

LIFELONG LEARNING COMPETENCES DEVELOPMENT PROGRAM FOR HIGHER EDUCATION

PROGRAMA DE DESARROLLO DE COMPETENCIAS PARA EL APRENDIZAJE A LO LARGO DE LA VIDA PARA ESTUDIANTES DE EDUCACIÓN SUPERIOR

PROGRAMA DE DESENVOLVIMENTO DE COMPETÊNCIAS PARA A APRENDIZAGEM AO LONGO DA VIDA DE ESTUDANTE DO ENSINO SUPERIOR

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ABSTRACT: *Introduction.* Lifelong learning (LLL) is an intentional learning that people engage in throughout their lives for personal and professional fulfillment and to improve the quality of their lives. Develop the capability for lifelong learning in Higher Education is important to facilitate the incorporation of new graduates to work. To this end, we have designed a program on 'Lifelong learning competencies for Higher Education students', which we have applied to students at University of San Diego, California, USA and to the University of Distance Education, Spain. *Methodology.* We have presented the program by means a workshop where the debate and the reflection played one important strategy. To check the program's achievements we used mixed methodologies, according to the evaluative research. We applied one questionnaire, and together to a practice and the students' personal portfolio, they enabled us to assess the program effectiveness, sa-

tisfaction and impact. *Results.* The comparison of the answers in the questionnaire, before and after of the workshops sing that students improved in their knowledge and awareness about the importance of LLL and key competencies for their profession development. *Discussion.* The program contributes to improve key competencies and commitment to learning throughout the people's lives.

KEYWORDS: Key competences development; higher education; lifelong learning program; questionnaire on lifelong learning.

RESUMEN: *Introducción.* El aprendizaje a lo largo de la vida (ALV) es un aprendizaje intencional que involucra a las personas a lo largo de su vida para su desarrollo personal y profesional y para mejorar la calidad de su vida. Desarrollar la capacidad para el ALV durante la Educación Superior es importante

para facilitar la incorporación de los nuevos graduados al mundo laboral. Con esta finalidad, hemos diseñado un programa sobre 'Competencias para el aprendizaje a lo largo de la vida para estudiantes de Educación superior', que hemos aplicado a estudiantes de grado de la Universidad de San Diego (USD), California, USA y a los de la Universidad Nacional de Educación a Distancia de Madrid (España). *Metodología empleada.* Presentamos el programa mediante un taller donde el debate y la reflexión jugaron un papel importante. Para comprobar los logros del programa, hemos utilizado metodologías mixtas, propias de la investigación evaluativa. Aplicamos un cuestionario, una práctica y el análisis de los portafolios personales de los estudiantes, hemos valorado la eficacia, satisfacción e impacto del programa. *Resultados.* La comparación de las respuestas dadas por los estudiantes antes y después de la presentación del programa indica que los estudiantes mejoraron su información sobre el ALV y las competencias clave para su desarrollo profesional. *Discusión.* El programa contribuye a la mejora en competencias y compromiso con el aprendizaje de los estudiantes a lo largo de la vida.

PALABRAS CLAVE: Desarrollo de competencias claves; educación superior; programa para el aprendizaje a lo largo de la vida; cuestionario sobre el aprendizaje a lo largo de la vida.

RESUMO: *Introdução.* Aprendizagem ao longo da vida (ALV) é uma aprendizagem intencional envolve

peçoas ao longo de sua vida para o desenvolvimento pessoal e profissional e para melhorar a qualidade de sua vida. Desenvolver a capacidade de ALV para o Ensino Superior é importante para facilitar a incorporação de novos graduados no mercado de trabalho. Para isso, criamos um programa sobre "Competências para a aprendizagem ao longo da vida para os estudantes do ensino superior", o que temos aplicado para estudantes de graduação da Universidade de San Diego (USD), Califórnia, EUA, e de Universidade Nacional de Educação a Distância em Madrid (Espanha). *Metodologia.* Apresentando o programa por meio de uma oficina onde o debate ea reflexão desempenhou um papel importante. Para verificar as realizações do programa, utilizamos métodos mistos, eles próprios de pesquisa avaliativa. Foi aplicado um questionário e, com a prática e análise de carteiras pessoais dos estudantes, foi avaliada a eficácia, satisfação e impacto do programa. *Resultados.* A comparação das respostas dadas pelos alunos antes e depois da apresentação do programa indica que os alunos melhoraram a sua informação sobre a ALV e competências fundamentais para o desenvolvimento profissional. *Discussão.* O programa contribui para a melhoria das competências e compromisso com a aprendizagem ao longo da vida estudantil.

PALAVRAS-CHAVE: Desenvolvimento de competências-chave; ensino superior; o programa para a aprendizagem ao longo da vida; questionário sobre a aprendizagem ao longo da vida.

Introduction

Learning never ends. We learn throughout our lives, motivated by our needs and mediated by our capabilities and interests, which are, in turn, influenced by external demands as a result of ongoing scientific and technological changes occurring in society. Therefore, educating today's students in a changing world requires preparing them with sufficient strategies to be learners throughout their lives. From this perspective, lifelong learning (LLL) is considered to be a personal process as well as a goal of education systems.

Maintaining employability is closely related to the ability to remain current, which is one of the main challenges for people, industries, governments, and society (Rodriguez, Prades, Bernáldez, & Sanchez, 2010).

International organisations, such as the Organization for Economic Cooperation and Development (OECD) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), together with the European Union countries, the United States, Canada, Australia, China, Japan, and many others are developing new approaches to education and training to address economic, technological, and social conditions in the world through lifelong learning improvement.

The OECD emphasises that learning occurs throughout the life of a person and states that LLL is influenced by formal and non-formal education, the family, the workplace, the community, and society (OECD, 2007).

The development of LLL competences to reduce the gap between young people's training and job demands is a major goal at all educational levels, particularly in higher and tertiary education. Together with the use of active learning methodologies that support the collaborative development of key competences across all disciplines, it is necessary to design and implement specific programmes to clarify and demonstrate the usefulness of key competences and to strengthen their development in the academic curriculum.

To this end, we have established a programme on competence development for lifelong learning for higher education students. The programme was offered to a group of seniors in engineering at the University of San Diego (USD), in San Diego, California as part of a multidisciplinary and international collaboration between a professor of engineering education and a professor of education in April 2011. The programme was subsequently offered to two groups of students at the University of Plovdiv, Bulgaria, one in engineering and one in psychology, and to a group of students of education at the National University of Distance Education (UNED) at the Associate Center of Madrid, Spain.

This article presents the theoretical foundation of the programme and the results of its application to the USD and UNED students.

1. Problem and research objectives

The research problem is formulated as follows: "In a society in which science and technology are constantly changing, it is important to improve young people's key competences for LLL, to provide strategies to remain current in their continuing profession, and to respond to society's demands".

To address this issue, our research objectives were as follows:

- To develop a programme of learning throughout life, including key competences, to make students aware of the importance of remaining current.
- To present this undergraduate programme.
- To analyse the results in terms of effectiveness, satisfaction, and impact.

2. Theoretical Framework

2.1. Lifelong learning concept

Lifelong learning is a concept that is linked to a vision of learning and to the economic society. Based on the concept of “permanent education” (Faure, 1972), LLL has developed a broader meaning as a guiding principle for education from the cradle to the grave in a variety of settings, including educational institutions and industry, and it encompasses formal, non-formal, and informal learning (Kirby, Knapper, and Egnatoff, 2011). Lifelong learning is intentional learning in which people engage throughout their lives for personal and professional fulfilment and to improve the quality of their lives (Knapper and Cropley, 2000).

2.2. Lifelong Learning Characteristics

Lifelong learning is characterised by self-directed learning, including meta-cognitive awareness and a disposition towards learning. LLL is also characterised by social and collaborative components that are linked to the need to address complex problems in real work environments.

Self-directed learning is identified as the ability to organise one’s own learning and requires the skill of “learning to learn” as well as metacognitive skills. Self-directed learners are self-confident and have a positive disposition towards learning.

Metacognition-awareness is a learner’s knowledge and regulation of his or her cognitive process. By means of strategic awareness, learners are responsible for their own learning processes and for identifying, finding, using, and critiquing resources for learning, establishing goals and strategies to address their learning needs, developing action plans and timelines to guide their learning activities, and taking advantage of available opportunities for learning.

Disposition towards learning is characterised by the desire, willingness, and motivation to learn. This disposition is acquired from interactive experiences with the environment as well as significant adults and peers and plays an important role in consolidating self-directed learners. Positive dispositions towards learning are also characterised by intellectual curiosity, the search for deep understanding, persistence in the face of obstacles, attempts at alternate solutions, and intrinsic motivation (Dunlap & Grabinger, 2003).

Learning is always a socio-personal and contextualised process. The development of these competences is enhanced through the use of problem-based learning and experience-based learning in a contextualised learning network, which affect autonomous learning as well as collaborative work. Through collaborative work, students experience and develop insight on learning from multiple perspectives, refining their knowledge through arguments and discussion, sharing ideas and perspectives, and receiving feedback, which helps them to think about their own learning and to manage complex and unstructured problems such as those that occur in real work settings.

2.3. Key Competences and Lifelong Learning

Competence is the ability to do something successfully or efficiently. Competence also reflects the ability to successfully meet complex demands in a particular context through the mobilisation of knowledge, cognitive skills, and practical skills, as well as social and behavioural components such as attitudes, emotions, values and motivations (Gonczi, 2003). One competence integrates and mobilises the relevant resources for the situation that have been acquired by through experience and training, and all is relevant to the situation where the competence acts.

To illustrate this concept, Sáez Carreras (2009, p. 17) analyses “cooperative competence” and notes that its internal structure involves knowledge, cognitive skill, and practical skill together with attitudes, emotions, values, ethics, and motivation, all of which are applied in a specific context.

Two elements are crucial to competence: the application of what one knows and can do in relation to a specific task or problem and the ability to transfer this application to different situations (Chisholm, 2005, p. 1, in Hoskins & Fredriksson, 2008, p. 3).

According to the literature on the topic, there are two main types of competence:

- a) Specific competences, which refer to concrete “technical” knowledge in a specific area, such as engineering, medicine, or education; and
- b) Key competences, also called generic, transdisciplinary, or transversal competences, which are shared by all professionals, such as competence in spoken and written communication or the use of information and communication technology.

To better understand these generic competences, we collected information from the “Tuning” and “DeSeCo” Projects.

In the Tuning Project (González & Wagenaar, 2003, pp. 81-82), generic competences cover a variety of categories:

- Instrumental competences: cognitive and methodological abilities as well as technological and linguistic skills.
- Interpersonal competences: individual abilities (the ability to express one’s feelings, critical skills, and self-criticism) and social skills related to the ability to work in teams or the expression of social or ethical commitment.
- Systemic competences: abilities and skills related to a system as a whole.

The OECD Definition and Selection of Competencies (DeSeCo) Project (Rychen, Salgnik, and Mclaughlin, 2003) classifies key competences in three broad categories:

- Key competence category 1: Using tools interactively. Individuals encounter the world through cognitive, socio-cultural, and physical tools. These encounters, in turn, shape how individuals make sense of and become competent in the world, address transformation and change, and respond to long-term challenges. Using tools interactively presents new possibilities in the way individuals perceive and relate to the world. We must remain up to date with technologies to adapt tools to our own purposes and to conduct active dialogue with the world. Three subcategories are contained in this first group:

- Use language, symbols, and text interactively.
- Use knowledge and information interactively.
- Use technology interactively.

- Key competence category 2: Interacting in heterogeneous groups. Relating well to others allows individuals to initiate, maintain, and manage personal relationships. Individuals are able to respect and appreciate the values, beliefs, cultures, and histories of others. We must address diversity in pluralistic societies to empathise with and relate to others.

Three subcategories are contained in this second group:

- Relate well to others.
- Cooperate and work in a group.
- Manage and resolve conflicts.

- Key competence category 3: Acting autonomously. Individuals must act autonomously to participate effectively in the development of society and to function well in different spheres of life, including the workplace, family life, and social life.

Acting autonomously is integrated into three subcategories:

- Act within the big picture, dependent on duties and obligations.
- Form and conduct life plans and personal projects.
- Defend and assert rights, interests, limits, and needs.

These three categories are interrelated and form the basis for the identification and relationship of key competences. The need for individuals to think and act reflectively is central to this competency framework. Reflexivity involves not only the ability to consistently apply a formula or method to address a situation but also the ability to cope with change, learn from an experience, and think and act critically.

2.4. Key Competences for LLL and Higher Education

The role of educators in helping students to develop as lifelong learners is clear. The European Union (EU) has expressed its commitment to key competences for LLL as part of the objectives of the Lisbon strategy (2000). The transversal nature of key competences makes them essential; they provide young people with added value, employment, and social cohesion.

The European Qualifications Framework in the Higher Education Area (QFEHEA) (2009) includes all qualifications that a learner must know, understand, and be able to perform based on learning outcomes and competences. These include lifelong learning, with the following learning result: “to be able to identify their own training needs in their study field and labour and professional environments, and to manage their learning highly autonomously in every context (well or poorly structured)” (The national Spanish ‘Real Decreto’).

The Europe 2020 Strategy for Smart, Sustainable and Inclusive Growth acknowledges lifelong learning and skill development as key elements in response to the current economic crisis, demographic ageing, and the broader economic and social strategy of the EU. The crisis has highlighted the major role of adult learning in achieving the Europe 2020 goals by enabling adults, particularly low-skilled and older workers, to improve their ability to adapt to changes in the labour market and society (European Union Council, 2011). The Renewed European Agenda for Adult Learning (EUC, 2011), described as a flagship initiative of the Europe 2020 strategies, includes An Agenda for New Skills and Jobs, which calls on Member States to ensure that people acquire the skills needed for further learning and for the labour market through general, vocational, and higher education as well as through adult learning (Ministerio de Educación, 2011).

2.5. Key Competences, Personal Development, and Professional Plan

In a world characterised by changes, uncertainty, and the need to solve problems from multiple disciplines point of view, key competences are essential to facilitate the transition between university and the working world. These key competences can contribute to personal and professional development as individuals enter the labour market.

- Elaborate a personal and professional development plan (PDP). Remaining current requires a personal and professional development plan (PDP). Meredith (2009) suggests the following steps:
 1. Begin by conducting a self-assessment to obtain information based on a comparison of what is needed to solve a task or problem on a job and current knowledge to determine what is necessary for improvement.
 2. Identify important areas for improvement to meet the initial job requirements.
 3. Elaborate a list of learning tasks to be achieved in a set time.
 4. Review the learning progress periodically to ensure professional development.
 5. Update the PDP with a focus on generic competences as well as specialised training in accordance with job requirements.

6. Include learning resources, activities, and courses following a programmed sequence and reflect on the results.
- Organise the job environment. The job environment should be organised according to daily activities. One important element of work is a personal computer and files.
 - Improve key competences, such as oral and written communication, working in groups, organising meetings, interpersonal relations, and project management. Use reading as a strategy for personal, professional, and social development as well as for continued learning.
 - Collaborative work stresses the benefits of teamwork and shared efforts to achieve a common goal. Generating synergies contributes to further progress and innovation in work.
 - Improve specific competences and attempt to work on cutting-edge projects. Identify resources to have sufficient information in computer files. Obtain advice from experts and seek mentors.
 - Project development involves accounting for the project's background, context, status, and specifications about the project's topic, including technical information, the project map, individual functions in the project, the resources to develop the project, and the beneficiaries' needs and expectations.
 - Membership in relevant professional societies. Professional organisations offer many opportunities to network with other professionals, including conferences, meetings, and tutorials. The publication of projects in scientific journals will serve as extrinsic motivation to enhance continuous learning.
 - Commitment to continuous learning. Lifelong learning involves taking responsibility for one's own development and fostering habits to improve effectiveness in learning. Learners take increasing responsibility for their own learning processes, and Information and Communication Technologies support these necessities. Universities and industries, often in collaboration, offer continuing education programmes and master's degrees, often web-based, which provide opportunities to update training needs to better address the changing world of work. An example is the National University of Distance Education (UNED), which has a wide range of continuing education and master's programmes as well as its recent offerings of massive online open courses (MOOC) to support training and exchange among entrepreneurs to help overcome the current economic crisis. These courses are based on instructional and learning models that are structured around specific goals and objectives that describe what the learner should be able to perform as a result of the learning. Such courses also offer a variety of resources, including information and links on the topic, expert demonstrations, tasks for applying what is learned, simulations of real job environments, self-evaluation to assess progress, and advice from tutors in addition to opportunities to debate with other students (Kommers et al, 2008, Martinez Mediano et al, 2009; Martinez Mediano et al, 2010, Stoyanov et al, 2008).

3. Lifelong Learning Development Programme for Higher Education Students

We understand the programme concept as a systematic plan of action specifically developed to respond to a set of goals that are considered to be valuable from one educational perspective based on a theoretical framework together with the required strategies and activities to achieve its goals (Pérez Juste, 2006).

The programme for LLL competences is based on the theoretical framework described in the previous sections of this article. The programme was believed to be more relevant for our purpose if it was integrated in the degree programme for engineers at the university where we were conducting the research, the University of San Diego, San Diego, California, USA, in the Department of Engineering. This issue is relevant because in section 3i of the results to be achieved, the accreditation body for engineering and technology studies (The Accreditation Board of Engineering and Technology, ABET, 2001) of the United States says that engineering graduates should develop “a recognition of the need for and an ability to engage in lifelong learning” and should include evidence demonstrating achievement in their personal portfolios.

Thus, the programme is aimed at undergraduate students to inform and discuss the importance of key competences for LLL and to raise awareness of the importance of including their personal and professional development plans in their continuous updates.

The programme was explained in a workshop delivered with power-point slides. The slides, together with the John Meredith book (2009), were delivered as hard copies at the beginning of the workshop, which was structured around the following three sections:

Part I: Lifelong Learning Competences Development

1. The context: The university: its mission, vision, and goals in relation to the degree.
2. Lifelong learning concepts and their characteristics.
3. Competence concepts.
4. The three key competence categories in the DeSeCo Project.
5. Key competences for LLL in higher education.
6. LLL as intentional learning throughout life.

Part II. Active exercise to identify LLL competences learned in one's career

The students in this second part completed a worksheet to reflect upon their learning experiences and to identify LLL and key competences during their degree using the three broad key competence categories of the DeSeCo Project presented in the workshop. Students were encouraged to work reflectively on the worksheet individually and then to share their best ideas in groups of two or three in a think-pair-share format. Then, the best ideas were reported to the class. With this practice, students had the opportunity to collaborate with others and to share meaningful experiences on their LLL competences. The teachers commented that this activity helped them identify evidence about LLL competences developed in the university to be reflected in their personal portfolios.

Part III. Lifelong learning competences development for continuing professional development

1. Elaboration of a personal and professional development plan
2. Organise the work environment
3. Enhance key competences, read for learning, work in groups
4. Improve specific competences
5. First project development assignment
6. Membership in professional societies
7. Commitment to continued learning

During the programme presentation, were used several examples from real work environments to help students better understand the importance of the competences explained in the workshop. More information about this program is available in Martínez Mediano and Lord, (2012).

4. Research Methodology

The research methodology is based on a mixed-methods evaluation research approach, which is essential for the continued improvement of programmes and their results. We define evaluative research as the systematic process of collecting information to evaluate the quality of the programme and its outputs, focused on the programme's structure, goals, application, and outcomes as a basis for making decisions about the programme's improvement as well as the personal application of the programme (Martínez Mediano, 2007; Pérez Juste, 2006).

4.1. Objectives

Our research objectives were to elaborate a specific programme for the development of key competences for LLL and to present it to undergraduate students to increase awareness of the importance of such competences to better manage students' updating and training needs by means of a workshop in which reflection and debate play important roles and to evaluate the results.

4.2. The sample

The sample of the results presented here consists of two groups.

The first group included the 21 senior engineering students enrolled in ELEC 492 at USD in Spring 2011. All 21 students were invited to participate in the workshop via email. Of the 21 students, 16 completed the questionnaire online before the presentation of the programme, and 12 completed it online after the workshop. All 21 students presented their portfolios.

The second group included 100 fourth-year students in pedagogy at UNED, Madrid Associate Center who were enrolled in Practicum II during 2011-2012. The students were invited to participate in the workshop via email. The workshop was held in May 2012 and lasted two hours. Questionnaires were answered in the classroom both before and after the presentation of the programme. Of the 100 students, approximately 40 attended the workshop. The final participant sample included 33 students who completed the questionnaires.

4.3. Quality indicators

The quality indicators to evaluate the programme and its results were "efficacy", "satisfaction", and "impact, which provided relational measures between the programme and its goals and achievements. Efficacy was defined as the degree to which the results are consistent with the programme's goals. Satisfaction was defined as the degree to which the expectations of the beneficiaries of the programme were met. Impact was defined as the degree to which the results sought by the programme were transferred to other areas and persisted over time.

4.4. Instruments for collecting information

It was important to determine students' prior information on key competences for LLL before introducing the programme. Therefore, we developed a questionnaire that was applied before the workshop and after the presentation of the programme.

The questionnaire on competences for lifelong learning was composed of 10 Likert-scaled questions in the pretest and two additional questions in the post-test. Students were asked to indicate their level of agreement from 1 (minimum) to 5 (maximum). In addition to these closed questions, the questionnaires included five open questions about key concepts in the pre-survey and two additional questions in the post-survey about the positive aspects of the workshop and areas for improvement.

At the end of the course, we analysed the students' portfolios in the sections that showed evidence of the results required by the ABET: "the recognition of the need and the ability to participate in learning throughout their life".

4.5. Data analysis results

For the analysis of the Likert-scaled items, we used SPSS V.17. To analyse the open questions and students' portfolios, we used content analysis. The internal consistency of the students' responses to the

questionnaires (pre- and post-test, N = 28) using Cronbach's alpha reliability was 0.75, indicating an adequate level of reliability that was reasonable for a construct such as "lifelong learning", which manifests in many aspects (Kirby, Knapper, Lamon & Egnatoff, 2010, p. 296). This reliability was confirmed in the analysis of the answers given by the student group from the UNED (N = 33), with a Cronbach's alpha reliability of 0.63 in the pretest and 0.85 in the post-test.

4.5.1. The efficacy of the 'competences for lifelong learning programme'

The results of the descriptive analysis of the Likert-scaled questions (from 1, strongly disagree, to 5, strongly agree) for both groups of students (USD and UNED) in the pre- and post-test Lifelong Learning Questionnaire are shown in Table 1.

Table 1. Descriptive statistics in the pre and post Lifelong learning Questionnaire. USD and UNED groups

Items	Pre-Survey		Post-Survey	
	Pre	Post	Pre	Post
1. Learning to learn is an important concept for personal development.	4,62	4,73	4,49	4,85
2. Lifelong learning is important for engineers.	4,68	4,91	4,73	4,73
3. I believe generic competences are important for success in my career.	4,68	4,64	4,15	4,57
4. Reflecting on my current knowledge can help me to improve my future performance in my career.	4,37	4,64	4,45	4,70
5. Organising my computer filing system could contribute to my professional success.	4,25	4,64	4,47	4,64
6. Collaborative work is important to solve complex problems	4,37	4,55	4,27	4,64
7. I have clear ideas about how to prepare my personal development plan.	3,31	4,00	3,00	4,24
8. The Internet offers many opportunities for learning.	4,31	4,55	4,06	4,45
9. My USD education has prepared me to be a lifelong learner.	4,06	4,36	3,51	4,03
10. Continuous personal development is the responsibility of all professionals.	4,50	4,64	4,15	4,55
11. I expect to improve my professional competences by using some of the ideas presented in this workshop.	3	4,27	3	4,45
12. Overall, I am satisfied with how easily the ideas presented in this workshop can be applied to my personal development.	3	4,18	3	4,42
Common items in pre and post survey	4,31	4,57	4,18	4,54
Items only in the post-survey		4,23		4,44

¹USD: N pre-survey =16, post-survey = 12

²UNED: N pre-survey = 33, post-survey =33

³Not in pre-survey.

In both groups, there was more agreement on the responses of students in the post-questionnaire, suggesting that the workshop helped students improve their knowledge on the subject.

To determine whether there were significant differences between the answers given in the questionnaire before and after the workshop, we applied a means test, a one-way ANOVA, to the UNED group, which was a larger sample than the USD group. We obtained a statistically significant difference in favour of the responses in the post-questionnaire ($\alpha = 0.034$), suggesting that the workshop helped to improve information and the assessment of key competencies for LLL.

To analyse the open questions, the approach used was to compare the students' answers to the definitions of the concepts presented in the workshop according to the theoretical foundation of the programme (part 3 in this article). Some examples of how we performed the analysis of the open questions are shown in Table 2.

Table 2. Content analysis results on the open-ended questions in the USD

Concept	No answer		Incomplete		Good		Improved
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Post-test
Lifelong learning	0	3	6	0	10	4	5
Professional competency	1	3	8	2	7	4	3
Self-assessment	0	3	9	2	7	3	4
Collaborative work	0	3	6	0	10	3	6
Personal development plan	1	3	10*	3	5	1	5
Total	2	15	39	7	39	15	23

* Includes 6 responses of "I don't have one [personal development plan]"

As a result of the open question analysis, we found that in the previous questionnaire among the USD students, 49% of the responses provided by the 16 students who participated showed good knowledge of the topic of LLL. However, in the post-questionnaire, 38% of the students improved. Of the nine students who answered the survey before and after the workshop, 51% improved their responses after the workshop, and 33% gave good answers before and after the workshop. The rest of the students did not respond or gave incomplete answers.

The education students from UNED showed a better definition of the concepts of LLL, competences, and collaborative work, but they had not improved their definitions after the workshop.

For the personal development plan, students from the UNED group had clearer ideas than the USD students before the workshop, although the USD students' prospects improved after the workshop. This outcome may have occurred because the second group included students at a distance university, many of whom were working, and enrolling in college was part of their personal and professional development plan.

4.5.2. Student satisfaction with the programme and workshop

We asked students to evaluate the workshop through four items introduced in the post-questionnaire, two Likert-scaled questions and two open questions. The Likert questions received an average of 4.23 out of a maximum of 5, indicating a high level of satisfaction with the workshop and the applicability of the information presented. In the group of pedagogy students at the UNED, satisfaction with the workshop was slightly higher.

For the two open questions aimed at assessing the workshop by asking about the most valuable aspects and those in need of improvement, the responses indicated that students were involved in the

workshop and obtained important information on key competencies and LLL. The students particularly valued the personal development plan and key competences as well as the reflection and discussion with colleagues relating to topics covered in the workshop during their studies at UNED. One student summed up these responses by saying, “The exercise of working in group facilitated us to reflect on our current work. The workshop has given us good information that we had not previously presented”. Regarding the suggested improvements, the most common were recommendations to provide more examples, more information linked to real-life situations, and more detail in explanations of personal development plans. Both groups, the USD and the UNED students, provided positive feedback on the workshop.

The pre-survey demonstrated good knowledge on the topic of LLL. In the post-survey, 25% of the students demonstrated good knowledge, and 38% showed improvement after the workshop. The remaining students provided no response or an incomplete response. Consistent with the quantitative results, the qualitative data show that the workshop was particularly beneficial for students to obtain deeper knowledge of the importance of lifelong learning.

4.5.3. The programme’s impact on the students’ portfolios

To measure the impact of the workshop on students’ learning on the topic, we analysed the portfolios of the 21 students as part of the lifelong learning outcomes throughout the student’s career at USD. The portfolio assessment is linked to the monitoring of specific indicators to quantify the results of the learning process, assess the merits of the actions undertaken to achieve specific competences, and analyse the content of the evidence provided by the student (Villar, 2002, in Martínez Segura, 2009).

The content analysis of the portfolios from the USD students showed that the workshop had a significant impact on the participants. Twenty of the 21 students (95%) included information on the workshop in their portfolios.

Specifically, four students mentioned the workshop, and two of these students included the documentation provided in the workshop; two referred to the book by Meredith; and three used the three broad categories of key competences of the DeSeCo Project, explained in the workshop, to organise their evidence on competence development, including examples discussed in the workshop. For example, one student noted that he learned to use tools such as ProEngineer Wildfire 5.0, worked with people of different cultures, attended a training seminar on leadership and a Technical Conference, and felt committed to lifelong learning. Ten students mentioned belonging to professional associations, and seven commented on the importance of remaining current due to continuous advances in science and technology and the need for continuing professional development plans. These students found that learning never ends, identified the importance of work in groups, and shared experiences, knowledge, and relationships through networking.

Discussion, conclusions, and recommendations

The “Programme for LLL competences for students in higher education” was effective. The results provided by the descriptive statistical analysis of the Likert questions in the survey before and after the workshop demonstrated the efficacy of the “Lifelong learning competences development for higher education students” Programme. Students improved their knowledge on the subject, and the programme helped them to recognise the importance of LLL to realise their personal development plans. The students expressed their satisfaction with the content and activities of the workshop. The students expressed satisfaction with the questions assessing the workshop. In the suggestions for improvement, they referred to the need for more examples and more time for discussion of these issues.

The impact analysis of the portfolios showed that 20 of the 21 students used the information developed in the workshop to describe the competencies for LLL acquired during their studies at the University of San Diego.

Based on this research, we recommend the use of this programme, in addition to other educational efforts, for the development of key competences for LLL in the early years of degree courses to help students become aware of the importance of developing these competences in depth. It is also advisable to conduct a workshop on key competences for professional development in the senior year to strengthen students' commitment to continuously updating their skills, identifying learning resources, and collaborating for their professional development, which is essential in a changing world.

References

- Abet (2001). Criteria for Accrediting Engineering Programs, Accreditation Board for Engineering and Technology in the U.S.A. Retrieved from www.abet.org.
- Chisholm, L. (2005) *Bridges for Recognition Cheat Sheet: Proceedings of the SALTO Bridges for Recognition: Promoting Recognition of Youth Work across Europe*, Leuven-Louvain.
- Dunlap, J.C. & Grabinger, S. (2003). Preparing Students for Lifelong Learning: A Review of Instructional Features and Teaching Methodologies. *Performance Improvement Quarterly*, 16 (2), 6-25.
- European Union Council (2000), Lisbon strategy.
- European Union Council (2009). European Qualifications Framework in the Higher Education Area (QFEHEA), D.G. Education and Culture: Luxembourg.
- European Union Council (2011). Resolution on a renewed European agenda for adult learning Official Journal of the European Union C (2011/C 372/01-06).
- Faure, E. (1972). *Learning to be: The world of education today and tomorrow*, UNESCO, Paris, 1972.
- Gonczi, A. (2003). Teaching and learning of the key competencies. In Rychen, D.S., Salganik, L. H. and McLaughlin, M. E. (Eds.) 97-99. *Contributions to the Second DeSeCo (Definition and Selection of Key Competencies) Symposium*, Swiss Federal Statistical Office, Neuchâtel.
- Gonzalez, J. & Wagenaar, R. (2003). *Tuning Educational Structures in Europe. Final Report. Phase One*. Madrid: Universidad de Deusto.
- Hoskins, B. & Fredriksson, U. (2008). *Development longlife learning competencies. Learning to Learn: What is it and can it be measured?* European Communities, EUR 23432 EN.
- Kirby, J. R., Knapper, C. Lamon, P. & Egnatoff, W. J. (2010). Development of a scale to measure lifelong learning, *International Journal of Lifelong Education*, 29 (3), 291-302.
- Knapper, C. & Cropley, A.J. (1985). *Lifelong learning in higher education*. London: Kogan Page, Routledge. 3rd ed. 2000.
- Kommers, P., Stoyanov, S., Mileva, N., & Martinez Mediano, C. (2008). The effect of adaptive performance support system on learning achievements of students. *International Journal of Continuing Engineering Education and Life Long Learning. Engineering Education and Life Long Learning*. 18 (3), 351 - 365.
- Martinez Mediano, C. (2007). *Evaluación de programas. Modelos y procedimientos*. Madrid: UNED.
- Martinez Mediano, C. & Lord, S. M. (2012) Lifelong Learning Competencies Program for Engineers, *International Journal of Engineering Education*, 28 (1), 130-143.
- Martinez Mediano, C., Riopérez, N. (2009). Design and evaluation of an on line innovative learning experience in higher education. *23rd ICDE World Conference on Open and Distance Learning. EADTU Annual Conference*. Maastricht, The Netherlands.
- Martinez Mediano, C., Mileva, N. Castro, M., Rioperez, N., & Tzanova, S. (2010). *Internet-based Performance-centered Learning Environment for Curriculum Support (IPLECS) and its application in mLearning. Proceedings of the IEEE Global Conference on Engineering Education (EDUCON)*. Madrid.
- Martínez Segura, M^a J. (Coord.) (2009). *El portafolios para el aprendizaje y la evaluación. Utilización en el contexto universitario*. Universidad de Murcia. Servicio de Publicaciones.

- Meredith, J. (2008). *Launching your career: lifelong learning - your key to an enjoyable and rewarding career*. The Gold Series: Book 4. IEEE-USA E_Books.
- Ministerio de Educación (2011). *El aprendizaje permanente en España. Secretaría de Estado de Educación y Formación Profesional*. Retrieved from: www.educacion.gob.es.
- OECD (2007). *Lifelong Learning and Human Capital, Policy Brief, July 2007*. Retrieved from <http://www.oecd.org/dataoecd/43/50/38982210.pdf>
- Perez Juste, R. (2006). *Evaluación de programas educativos*. Madrid: La Muralla.
- Real Decreto (2011) Marco Español de Cualificaciones para la Educación Superior. 1027. BOE.
- Rodríguez, S., Prades, A., Bernaldez, L. & Sánchez, S. (2010). Sobre la empleabilidad de los graduados Universitarios en Cataluña: del diagnóstico a la acción. *Revista de Educación*, 351, 107-137.
- Rychen, D.S., Salganik, L.H., & Mclaughlin, M.E. (Eds.) (2003). *Contributions to the Second DeSeCo (Definition and Selection of Key Competences) Symposium*. Neuchâtel. OECD.
- Saez Carreras, J. (2009). El enfoque por competencias en la formación de los Educadores Sociales: Una mirada a su caja de herramientas. *Pedagogía Social. Revista Interuniversitaria*. 16, 9-20.
- Stoyanov, S., Kommers, P. Bastiaens T. & Martinez-Mediano C. (2008). Performance support system in higher engineering education - introduction and empirical validation. *International Journal of Continuing Engineering Education and Lifelong Learning*, 18(4), 491-506.
- Villar, L.M. (2002). La carpeta digital. In Ma V. Aguiar, J.I. Farray & J. Brito. *Cultura y Educación en la Sociedad de la Información* (pp.95-107). Coruña: Netbiblo, S.L.

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Received date: 10.7.2012

Reviewed date: 15.11.2012

Accepted date: 10.1.2013

How to cite the article

Martínez Mediano, C; Lord, S.M. y Riopérez Losada, N. (2013). Programa de Desarrollo de Competencias para el Aprendizaje a lo Largo de la Vida para Estudiantes de Educación Superior. *Pedagogía Social. Revista Interuniversitaria*, 22, pp. 133-146.