visual-presentations-guidelines.pdf>.

<sup>x</sup> Taken from The International Federation of Library Associations and Institutions' website (*WBU PowerPoint Guidelines*). <http://archive.ifla.org/VII/s31/pub/wbu-visual-presentations-guidelines.pdf>.

<sup>xi</sup> Taken from The International Federation of Library Associations and Institutions' website (*WBU PowerPoint Guidelines*). <http://archive.ifla.org/VII/s31/pub/wbu-visual-presentations-guidelines.pdf>.

<sup>xii</sup> Taken from the International Federation of Library Associations and Institutions' website (*WBU PowerPoint Guidelines*). <http://archive.ifla.org/VII/s31/pub/wbu-visual-presentations-guidelines.pdf>.

<sup>xiii</sup> Taken from the International Federation of Library Associations and Institutions' website (*WBU PowerPoint Guidelines*). <http://archive.ifla.org/VII/s31/pub/wbu-visual-presentations-guidelines.pdf>.

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<sup>xiv</sup> As of January 2012 the e-Croatia program is no longer under the jurisdiction of the Central State Office for e-Croatia. The new governing body is the Ministry of Public Administration.

<sup>xv</sup> Taken from <http://www.ncsu.edu/project/design-projects/sites/cud/content/principles/principles.html>.

<sup>xvi</sup> Taken from <http://www.open.ac.uk/inclusiveteaching/pages/inclusive-teaching/written-assessment.php>.

<sup>xvii</sup> Taken from <http://www.open.ac.uk/inclusiveteaching/pages/inclusive-teaching/written-assessment.php>.

<sup>xviii</sup> Taken from <http://www.open.ac.uk/inclusiveteaching/pages/inclusive-teaching/oral-assessments.php>.