

Lifelong Distance Learning and Skills Development: A Case Study Analysis in Greece

Eleni Giouli

Abstract—Distance learning provides a flexible approach to education, enabling busy learners to complete their coursework at their own pace, on their own schedule, and from a convenient location. This flexibility combined with a series of other issues; make the benefits of lifelong distance learning numerous. The purpose of the paper is to investigate whether distance education can contribute to the improvement of adult skills in Greece, highlighting in this way the necessity of the lifelong distance learning. To investigate this goal, a questionnaire is constructed and analyzed based on responses from 3,016 attendees of lifelong distance learning programs in the e-learning of the National and Kapodistrian University of Athens in Greece. In order to do so, a series of relationships is examined including the effects of a) the gender, b) the previous educational level, c) the current employment status, and d) the method used in the distance learning program, on the development of new general, technical, administrative, social, cultural, entrepreneurial and green skills. The basic conclusions that emerge after using a binary logistic framework are that the following factors are critical in order to develop new skills: the gender, the education level and the educational method used in the lifelong distance learning program. The skills more significantly affected by those factors are the acquiring new skills in general, as well as acquiring general, language and cultural, entrepreneurial and green skills, while for technical and social skills only gender and educational method play a crucial role. Moreover, routine skills and social skills are not affected by the four factors included in the analysis.

Keywords—Adult skills, distance learning, education, lifelong learning.

I. INTRODUCTION

LIFELONG learning is the dominant strategy applied in developed economies to deal with the changes taking place in the era of the 4th Industrial Revolution. Through skills acquired in lifelong learning, members of society are given the opportunity to cope and adapt to continuous change [1].

The concept of skills is the subject of intense scientific dialogue, which is often characterized by ambiguity and semantic instability, making it difficult to use in business terms. However, especially when it comes to comparing skill with the concept of competence, we can characterize it as a more partial concept, which describes specific activities and tasks. Skill means the ability of an individual to apply knowledge and know-how in such a way that he is able to complete his tasks and solve problems. It is the acquired ability of an individual to perform a task effectively. Developed skills facilitate learning and the faster acquisition

of knowledge. In the job market, employees receive a reward in return for the skills they offer and use in their work. People who can give potential employers a description of themselves in terms of skills are more likely to find the job that interests them and satisfies them. Skills refer to the application of knowledge and the utilization of know-how in the performance of tasks and problem solving in the workplace. They are formed by the systems of initial or continuing education and training as well as by work learning, i.e. the knowledge and skills acquired during the execution of the work (on the job training). Professional skills, as a component of human capital, have a decisive influence on labor productivity and then on the competitiveness of the economy.

The purpose of the paper is to investigate whether participating in lifelong distance learning programs can contribute to the improvement of adult skills in Greece. In this way, the paper examines the importance and necessity of the lifelong distance learning in the complex changing modern world. In order to do so, the paper concentrates on four distinct factors, looking at the effects of those factors on acquiring different types of skills. These factors are the gender, the educational level, the employment status and the educational method used in the lifelong distance learning program.

The order of the paper is as following. Section II presents a theoretical background on the connection between lifelong programs and the development of skills. Section III presents the data and the methodology employed as well as the hypotheses that are tested. Section IV presents the empirical results and finally, Section V presents the conclusions.

II. THEORETICAL BACKGROUND

Theoretical approaches about the importance of lifelong learning have changed significantly over the last decades [2]. During the 1970s, lifelong learning was the answer to the changing socio-political conditions [3]. However, until the mid-1980s, lifelong learning was not considered as linked to the labor market and economic progress. Therefore, lifelong learning programs were initially linked to the individual's personal development [4], while theoretical works were unaware that through these programs the trainee's professional skills were developed at the same time. However, the importance of lifelong learning changed in the following years and from the social dimension the burden shifts to the needs of the economic field. Thus, theoretical arguments were concentrated on the need to upgrade the knowledge and skills of human capital in an ever-changing economic environment. Linking to the labor market is perhaps the main reason why so

E. Giouli is with the National and Kapodistrian University of Athens, Department of Primary Education, Athens, Greece (phone: 0030-210-3689351 (e-mail: egiouli@elke.uoa.gr)).

much value is placed on lifelong learning [5].

The European Union in its text "The Goals, Architecture and Means of Lifelong Learning" [6] on lifelong learning in 1996, a year that was also designated as the "European Year of Lifelong Learning", proposes the economic dimension over the social dimension for the objectives of lifelong learning stating that:

- (a) The economic dimension includes investing in human resources, promoting employment in an era of structural change and making the company a key partner in the learning society.
- (b) The social dimension refers to the removal from the traditional division of life (education, work and pension), to equal opportunities and to the provision of educational opportunities of multiple forms.

The 4th Industrial Revolution [7], [8] has brought changes in the labor market as technological changes and their impact on it require a new focus on the way human capital is invested and exploits social prosperity. As many of today's education systems are disconnected from the skills required in today's labor market, the pace of technological and economic change is further widening the gap between education and the labor market. In this regard, lifelong learning is called upon to play an important role in bridging this gap.

As skills and professions evolve over time, lifelong learning becomes vital for both society itself and the economy and economic policymakers, enterprises and individuals as separate entities [9]-[11].

It is now necessary to train the workforce through lifelong learning. The term "training" means the further education of the individual, i.e. beyond the limits set by the basic educational system of the country. Obviously, training is closely linked to the individual's freedom and free will to evolve his or her abilities and skills. It mainly concerns people who are mature, calm and usually older, while the decision for training is mostly a conscious choice. Therefore, in an evolving world, continuing education through distance learning methods for adult education can contribute to the efficiency of the education system and create benefits for the economy and society [9]-[14]. In addition, today's education systems focus on the development of cognitive skills; however, non-cognitive skills that cultivate an individual's ability to work together and solve problems are becoming increasingly important. Current education systems are also "time constrained" in a way that may not make them suitable for current or future job markets. In other words, they impose close career and experience decisions at a young age. The distinction between formal education and the labor market must be bridged, as learning, research and development (R&D), knowledge exchange, retraining and innovation take place simultaneously throughout the life cycle, regardless of work and education level.

In a world where continuous education is evolving through electronic distance learning methodologies for adult education, it can contribute not only to the effectiveness of the education system but also to the benefit of society and the economy.

Lifelong learning programs also offer a second chance to

those leaving the formal education system. The results [15] show that vocational training and formal education are complementary investments and that there are teaching implications for family members, especially among those seeking distance education with a high basic level of education.

Another important dimension that highlights the role of lifelong learning is its contribution to strengthening human capital and economic development in general. Differences between countries in GDP per capita generally reflect differences in labor productivity [16]. In turn, these labor productivity gaps are largely a function of differences in the productivity ratio and the concentration of human capital that a country has at its disposal. While human reserves have increased, highly educated workers have significantly increased labor productivity over the past 50 years [17], [18]. At the same time, the growing economic importance of knowledge is expected to increase the return on investment in skills, thus enhancing the further increase in income inequalities within countries in the coming decades [18]. In this context, the ability of economies to effectively develop existing human resources and strengthen the capacity of the population through lifelong learning will be of greater importance in combating the slowdown in growth and the increase in inequalities. It is therefore understood that economic policymakers need a clear picture not only of how labor markets and economies are changing, but also of the extent to which their citizens are being equipped with the skills needed in the 21st century. People with low professional skills face a much higher risk of economic disadvantage, a higher chance of being found unemployed and a poor quality of health compared to a highly trained workforce.

Skills can change a person's life by fostering economic and social development, helping to improve well-being and promoting social inclusion [10]. Without the right skills, people are marginalized in society, technological progress does not translate into economic growth, and businesses and countries cannot compete in an increasingly complex global environment.

As the demand for manpower with information analysis and communication skills increases and as technology permeates all aspects of life, people with poor writing and arithmetic skills are more likely to face the problem of unemployment. Lack of IT skills limits adults' access to many basic services, better paying jobs and access to further education and training, which is vital for developing and maintaining skills in working life.

Enhancing the skills of adults through lifelong learning and e-learning methods could be the springboard to tackle social exclusion and help integrate into the labor market [19].

The link between skills and prosperity applies not only at the individual level but also at the country level. Countries with low skills are lagging behind in terms of competitiveness as the global economy tends to become increasingly dependent on skilled labor [10]. At the same time, skills inequality is related to income inequality. The way skills are distributed to the population has a significant impact on how

wealth is distributed in society.

III. DATA, METHODOLOGY AND HYPOTHESIS TESTING

The analysis of the present paper is based on the development of a questionnaire given to individuals that have participated in the lifelong distance e-learning program of the National and Kapodistrian University of Athens in Greece. The questionnaire was sent by email to participants in that program and they responded on-line through an online form. The time period of data collection was realized from June up to August 2019. A total of 3,016 individuals participated in the questionnaire. From those responses the 2,168 were valid and complete.

The individuals that participated were above 21 years old. From the total of 2168 responses, 70,1% were females and 29.9% were males (Table I).

TABLE I
GENDER FREQUENCIES

	Frequency	Percent
Male	649	29.9%
Female	1519	70.1%
Total	2168	100.0%

The basic research questions to be addressed through this questionnaire regard which are the effects of participating on distance learning programs on the development of new skills. More precisely, the research questions are the following:

- Which is the effect of gender on the development of new general, technical, administrative, social, cultural, entrepreneurial and green skills?
- Which are the effects of the previous educational level on the development of new general, technical, administrative, social, cultural, entrepreneurial and green skills?
- Does the current employment status affect the development of new general, technical, administrative, social, cultural, entrepreneurial and green skills?
- How does the method used in the distance learning program affect the development of new general, technical, administrative, social, cultural, entrepreneurial and green skills?

Table II presents the frequencies regarding the education level of the participants. Most of the respondents are university graduates (32.3%) or have a master degree (31.2%).

Table III presents the frequencies regarding the employment status. Most responders are employed (76.4%), while 8.3% consider themselves as unemployed, and the rest of them declare another employment status.

Table IV presents the frequencies regarding the educational methods that are used in the distance lifelong learning programs of the National and Kapodistrian University of Athens. Most of the respondents have participated in programs realized through video recorder lectures (42.4%), while the 33.7% participated in programs using Virtual Reality Applications, 5.3% using face to face lectures and 4.6% live streaming lectures.

Finally, Table V presents the frequencies regarding the

skills acquired. 65.9% answered that they acquired new skills in general. It has to be noted that only participants

TABLE II
EDUCATION FREQUENCIES

	Frequency	Percent
PhD	87	4.0%
Master	676	31.2%
Bachelor	701	32.3%
ATEI/TEI/KATEE	297	13.7%
College	51	2.4%
Two-year Pedagogical Academies	6	0.3%
SELETE	3	0.1%
Post-Secondary Vocational School	58	2.7%
Institute of Vocational Training (IEK)	118	5.4%
General Lyceum (Secondary School)	120	5.5%
Vocational Lyceum (EPAL) (Vocational education and training)	40	1.8%
DN/NR	11	0.5%
Total	2168	100.0%

Note: DN/NR: Don't Know / No Response.

TABLE III
EMPLOYMENT STATUS FREQUENCIES

	Frequency	Percent
Employed	1657	76.4%
Unemployed	181	8.3%
Other case of unemployed	50	2.3%
Student	86	4.0%
Providing social service/tenure	79	3.6%
Pensioner	38	1.8%
Housewife	25	1.2%
Person with disabilities	6	0.3%
DN/NR	46	2.1%
Total	2168	100.0%

Note: DN/NR: Don't Know / No Response.

TABLE IV
EDUCATIONAL METHOD FREQUENCIES

	Frequency	Percent
Video Recorded Lectures	915	42.2%
Live streaming	100	4.6%
Face to face	114	5.3%
Virtual Reality Applications	731	33.7%
DN/NR	308	14.2%
Total	2168	100.0%

Note: DN/NR: Don't Know / No Response.

TABLE V
SKILLS FREQUENCIES

	Yes	No	Total	Percent Yes (%)	Percent No (%)
Acquiring new skills in general	1286	665	1951	65.9%	34.1%
General skills	650	696	1246	52.2%	47.8%
Routine skills	280	950	1230	22.8%	77.2%
Technical skills	408	829	931	33%	67%
Administrative skills	527	717	1244	42.4%	57.6%
Social skills	616	626	1242	49.6%	50.4%
Language and cultural skills	354	887	1241	28.5%	71.5%
Entrepreneurial skills	400	827	1227	32.6%	67.4%
Green skills	174	1049	1223	14.2%	85.8%

Acquiring new skills in general refers to whether respondents have acquired some new skills (e.g. critical and analytical thinking, teamwork, problem solving, using a computer program, etc.) from their participation in the program. General skills refer to general skills in the use of information technology (IT), oral and written communication, arithmetic and grammar literacy, office management skills and so on. Routine skills refer to more basic skills, characterized by repetition and low specialization. Technical skills (specializations) are skills that are necessary for solving technical problems, for the design, operation, review and maintenance of equipment or technological infrastructure, or professional IT Communication (ICT) specializations. Administrative skills are those used for business planning, quality control, human resource management (recruitment, training/development and human resource development) and distribution/allocation of company resources in general. Social skills refer to mobilizing and utilizing the characteristics of employees for individual and group purposes in the context of their work, handling customers/consumers, recognizing the value of networks and partners with networking dynamics. Language and cultural skills are about the ability to communicate in more than one language and take advantage of culturally diverse ethnic groups. Entrepreneurial skills are special skills for start-ups such as risk management, strategic thinking, self-esteem, optimal use of personal networks, ability to handle recruitment and address all kinds of business challenges and opportunities. Lastly, Green skills are special skills needed to adapt business products, services and operations to the new environmental conditions, requirements and regulations imposed by climate change.

The methodology followed in the analysis uses a generalized linear model which expands the general linear

model so that the dependent variable is linearly related to the factors and covariates via a specified link function. Moreover, the model allows for the dependent variable to have a non-normal distribution. Thus a binary logistic model is used which defines binomial as the distribution and logit as the link function. A binomial distribution is appropriate only for variables that represent a binary response or number of events.

Taking into account the statistical properties of the available discrete choice models, the analysis concludes that the logistic framework best serves the analysis' needs, since the independent variable cannot be different from a binary while the intensity is to estimate the probabilities that the one or the other case of the independent variable will have on the depended variables that are used. The choice set exhibits the appropriate characteristics of mutual exclusiveness, exhaustiveness, and finiteness as defined in the literature. The model is estimated by maximum likelihood (ML), assuming independence across observations.

As dependent variables, the skills acquired after the participation in a lifelong distance learning program are used. All different types of skills -as presented in Table V- are taken into account as binary dependent variables. Thus, the logistic regression is estimated nine times, one time for each skill. The independent variables used in the analysis are categorical (nominal): gender, education, employment status and educational method used in the lifelong distance learning program.

IV. EMPIRICAL RESULTS

Table VI presents the results after estimating the binary logistic framework described in the previous section.

TABLE VI
LOGISTIC REGRESSIONS

	Acquiring new skills in general	General skills	Routine skills	Technical skills	Administrative skills	Social skills	Language and cultural skills	Entrepreneurial skills	Green skills
Gender	0.209** (3.848)	-0.222* (3.261)	-0.051 (0.122)	0.723*** (31.887)	0.278** (5.079)	-0.005 (0.002)	-0.417*** (8.691)	0.385*** (8.723)	0.330** (3.717)
Education	-0.058*** (9.994)	-0.040* (3.386)	-0.016 (0.376)	0.006 (0.070)	-0.029 (1.744)	0.010 (0.213)	0.066*** (6.543)	-0.079*** (12.211)	-0.061** (4.564)
Empl. status	-0.007 (0.064)	0.050 (1.895)	-0.027 (0.433)	0.019 (0.222)	0.048 (1.629)	0.000 (0.000)	0.011 (0.080)	0.052 (1.571)	-0.051 (1.089)
Method	0.074*** (5.941)	0.133*** (12.756)	0.022 (0.258)	-0.115*** (8.200)	-0.094*** (6.242)	0.030 (0.665)	-0.073* (3.155)	-0.123*** (18.156)	0.090* (2.802)

Notes: Parentheses present the value of the Wald test. *, ** and *** denote statistical significance at 10%, 5% and 1% significance level.

From the analysis above, it seems that the development of new skills is significantly affected by the gender, the education level and the method used in the lifelong distance learning program. Moreover, the employment status does not play a role in acquiring new skills. More precisely, the coefficient for gender is statistically significant and positive for the case of acquiring new skills in general, and in acquiring technical, administrative, entrepreneurial and green skills. This means that it is more possible that men participating in such programs are going to acquire such skills. Moreover, the coefficient for gender is statistically significant

and negative for the case of acquiring general skills and language and cultural skills. This means that it is more possible that women participating in such programs are going to acquire such skills.

Regarding the education level of the participants, it seems that it has a negative role in acquiring new skills in general as well as in acquiring general, entrepreneurial and green skills. It seems that the higher the educational level, the lower are the new skills acquired through participation in such programs. The participants have already acquired many skills through the education they have received in the past, receive lower new

skills after participating in a lifelong distance learning program. In addition, education level is positively linked to the acquiring language and cultural skills, since it seems that those skills require a higher educational level in order to be absorbed.

Finally, the method used in the analysis is a critical factor for acquiring new skills in general, as well as for general, technical, administrative, language and cultural, entrepreneurial and green skills. The only skills that are not affected by the educational method used are routine skills and social skills. It should be noted that routine and social skills are the only skills not affected by neither of the factors used in the analysis.

V.CONCLUSIONS

The present paper determines the role of the gender, the previous educational level, the current employment status, and the educational method used in lifelong distance learning programs, in acquiring new skills. As a case study, responses from 3,016 participants educated in the lifelong distance e-learning program of the National and Kapodistrian University of Athens are used.

Using a binary logistic framework of empirical analysis, the basic conclusions that emerge are that the gender, the education level and the educational method used in the lifelong distance learning program are crucial for the development of new skills for those participated in these programs, while the employment status does not play a significant role. These factors affect acquiring new skills in general, acquiring general skills, language skills and cultural skills. Moreover, the gender and the educational method affect the acquiring of technical and social skills. In addition, there are two kinds of skills that are not affected by the factors included in the analysis; routine skills and social skills. Moreover, through the analysis it seems that men acquire more new skills in general, as well as technical, administrative, entrepreneurial and green skills than women, while women acquire more general skills and language and cultural skills than men. In addition, the participants that have already acquired high skills through the education they have received in the past receive lower new skills after participating in a lifelong distance learning program, while language and cultural skills are highly acquired by those having higher educational level. Finally, the educational method used in the analysis is a critical factor for acquiring new skills in general, as well as for general, technical, administrative, language and cultural, entrepreneurial and green skills.

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Eleni Giouli is a PhD Candidate in the Pedagogical Department of the National and Kapodistrian University of Athens. Also, is the Director of the E-Learning Programme of the National and Kapodistrian University of Athens since 2001.

She has the overall coordination and the management of the E-Learning distance courses of the University of Athens and she has supported actively the expansion of the organization all these years.

Mrs Giouli holds a BSc degree in Economics from the University of Athens and a MSc in Regional Development.