

Empolyability. Why. Experience of Implementation in a Laboratory Work in Analytical Chemistry

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Abstract: Our students ,future employees, will find themselves in an economy buffed by global economic forces and constant technological innovation.All employees will be subject to the demand of new systems and technologies.Jobs will be created which do not exist now and existing jobs will require new skills ,and there will be a need to combine new operational skills with communication,teamwork and decision-making skills,will intensify the flexibility and reliance to change jobs,apply skills in different context and go on learning will be essential.

Index terms: employability of graduates, deficiencies, assessment and self-assessment

I. INTRODUCTION

21st century is characterized by dependence on technology to address the growing concerns about diminishing resources and sustainable development.

The economic crisis of 2008-2009 has raised the need for competent human resources for recovery losses. Universities as creators of valuable human capital are facing major challenges to contribute to economic development in the economic downturn. The rapid pace of change and development of new technologies means that training programs need to be in line with knowledge and skills sought by employers.

II. EXPERIENCE OF IMPLEMENTATION IN A LABORATORY WORK IN ANALYTICAL CHEMISTRY

Theoretical perspective

Types of these skills and the way universities can encourage them, not fully resolved by politicians. European Commission in April 2012. adopted a resolution on modernization of higher education systems in Europe on:

- "The creation of new areas of study that reflect the needs of the labor market and the development of training programs covering both general knowledge and specific skills"

- "Monitoring trends in the requirements of the labor market in order to take better account of future needs in terms of learning opportunities"

In our National Action Plan for Employment 2014. in the "Restoring the dynamics of the labor market" in t.2.3.3. recommends "investing in skills based on better forecasting and monitoring of the needs of employers"

This combination of knowledge, skills and competencies is called "employability skills for employment respectively".

However,while there is general agreement that skills are important ,there is less clarity on the nature of skills , the kinds of skills we need and how they should be implemented and developed in Higher education.

Terminology and basic definitions

Set of competencies, knowledge, skills, attitudes and behaviors to achieve results (performance levels) in a professional role or an organization.

There is some difficulty in terms of the terminology "employability skills" to be understood and accepted by all stakeholders, especially the educational and training institutions that are associated with learning and results.

The literature identifies two trends. One of them (J. Hillage & E. Pollard, 1998) focuses on the ability of individuals to gain initial employment, maintain employment and / or get a new job, if necessary. The second (P. Knight & M. Yorke, 2003) apply a complex concept as a synergistic combination of cognitive, social, emotional and behavioral skills (L.D. Pool & P. Sewell, 2007). Enriched by applying the concept of social theory, Bandura, including self-efficacy as self-esteem and belief in their own abilities.

The model of Kubler and (B. Kubler & P. Forbes, 2006) the most comprehensive unites:

- Cognitive skills such as the ability to identify, analyze and solve problems, work with information and an array of diverse data, assess risk and make the necessary conclusions:

-General competence and a high level of transferable key skills.

-Personal abilities

Despite the different names, they have general content:

- Key- because they are fundamental to the development of further competencies

- Soft-specific complementary competencies

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- Transferable, portable as they develop lifelong skills in different situations and are applicable in any professional environment;

- Hidden skills as they are complex to measure and assess, but clearly distinguishable in the workplace

In our country there are no statistics on employability skills and their measurement and evaluation, and validation.

The "Business for Education" held in 2007. and 2010. national surveys on professional orientation of students in Bulgaria and employability skills of young people.

International Study 2010. 1091 students, chemical engineers, bachelor's degree, from 63 countries showed similar results (S. Male, B. Bush & E. Chapman, 2010).

Regular surveys and polls conducted and Bulgarian Industrial Association.

With minor differences there is general consensus on the main deficits to students and recent graduates, which is confirmed by the literature:

- Lack of practical experience to no acquisition of real understanding of the work performed (R. Rateau & K. Kaufman, 2009);

- Communication skills, written and oral, that determine the best teamwork and accounting for it (M. Sleep & H. Reed, 2006);

- Critical thinking and self-determination of how to perform the tasks and solve problems (J. Robinson, 2009, pp. 56-62);

- Business and entrepreneurial skills;
- Self-regulation and self-governance;

Measurement and assessment of employability skills

While knowledge can be accurately assessed, the assessment of skill requires different techniques and approaches as specified methodology will. Flexible and easy to use products are needed to analyze behavioral characteristics, way of dealing with job tasks, style of embracing new knowledge and more. Such an approach in Bulgaria is not widespread.

According to the authors employability skills can be effectively evaluated in the context of a discipline as a formative assessment and implemented within the curriculum and goals, as should be carefully assessed in what stage and how it will be included.

There are several ways:

- As part of the curriculum not called default model
- Parallel model-evaluated by the teacher on student activities or extra-curricular

- Separate model-evaluated on core competencies specially selected tasks and activities

- An integrated approach in which the assessment is on the appropriate tasks in the usual assessment activities in an appropriate discipline.

Issues and goals of the study

- to know students basic skills, their qualifications, their nature and importance;

- to date draw card for the measurement of certain core competencies;

- to enable self-assessment of students;

- to give the possibility to compare self and teaching evaluations.

Methods

Participants

There are 37 students, a bachelor degree. Covers groups, with high academic success and with medium and low performers. The period of study is 2012-14d. The discipline e "Analytical Chemistry" and "Instrumental methods in analytical chemistry" laboratory work.

General Procedure

Compiled map skills for employment, which is consistent with the educational level of students and the requirements of discipline and academic programme. They covers four clusters: knowledge and academic experience, communication skills, personality and job skills. Each contains detailed information about the included indicators and evaluation criteria. The map will be displayed in Table 1.

Developed tasks for independent work and evaluation that fully match the content of the course. For the evaluation Likert-type scale of magnitude of 1 to 4 is used. Like most suitable for the purposes of research and education, we have implemented an integrated model of skills for employment and constructivist approach and the corresponding SOLO taxonomy (J. Biggs & F. Collis, 1982).

Intervention

First and last week of student questionnaires were distributed free responses to the essence and importance of the competencies included in the map.

The eleventh week students were given the opportunity for self-assessment, using a checklist of competencies and agreed criteria.

We offer the following distribution activities for a standard twelve-week module:

1-4 weeks - a period of negotiation and introduction to the types of activities and responsibilities

3-9 weeks - has developed the skills and timely feedback

8-12 weeks - assess and report on achievements and weaknesses and recommendations for - further work.

Results

Results are derived from questionnaires and checklist for evaluation and self-evaluation and summarized in Table 2. Reported a correlation between teaching evaluation and student self-assessment.

Questions about the meaning and importance of employability skills 85% responded incompletely and ambiguously, 10% have tried to identify individual characteristics, 5% did not answer. At the end of the semester 49% understood the concept and the others gave a satisfactory answer. No nonresponders.

TABLE I.
CHECKLIST FOR ASSESSING TEACHER AND STUDENT
SELF-ASSESSMENT OF SKILLS FOR EMPLOYMENT AND
COMPARING THE ESTIMATES

Basic skills for employment	1-highest level			
	1 %	2 %	3 %	4 %
I. Knowledge and academic experience				
1. Mathematics, technical disciplines, Analytical Chemistry.				
Grade:	37	41	12	10
Selfassessment:	29	47	15	9
2. Critical and analytical thinking.				
Grade:	10	15	14	61
Selfassessment:	30	25	25	20
3. Ability to link theory and practice.				
Grade:	38	46	15	1
Selfassessment:	35	39	18	8
4. Problem solving				
Grade:	15	25	37	23
Selfassessment:	37	26	21	16
5. Ability to create a flow chart of the procedure in analytical practice				
Grade:	19	37	35	9
Selfassessment:	23	30	35	12
II. Communication skills				
1. Oral report				
Grade:	30	24	28	18
Selfassessment:	45	25	21	9
2. Written report				
Grade:	10	15	59	12
Selfassessment:	55	23	20	2
3. Presentation skills				
Grade:	12	26	25	37
Selfassessment:	62	25	10	5
III. Personal skills				
1. Ability to work in team				
Grade:	31	20	26	23
Selfassessment:	70	25	5	0
2. Learning ability				
Grade:	31	59	10	0
Selfassessment:	15	59	20	6
3. Reliability (performance and engagement)				
Grade:	45	31	22	2
Selfassessment:	40	35	23	2
IV. Work skills				
1. Time management				

Grade:	35	29	19	17
Selfassessment:	30	21	22	27
2. Skills with utensils and appliances				
Grade:	79	21	-	-
Selfassessment:	71	26	3	-

Summarizing the results and discussion

Young people are not familiar with the necessary competencies to their qualifications, do not fully understand what is in mind and remain uncertain and timid. They have no vision for their realization. The final results show a high level of commitment, inspired by technology assessment and implemented within the curriculum.

In assessing a significant discrepancy between teaching and personal evaluations some critical competencies, namely: critical and analytical thinking, problem solving, teamwork and time management. The main deficiencies in teamwork is associated with fear of conflicts in some, while others - inattention to results and avoiding responsibility.

The first assume greater part of the duties, although in general the students praise team work. In other competencies comparison is positive, but it is difficult to accept that they have reached a level of government regulation and, in particular time management.

III. CONCLUSION

Maintaining cognitive environment to help students achievements, including those that are not anticipated in training so far.

Use of various forms of formative assessment - self assessment, peer review and resubmission.

Promote metacognition through reflection and self-regulation as writing critical comments and opinions creating log weaknesses and accomplishments portfolio.

Increasing the efficiency of extramural activity to be further encouraged.

Tasks for training and assessment to be real context and well-resourced as case studies, summarize complex material in a short briefing.

Implementation of good teaching strategies such as problem-based learning, active learning, blended learning. Of particular note is blended learning that combines classroom lessons, electronic platforms and social networks WIKIS-type product that allows the training and assessment in real time and every place, visible contribution of each participant.

Improving communication skills is included in the project report presentations at the completion of a cycle of classes or assigned tasks that could be developed in collaboration with employers and be related to future jobs.

It is necessary to increase the importance of vocational training programs and employment skills while not neglecting academic standards.

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