ΓΗΡΑΣΚΩ ΑΕΙ ΔΙΔΑΣΚΟΜΕΝΟΣ

LEARNING THROUGH THE LIFE SPAN

Trends, dimensions, practices and reflections

Editors: Katerina Kedraka & Eirini Tzovla

Alexandroupolis, 2023

ΓΗΡΑΣΚΩ ΑΕΙ ΔΙΔΑΣΚΟΜΕΝΟΣ

LEARNING THROUGH THE LIFE SPAN

Trends, Dimensions, Practices, and Reflections

Editors:

Katerina Kedraka, Associate Professor, Department of Molecular Biology and Genetics, Democritus University of Thrace

Eirini Tzovla, Postdoc Researcher, Democritus University of Thrace

ΓΗΡΑΣΚΩ ΑΕΙ ΔΙΔΑΣΚΟΜΕΝΟΣ

LEARNING THROUGH THE LIFE SPAN

Trends, Dimensions, Practices, and Reflections

The opinions expressed and the arguments used in this book bind only to to its writters and editors and do not necessarily reflect the official views of the Department of Molecular Biology and Genetics / Democritus University of Thrace

Cited as: Kedraka, K. & Tzovla, E. (Eds) (2023). *ΓΗΡΑΣΚΩ ΑΕΙ ΔΙΔΑΣΚΟΜΕΝΟΣ LEARNING THROUGH THE LIFE SPAN Trends, Dimensions, Practices, and Reflections.* Laboratory of Teaching and Professional Development of Bioscientists, Department of Molecular Biology and Genetics, Democritus University of Thrace

CONTENTS

Introduction

ΓΗΡΑΣΚΩ ΑΕΙ ΔΙΔΑΣΚΟΜΕΝΟΣ

LEARNING THROUGH THE LIFE SPAN

Trends, dimensions, practices and reflections

The scope of this book is to offer a glance all over the spectrum of adult learning through the life span. Colleagues, academics, scholars and collaborators of the Laboratory of Teaching and Professional Development of Bioscientists of the Department of Molecular Biology and Genetics – Democritus University of Thrace -Greece have contributed their expertise and scientific specialization to provide, through their lens, a range of trends, dimensions, practices and reflections regarding Adult Education and Learning just after the pandemic of Covid-19, which caused several turbulences to many sectors of our lives.

Learning can be defined as a lifelong process of processing data in the central nervous system of the learner. It results in the acquisition of new knowledge, skills, opinions and experiences, all affected by ageing. It is related to individual's background, prior experiences, temperament and preferred ways of learning. Learning in Adult Education is not an ad-hoc or merely opportunistic effort, but an active process, which continues throughout a person's life and leads to the renewal and/or specialization of general and specific knowledge, skills and attitudes, that is, of the broader ways of approaching life. This means that adults get involved in learning processes, either to improve their knowledge and skills within their job environment, or to change the direction of their work, or even their life. Karalis (2020b) defines lifelong learning as all *"those processes that refer to learning, education, educational institutions and the learning citizen; with the concept of continuum as a key element of differentiation. Lifelong learning encompasses all learning and educational activities of any type, content, or level, taking place in formal, non-formal and informal educational contexts and involving citizens of all ages and levels of education at any stage of their biological and social cycle"* (p. 532).

Personal motivation to learn and the provision of a variety of learning opportunities are the basis and the necessary conditions for Adult Education (Jaques, 2001). Overall, learning is based on a complex network of certain quality criteria and conditions: the observance of the principles of Adult Education, the continuous and open communication with the instructor, the quality characteristics of the educational material, the methodological framework of the educational meetings, the utilization of various pedagogical techniques and the use of new technological means. But also the organizational culture is very important, since it encourages in wok education and training, on various thematic issues and not only to topics related to the job. The educational practices used in Adult Education support the learner to actually reach knowledge. Teaching is not the core of learning, as it loses its traditional

character of distant and boring lectures in the classroom or auditorium. Instead, it becomes a continuous discourse, a creative active process, where participants reflect, engage and interact in order to discover knowledge, acquire skills and adopt attitudes, in other words to concur learning (Kedraka & Phillips, 2017).

But who is the adult learner?

The concept of "adulthood" is essential for adult learners, because it demonstrates that "adulthood" emerges naturally or rather it is attained through the learning process (Rogers, 1999). Adulthood, is not solely based on the age criterion, but also based on parameters, like, maturity, responsibility, experience, self-management, self-definition (self-perception), autonomy and the sense of social responsibility, as identified by Malcolm Knowles (theory of Andragogy), Jack Mezirow (Transformative Learning theory) and Paulo Freire (Radical Humanism theory).

Knowles (1970) links learning to adulthood. He argues that adults learn in a different way than children learn, because they have certain characteristics that they acquire with their adulthood, namely "they have self-concept, experience, readiness to learn, orientation to learning and finally, (later added) incentives" (Knowles, 1984, p.12). According to Knowles, adults enter the educational process having mastered adulthood with the above characteristics, which, through the life span, develop and evolve. He considers that adulthood makes adults capable of self-managing learning, taking responsibility for diagnosing their learning needs, formulating their learning goals, recognizing material and non-material means for the facilitation of their learning, choosing learning strategies and evaluating their learning outcomes. He concludes by saying that adults' active attitude towards their learning is a sign of adulthood as a result of both internal characteristics and the social context in which learning is taking place.

Freire treats the adult learner from the outset as an autonomous, dynamic, and politically aware citizen who, when engaged in the educational process, learns to think critically, emancipates, and acts for social change (Freire, 1977). He considers the socio-cultural environment to be an important factor influencing the process of adult learning, since education and learners live and operate in a socio-cultural environment, influencing them in the formation of their ideology and political point of view. Therefore, education is not politically neutral. He notes that adulthood emerges in the form of readiness for learning, which, however, can be strengthened, mainly, through the application of techniques and methods, such as simulation, counseling discussion, role play, case studies in a learning environment, of mutual trust, respect, mutual assistance, and acceptance of diversity.

Mezirow argues that the adult learner becomes independent, acquires individual and social responsibility, self-management ability and finally, maturity and personal fulfillment, through education and his involvement in the learning process and finally, he transforms and evolves his way of thinking. For Mezirow the purpose of learning is personal growth and fulfillment, introspection, the development of self-esteem and adult sociability. That is why adults are interested in learning objects that are related and can also be applied in real life situations. Mezirow highlights the impact of experiences on the way adults reflect on their experience (professional, social, personal, educational).

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

He argues that adulthood 's experiences orient adults to learn things that will help them solve problems and deal with situations that concern their assumptions and mental habits that determine their lives, thus adult learning is promoted through personal exploration and interpretative reflections (Karyotou, & Kedraka, 2019).

Illeris (2014) argues that the concept of transformative learning should also include the definition of "identity", as today's living is changing and evolving so rapidly that we must constantly adapt our identity to new conditions –a struggle for constant change that can only be achieved through transformative learning processes. Thus, he defines transformation as a "learning that leads to a change in the learner's identity" (Illeris, 2014: 40). Illeris (2016), also, notes that transformative learning when implemented in an educational context finds very good ground in a project, which offers an opportunity for rich learning experiences. When students feel that they have invested in learning through a project, they are motivated, they acquire multiple skills and understand that learning *how to learn* is more important than acquiring knowledge through lectures at the auditorium, a prerequisite for building their future professional identity (Orfanidou, & Kedraka, 2022).

Furthermore, Illeris (2016) notes that the term development includes both learning and the biological maturation of the individual and that learning depends on the age of the individual, in the sense of the life course. He divides life into four periods, childhood, youth, adulthood, and mature adulthood and he notes that learning motivations change with age (Illeris, 2003). Children want to capture their world, young people want to construct their own identities, adults pursue their life goals, in many life areas: social, professional or family and mature adults seek wealth and harmony. He underlines that gradually the individual learns more autonomously and gains control over its learning, leading to more conscious learning choices.

Therefore, we can say that adults are considered to have mastered adulthood, when they have reached a very good level of maturity, responsibility, and self-determination, mainly through their reflection on in their assumptions and experiences. All this has a positive effect on their learning. All three scholars consider that adults have not become autonomous, nor that they have developed capacities for emancipation and self-management, if they have not mastered the ability not only to think critically, but to act for social change, an element that Freire particularly emphasizes, considering the very essence of the learning process (Karyotou, & Kedraka, 2019). The 'key' for a meaningful, liberating and reflective adult learning, seems to be the exploitation of experiences and critical reflection, which can emerge and be exploited through the active participation of adult learners in a challenging and interactive educational condition that will give adults the opportunity to become independent, to think critically, so to take into their hands their life (Mezirow, 1990).

In the context of a cognitive approach learning things are simple, since students use different individual tactics to improve their learning (Schraw, Crippen, & Hartley, 2006), through various learning experiences and events. According to Kong (2015) in especially in formal Higher Education cognitive strategies are used for processing information, problem solving for defining the specific path

for reaching a goal and critical thinking, related to a person's ability to think reflectively and decide skilfully.

In the key question for the field of transformative learning by Robert Kegan (2000) *"what form transforms?",* Illeris (2014) proposed that the most appropriate term regarding what is transformed by learning is identity, because it includes in addition to the internal processes that take place in the individual and the external ones, i.e. the interaction of the individual with the social environment. Identity transformation through learning involves changes in the way a person thinks, feels and acts.

Learning does not, however, take place exclusively through structured educational contexts. It is a broader activity of life, a continuous individual process in which we participate throughout our lives, since a significant part of learning occurs through our experiences and activities (OECD, 1996).

Formal education is provided by the statutory education and training institutions and is completed by the awarding of recognized diplomas and degrees, which also lead to corresponding professional rights, as it is provided in Primary, Secondary and Tertiary Education.

Non-formal education includes activities aimed at enriching knowledge, developing and improving abilities and skills, developing personality and being an active citizen, as well as mitigating educational and social inequalities. It is provided outside of the statutory education and training systems and does not lead to the acquisition of degrees, however certificates of attendance, completion, etc. are provided that certify the participation of the trainees. Often, non-formal education/training is provided in the form of conferences or seminars by scientific and professional bodies of each discipline. Sometimes it is provided by the employer (even if it is the state) at the workplace (in-service training) and sometimes through educational activities organized by the various social organizations and groups (eg, youth organizations, trade unions and political parties). It is also provided by organizations that have been created to complement the official systems (eg, the various art, music and sports schools, tutoring centers, etc.).

Informal learning is the natural consequence of everyday life, including professional life. They are the learning activities that take place outside of an organized educational context, in the context of leisure, of professional sphere of life, sports, social, community or cultural activities. It includes all kinds of self-education and personal cultivation activities. Unlike the previous two types of education, it is not necessarily a deliberate action and thus may not be recognized – not even by the individuals themselves – as contributing to the improvement of their knowledge and skills (eg, the social skills of a housewife).

Training, on the other hand, describes the systematically organized process of acquiring specialized professional knowledge and skills, which meet specific work requirements.

Identifying learning outcomes is necessary to determine learning as a complex concept, considered a necessary for any kind of individual development. Lifelong learning takes place throughout life (lifelong), continuously or occasionally, and in all aspects of life (lifewide) (Barros, 2012). It should end up with some *"learning outcomes»,* a term often used lately (Cedefop, 2022). Despite the importance

of learning outcomes, the least researched aspect of learning, many of them appear sometime later in learners' lives and it is very difficult to determine the appropriate methods and time for measuring. The actually achieved learning outcomes can only be identified following up the achieved learning in real life. Therefore, the recently increased research in learning outcomes (Schuller & Desjardins, 2007) is about lifelong learning pathways, learning journeys, learning lives and identities, and the wider benefits of adult learning. Indeed, even though lifelong learning is considered necessary for all, learning outcomes are often researched in terms of employability, restricting understanding of learning's wider impact on individuals' lives and changes in elements of identity. Nevertheless, the way of experiencing learning is completely individualized and each person's learning and development path is unique. That is why approaches and analyzes of long-term data (Bynner, 2002) are often used to investigate the phenomenon of learning and to study changes in the lives of adult learners over time to explore how they experience and interpret their learning (Orfanidou, & Kedraka, 2022).

Adult Education offers access to lifelong learning opportunities, by providing opportunities for everyone, to acquire basic skills (reading, writing, numeracy) and "new" skills (social, technological, communication). However, concerns were raised that the employment-related dimensions of lifelong learning could shift the focus to the field of training, so we should prevent the one-dimensional orientation of lifelong learning objectives towards the labor market. The EU (2000) clarified that overall, lifelong learning is about personal fulfillment, active participation, social inclusion and employability/adaptability, identifying the following four goals of lifelong learning:

a. upgrading of professional knowledge and skills

b. social cohesion

c. active participation of citizens

d. personal fulfillment

Therefore, we consider important the equal emphasis on the effort to achieve all four of these goals of lifelong learning and education, however, training for the employability and adaptability of the workforce is not always compatible with personal fulfillment (Kedraka & Phillips, 2017). Indeed, accessibility and affordability of education, training and development opportunities for adult learners is one of the most critical issues affecting social and economic stability in contemporary societies (Merriam & Caffarella, 1999).

The recent outbreak of the COVID-19 pandemic affected Adult Education. During a two-years' time, all educational institutions transformed their educational function from face-to-face to e-learning. After the pandemic crisis, a new reality has emerged, including hybrid and transitional educational forms and solutions. The immediate effects of the consequent disruption of the traditional educational function not only requires adult teachers to master the relevant educational technology, but also to update their own educational ideas towards online learning. Karalis (2020a) argues that there are some very important "lessons learned" during the covid period, which form a new normality for the years to come. Thus, Adult Education has become more receptive to online teaching, since the

experience of teaching during the pandemic proved that the teaching practices could move from face-to-face teaching to e-learning if interaction and critical aspects of learning remain the core principles of the education offered.

The literature review in adult learning can help us establish a philosophical, theoretical and practical basis, necessary for constructing a meaningful approach to answer adult learners' undergoing needs within academic, occupational and/or professional education and training in classroom, workplace, or virtual environments, wherein the adult student enters to achieve intellectual synergy and transformational changes related to his knowledge, skills and attitudes, which impact his social and occupational contexts (Chaves, 2008). Indeed, adult learners through their personal and occupational profiles, are moving towards a challenging (and not always easy or desired) pursuit of new knowledge, updated skills, and attitudinal changes, necessary for them to survive in a "new world" captured by technology and internet apps. It is obvious that often adults do not always feel comfortable, since (especially) older individuals are "more set in their ways". For them, unlearning their outdated knowledge, skills, attitudes, or expectations is not easy for them. In this context, lifelong learning should engage them in dialectical processes and "fresh" reflection, that may lead to sustainable answers and new understandings of the world surrounding them.

Therefore, questions arise in the field of Adult Education, like

o   *How can the spectrum of the adult learning be defined?*

o   *Who is the adult learner today?*

o   *How do adults perceive their educational and professional pathway, combined to personal choices within a new, demanding, world?*

o   *How can learning experiences go beyond cognitive approaches and trigger critical thinking?*

o   *Using a critical approach teaching model, can the necessary transformation occur for adult learners and how?*

o   *What are the challenges brought up by the emerging learning culture?*

This book will try to answer these questions -and hopefully many more- through its chapters, in which writers from the field of Adult Education, in an alphabetical order, present their argumentations and reflections.

In their chapter, **Theodora Boubonari, Katerina Kedraka, Maria Grigoriou, Maria Lambropoulou, George Skavdis,** and **Christos Konstandopoulos** highlight the advantages and disadvantages of applying the flipped classroom model in Higher Education's courses, considering both students' and educators' perspective, applied within three in-person undergraduate courses, in the Department of Molecular Biology and Genetics, Democritus University of Thrace during the spring semester 2021-22. The results showed that the students were positive about the application of the model. Both, faculty and students, evaluated the model highly. However, they do not seem comfortable to fully implement this model in their courses. They prefer live lectures, suggesting that they are not ready to take

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

sufficient responsibility for their own personal study alone at home and that they need interaction with the teacher. Faculty estimated that the flipped classroom model can be a very good teaching technique in higher education, since it contributes in the deeper understanding of the subject but also in the development of students' critical thinking. However, it requires a lot of time to design and carry it out. In conclusion, the use of flipped classroom model could significantly reduce the use of the traditional lecture, overcome many of the limitations of traditional university teaching and learning approaches, and ultimately serve the student-centered learning approach.

Lambrina Gioti contributes with an interesting aspect concerning leisure education, a form of organised or institutionalised lifelong learning that takes place in participants' leisure time in many forms, through a variety of means and methods and by a wide range of mainly private providers. It has become one of the growing areas of Adult Education and lifelong learning, since its wide dissemination has also contributed to the emergence of the important function of leisure education in people's personal - and not only professional - development. The main motivation for adults to participate in leisure learning activities is to seek experiences related to their personal development and to make creative use of their leisure time. In particular, certain educational activities, including non-formal learning, are considered important means for adults' self-improvement and self-fulfillment. Furthermore, as research evidence suggests, long-term participation of adults in leisure educational activities provides them with rich experiences capable of shaping a unique culture as well as the benefits they enjoy on a personal level.

Christos Kaltsidis approaches the learning experience using new technological trends, like Virtual Reality. New technology in education, contains various benefits, obstacles, and risks that should be considered in the context of the use of Virtual Reality. Basic concepts of experiential learning are discussed alongside with adult education theories and Cognitive Theory of Multimedia Learning (CTML), which explains the mental representations that are created using technological tools. Representing the real world and performing authentic tasks are possible with Virtual Laboratories. This kind of educational software borrows principles from computer gaming for learning purposes. Teachers and learners should be ready to face new challenges during the forthcoming years as technology evolves.

Venetis Kanakaris and **Maria Pavlis-Korres** contribute with an interesting topic on using smartphones and social media to Improve the daily life of women in the third age through participation in a blended learning course. Elderly people appear hesitant to join educational programs -especially those focusing on using social media platforms and smartphone apps- due to several barriers that discourage them from engaging with technology. In this chapter a study on older women's views regarding the impact of such learning courses, after attending a blended (synchronous and asynchronous) educational program on using apps and social media on smartphones for a period of eight months is presented. According to the findings of the research the authors conducted, the use of smartphones and certain smartphone applications improved elder people's lives, as it enabled them to interact with public services and banks remotely during the quarantine period. Moreover,

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

communication with family members and friends was retained due to the use of Facebook and Facebook Room, while the learning community was kept alive after the completion of the course. The authors conclude that participants' willingness to join a new educational program on the use of smartphones/smartphone apps significantly improved.

Alexis Kokkos discusses the way in which contact with works of art – the aesthetic experience – can be a source of continuous, essential self-directed learning, often used in Adult Education. In the first part he examines the emancipatory dimension of approaching art within the framework of the dominant instrumentalized educational and socio-economic system. The second part of the chapter focuses on views of leading thinkers (Adorno, Aristotle, Dewey, Greene, Horkheimer, Marcuse) who highlighted the learning potential of the aesthetic experience ensuing from the exploration of important works of art. In the third part the author deals with the prerequisites required for adult learners to be able to understand and enjoy works of art of aesthetic value more deeply, through their own intellectual and mental powers. The prerequisites relate to the willingness to approach art, the utilization of creative and critical questions as triggers for exploring the artworks, and the process of selecting the artworks at hand. Finally, an example of self-directed learning is presented, prompted by a poem by Seferis.

Niki Phillips deals with the idea of incorporating play into learning and development settings. Her chapter draws on Adult Education literature and research regarding the fields of Human Resources Development (HRD) and Game Based Learning (GBL), to introduce the practical value and role of Serious Play (SP) in the social skills development of corporate staff and/or executive employees. The concept *serious play* is associated with gameful experiences for purposes beyond entertainment. More specifically, it relates to the game-based learning activities in which trainees/employees deliberately engage during an adult training workshop, intending to achieve serious, work-related objectives and soft skills development. The author proposes that the essential social skills for a successful career in present and organizations can be effectively developed by using GBL techniques and SP. The term *social skills* (also mentioned as *soft skills*) refers to a set of interpersonal competencies employees need to successfully and significantly communicate, interact and build relationships with their colleagues. They include communication (both verbal and non-verbal), leadership, teamwork, time management, problem-solving, change management, resilience, creative thinking, etc. Theoretical data are presented to portray this proposition, while several necessary preconditions for the effective implementation of GBL and SP are outlined.

Maria Papathanassiou approaches the critical question whether all grown-ups can be adult learners - or not? Is their motivation, the barriers, the existing learning culture and the role of mentoring in the workplaces, appreciated and taken into serious consideration? Are their conditions of learning in various ways and places that can turn them into active learners recognized in all learning environments including the formal, the informal, the non-formal and, lately, the online environment? An interesting literature review is provided to give answers, whether critical theory in adult learning, could engage adults to ask questions, to think, to reflect, to reason, to decide, and act. This whole

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

process reflects deep thinking in order to be able to ask dynamic questions, reflect on one's own and on others' ideas, perceptions, and assumptions, and explore multiple possible answers, to provoke deep thinking into dialogue and make the adult learners responsible for looking at a perplexing question from different angles.

Natassa Raikou and **Thanassis Karalis** explore some of the main theoretical approaches in the field of Adult Education, regarding the concept of adulthood and the transition to it, in the light of lifelong learning and lifelong development. During this interesting review, they examine the main findings from selected research, mainly concerning the Emerging Adulthood approach and especially the age of transition to the adult phase of life. Their aim is to highlight some critical factors for this transition of individuals and to link these factors to the major relevant theoretical approaches of Adult Education and lifelong learning. They argue that findings of the studies presented led them to the conclusion that the course and transition to adulthood in Greece does not differ radically from that of other Western societies, therefore, students gradually follow a lifelong developmental path towards adulthood.

Anna Tsiakiri is approaching lifelong learning through the perspective of neuroscience, in order to shed light on the cognitive processes, that contribute to its maintenance, but also its benefits in healthy cognitive aging. The human brain is an organ with infinite possibilities of development and change, directly changed by experiences, the external environment, but also personal motivation. Many theories have been developed to explain the structural changes through experience, but also the pathology that can occur with normal and abnormal aging. Additionally, it has been proposed to consider lifelong education as a neuroprotection technique, as it actively contributes to brain plasticity. An attempt is therefore made to analyze the theoretical background of the connection of neuroplasticity with lifelong education, but also of the techniques of strengthening the human brain through the theory of "serious games".

Anna Tsiboukli refers to the sensitive phenomenon of mobbing and sexual harassment, which lead to negative consequences, beyond the individual level, to the organizational level. In many cases is due to a corporate culture that fails to recognize and prevent it. In many cases the institutional reaction mechanisms are absent, because usually the case is that organizations do not have the necessary procedures to prevent these phenomena. Gender triggers negative stereotypes and prejudices about the role of women in the workplace, lead to questioning of women's knowledge, skills, and abilities, even when they are objectively more qualified than men in occupying higher positions. However, many women are still reluctant to report incidents of sexual harassment. The author argues that lifelong learning programs for preventing the phenomena and coping with trauma when necessary are urgently needed. Organizations should conduct regular information-awareness seminars for staff and leadership on ways to deal with the phenomenon in the workplace and systematically provide training and re-training of staff and leadership on ethical and sexual harassment issues

In their chapter **Eirini Tzovla** and **Katerina Kedraka** focus on conceptual clarifications **r**egarding self-efficacy, the concept that refers to the way adults perceive themselves, interpret events, determine

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

their assumptions, motivations and expectations and contribute as a strategic factor to forming their understandings for the self and the environment in which they live and act. Exemplary experiences encourage adult learners to perceive their personal beliefs about their own competence within educational contexts in similar situations. Moreover, adult educators' sense of self-efficacy affects their orientation towards the educational process and therefore their educational practices, learning outcomes, in other words their educational identity and the teaching practices they adopt. Finally, the writers argue that during participation in adults' professional development programs both educators' and learners' self-efficacy can contribute to the transformation of dysfunctional frames of reference, as the exchange of experiences that takes place within these programs can activate critical reflection.

Afroditi Vergidou in her chapter explores the action strategies developed by Second Chance Schools (SCSs) in Greece. SCSs were legislated as alternative schools to formal education, with accelerated educational programmes for the completion of compulsory education for young people and adults who do not have a first cycle of secondary education certificate. The author, based on her research, argues that today the conditions for the innovative function of the SCSs were not met due to the dysfunctions of the General Secretariat and of the Institute of Continuing Adult Education, to the tendency to bureaucratize the institution, and to the lack of training and scientific support for teachers and the increase in the number of SCSs without the adequate and necessary preparation. The strategy of personal and socio-cultural development of learners continues to be developed to a significant extent in SCSs. The strategy of contributing to integrated local development seems to be rather prominent only in some SCSs, operating as Open Democratic Schools - Cultural Centers, yet this is an aspect of the operation of SCSs that should be further analyzed and enhanced.

We hope that this collective volume will prove intricating, interesting and useful for the Adult Education community!

Katerina Kedraka and Eirini Tzovla

References

Barros, R. (2012). From lifelong education to lifelong learning. Discussion of some effects of today's neoliberal policies. *European Journal for Research on the Education and Learning of Adults*, *3*(2), 119-134.

Boumponari, Th., Kedraka, K., Grigoriou, M., Lampropoulou, M., Skavdis, G., & Konstantopoulos, X. (2022). Utilization of the Flipped Classroom Teaching Model in the Teaching of BioSciences in Higher Education. *Pedagogicos Logos, 28*(1), 77-79. https://doi.org/10.12681/plogos.31610. [in Greek]

Bynner, J., Dolton, P., Feinstein, L., Makepeace, G., Malmberg, L., & Woods, L. (2002). *Revisiting the benefits of higher education.* Technical Report. Centre for Research on the Wider Benefits of Learning, Institute of Education, London. https://researchonline.lshtm.ac.uk/id/eprint/11846.

Cedefop. (2022). *Defining, writing and applying learning outcomes: a European handbook* (2nd ed.). Luxembourg: Publications Office of the European Union. http://data.europa.eu/doi/10.2801/703079.

Chaves, A.C. (2008). ADULT LEARNERS AND THE DIALECTICAL PROCESS: A VALIDATING CONSTRUCTIVIST APPROACH TO LEARNING TRANSFER AND APPLICATION. *Online Journal of Workforce Education and Development*,3(1), 1-14.

Freire, P. (1977). *The treatment of the oppressed.* Rappas. [in Greek]

Illeris K. (2014). *Transformative learning and identity* (1st ed.). Routledge.

Illeris K. (2016). *How we learn: Learning and non-learning in school and beyond* (2nd ed.). Routledge.

Illeris, K. (2003). Learning Changes through Life. *Lifelong Learning in Europe*, *8*(1), 50-60.

Jaques, D. (2004). Learning in groups. Athens: Metaichmio. [in Greek]

Karalis, T. (2020a). Planning and evaluation during educational disruption: lessons learned from COVID-19 pandemic for treatment of emergencies in education, *European Journal of Education Studies, 7*(4), 125-142.

Karalis, T. (2020b). Lifelong Learning and Adult Education. In A. Androusou, & V. Tsafos, *Sciences of Education: A Dynamic Interdisciplinary Field* (529-544). Gutenberg.

Karyotou, M., & Kedraka, K. (2019). "Adulthood", as defined by Malcom Knowles, Jack Mezirow, and Paulo Freire. Points of convergence & differentiation. *Educational Circle, 7*(3), 64-75. http://www.educircle.gr

Kedraka, K. & Phillips, N. (2017). *DESIGNING EDUCATIONAL PROGRAMS. Practical Guide for Young Adult Trainers.* Kyriakides Publications [in Greek]

Kedraka, K. (2018). Transformative Experiences in Biosciences: Dilemmas for Students and Professors? In the *Proceedings of the 3rd Conference of ESREA's Network Interrogating Transformative Processes in Learning and Education: 'Contemporary Dilemmas and Learning for Transformation'*, 28th June – 1st July 2018, Milan, Italy: ESREA & Italian Transformative Learning Network. https://www.academia.edu/42191483/

Kegan, R. (2000). What "form" transforms?: A constructive-developmental approach to transformative learning. In J. Mezirow (Ed.) & Associates, *Learning as Transformation* (pp. 3- 34). Jossey-Bass.

Knowles, M. (1970). *The Modern Practice of Adult Education: Andragogy versus Pedagogy*. Association Press.

Knowles, M. (1984). *Andragogy in Action. Applying modern principles of adult education.* Jossey Bass.

Kong, S. C. (2015). An experience of a three-year study on the development of critical thinking skills in flipped secondary classrooms with pedagogical and technological support. *Computers & Education, 89*, 16-31. https://doi.org/10.1016/j.compedu.2015.08.017

Merriam, S., & Caffarella, R. (1999). *Learning in Adulthood, a Comprehensive Guide.* Jossey Bass.

Mezirow, J. et al. (1990). *Fostering Critical Reflection in Adulthood: A Guide to Transformative and Emancipatory Education*. Jossey - Bass.

OECD, (1996). *Making lifelong learning a reality for all.* OECD.

Orfanidou, Ch., & Kedraka, K. (2022). Identity development as a learning outcome: a case study. *Hellenic Journal of Research in Education, 11*(1), 189-196. https://doi.org/10.12681/hjre.3159

Rogers, A. (1999). Adult Education. Athens: Metaichmio. [in Greek]

Schraw, G., Crippen, K.J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in Science Education, 36*(1-2), 111-139. https://doi.org/10.1007/s11165-005-3917-8.

Schuller, T., Desjardins, R. (2007). *Understanding the Social Outcomes of Learning (Report).* OECD.

University Pedagogy: Teaching Biosciences by using the flipped classroom model

Theodora BOUMPONARI[1], Katerina KEDRAKA[1], Maria GRIGORIOU[1], Maria LAMPROPOULOU[2], George SKAVDIS[1], Christos KONSTANTOPOULOS[1]

1 Democritus University of Thrace, Depart. Of Molecular Biology & Genetics

2 Democritus University of Thrace, Depart. Of Medicine

Introduction

Among the recent changes in higher education in Europe, there is a widely accepted shift away from teaching to learning, and the need for an education focused on student learning and success (student-centered, 2018). Under this approach, commonly referred to as student-centered learning, the provision of education and all aspects of it are defined by the intended learning outcomes and the most appropriate learning process, rather than student learning being determined by the traditional lectures provided. Thus, there is a broad orientation in European higher education to focus more on the student learning experience, which must be supported by the necessary changes in policy and practice (European Commission/EACEA/Eurydice, 2018; Gaebel & Zhang, 2018). A student-centered approach is also highlighted as an important parameter for developing high-quality education by Standard 1.3 in the 2015 Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), according to which universities "should ensure that the programs are delivered in a way that encourages students to take an active role in creating the learning process and that the assessment of students reflects this approach" (ESG, 2015, p.25).

European universities, in order to offer more student-centered learning environments, need to encourage a culture shift from teacher-centered learning and teaching, in which faculty members impart knowledge to students, to student-centered learning, which leads to an interactive students' construction of knowledge (Barr & Tagg, 1995). The core values of student-centered learning are: the main focus lies on students, their participation in authentic tasks and sociocultural practices, the importance of their past and everyday experiences in the construction of knowledge, and access to multiple perspectives, resources, and representations of knowledge (Land et al., 2012). Student-centered learning unfolds a wide range of participation-oriented practices that engage individuals in deep learning. These practices emphasize positive and supportive student-faculty relationships that enable students to persist, develop and succeed in academic environments that are challenging, relevant, collaborative, self-directed, and applied to real-world situations.

Current educational approaches in higher education use blended learning, whereby students receive a combination of traditional live lectures, but also out-of-class activities, facilitated through a range of technological resources. Blended learning is gaining popularity in higher education worldwide, becoming a cornerstone of curriculum design and providing opportunities for learning that were not previously possible or available to students (Lage et al., 2000).

The flipped classroom is a teaching model that could successfully serve blended learning. According to this model, students prepare before the live course by, among other things, attending recorded/videotaped lectures, searching for relevant material, studying, preparing short papers, etc. This asynchronous approach creates classroom time for student-centered synchronous learning activities, which aim at applying knowledge (Pluta et al., 2013). Consequently, the flipped classroom emerges as a field of great interest for scientific educational research, although in Higher Education face-to-face teaching in university classrooms are still the dominant teaching method (Roditi & Karalis, 2014).

The literature review revealed studies that were carried out in the field of BioSciences aiming at the application of the flipped classroom model and the evaluation of its various aspects. Entezari and Javdan (2016), in their research at a New York University College, found that students' achievement improved significantly, while students' attitudes were particularly positive, as the majority of the participant students showed an increased preference for active learning activities that were integrated into the procedure of the flipped classroom. Dickson and Stephens (2014) wanted to estimate students' assessment of using lectures on the musculoskeletal system which included kinesthetic participation. The students were enthusiastically involved in the activities. The percentages of students who agreed or strongly agreed that communication was effective, that the environment was conducive to learning, and that they were satisfied with the teaching, were very high. In the study conducted by McNally et al. (2017), students from the Australian University School of Health Sciences attended courses in Physiotherapy, Human Services and Social Work, Nursing, Medical Science, Environmental Health and Dentistry in a flipped classroom environment and the results indicated two groups of students: a) those who wholeheartedly accepted most aspects of the flipped classroom (both pre-and in-class) and clearly showed their preference for it and b) those who are almost neutral about some elements of a flipped classroom environment but do not support the activities that must be completed before class. Overall, the authors concluded that although students may find the flipped classroom technique more difficult, student achievement and active participation in classroom activities actually improve. Tune et al. (2013) wanted to evaluate the effectiveness of a traditional lecture-based curriculum of cardiovascular, respiratory, and renal physiology delivered to first-year graduate students versus a modified curriculum based on the flipped classroom model. Participants in the flipped classroom course scored significantly higher on tests of cardiovascular, respiratory, and renal function. Sezer and Abay (2019) in their research aimed to examine the effects of the flipped classroom model on the academic performance of first-year medical students of Hacettepe University in Turkey and to collect data on the students' opinions of this technique. The results showed that students who worked using the flipped classroom model had higher achievement levels compared to

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

those using the traditional method, and the interviews showed that these students had positive views about the flipped classroom method.

Of particular interest is the research by Jensen et al. (2015), who compared an active formal classroom to an active flipped classroom. The results showed that both first-level knowledge (e.g. recognition, recall) and deep conceptual learning (e.g. analysis, synthesis) were performed to the same extent in both teaching approaches, the traditional lecture, and the flipped classroom model. Also, the students showed the same degree of satisfaction in both cases and even declared that the interaction time with the instructor was more constructive for their learning than the homework they were assigned. The authors concluded that the flipped classroom does not result in higher learning gains or better student attitudes compared to the standard classroom when in both cases an active learning and constructive approach is pursued and suggested that the learning gains in both cases are likely a result of active learning.

Also, Fakhoury et al. (2021) wanted to assess the feasibility, acceptability, and impact of Biochemistry courses with the flipped classroom model compared to the traditional curriculum, in a survey with first-year medical students at a private University in Saudi Arabia. They found that the students' performance on the exams, which was common to both groups using multiple-choice questions, showed no difference between the two teaching methods. Although there was no significant improvement in test scores, participants showed a significantly higher preference for the flipped classroom model over traditional lectures. Participants noted that the effort required for the course was similar, regardless of the learning approach. The same results in terms of learning outcomes were found by other researchers (Knutstad et al., 2020; Whillier & Lystad, 2015), who concluded that the flipped classroom technique is probably not suitable for intensive courses with increased teaching material.

Similarly, Leatherman and Cleveland (2019) compared three semesters of an undergraduate Genetics course that took place in a typical classroom, but included a significant percentage of active learning, with three semesters of the same course and content using the flipped classroom model. Student test performance was not statistically different between the two different applications, suggesting that the benefits of the flipped classroom model may be similar to those achieved through active learning. They also found that 56% of the students were satisfied with the flipped classroom model, while dissatisfied students said they had difficulty learning the course material from videos. Smallhorn (2017) reached the same conclusions with the implementation of the flipped classroom in a Genetics and Evolution course at an Australian University for second-year students. In this study, students' positive attitudes and increased engagement in the course were recorded, but no measurable increase in their academic success was observed, taking into account their final grades. In contrast, Rathner and Shier (2020), in Neurology and Cardiorespiratory and Renal Physiology courses at an Australian university found that while students performed higher on final exams with the flipped classroom model, their participation rate remained low.

Several studies of the flipped classroom technique have been conducted in Nursing courses. Rawas (2019) concluded that the satisfaction rate of students in a typical and a flipped classroom varies

according to their social status and place of residence, their mode, and time of the study. Joseph et al. (2021) comparing the traditional lecture with the flipped classroom model, found that nursing students in an Anatomy and Physiology course demonstrated increased learning outcomes and a high rate of satisfaction with the flipped classroom technique, concluding that this technique is an important teaching strategy in the education of future nurses. On the other hand, Bingen et al. (2019) in their research on the activities preceding a flipped classroom found that nursing students in Oslo are probably dependent on living and social interaction with the instructor and are not ready to take sufficient responsibility for their personal study alone at home. In a follow-up study (Bingen et al., 2020) involving classroom activities of this technique, study participants stated that student-centered activities were of increased difficulty and that they felt doubtful about their ability to understand physiology.

Ojennus (2016) evaluated learning outcomes in a flipped Biochemistry course and compared them to gains in a traditional lecture. Although measured learning outcomes were not significantly different between the two courses, students' perceptions of learning gains differed and indicated a higher level of satisfaction with the flipped model. Although overall learning gains were not affected, students found that the new model made it easier to tackle complex ideas and work effectively with fellow students in the flipped classroom. Finally, Chen et al. (2018) sought to compare the effectiveness of the flipped classroom model against traditional learning in the field of Life Sciences, and their results showed that the flipped classroom performed significantly better than the traditional method on test scores.

Limited research has also been carried out in Greek Higher Education Institutions regarding the implementation of the flipped classroom. Specifically, Plota & Karalis (2019) applied the model to the Department of Education and Early Childhood Sciences at the University of Patras and found that participation rates were three times higher than those observed in previous years, when the course was offered in the traditional way, and, in fact, students showed high satisfaction rates. In addition, the students stated that this new approach contributed to a better understanding of the course content, enhanced their active participation, and promoted their critical thinking skills. Similarly, Rakitzi et al. (2020) at the University of Thessaly in their research concluded that the flipped classroom is an interesting educational model and a worthwhile solution for significantly reducing the use of the lecture method and overcoming many of the limitations of traditional approaches in university. They also outlined the increased interest of students in active participation in the educational process, which contributed to their social interaction inside and outside the university classroom. Finally, Karalis and Raikou (2021) applied the model during the pandemic in distance education and concluded that both the traditional form of the flipped classroom, as well as the distance flipped classroom can contribute to teaching and learning in higher education, in promoting the active participation and engagement of students and improving their learning experiences.

Considering all the above, the aim of this research is to highlight the advantages and disadvantages of applying the flipped classroom model in higher education, recording the views of students and instructors. The ultimate goal of the research is to contribute to the evaluation of the application of

the flipped classroom model in the Higher Education context and whether it can serve the approach of student-centered learning, which is currently the aim of European Higher Education.

Methodology

Aim and research questions

The aim of this research is to investigate whether the flipped classroom model can work effectively to serve student-centered learning in Higher Education. The objectives of the research are to estimate students' attitudes toward the flipped classroom model and to record teachers' views on the benefits and difficulties of the flipped classroom implementation. Considering this purpose, the research questions of this research are the following:

1. What are the advantages and disadvantages of applying the flipped classroom in the field of BioSciences?

2. Could this model effectively serve the approach of student-centered learning in Higher Education?

The participants

The research was conducted at the Department of Molecular Biology and Genetics of the Democritus University of Thrace, in the spring semester 2021-22. The flipped classroom technique was applied in three elective courses, in one of the 13 meetings of each course. As the presence of students in these courses is not mandatory, 39 students, who registered in these courses, participated voluntarily, after having been informed about our research. The courses were the following: "Histology" in the 2nd year of studies, "Behavioral Biology" and "Stem Cell and Regenerative Biology" in the 3rd year of studies. Additionally, the teachers of these courses were interviewed, two teachers for the "Biology of Behavior" course and one teacher for each of the other two courses.

Research Tools

A mixed methods research design was chosen (Bryman, 2017), using a questionnaire for the quantitative approach and conducting interviews for the qualitative analysis. Specifically, the questionnaire by McNally et al. (2017) was used to evaluate the implementation of the flipped classroom by the students. It was distributed electronically to students using the Google Forms online platform, at the end of the in-person courses, in the spring semester 2021-22.

The questionnaire contained questions related to demographic characteristics, as well as three subscales (McNally et al., 2017). The first subscale consisted of 4 statements about students' attitudes toward the pre-class activities, namely whether (a) they were helpful to their learning, (b) they motivated them to learn more, (c) they allowed them to learn in their own pace, and (d) prepared them for in-class activities. The second subscale contained statements about the classroom activities, specifically whether they helped them (a) clarify and (b) apply what they had learned in the pre-class activities, (c) develop problem-solving skills, (d) improve teamwork skills, (e) develop learning and study strategies and (f) improve communication skills. For these two subscales, participants had to respond on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The first

and second subscale statements were averaged so that higher scores represented more positive attitudes toward pre- or in-class activities.

The third subscale contained nine statements about students' preference for traditional and flipped teaching models. Specifically, participants were asked to indicate their level of preference between two statements. One statement was designed to describe one aspect of a flipped classroom setting, and the other to describe the corresponding aspect in a traditional instructional setting (e.g., Strayer, 2012). For example, regarding when the lesson content should first be presented, the two statements were "the first time I learn about the content should be at home before the lesson" (flipped classroom) and "the first time I learn about the content should be in the classroom'' (traditional classroom). Participants indicated their preference by selecting a number closest to their preferred statement. The closer the number is to the statement, the stronger their preference for that aspect. Numbers ranged from 1 to 4, with lower numbers (1 and 2) representing a preference for the traditional classroom and higher numbers (3 and 4) representing a preference for the flipped classroom.

To evaluate the flipped classroom model more effectively, teachers' semi-structured interviews were carried out. Four teachers were interviewed, two teachers for the Biology of Behavior course and one teacher for each of the other two courses. The Critical Incident Questionnaire (Brookfield, 1998) was used for the interview questions, and questions related to the requirements of applying the model and the benefits derived from it for the students and the teacher were also added. The interviews lasted about half an hour.

Data collection process

The implementation of the flipped classroom in the teaching practice of each course varied according to the topic and the objectives. At the beginning of the semester and before the start of the courses, meetings were held with the lecturers in order to organize the courses with the flipped classroom model. The means and materials were selected according to the educational goals and the expected results of each course. An important factor for the selection of the means and materials was also the availability and the easy access the students could have, as well as the possible stimulation of their motivation for learning.

The materials and activities related to the preparation of the students before the class included posted lectures by the teachers, watching videos and films that were relevant to the subject matter of the courses and were collected from the internet, links for further study, literature search by the students for the purpose of preparing small-scale works that related to specific, smaller units of the cognitive subject. More specifically, the students, before coming to the scheduled in-person meeting, had to watch the videos and study all the educational material according to the study schedule, so that they could get engaged in the subject. In the case that they did not fully understand all the videos, they had the possibility to repeat them as many times as they wanted and also to have feedback from the teacher through eclass. Also, the students had to prepare the planned assignments according to the study schedule.

During the classroom lesson, the students were divided into groups. Each group presented the work they had prepared, and were then asked to debate and support opinions/issues about the subject,

and propose solutions per group for case studies they had to study in class. The applied educational techniques and strategies were meant to promote active participation and collaboration (open-ended questions, assignments shared among students, discussion, presentations of assignments, and the development of critical thinking, problem-solving, dialogue, etc.). Dialogue between students was the most important tool during the course. The lecturers mainly assumed the role of coordinator and animator, clarifying any queries, and answering questions.

The teachers' interviews were carried out at the end of the semester so that the lessons would have been completed and teachers could probably have a holistic view regarding the evaluation of the model's implementation of the model.

Data analysis

The analysis of the questionnaire data was performed with the statistical program for the social sciences SPSS (v.27) at two levels. At the first level, applications of descriptive statistics were used (absolute and relative frequencies, average values, and standard deviations). The normality test was performed with the Shapiro-Wilk test and showed that the three subscales of the survey follow a normal distribution (0.929, 0.954, and 0.980, respectively). At a second level, inductive statistics (t-test for independent and dependent samples and univariate analysis of variance of independent samples) were performed, so as to investigate whether the selected course, gender, and semester affect students' attitudes towards the flipped classroom model. The reliability index (Cronbach's alpha) was calculated for the tool as a whole, but also for the three subscales separately.

The interviews were transcribed. The basic principles of thematic analysis (Tsiolis, 2014) were adopted for the analysis. These are the systematic identification, the organization, and the understanding of repeated patterns of meaning within a set of data. In particular, the transcribed texts of the interviews were carefully studied, and the excerpts that provided information for the research questions of this paper were identified and gathered.

Afterwards, the passages were coded, i.e. a specific conceptual definition was given to each of them. After the coding, the transition was made from the themes, to the repeated patterns of meaning, which can function as versions of the answer to the research questions (Tsiolis 2014).

Results

Of the participants, 69.2 % were female students, while the highest proportion of students was 3rd and 2nd year (56.4% and 33.3%, respectively). The answer to the first research question emerges from the students' answers to the questionnaire, as well as from the teachers' opinions as recorded in the interviews. More specifically, Tables 1 and 2 show the student's opinions on the implementation of the flipped classroom and their preferences for this model. The highest average value concerns the students' statement that the activities before the lesson contributed significantly to the construction of knowledge of the new subject (M:4.28, SD:0.686), and the immediately following statement with the highest average value refers to their assessment that the live lesson contributed to clarifying and confirming the knowledge obtained from the activities before the class (M:4.21, SD:0.615). The lowest mean value refers to the statement about the benefits of the flipped classroom in developing

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

teamwork skills (M:3.77, SD:1.087). The reliability index (Cronbach's alpha) is satisfactory for the questionnaire as a whole (α=0.682), but also separately for the first two subscales (Table 1), while the third subscale presents an index a little lower than required (Table 2).

The highest average value in the students' preferences for this model concerns the utilization of new technologies (M:3.69, SD:0.614), and then active participation in the classroom (M:3.21, SD:1.031). The lowest average values concern the realization of the cognitive test, which the students prefer at the end of the live course, and the preference for live lectures over online ones (M:1.51, SD:0.885, and M:1.64, SD:0.668, respectively).

Overall, students expressed a moderate to high preference for the implementation of the flipped classroom model (M:2.58, SD:0.91) (Table 2).

Table 1. Students' views of pre- and in-class activities. M: mean value, SD: standard deviation, α: Cronbach's alpha. 1: strongly disagree, 2: disagree, 3:neutral, 4:agree, 5:strongly agree.

	M	SD	Relative frequency (%)					a
			1	2	3	4	5	
The activities before the live lesson (e.g. study, videos, group work):								
helped me to learn the subject better	4,28	0,686	0	2,6	5,1	53,8	38,5	
motivated me to learn more	4,21	0,833	0	2,6	17,9	35,9	43,6	
allowed me to learn at my own pace	3,85	0,904	0	5,1	33,3	33,3	28,2	0,82
prepared me for the classroom activities	4,08	0,739	0	2,6	15,4	53,8	28,2	
The live lesson in classroom helped me to:								
clarify what I had learned in the previous activities	4,21	0,615	0	0	10,3	59,0	30,8	
apply what I had learned in the previous activities	4,05	0,686	0	0	20,5	53,8	25,6	
develop problem solving strategies	4,03	0,778	0	0	28,2	41,0	30,8	0,709
develop teamwork skills	3,77	1,087	0	15,4	25,6	25,6	33,3	
understand strategies for learning new knowledge objects	3,9	0,718	0	2,6	23,1	56,4	17,9	

Table 2. Students' preferences for the flipped classroom. M: mean value, SD: standard deviation, α: Cronbach's alpha.

Statements	M	SD	1	2	3	4	α
Lectures (live/online)	1,64	0,668	46,2	43,6	10,3	0	
Classroom activities (New Subject/Practical Application)	3,1	0,788	5,1	10,3	53,8	30,8	0,503
Teaching a new subject (in class/before class)	2,23	1,087	35,9	17,9	33,3	12,8	

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

New technologies (avoidance/exploitation)	3,69	0,614	2,6	0	23,1	74,4
Cognitive test (in the live lesson/before the live lesson)	1,51	0,885	66,7	23,1	2,6	7,7
New knowledge (everything in class/search before class)	2,72	0,972	12,8	25,6	38,5	23,1
Class participation (passive/active)	3,21	1,031	10,3	12,8	23,1	53,8
Pre-class activities (optional/compulsory)	2,44	0,968	17,9	35,9	30,8	15,4
Teaching (traditional/flipped)	2,69	1,151	20,5	23,1	23,1	33,3
MEAN	2,58	0,91				

Additionally, the teachers' answers contribute to answering the first research question. More specifically, the results of the thematic analysis of the teachers' interviews include the four following modules:

Critical incidents in the classroom

The teachers stated that in the in-person lesson the most powerful moments concerned the question-and-answer phases mainly among the students. Overall, their assessment was that the course was very interactive, as they state:

Teacher 1:

I think that throughout the lesson the students and I had a great interaction. We had a very lively discussion, everyone took part…. But I think that everything went very dynamically and with a lot of discussion.

Teacher 2:

It was the same dynamic participation throughout the whole course.

Teacher 3:

I think the peak came during some question-and-answer moments... there were some questions that clearly had a great response to such an extent, that I actually had to intervene a bit because we also had to discuss other points...

...there were points I didn't expect or where I personally wouldn't highlight.... the students really opened the discussion on topics that I didn't expect…

Benefits of the flipped classroom for the student

The most important benefits that arise for the student from the application of the flipped classroom are that the teaching becomes more student-centered, the student is given the opportunity to contribute to the preparation of the lesson, to focus on points that interest him, and to support his point of view. The following excerpts are particularly illustrative:

Teacher 1:

The most important advantage is the fact that many students focused on different points. Probably we couldn't achieve this in the normal class... So this is important because later in the discussion everyone brings their own points... So it becomes a more multi-faceted conversation than what I would have done with whatever points I thought appropriate that I should use...

...I think that the students could prepare the material and we have more time in class for the debate. So, they have more time to think about the arguments, and not during class time when they will have to do it ad hoc. So they should, in order to do that, have read more things, seen more things, to then be able to go into that process…

… and I think it will help students be engaged even more. In this course, they are involved but it will help them more and maybe give a nice balance between the group and the involvement on an individual level. Because within each group someone is weaker, someone is better and all this works within the group.

Teacher 2:

…that there can be much more brainstorming and more discussion and analysis.

Teacher 3:

For the student, the obvious benefit is that an important role is given... there is more participation... that is, the participation is greater both quantitatively and qualitatively... Because in another model, as a student, the only thing you will have time to say is just a question at the end...

if you are a student, the qualitative part is also important... because it is not the same kind of participation... it is one thing to ask a question at the end, another thing to say your opinion on the topic... and beyond, that is where students practice to a large extent...to support their arguments…

develops critical thinking and certainly the courage to speak out your opinion... so I think this is more developed...

Also, this model gives the student autonomy and prepares him to a better degree for the final exam, according to the following excerpts:

Teacher 2:

…I ultimately believe that the student can only benefit from the flipped classroom… the time he spends is a lot, but it is time he spends anyway in the end for exams.

...a very good thing about the flipped classroom that could work in the reality of the Greek University is the fact that it puts more pressure on students to study during the semester…

Teacher 4:

I think that the student alone could study, to use the material at his own pace and in his own time...

Benefits of the flipped classroom for the teacher

The teachers judged that the flipped classroom model can work as a good tool, however, they did, not feel that they benefited in terms of the subject and, of course, its implementation did not change the learning objectives of the course.

Teacher 1:

I think so, okay, I benefited. First of all, because in this particular course this can be done on a larger scale, i.e. not just in one lecture, which will allow me to cover more material.

Teacher 2:

Yes, as an instructor I have benefited somewhere in the sense that I have learned an interesting educational tool, which I can apply in teaching.

..Not that I became better in the subject matter… the learning objectives did not change, I did not see the learning objectives from a different perspective…

Teacher 3:

at some point you need, to spend a lot of time, but in the long run it compensates... I would use this teaching model for disciplines ή fields that change slowly and I would not use it for concepts, processes, techniques s that I think they need to be updated very often… because if they need to be updated very often, then this is a problem…

Teacher 4:

I didn't benefit much. I did not change anything in the learning objectives. I was confused however as to what the best material to use is.

Weaknesses in the application of the flipped classroom

According to the interviews, the implementation of the flipped classroom is time-consuming and demanding, as the appropriate educational material should be found, the one that will inspire students and prompt their involvement. However, when the structure of the flipped classroom is completed, then it can be used in the long term with the appropriate modifications each time. It also requires increased time to carry out the class activities, which is difficult to find in the timetable and also increases students' and teachers' workload. However, it creates a more demanding approach to the subject. For these reasons it is difficult to apply to a large number of students.

Teacher 1:

I think it is finding and creating appropriate material…. So what I would be interested in would be to find a suitable material to answer the cognitive demands of the course and at the same time to stimulate their interest, that is, some material that will pique their interest... Also, I don't want it to be papers because that's a bit boring. What would be interesting for them would be to construct knowledge and not just read papers.

However, it is difficult to find suitable and attractive material.

Of course, okay, I don't know if a whole lesson could be done with a flipped class. In some lectures you will necessarily have to put something of your own in PowerPoint but now, here, because I don't like lecturing, I could have two more sections for next year.

Teacher 2:

Something that could be considered as a weakness is the fact that if, for some reason, the student does not have time to get prepared for the lesson, then he essentially comes out as a loser, that is, the live course will be of no benefit to him.

That it takes more time on the part of the student and it takes more time on my part in the setup phase… in the long run it doesn't take more time.

I would use this teaching model for disciplines ή fields that change slowly and I would not use it for concepts, processes, techniques that I think they need to be updated very often.

Teacher 3:

a problem that can arise is time… such a model needs much more time to work properly… Obviously, when a student is involved, the time is unpredictable to very unpredictable, because you don't know how much everyone wants to explain a topic… there is always the risk of the discussion getting out of time control, or the teacher interjecting too often, so we end up with a lecture rather than a flipped classroom.

the evaluation... how the evaluation will be done... the teacher must decide how to evaluate the knowledge but also the application of the subject...

..it is very difficult for the teacher to clarify what parts and how much of the teaching role he will give to the students.

..so the second issue has to do with the material that will be given... usually in a lecture you give the material that will help to understand the lecture.. In the flipped classroom you should also give material that will not only help students to understand the topic but will also stimulate them to ask questions and students will approach it from many perspectives...

..generally, I believe that if someone wants to set up just a flipped classroom or more interactive teaching, there must be preparation beforehand. Whether it will be in the classroom, whether it will be at home, whether it will be guided or not, in any case, some form of preparation should be required... exactly because now we were talking to people who had an opinion on the matter, had seen some things, some had embraced the views they had heard, others not so much... and that was also interesting. I mean, not everyone reacted in the same way to some of the things we said... Yes, I think it helped and I think it's good to have some preparation...

Teacher 4:

It takes a lot of time. It cannot be applied to large classes.

Discussion

The results of this research, regarding the first research question, show that both the students and the teachers of the Department of Molecular Biology and Genetics evaluated the application of the flipped classroom model positively. These results are in line with the results of similar studies (e.g., Dickson & Stephens, 2014; Entezari & Javdan, 2016; Sezer & Abay, 2019; Tune et al., 2013). More specifically, with regard to the Greek educational reality, in surveys carried out in two Greek Universities, high rates of student satisfaction and understanding of the subject matter and an increase in their active participation were also recorded (Plota & Karalis, 2019; Rakitzi et al., 2020). The following discussion analyzes the advantages and disadvantages of the application of the model, as they emerged from the results of the research.

More specifically, the fact that the students considered that the activities before the live course helped them better understand the new subject, is consistent with previous research (e.g. Basal, 2015; Plota & Karalis, 2019; Özkan, 2017). This is probably due to the variety of the educational material and the fact that the students had the time to study the recommended material at their own pace. This opinion is reinforced by the data obtained from the teachers' interviews, according to which the students watched the offered videos about the new subject more than once or twice. According to Mason et al. (2013), the process of watching the videos and the ability to replay parts of the videos that were unclear on the first viewing enables students to stop and repeat the video lectures as many times as they want, but also to watch it whenever they have time. At this point, it should be taken into account that many students, alongside their studies, work and often miss the opportunity to attend the live course, as stated in similar research (Zainuddin & Halili, 2016), a problem that finds a partial solution with the flipped classroom.

In addition, the increased positive attitude of students towards pre-class activities is probably partly explained by the fact that autonomy in learning fosters a sense of self-confidence (Cabi, 2018). According to other researchers, watching videos activates students' learning interests and prepares them for more active participation in the classroom (e.g. de Araujo et al., 2017; Kong, 2014). Also, the teachers of the present research considered that the activities before the class contribute to the student's active participation, as well as to their critical attitude towards issues related to the new subject, which is consistent with the findings of other researchers (e.g. Basal, 2015). They also argue that pre-class preparation is an important investment of time by students and contributes to increasing their success rate in the final exams. Similarly, Rakitzi et al. (2020) applied the flipped classroom model to an entire semester course in the Pedagogical Department of Special Education and found that the model contributes to the development of student's personal skills and abilities.

Regarding the classroom activities, the student's positive attitude towards them suggests that the flipped classroom model creates a cooperative learning environment, enhances the interaction between students, helps them better understand the subject matter and solves related problems assigned to them during the live course. Similar results were reached by Ojennus (2016), who found that although overall learning gains were not affected, students grappled with complex ideas and

worked effectively with fellow students in the flipped classroom model. Overall, other researchers also found that small group classroom activities develop communication skills as they allow for the formulation of ideas by all group members, and facilitate discussion (e.g. Danker, 2015; Entezari & Zavdan, 2016; Zainuddin & Halili, 2016). Also, students in other studies, after participating in this model, showed a greater preference for group work and reported that the increased interaction in flipped classrooms was helpful for understanding concepts and that it helped them more than in traditional classroom-based learning environments, such as lectures (Kim et al., 2014; Plota & Karalis, 2019; Rakitzi et al., 2020). The fact that the students of the present research stated that this teaching model improves their metacognitive strategies has also been recorded in other studies (Kong, 2014; Van Vliet, et al., 2015). The data obtained from the interviews confirm these findings, as the lecturers described students' dynamic presence. Each student brought to the fore his own important point, as it emerged from his personal study. They mainly discussed with each other, debated, and argued in an atmosphere of cooperation and teamwork.

Although the students of the present research show strongly positive attitudes towards the activities before and during the class, a greater percentage of students express the desire for life and not online recorded lectures. This attitude of the students probably indicates their need for live interaction with the instructor and confirmation of their constructed knowledge from him, despite their preparation before the lesson. This result is consistent with the findings of other research, according to which students were not ready to take sufficient responsibility for their personal study alone at home, sought interaction with the teacher, and stated that student-centered activities were of increased difficulty and that they felt doubts about their ability to understand the new subject matter (Bingen et al., 2019, 2020). Also, in a study by Leatherman and Cleveland (2020), students stated that they had difficulty understanding the subject from the video and expressed the need for input from the instructor.

Also, students would like to be tested on the new subject at the end of the live course and not before it, which reinforces the previous finding that they need interaction with the teacher, so as to certify the knowledge they have constructed during their preparation at home. This finding probably also suggests that they are positive about the implementation of the model, but they don't agree with the evaluation of their preparation at home, which has also been found in other research (Doyle et al., 2013). The literature review showed that in order to ensure that students complete the out-of-class activities, such as readings or watching recorded lectures and other videos, some instructors implement quizzes and short assessment sections, which are embedded in the course material, as mandatory stages for the completion of the preparation and account for part of the overall grade of the course (Jensen et al., 2015).

The tendency of students to want to be taught the new subject for the first time in the classroom combined with the slightly high mean value of students' preference for activities in the classroom in which they apply the new subject, also suggests that students are not ready to undertake their preparation at home. This finding is also supported by their moderate preference for mandatory preparation before class. However, although they probably prefer the new knowledge subject to be taught for the first time in the classroom, they state their need for time to be allocated for the practical application of the new subject, which shows that they need their active participation for deeper

understanding and consolidation, something which they clearly state in the relevant question. In addition, their high preference for New Technologies shows that the use of electronic educational material is a useful tool and helps students interact with each other and with the instructor, elements essentially required for the implementation of this model (Elmaleh & Sockalingam, 2015; Zainuddin & Halili, 2016).

The teachers' interviews contribute significantly to a more reliable assessment of the utilization of the flipped classroom model in higher education, considering that most studies concern the students' opinions, evaluation, and desires for this model and few studies examine the view of educators (Long et al., 2017). The teachers of the present research state that this model is an important tool, as it creates time to apply the new knowledge in the classroom in an authentic inquiry environment that the teachers have previously set up, contributing to the development of student's critical thinking, a view that is consistent with the results of other researches (Demetry, 2010; Frydenberg, 2013; Strayer 2012; Zappe et al., 2009). Similarly, Rakitzi et al. (2020) found that the model promotes students' critical thinking.

The present research confirms the conclusions of previous studies that the specific model requires significant time from the teacher for its preparation, at least during the first application (Long et al., 2017). However, a teacher of the present research highlights the fact that when it comes to a subject that is constantly modified or improved, such as Molecular Biology and Genetics, in which experiments and research have been progressing at a rapid pace in recent years, then, perhaps, the utilization of this model will burden the teacher's time, as he will have to regularly update the material he has prepared and uses.

In addition, the teachers in this research note that a critical factor in creating an effective flipped classroom course is whether students will prepare before the class, as lack of preparation is a very significant barrier to implementing the model. Therefore, it is a big challenge for the teacher to ensure that the students carry out the activities before the class. In the same context, another teacher of the present research argues that the material that the teacher should construct for the flipped classroom model must be interesting for the students, suggesting that otherwise the students' activity before the class cannot be ensured. This concern has also been expressed by other higher education educators who have implemented the model (Long et al., 2017). Also, the teachers of the present research estimate that, often, the time required to carry out the life activities can exceed the planned program, which makes it difficult to apply the model in several or even the thirteen lectures required to complete the course.

Regarding the second question, it appears that the flipped classroom model can satisfactorily serve the student-centered learning approach. This model allows flexibility in the learning process and involves the students in constructing the knowledge object, as it encourages them to prepare part of it before the application in the classroom while ensuring support from the teachers. Thus, they are allowed to make their own decisions and choices about their studies in general, to leave their own mark on their studies, and to give and receive feedback from and to their lecturers and fellow students. Also, structural elements of the flipped classroom, such as online lectures, group work, the support of

students in their work by lecturers, and the important role that students take in the preparation of the knowledge object, are important elements that should be included in the educational strategy of university departments in order to serve student-centered learning (EUA, 2018). Generally, the need for students to take responsibility for their own learning is at the heart of the concept of student-centered learning, and this is largely achieved through implementing the flipped classroom model.

Conclusions

This paper, based on a mixed methods research approach, aimed to evaluate the application of the flipped classroom model in higher education, specifically in the field of Molecular Biology and Genetics. In this direction, this teaching model was applied in a lecture of three different courses, with the voluntary participation of the students. For the quantitative analysis, questionnaires, answered by the students after the end of the live course, were used, in order to evaluate the model and estimate their preference for its implementation. For the qualitative approach, teachers' interviews were analyzed, in order to record their opinions and thoughts about this model. From the convergence of the results of the above analyses, the following emerge:

1. The students of the present research were positive towards the application of the model, evaluating highly both the activities before the class, stating that they allowed them to better learn the new subject at their own pace, as well as the activities in the class, as these contributed to the practical application of the new knowledge and in the interaction with their fellow students and the teacher, which significantly contributed to a deeper understanding of the subject. However, they are not ready to participate in a course with full implementation of this model, as they prefer live lectures. They express their anxiety that they are not ready to take sufficient responsibility for their own personal study alone at home and need interaction with the teacher.

2. The teachers of this research estimate that the flipped classroom model can be a very good teaching technique in higher education, as long as the preparation of the students before the class is ensured and enough time is spent on the preparation of the first application of the model, as this technique contributes in the deeper understanding of the subject but also in the cultivation of complex and critical thinking of the students. However, it also requires a lot of time to carry it out, as often the time the students will need to complete the life activities is unpredictable.

In conclusion, according to this study, the flipped classroom model could be leveraged to significantly reduce the use of the traditional lecture, overcome many of the limitations of traditional approaches to university teaching and learning, and ultimately serve the student-centered approach. However, it is estimated that the application of the flipped classroom in other courses in the field of Life Sciences, but possibly also its application in all thirteen meetings of the semester in some courses, would shed light on the perspective of the application of the model in Higher Education, as it would better highlight the advantages and disadvantages of the model on a larger scale of students and range of courses. Also, according to the results of this research, students express a need for support in studying and preparing at home, a need that is probably difficult to be met by the one and only teacher of the

course, especially when it is a compulsory course, where the number of students is high. It is indicated, in general, that for the successful implementation of the model and, furthermore, the precipitation of student-centered learning in Tertiary Education, the University Departments should be properly adapted and implement strategies and practices that will facilitate this type of learning.

References

Barr, R. B., & Tagg, J. (1995). From teaching to learning—A new paradigm for undergraduate education. Change: *The magazine of higher learning, 27*(6), 12-26.

Basal, A. (2015). The implementation of a flipped classroom in foreign language teaching. *Turkish Online Journal of Distance Education-TOJDE,16*(4), 28-37.

Bingen, H. M., Steindal, S. A., Krumsvik, R., & Tveit, B. (2019). Nursing students studying physiology within a flipped classroom, self-regulation and off-campus activities. *Nurse education in practice, 35*, 55-62.

Bingen, H. M., Steindal, S. A., Krumsvik, R. J., & Tveit, B. (2020). Studying physiology within a flipped classroom: The importance of on-campus activities for nursing students' experiences of mastery. *Journal of clinical nursing, 29*(15-16), 2907-2917.

Brookfield, S. (1998). Critically reflective practice. *Journal of Continuing Education in the Health Professions, 18*(4), 197-205.

Bryman, A. (2017). Quantitative and qualitative research: further reflections on their integration. In *Mixing methods: Qualitative and quantitative research* (pp. 57-78). Routledge.

Cabi, E. (2018). The Impact of the Flipped Classroom Model on Students' Academic Achievement. *International Review of Research in Open and Distributed Learning, 19*(3).

Chen, K. S., Monrouxe, L., Lu, Y. H., Jenq, C. C., Chang, Y. J., Chang, Y. C., & Chai, P. Y. C. (2018). Academic outcomes of flipped classroom learning: a meta-analysis. *Medical education, 52*(9), 910-924.

Danker, B. (2015), Using Flipped Classroom Approach to Explore Deep Learning in Large Classrooms. *The IAFOR Journal of Education, 3*(1), 171-186.

de Araujo, Z., Otten, S., & Birisci, S. (2017). Mathematics teachers' motivations for, conceptions of, and experiences with flipped instruction. *Teaching and Teacher Education, 62*, 60-70.

Demetry, C. (2010). Work in progress—An innovation merging "classroom flip" and team-based learning. In *2010 IEEE frontiers in education conference* (FIE) (pp. T1E-1). IEEE.

Dickson, K. A., & Stephens, B. W. (2014). Engaging large and diverse cohorts of bioscience students in lectures using Kinaesthetic active learning. *International Journal of Innovation in Science and Mathematics Education, 22*(3).

Doyle, I. C., Krupicka, M. I., & Vo, T. (2013). Student perceptions during the implementation of the flipped classroom model in a modified block curriculum. *Paper presented at the 114th annual meeting of the American Association of Colleges of Pharmacy, Chicago, IL.*

Elmaleh, J. & Sockalingam, N. (2015). Students' Perspectives on Flipped Classroom Implementation in Higher Education. *Emerging Technologies for Online Learning 8th International Symposium, 22-24 April 2015*. Research Collection School Of Information Systems.

Entezari, M., & Javdan, M. (2016). Active Learning and Flipped Classroom, Hand in Hand Approach to Improve Students Learning in Human Anatomy and Physiology. *International Journal of Higher Education, 5*(4), 222-231.

EUA, (2018). Learning and Teaching in Europe's Universities: An EUA position paper (Brussels, EUA). http://bit.ly/EUALTposition.

European Commission/EACEA/Eurydice, (2018). The European Higher Education Area in 2018: Bologna Process Implementation Report (Luxembourg, Publications Office of the European Union).

European Students' Union (2015). *Overview on Student-Centred Learning in Higher Education in Europe*: Research Study.

Fakhoury, H. M., A Fatoum, H., Aldeiry, M. A., Alahmad, H., Enabi, J., Kayali, S., ... & Lumsden, C. J. (2021). Flipping a biochemistry class within a medical curriculum: Impacts on perception, engagement, and attainment. *Biochemistry and Molecular Biology Education*. DOI: 10.1002/bmb.21521

Frydenberg, M. (2013). Flipping excel. *Information Systems Education Journal, 11*(1), 63.

Gaebel, M. & Zhang, T. (2018). Trends 2018. *Learning and teaching in the European Higher Education Area* (Brussels, EUA).

Jensen, J. L., Kummer, T. A., & Godoy, P. D. D. M. (2015). Improvements from a flipped classroom may simply be the fruits of active learning. *CBE—Life Sciences Education, 14*(1), ar5. doi: 10.1187/cbe.14-08-0129

Joseph, M. A., Roach, E. J., Natarajan, J., Karkada, S., & Cayaban, A. R. R. (2021). Flipped classroom improves Omani nursing students' performance and satisfaction in anatomy and physiology. *BMC nursing, 20*(1), 1-10.

Karalis, Th., & Raikou, N. (2021). Flipping the classroom remotely: implementation of a flipped classroom course in higher education during the Covid-19 pandemic. *European Journal of Open Education and E-learning Studies, 6*(2), doi:http://dx.doi.org/10.46827/ejoe.v6i2.3809.

Kim, M. K., Kim, S. M., Khera, O., & Getman, J. (2014). The experience of three flipped classrooms in an urban university: an exploration of design principles. *The Internet and Higher Education, 22*, 37-50.

Knutstad, U., Småstuen, M. C., & Jensen, K. T. (2021). Teaching bioscience to nursing students—What works? *Nursing Open, 8*(2), 990-996.

Kong, S. C. (2014). Developing information literacy and critical thinking skills through domain knowledge learning in digital classrooms: An experience of practicing flipped classroom strategy. *Computers & Education, 78*, 160-173.

Lage, M., Platt, G., & Treglia, M. (2000). Inverting the classroom: A gateway to creating an inclusive learning environment source. *The Journal of Economic Education, 31*(1), 30–43.

Land, S. M., Hannafin, M. J., & Oliver, K. (2012). Student-centered learning environments: Foundations, assumptions, and design. In *Theoretical foundations of learning environments*, pp. 3-25. Routledge.

Leatherman, J. L., & Cleveland, L. M. (2020). Student exam performance in flipped classroom sections is similar to that in active learning sections, and satisfaction with the flipped classroom hinges on attitudes toward learning from videos. *Journal of Biological Education, 54*(3), 328-344.

Long, T., Cummins, J., & Waugh, M. (2017). Use of the flipped classroom instructional model in higher education: instructors' perspectives. *Journal of computing in higher education, 29*(2), 179-200.

McNally, B., Chipperfield, J., Dorsett, P., Del Fabbro, L., Frommolt, V., Goetz, S., ... & Rung, A. (2017). Flipped classroom experiences: student preferences and flip strategy in a higher education context. *Higher Education, 73*(2), 281-298.

Mason, S. G, Shuman, R. T., & Cook, E. K. (2013). Comparing the Effectiveness of an Inverted Classroom to a Traditional Classroom in an Upper-Division Engineering Course. *IEEE transactions on education, 56*(4).

Ojennus, D. D. (2016). Assessment of learning gains in a flipped biochemistry classroom. *Biochemistry and Molecular Biology Education, 44*(1), 20-27.

Özkan, Y. (2017). Flipped Higher Education Classroom: An Application in Environmental Education Course in Primary Education. *Higher Education Studies, 7*(3).

Plota, D., & Karalis, T. (2019). Organization and implementation of a Flipped Classroom course in the Greek University context. *Educational Journal of the University of Patras UNESCO Chair*.

Pluta, W., Richards, B., & Mutnick, A. (2013). PBL and beyond: Trends in collaborative learning. *Teaching and Learning in Medicine, 25*(S1), S9–S16.

Rakitzi, K., Botsoglou, K., & Roussakis, G. (2020). The implementation of the flipped classroom model in Higher Education: let the students speak. *Open Education: the journal for Open and Distance Education and Educational Technology, 16*(1), 132-144 [in Greek].

Roditi, G., & Karalis, T. (2014). Reflection on Teaching in Higher Education: Critically reflective processes of Greek academics in Hard, Soft, Pure and Applied disciplines. In D. Andritsakou, & L. West (Eds.), *1st Conference of ESREA's Network "Interrogating Transformative Processes in*

Learning and Education: An International Dialogue" What's the point of Transformative *Learning?* ESREA & Hellenic Adult Education Association.

Rathner, J. A., & Schier, M. A. (2020). The impact of flipped classroom andragogy on student assessment performance and perception of learning experience in two advanced physiology subjects. *Advances in physiology education, 44*(1), 80-92.

Rawas, H. (2019). Comparison of Undergraduate Nursing Student Satisfaction in Flipped Class (FC), Active Lecture Class (ALC) and Traditional Lecture Class (TLC). *American Journal of Nursing Research, 7*(6), 991-994.

Sezer, B., & Abay, E. (2019). Looking at the impact of the flipped classroom model in medical education. *Scandinavian Journal of Educational Research, 63*(6), 853-868.

Smallhorn, M. (2017). The flipped classroom: A learning model to increase student engagement not academic achievement. *Student Success, 8*(2), 43-53.

*Standards and Guidelines for Quality Assurance in the European Higher Education Area (*ESG), (2015). Brussels, Belgium.

Strayer, J. F. (2012). How learning in an inverted classroom influences cooperation, innovation, and task orientation. *Learning environments research, 15*(2), 171-193.

Tune, J. D., Sturek, M., & Basile, D. P. (2013). Flipped classroom model improves graduate student performance in cardiovascular, respiratory, and renal physiology. *Advances in physiology education, 37*(4), 316-320.

Tsiolis, G. (2014). *Methods and techniques of analysis in qualitative social research.* Critique [in Greek].

Van Vliet, E. A., Winnips, J. C., & Brouwer, N. (2015). Flipped-class pedagogy enhances student metacognition and collaborative-learning strategies in higher education but effect does not persist. *CBE—Life Sciences Education, 14*(3), ar26.

Whillier, S., & Lystad, R. P. (2015). No differences in grades or level of satisfaction in a flipped classroom for neuroanatomy. *Journal of Chiropractic Education, 29*(2), 127-133.

Zainuddin, Z., & Halili, S. H. (2016). Flipped Classroom Research and Trends from Different Fields of Study. The International Review of Research in *Open and Distributed Learning, 17*(3). https://doi.org/10.19173/irrodl.v17i3.2274.

Zappe, S., Leicht, R., Messner, J., Litzinger, T., & Lee, H. W. (2009, June). "Flipping" the classroom to explore active learning in a large undergraduate course. In *2009 Annual Conference & Exposition*, 14-1385.

Adult contemporary lifelong and life-wide leisure education and learning. New emerging trends and adversities in the aftermath of the post-economic crisis and post-Covid-19 pandemic era

Labrina GIOTI

Aristotle University of Thessaloniki

Intoduction

Leisure time as an important dimension of lifelong and life-wide human life span has gained prominence in contemporary post-industrialized societies, resulting in the widespread of leisure activities, as well as leisure education and learning. However, in recent decades, the pace of change in technology and the workplace has become hyper-accelerated, changing the nature, modes, and forms of work, social relations, life rhythms and lifestyles, as well as adult education, giving priority to non-formal and informal forms of learning and education, and ultimately the very concept of leisure time (Gioti, 2018).

Particularly in the post-economic crisis and post-Covid-19 era, the global mobile workforce[*] has grown enormously, including home and internet-based work, mobile and teleworking, and other forms of work, also accelerating unemployment and job precariousness, while working time has expanded significantly, and the boundaries between personal and working life have blurred (World Economic Forum, 2020;, 2020; Brunelle, 2013). Additionally, demographic changes as the ageing of the population in Europe and other western countries in relation to the increasing life expectancy transformed our perceptions about healthy and active ageing increasing the diffusion of lifelong education and learning in late adulthood. Moreover, lifelong learning policies promoted by international organizations and the European Union are launching the "new leisure society" in order to commercialize and privatize the wider range of activities that people do in their leisure time, removing the participatory and rewarding nature of the free provision of leisure programs offered by public organizations, local communities, and regions (Gioti & Perdiki, 2019).

Leisure as a concept has its origin in the Greek philosophy of classical humanism. It relates to the evolution of Western thought and especially the liberal philosophy of life that is developed mainly on the basis of the work-leisure dichotomy. The meanings of leisure practices as well as meanings and practices concerning power structures and oppression or other relevant topics of importance for a social group are historical, societal, and culturally bound. In the context of our study, we conceive

---

[*] Mobile work means that work can be done at a distance, that is, outside conventional offices, at any time and in any place. Although the mobility resulting from this kind of work organization creates many advantages, such as reduced real estate costs, better work-life balance for employees, access to a larger pool of workers, and overall improved employee productivity, the distances that it generates have major consequences for organizations and for leadership dynamics (Brunelle, 2013).

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

leisure in relation to work as an "opportunity afforded by freedom from occupation" and as a freely chosen time, with no obligations that bring us joy and satisfaction (Pejatović et al., 2016, pp. 220-1).

In modern industrialized cultures, significant and fruitful workers' achievements have resulted in the quantitative increase and qualitative development of leisure activities compared to the past (Koronaiou, 1996). The leisure western culture has also established a wider demand for collective and personal expression by pursuing the right to free time. However, if adults manage to ensure adequate leisure time, their use is purely personal. Leisure is generally seen in terms of time, activity, and/or as a state of mind (Nikolic Maksic, 2015 as cited in Pejatović et al., 2016, p. 221), and its main and most essential characteristics to be perceived as such are the sense of freedom, the intrinsic motivation, and the positive affect. It is an objectively existing phenomenon, and its meaning is relatively fixed and innate (Pejatović et al., 2016; Tanner et al., 2008).

The scope of leisure choices that can be made ranges from actions that offer personal growth to those that excite the body and the soul, and which can sometimes be characterized as illegal or socially dissuasive (Harris, 2011). Demands on leisure as well as on leisure activities change, as research findings show, during adulthood and across life span depending on the life transitions and the social roles adults perform in each of it (MacNeil, 1998; Pejatović et al., 2016; Sargant, 1996). Leisure is overlapping during the life course with study or work time transition from school to work, from being single to being partnered, and the transition to parenthood, as well as by loss of paid employment and of relationships, and the transition to old aging (MacKean & Abbott-Chapman, 2011).

In our study, we will briefly examine the concept of leisure time and its changing meaning during its historical evolution, the type of activities it includes and their providers, the motivations and barriers to participation in leisure activities, as well as new emerging trends and adversities in the aftermath of the post-economic crisis and post-Covid-19 pandemic era related to learning and education in leisure time.

Historical evolution of the 'leisure' concept and shift of meanings

We first meet the word leisure in the ancient Greek language with two versions 'scóli' and 'scoli' which are the same word with different intonations and two different meanings. The first referred to the free time from labor and the second one to the content and the use of this free time. Both connect free time with spiritual of physical benefits for the person. In a contemporary Greek Lexicon, we read that 'skóli' means "rest, pause, laziness, lack of occupation, study, dialectical conversation, chance" (Dimitrakou, 1976) and a prerequisite for 'skóli' is to have "free time". Accordingly, in the Oxford English Dictionary, we read the word leisure as "freedom or opportunity to do something specific or implied" and in a narrower term "opportunity afforded by freedom from occupation" (Sargant, 1996). The root of the word "leisure" derives from the French loisir, and from the Latin licere. The latter has its roots in 'liberty' and 'license'. Leisure, as a synthesis of the above meanings, implies both the permissible and the free. It is precisely the meaning of 'skóli' that is attributed to the English word 'leisure' (Adler, 1951; Koronaiou, 1996; Van Moorst, 1982).

The Greek philosophers, Aristippus and Epicurus (representatives of the Hedonist school), focused on the importance of happiness as a factor of a good life and Aristotle added that the ultimate purpose

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

of human life is to achieve eudaimonia that is not only happiness that leads to well-being through personal pleasure and satisfaction of desires but also the bliss that one achieves through self-awareness and self-realization (European Social Survey, 2015). Later contributions attempted to incorporate both the hedonistic school and the eudaimonic approach in one definition of well-being, noting that well-being is related to joy, pleasure, and satisfaction and at the same time to the functioning and fulfillment of individual potential (Huppert et al., 2009).

But it was Aristotle who elaborated furthermore the concept of 'scole' from which the English word school came. He suggested that the meaning of leisure (scole) is neither repose nor the end of work, but on the contrary, it is the occupation (ascolia = not occupation) which signifies the end of free time for yourself, free time to pursue the happiness (Gioti, 2010a; Kouthouris, 2006). Thus, he initiated the clear dichotomy between labor and leisure. Classical humanism established liberalism that emphasized on the individual and the liberal education of future leaders and the upper class while liberal adult education set leisure as its end. Based on this perception, adult education is divided into two main types vocational training specialized education for work and labor, which is an extrinsic end, and general education which is an education for leisure which is an intrinsic end (Adler, 1951; Gioti, 2010a, 2010b; Karalis, 2017; Pejatović et al., 2016).

Nowadays, it is considered that, as Veenhoven (2008) notes, a person's overall happiness is simply life satisfaction and subjective well-being, while Tay and Diener (2011) describe, life satisfaction as the perceived divergence between aspiration and achievement. They consider life satisfaction as a cognitive component of subjective well-being and define happiness as an experience of emotions while the former makes a distinction between cognitive and affective appraisals of life. According to his opinion life satisfaction is an overall judgment of life based on two components: cognitive comparison with the subjectively internalized standards of good life and affective information on how one feels most of the time (Veenhoven, ibid).

Undoubtedly, leisure in the history of humankind as meaning and practice was never fixed nor had the same value or meaning for all social classes. However, from the late 18th century onwards, with the emergence of the industrial revolution until the middle of the 20th century, free time was closely linked to work as the working class had to struggle hard to claim and establish it (Koronaiou, 1996). Indeed, the eight-hour day movement was necessary to establish that the time spent on work and the time spent on leisure was the equal amount in order to ensure the well-being of man (Haworth & Lewis, 2005). The age of leisure boom coincides with the golden thirty-year period of post-war social democracy in Europe and North America (Gioti, 2018) although "unevenly spread, subject to all the continuing inequalities of class, race, gender, and geography, nevertheless in total there is more free time and more money to spent on enjoying it than ever before" (Worpole, 2013, p. 112).

Additionally, the influence of the socialist ideals and the leisure practices in the socialist countries introduced leisure as free association, rest from work, play, a sense of community, and popular participation in the creation of art and culture. Museums, libraries, sports centers, parks, swimming pools, etc were offered to the public free of charge. In the '70s and '80s, the spread of these ideas resulted in the growth of the community and the often-self-organized creative leisure activities by

local cultural associations or municipal leisure provisions such as art, adult popular education programs, and other popular forms of leisure (Worpole, ibid).

During the '70s, UNESCO articulated and advocated the idea of lifelong learning as the form of general adult education and learning for and through leisure which is based on the liberal philosophy (Faché, 2011). Lifelong learning embraces the idea of learning as "a normative way of life informed by and expressive of cherished values…." as people seek happiness and well-being in a meaningful and fulfilled life, both personal and communal whereby "individuals creatively and critically engage with the subject matter and situations in a continuous lifelong journey" updating the ideals of liberalism (Skilbeck, 2012, pp. 500, 514).

In the age of leisure, the use of the concept is perceived mainly in two ways: as a free time that can be used for play "recreation, amusement, diversion, pastime, and, roughly, all ways of killing time" while the other use is related with the engagement in leisure activities, that is "such things as thinking or learning, reading or writing, conversation or correspondence, love and acts of friendship, political activity, domestic activity, artistic and esthetic activity." (Adler, 1951, p. 37).

However, the emergence and prevalence of neoliberalism especially in the last three decades have gradually established a 'new leisure society' that surrounds the concept of leisure with a new consumerist ideology. The new leisure activities are much more amenable to the rhetoric of the enterprise and business. Creative and non-creative leisure (spending time) becomes another economic sector. The development of the leisure industry aimed at the rapid privatization of public space. Visitors of public cultural and sports spaces become customers and leisure is promoted as a consumer lifestyle or as a voluntary activity. The malls, the thematic parks, and sports centers, the shopping as leisure per se, non-formal programs charges, savage cuts in adult education, local cuts in public leisure provision, reduced opening hours in libraries, etc. systematically downgraded and undermined the alternative tradition of catering for popular leisure (Worpole, 2013).

Gradually, lifelong learning loses its liberal ideological casing which is now shifting to emphasize the contribution of leisure education as a form of organized or institutionalized learning that is chosen as one of the adult leisure activities to the process of lifelong learning. Leisure education in the coming years turns into one of the growing fields of adult education and learning (Jones & Symon, 2001; Pejatović et al., 2016). The educational activities in adulthood that combine leisure with personal development and skills acquisition in a pleasant creative environment are considered leisure or interest-related learning (Kouthouris, 2006; Thoidis & Pnevmatikos, 2014). Frequently, leisure offers an opportunity to engage in active learning while many people learn through their leisure activities whether they realize it or not (Sargant, 1996, p. 198). In Greece, such learning activities till recently are provided through general adult education in the form of leisure programs or courses mainly by public or private bodies or even by community services (Gioti & Perdiki, 2019; Karalis, 2017; Vergidis, 2008).

Following the EU Treaty, the European Union has been committing its Member States to high-level policy initiatives from the 1990s onwards to encourage 'lifelong learning'. Their purpose is to promote the idea of developing a 'learning society' in which continual learning becomes an integral part of

society, with a subsequent enhancement of social capital (Gioti, 2018). It is argued that it is through learning as 'serious leisure', which requires some form of educational commitment, rather than as vocationally oriented, that will be most appropriate for such a policy (Aspin et al., 2012). The implications of 'lifelong learning as leisure' for the individual, the community, and society as a whole are exemplified in order for the EU's neoliberal strategy to be promoted with greater consensus by European peoples. The same policies are followed and integrated rapidly by international organizations at a global level as well. Ironically, since the EU Treaty and onwards, and despite the widespread rhetoric of European policies, the EU has been increasingly funding vocational education and training programs, and vice versa, the so-called general education programs have been increasingly reduced (Gioti, 2018).

During the first decade of the millennium, in an extended series of phenomenography research conducted by Watkins (2002, as cited in Pejatović et al., 2016), about how adults experience and describes leisure, four main qualitative categories were raised: 1) *Leisure as Passing Time*: "nothing more significant to do", 2) *Leisure as Exercising Choice*: the time that a person has in his/her disposal so to do whatever he or she wants 3) *Leisure as Escaping Pressure*: from the stressful situations of life through withdrawal, relaxation and rejuvenation and with activities that may be physically active or socially oriented in order to restore a persons' feelings and well-being. 4) *Leisure as Achieving Fulfillment*: means to feel happy and satisfied. Leisure is perceived as independent of time (as timelessness), as well as independent of the specific activity, and is often associated with feelings of satisfaction, pleasure, relaxation (physical, mental, spiritual), choice, achievement, and self-esteem.

Changes in meanings and policies do not happen in a political or economic vacuum. Adult education and lifelong learning are correlated with employability and the adaption of labor to the economic demands of contemporary capitalism. Eventually, the global changes caused by neoliberalism brought about major changes in the way of life and thus in the way of experiencing leisure. Especially, after the economic crisis and the Covid-19 pandemic precariousness and intensification of work rapidly changed the work-leisure relationship. The standard full-time job has gradually been replaced by a wide range of part-time jobs with greatly varying working times, dramatically increasing the size of flexible labor temporary workers. Occupational obligations monopolize time in and out of work at the expense of adult needs and desires while for the unemployed and the retired, serious leisure is their only resource if they are to have a central life interest at all. Leisure in this case means enabling the jobless to manage their stress situation positively provided that the leisure concerned does not involve too much expense (Gioti & Perdiki, 2019; Harris, 2011; Faché, 2011; Koronaiou, 2010; *influencing*, 2010).

The above developments intensified dramatically after the outbreak of the pandemic Covid-19 that profoundly influenced and drastically changing human lives on different levels and not only in the ways leisure time and space meanings are redefined or the ways and forms of activities, learning, and education of leisure are perceived as well. Nevertheless, the subjective perceptions of how leisure is experienced and used as well as how each person handles the relation between leisure and work, family and social obligations, and other factors that influence his/her leisure varies affecting both the

way he/she makes meaning, experiences and the way he/she uses his/her leisure (Falasca, 2011; Gioti & Perdiki, ibid; Ryan & Deci, 2000).

Motivation, Activities, and Providers

Rest and recreation as leisure activities play an important role in most people's lives. Often, we tend to think of such activities as involving participation in sports and games or social activities and ignore other forms of rest. However, they include a wide range of activities such as travel and tourist excursions, cultural recreation or participation in the fine arts, involvement in hobbies, participation in social groups, nature-related activities (e.g. hunting, fishing), or even sporting activities (McLean et al., 2015). People participate in various activities to meet a variety of needs and enjoy personal benefits from their participation. For some people, these activities are a means of strengthening family relationships, or they simply seek to engage in interesting hobbies, sports, or social activities seeking personal improvement and development for all ages (ibid.). For others, participation in non-formal and informal educational and learning activities is considered as taking place in the context of leisure time and is therefore perceived as a leisure activity that provides personal and professional development and/or pleasure and satisfaction (Gioti & Perdiki, 2019). Actually, personal development can be seen as an important function of rest (Kleiber, 1999). The fact that adults enroll in non-formal-education programs with the primary goal of improving themselves – professional or personal –with their personal pleasure or satisfaction secondary, does not negate the fact that they perceive them as leisure activities (Thoidis & Pnevmatikos, 2014). Moreover, people in their free time seek rest and relaxation from the stress of their daily routine. Participation in leisure education and learning is for them an escape from their demanding way of life. Thus, leisure acts as a balancing factor within other aspects of life as (Watkins 2002 as cited in Pejatović et al., 2016).

In one of the earliest attempts to classify motivations for participation in leisure activities, Beard and Ragheb (1983), overview a wide range of research outcomes and the existing literature in order to assess the psychological and sociological reasons for participation in leisure activities, formulated four broad categories of motivation:

- *Intellectual,* which includes substantial mental activities such as learning, exploring, discovering, and creating or imagining

- *Social*, which includes two basic needs, the first is the need for friendship and interpersonal relationships, while the second concerns the need for the esteem of others

- *Competence-Mastery*, which involves achievement, mastery of a high level of skill, challenges, and competition (mostly activities that are physical in nature).

- *Stimulus-Avoidance,* which includes all the activities that people undertake in order to avoid stressful situations and get away from overstimulating life situations and express the need to avoid social contacts, seek solitude and relaxation.

Undoubtedly, leisure activities contribute to personal satisfaction and happiness. Some of their benefits concern mental well-being and personal growth while others provide the means for self-expression, a sense of choice, and an escape from the daily routine. For some, including more specific

benefits such as learning of new skills, the expression of creativity, hidden talents, or the pursuit of distinction in various fields. The most popular reasons that serve as motivation to participate in such activities are pleasure, relaxation, physical health, or exercise, doing something different outside work, and getting in touch with nature. For others, the motive is to participate in adventurous and dangerous pursuits in nature or to be engaged in active, competitive entertainment that will provide an outlet for their aggression. Still, others choose and prefer socialization activities that offer opportunities to socialize with other people with the goal of making friends or working with others in group settings, or participating actively in community-based projects. Finally, there are those who choose activities to improve their physical fitness. The availability of leisure time depends above all on class and class-related dimensions such as educational level, cultural capital, type of work and position in the division of labor, and income. It also depends on age, gender, physical and mental state, and the presence or absence of some form of disability (par example children and older people have more leisure time than working people) (Leisure Information Network, 1990; McLean et al., 2015). Additionally, it depends as well as on the previous positive experience of people who have participated in recreation activities and leisure learning activities, and educational programs (Gioti & Perdiki, ibid).

According to relevant research about the importance of leisure in adults' lives, it is shown that they mostly enjoy the fact of having the chance to freely choose between a variety of activities according to their needs and desires, as well as the level of satisfaction they get from their lives (Gökyürek, 2016; MacKean & Chapman, 2011; Thoidis & Pnevmatikos, 2014). The research shows, also, that the way adults experience their leisure differs significantly. Some find no meaning in it, while for others it makes them feel independent (Watkins, 2002, as cited in Pejatović et al., 2016). Some see it as a way out of the problems of their lives and others treat it as a source of pleasure and satisfaction (Karapiperi, 2015; MacKean & Chapman, 2011; Spanou, 2017; Watkins, 2002, as cited in Pejatović & al., 2016).

As current research exhibits, the dominant perception adults have, concerning the leisure activities, is that they gain benefits both as individuals by acquiring specific knowledge and skills, as well as by disseminating these to the personal, social, and professional aspects of their lives (Karapiperi, ibid; MacKean & Chapman, ibid; Spanou, ibid; Thoidis & Pnevmatikos, 2014). Gained benefits are an important motivational factor that positively influences adults' decisions about future participation in leisure education (Karapiperi, ibid; Murray, 2012). The most powerful motivation for getting involved in adult leisure education is personal development and socialization (Dillard & Bates, 2011; Karapiperi, ibid; MacKean & Chapman, ibid; Murray, 2012; Spanou, ibid). Dattilo & Dattilo (2012) sorted motivation into three categories: a) *contact with others*, b) *internal motivation*, and c) *well-being*. In any case, the most important motivation remains intrinsic (Kleiber, 2012). On the other hand, there are barriers that make adults skeptical about participation, such as the limited available time, age, family obligations, mental or physical deficiency, geographical restrictions, and financial difficulties (Gioti & Perdiki, 2019; Gökyürek, 2016; Karapiperi, ibid; Spanou, ibid; Tane et al., 2008).

Furthermore, in the post-economic crisis period, as current research reveals, people believe that their leisure has been significantly reduced. The main reasons for this fact are the increased and highly demanding occupational, family, and social obligations and duties that absorb their time and energy.

This fact raises concerns about the proper management of their leisure time since they ultimately fail to do what they want to do. In addition, there have been significant restrictions in the range of free leisure and recreational activities offered by communities due to severe budget cuts, factors that have been highlighted as the leading cause that compresses their actual leisure choices in other related surveys as well (Gioti & Perdiki, 2019; Harris, 2010; Spanou 2017; Thoidis & Pnevmatikos, 2014). And of course, an additional significant obstacle is the expense and the overall cost of participation (Gioti & Perdiki, ibid; Koronaiou, 2010).

Providers of adult leisure programs and activities may be public or private institutions and organizations. They are organizations that organize activities aimed at both formal adult education (e.g. Adult Learning Centres) and informal or non-formal education, such as:

- Public services: state and local recreation areas and parks that offer similar services as their primary function.

- Vocational Training Centres (VTCs), both public and private, for the purpose of organizing continuing training programs for the workforce.

- Non-profit organizations: non-governmental organizations that serve the general public through multiple programs with the main feature being the opportunity for recreation. Such organizations include national youth programs (e.g., Boy Scouts).

- Private clubs for individual members: these are tennis, golf, sailing, and sports clubs, as well as fraternities that offer social activities to their members and in some cases serve the recreational/relaxation needs of their members.

- Commercial entertainment and leisure businesses: this includes a wide variety of private, profitable businesses such as cinemas, theatres, nightclubs, internet cafés, gyms, dance schools, etc.

- Employee entertainment/recreation programs that serve those who work in a business as part of the overall staff benefit and are linked to the health and fitness of employees.

- Programs offered by universities: include on-campus sports clubs, social activities, recreational trips, art clubs, film clubs, etc.

- Rehabilitation services that provide programs designed to meet the needs of people with physical or mental disabilities, older people or people with aberrant social behavior, and similar special groups in general.

- Sports organization and management services: this includes professional sports, public recreational parks, private sports enterprises, sports for young people, sports for people with disabilities, and many other types of sports.

- Tourism organization and management services: includes travel agencies, airlines, cruise ships, accommodation, amusement parks, etc. (Karalis, 2017; McLean et al., 2008; Vergidis, 2008).

In today's ever-increasing and changing demands for different forms of recreational activities, public, commercial, and non-profit organizations are struggling to respond. However, often public and non-profit agencies do not have the necessary financial capital, resources, or capacity to meet public demands. Commercial enterprises are usually quick to respond to even the most bizarre demands (e.g. paintball) (McLean et al., 2008). In addition, the Covid-19 pandemic has highlighted new trends and forms of e-leisure activities, unleashing a multitude of private leisure activities, boosting the supply of private non-formal education programs and informal learning leisure activities via the Internet through MOOCs or other synchronous or asynchronous learning modes offered by a wide range of private providers, including a significant number of individuals.

New emerging trends and adversities in leisure adult education and learning

Leisure nowadays has extended its duration in relation to previous times to accommodate significant personal or leisure-related learning. A range of social, political, and economic factors have brought about this new leisure boom change. The rapidly growing numbers of the population over the age of 65 and the need to promote healthy and active ageing, the emerging adulthood that extended the transition to adulthood until the mid to late twenties in relation to the grown numbers of unemployment in youth, which delays their transition to working life and constantly prolongs their education and training period, the promotion of active citizenship and the strengthening of social ties and relationships in local communities in contemporary industrialized cultures are considered to be significant factors for this (MacKean, & Abbott-Chapman, 2011; Arnett, 2001).

But the most significant influence is the spread of the idea of lifelong and life wide learning and the promotion of the neoliberal agenda by international organizations (European Union, OECD, UNESCO, etc) (Faché, 2011; Gioti, 2018). Along with the lifelong policies and the forthcoming of the so-called neoliberal "learning societies", the idea of a "new leisure society" is also promoted by international and national organizations, since it creates another economic space in order to nurture the private sector (Pejatović et al., 2016, p. 157; Worpole, 2013). Particularly, with the advent of the new millennium, the explosion of the international expansion of the Internet has led to the widespread use and exploitation of the digital possibilities it has highlighted, including also new forms of offering e-leisure and recreation activities, as well as opportunities for distance participation in e-leisure learning activities and education programs.

Hence, learning and leisure education, as a form of organized or institutionalized learning that takes place in participants' leisure time in many forms, through a variety of means and methods and by a wide range of mainly private providers, has experienced significant growth in recent decades and has become one of the growing areas of adult education and learning (Gioti, 2018; Karalis, 2017). Their wide dissemination has also contributed to the emergence of the important function of leisure education and learning in people's personal - and not only professional - development (Kleiber, 2012). As studies pointed out, the main motivation for adults to participate in leisure learning activities is to seek experiences related to their personal development and to make creative use of their leisure time. In particular, certain educational activities, including non-formal learning, are considered important means for adults' self-improvement and self-fulfillment (Faché, 2011; McLean et al., 2015; Thoidis &

Pnevmatikos, 2014). Furthermore, as research evidence suggests, the long-term participation of adults in leisure educational activities provides them with rich experiences capable of shaping a unique culture in relation to the classes in which they participate as well as the benefits they enjoy on a personal level. Among the benefits participants derive from leisure education activities are the reinforcement of their critical dispositions in many areas of their lives, the flexibility they notice in their way of thinking, and also the feeling of pleasure that is described as an improvement of their mental state contrary to the daily routine (Dattilo et al., 2012; Fave & Massimini, 2003; Gioti & Perdiki, 2019; Spanou, 2017). Additionally, other research claims that since leisure education has a positive effect on the development of their personality it makes sense for them to be positive to the prospect of future participation in similar programs of creative use of leisure (Karapiperi, 2015; Murray, 2012).

Besides, due to the wide and ever-increasing pace of technology, the rapid growth and expansion of the lifelong learning market, and the wide access to Internet resources, a myriad of leisure educational and learning activities are offered. However, in this ever-confusing and contradictory reality that people face as workers, citizens, and consumers, they are not in a position to know all the implicit and real needs they have and to be able to evaluate the educational activities and programs on offer or to choose the most appropriate ones to meet those needs. These new developments brought to the surface the need to learn about the kind and modes of leisure. Nowadays, in the relevant current bibliography, we meet three terms about leisure education. The first is "education as leisure" wherein leisure is considered to be a learning process taking place in leisure, that is to say, people choose education as one of their leisure activities. The second one is "education for leisure" and concerns leisure as a content of learning where adults learn about leisure and how to use and create leisure while the third one is "education through leisure or in leisure" is aiming to effectuate improvements in lifestyle, self-esteem, self-regulation and control and social inclusion. Although the distinction among these terms is not always clear, they largely reflect the explicit or implicit needs of the potential participants (Faché, 2011; Kleiber, 2012; Pejatović et al., 2016).

However, at the same time, leisure has been lost due to structural parameters such as the long distances people travel to work, the abolition of breaks during working hours, and the need to constantly restructure working hours due to flexible systems (Thoidis & Pneumatikos, 2014). It is apparent that the modern working regime as well as people's way of life has shaped a demanding reality in which leisure time is significantly limited and people themselves are worried about its management (Gioti, 2018; Eurostat, 2018; *Constantopoulou*, 2010). Particularly following the economic crisis, and because of the severity with which many countries and our country struggled, labor conditions are changing rapidly, re-establishing medieval working times as demonstrated by the 12-hour vote by the Austrian Parliament. Increasing working time, intensification, and especially precariousness, make even the minimum time left to the workers tightly restrained, while for the unemployed or partially employed, the question arises whether they consider the time available as free or not and why (Gioti, ibid). But still, research during the financial crisis period indicates that for the participants in leisure activities, the most significant obstacle is the expense and their limited available free time (Gioti & Perdiki, ibid; Koronaiou, 2010).

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

This situation was further aggravated after the outbreak of the Covid-19 pandemic, following which, time and space at work were severely disrupted, and working time was vastly extended, reducing actual rest time. Simultaneously, the boundaries of personal, family, and work-life were blurred, and the body-space relationship and its kinesthetic definition were reshaped (Gioti, 2020). Human relationships and cooperation, as people had experienced them until then, were substantially reconfigured. The very sense of togetherness was dismantled, while the community was disorganized. Especially with the Covid-19 pandemic outbreak work-time internet use as well as leisure-time internet use were geometrically increased. On the one hand, this situation has revealed significant possibilities for users as well as important benefits. One of the most important benefits was the saving of time and money that would have had to be spent on travel to and from home and work and other transitions. Thus, this saved time was used to participate in e-leisure activities. In addition, they were given the opportunity to familiarize themselves with the use of the internet and digital media and, of course, to participate in a range of e-leisure activities.

This development has facilitated nonformal as well as informal e-learning and self-educated activities which ultimately enhance users' self-confidence by facilitating their self-directed learning (as was i.e. seeking information about the e-health care facilities enhancing health literacy) (Biswas et al., 2022). Data reveals a significant increase in demand for personal development and self-management skills courses, as well as health courses, which saw an 88% increase among the employed, while the unemployed put more emphasis on learning digital skills (World Economic Forum, 2020). Research findings also present that those whose work-time internet use could be considered balanced (5–28 h/week in this study) indicated a higher perceived quality of life compared to individuals with a little or a large amount of internet use for work (Kovačić et al., 2022; Islam et al., 2020; Pontes et al., 2015 as cited in Islam & al., ibid.).

Conversely, as recent research findings showed, one of the problems that emerged from lockdown and related containment measures was the rapid increase in psychosocial isolation and loneliness combined with high levels of uncertainty about the future and economic insecurity that led to internet-based addictive behaviors (Kovačić et al., 2022). Given the absence of any physical activity and social interaction outdoors, it was natural that people would turn their leisure time interest to the opportunities that online and digital technology offered. One of the problems that arise was the plethora of offered leisure activities in relation to the difficulty to establish criteria in order to select among these the ones that addressing to their needs and the weakness in tracking obstacles for their participation in leisure education. The most serious of the problems that emerged was internet addiction, which is caused by excessive and long-term internet use and has become a serious public health issue, especially in urban areas. Another dysfunctional aspect of the internet, similar to this one, is problematic internet use (PIU), (Internet addiction, Internet gaming disorder, problem gambling or gambling disorder, social media addiction including smartphone use disorder, problematic pornography use, and compulsive buying) increased in all age groups and was associated with increased levels of stress, anxiety, and depression in the general population, especially among children and adolescents (Biswas et al., 2022; Dong et al., 2020; Islam & al., 2020; Kovačić et al., ibid; Khubchandani et al.2021; Ko et al., 2022).

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

In the aftermath of the neoliberal capitalist crisis and especially in the post-Covid-19 era, the world of work is subject to high-speed, adverse, and often violent changes. Thus, it has become a source of insecurity and anxiety. In addition, as a result of the commercialization of leisure time in any state or local community, public adult leisure programs' provision has been reduced or seriously restricted to enable the private sector to flourish. Moreover, the Covid-19 pandemic resulted in the cessation of any community or privately offered live and outdoor activities. The demanding personal, economic and professional conditions significantly increased the pressure and stress in people's daily lives and consequently changed their meanings, perceptions, and leisure practices. In this frame, the very meaning of leisure as well as leisure learning and education are being redefined as they have undergone dramatic changes in the degree that the very essence of the relation of space and time in our daily working and personal lives has been seriously disrupted.

In addition, other pressing issues emerged, and they are directly and obviously associated with leisure time itself as well as leisure learning and education. These include unequal access to facilities and opportunities for recreation and play as well as for learning and education that prevent the possibility of obtaining the resulting personal, educational, professional and other forms of developmental benefits of leisure participation in such activities. These inequalities relate to, inter alia, gender, race and ethnicity, sexual orientation, disability, poverty, and religion and derive from class division and the consequent, asymmetrical and unjust access to privileges and power, due to the specific socio-political and economic structure of the societies. The serious cuts in the funding of leisure education programs that followed the economic crisis resulted, especially in the Greek peripheries, in the absolute absence of state-supported programs addressing the needs of local community adults in leisure learning activities and programs and have further exacerbated these aforementioned inequalities during the Covid-19 period and onwards (Gioti & Perdiki, 2019).

In the forthcoming first-digital world (World Economic Forum, 2020), new ways of delivering e-leisure activities are underway (proliferation of online leisure programs), raising both opportunities and challenges, while new initiatives to enhance community education, promote active citizenship, active and healthy ageing and leisure education have emerged giving access to many people who are reaping significant benefits on a personal level. However, the fundamental question remains: Which social groups' interests and needs will the new possibilities and opportunities serve, and who will be excluded and why? Do we move beyond denouncing and pointing out inequalities and injustice to acting to radically transform them so that the less privileged and disadvantaged also enjoy the benefits of leisure and e-leisure's education and learning?

References

Adler, J. M. (1951). Labor, leisure, and liberal education. *The Journal of General Education, 6(1),* 35-45.

Arnett, J. J. (2001). Conceptions of the transition to adulthood: Perspectives from adolescence through midlife. *Journal of adult development*, *8*(2), 133-143.

Aspin, N. D., Chapman, D. J., Evans, K., & Bagnall, R. (Eds). (2012). Foreward. In *Second international handbook of lifelong learning*. Springer Science & Business Media.

Beard, J., & Ragheb, M. (1983). Measuring Leisure Motivation. *Journal of Leisure Research, 15*(3), 219-228.

Biswas, P. R., Ahammed, B., Rahman, M. S., Nirob, B. M., & Hossain, M. T. (2022). Prevalence and determinants of internet addiction among adults during the COVID-19 pandemic in Bangladesh: An online cross-sectional study. *Heliyon*, *8*(7), e09967.

Brunelle, E. (2013). Leadership and mobile working: The impact of distance on the superior-subordinate relationship and the moderating effects of leadership style. *International Journal of Business and Social Science*, *4*(11).

Dattilo, E. L., Ewert, A., & Dattilo, J. (2012). Learning as Leisure: Motivation and Outcome in Adult Free Time Learning, *Journal of Park & Recreation Administration, 30(1)*.

Dillard, J., & Bates, D. (2011). Leisure motivation revisited: why people recreate, *Managing Leisure, 16(4),* 253-268.

Dimitrakou, D. (*1976). Mega dictionary of the Greek Language*. Athens, GR: Hellenic Paideia, [in Greek]*.

Dong, H., Yang, F., Lu, X., & Hao, W. (2020). Internet addiction and related psychological factors among children and adolescents in China during the coronavirus disease 2019 (COVID-19) epidemic. *Frontiers in psychiatry*, 751.

European Commission, (2015). *Education and Training 2020, Improving Policy and Provision for Adult Learning in Europe*. Available: http://ec.europa.eu.

European Social Survey (2015). *Measuring and Reporting on Europeans' Wellbeing: Findings from the European Social Survey*. ESS Eric Work Program 2013-2015. https://www.europeansocialsurvey.org/ [online January 2020).

Eurostat, (2018). Quality of life in Europe- Facts and views- leisure and social relations". Available: https://ec.europa.eu/eurostat/statistics-explained/ [Online May 2018].

Faché, W. (2011). Lifelong Learning for and through Leisure. In P. Reinhold (ed), *Sociology of leisure: work on temporal patterns, sport, music, education, and social problems,* (pp. 267-284). [Freizeitsoziologie: Arbeiten über temporale Muster, Sport, Musik, Bildung und soziale Probleme, 5].

Falasca, M. (2011). Barriers to adult learning: Bridging the gap, *Australian Journal of Adult Learning, 51(3),* 583-590.

Fave, A.D., & Massimini, F. (2003). Optimal experience in work and leisure among teachers and physicians: Individual and bio-cultural implications, *Leisure Studies, 22 (4),* 323-342.

Gioti, L. (2010a). Lifelong education and Teachers. Theories and practices of School Counselors. *Ph.D. dissertation*, Department of Philosophy, Pedagogy & Psychology, National Kapodistrian University of Athens, [in Greek].

Gioti, L. (2010b). Adult Education Philosophies Guiding Educational Theory and Practice: The Case of Greek Primary Education Teacher Counsellors, *The International Journal of Learning, 17(2),* 393-406.

Gioti, L. (2018). *Formulating the field of Adult Education. Policies, Pedagogical Theories and Practices.* Grigoris, [in Greek].

Gioti, L., & Perdiki, E. (2019). Participation in Adult Non-Formal Leisure Education in Local Community Programs in the Economic Crisis. *International Journal of Management and Applied Science, 5*(IKEEART-2020-3552), 48-54.

Gioti, L. (2020). Learning in quarantine. *Adult Education, 48*, 122-24, [in Greek].

Gökyürek, B. (2016). An Analysis of Leisure Attitudes of the Individuals Participating in Dance Activities and the Relationship between Leisure Attitude and Life Satisfaction, *International Journal Of Environmental & Science Education, 11*(10), 3285-3296.

Harris, D. (2010). Key Concepts in Leisure Studies. Plethron. [in Greek].

Haworth, J., & Lewis, S. (2005). Work, leisure, and well-being. *British Journal of Guidance & Counselling, 33(1),* 67-79.

Hellenic Statistical Authority, (2019). Demographic characteristics/2011. http://www.statistics.gr/en/statistics/publication/SAM03/ 2011, [Online 20/3/2019].

Huppert, F. A., Marks, N., Clark, A., Siegrist, J., Stutzer, A., Vittersø, J., & Wahrendorf, M. (2009). Measuring well-being across Europe: Description of the ESS well-being module and preliminary findings. *Social Indicators Research*, *91*(3), 301-315.

Islam, M. S., Sujan, M. S. H., Tasnim, R., Ferdous, M. Z., Masud, J. H. B., Kundu, S., Mosaddek, A.S., Shahabuddin, K.C., Kircaburun, K., & Griffiths, M. D. (2020). Problematic internet use among young and adult population in Bangladesh: Correlates with lifestyle and online activities during the COVID-19 pandemic. Addictive behaviors reports, 12, 100311.

Jones, I., & Symon, G. (2001). Lifelong learning as serious leisure: *Policy, practice and* potential*, Leisure Studies, 20,* 269-283.

*Karapiperi, E. (*2015). Informal learning methods in women's free time, that been operated at the cultural clubs in the Municipality of Hersonissos. M.S. thesis, Hellenic Open University, Patras, GR, [in Greek].

Khubchandani, J., Sharma, S., & Price, J. H. (2021). COVID-19 pandemic and the burden of internet addiction in the United States. *Psychiatry International*, *2*(4), 402-409.

Kleiber, D. (2012). Taking leisure seriously: New and older considerations about leisure education", *World Leisure Journal, 54(1),* 5–15.

Ko, C. H., Yen, J. Y., & Lin, P. C. (2022). Association between urbanization and Internet addiction. *Current Opinion in Psychiatry*, *35*(3), 219-225.

Kovačić Petrović, Z., Peraica, T., Kozarić-Kovačić, D., & Palavra, I. R. (2022). Internet use and internet-based addictive behaviours during coronavirus pandemic. *Current Opinion in Psychiatry*, *35*(5), 324-331.

Constantopoulou, Ch. (2010). *Leisure, Myths and Realities.* Papazisis. [in Greek].

Karalis, T. (2017). Shooting a moving target: The Sisyphus boulder of increasing participation in adult education during the period of economic crisis. *Journal of Adult and Continuing Education*, *23*(1), 78-96.

Koronaiou, A. (1996). *Sociology of Leisure.* Nissos, [in Greek].

Koronaiou, A. (2010, October 3rd). Leisure time in the age of crisis. Enet.gr Eleftherotypia. http://www.enet.gr/?i=news.el.article&id=209368 [Online November 2017] *[in Greek].*

Kouthouris, H. (2006). Leisure, Recreation, Entertainment, Athletics: Issues Meaning and their Relationships *Inquiries in Physical Education and Sport, 4(1)*, 68-77. [in Greek].

Leisure Information Network (L.I.N.) (1990). *A look at leisure*. No. 26. http://culture.alberta.ca/recreation/resources/research-analytics/look-at leisure/pdf/LL26_favourite_activities.pdf

MacKean, R., & Abbott-Chapman, J. (2011). Leisure activities as a source of informal learning for older people: The role of community-based organizations, *Australian Journal of Adult Learning, 51(2)*, 226-247.

McLean, D. D., & Hurd, A. R. (2015). *Kraus' recreation and leisure in modern society.* Jones and Bartlett Learning (10th ed) http://www.worldcat.org/oclc/935095489.

MacNeil, D. R. (1998). Leisure, lifelong learning, and older adults: A conceptual overview, *Journal of Physical Education, Recreation & Dance, 69(2)*, 26-28.

Murray, G. (2012). *The Lure of Non-credit Studio Art Classes for Adult Learners, Ph.D.* dissertation, Graduate Faculty, Auburn University.

Pejatović, A., Egetenmeyer, R., & Slowey, M. (Eds) (2016). *Contribution of Research to Improvement of Adult Education Quality*, Belgrade: Institute for Pedagogy and Andragogy- University of Belgrade, University of Wurzburg, Dublin City University.

Robson, C. (2002). *Real World Research: A Resource for Social Scientists and Practitioner-Researchers* (2nd ed.). Blackwell Publishers Ltd.

Rubenson, K., & Desjardins, R. (2009). The impact of welfare state regimes on barriers to participation in adult education: A bounded agency model, *Adult education quarterly, 59(3),* 187-207.

Ryan, R., & Deci, E. (2000). Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being, *American Psychological Association, 55(1)*, 68-78.

Sargant, N. (1996). Learning and leisure. *Boundaries of adult learning, 3(1)*, 196-210.

Skilbeck, M. (2012). No Royal Road: Mapping the Curriculum for Lifelong Learning. In D. N. Aspin, J. D. Chapman, K. Evans, & R. Bagnall (Eds), *Second International Handbook of Lifelong Learning*, (pp. 499-520). Springer Science & Business Media.

Spanou, F. (2017). Adult education and leisure programs. The case of the Theatrical Workshop of the Municipality of Trikala [*Εκπαίδευση ενηλίκων και προγράμματα αξιοποίησης του ελεύθερου χρόνου. Η περίπτωση του Θεατρικού Εργαστηρίου Δήμου Τρικκαίων*], M.S. thesis, Hellenic Open University, Patras, GR, 2017 [in Greek].

Tanner, J. L., Arnett, J. J., Leis, J. A., Smith, M. C., & DeFrates-Densch, N. (2008). *Handbook of Research on Adult Learning and Development*. Routledge.

Tay, L., & Diener, E. (2011). Needs and subjective well-being around the world. *Journal of personality and social psychology*, *101*(2), 354-356.

Thoidis, I., & Pnevmatikos, D. (2014). Non-formal education in free time: leisure- or work-oriented activity?, *International Journal of Lifelong Education, 33*(5), 657-673.

Van Moorst, H. (1982). Leisure and social theory, *Leisure Studies, 1(2),* 157-169.

Veenhoven, R. (2008). Sociological theories of subjective well-being. *The science of subjective well-being*, *9*, 44-61.

Vergidis, D. (*2008*). *Evolution of Adult Education in Greece and its Socio-Economic Function. Hellenic Open University*, [in Greek].

World Economic Forum (2020). The future of jobs report 2020. https://www.weforum.org/reports/the-future-of-jobs-report-2020/ *[online December 2022].*

Worpole, *K.* (2013). The age of leisure. In R., Edwards, P., Raggatt, & N. Small (Eds.) *The learning society: Challenges and trends*, *2*, 112-121. Routledge.

Learning Experience in Virtual Reality Environments

Christos KALTSIDIS

Democritus University of Thrace

Introduction

Technological development is driving the learning process along new paths. Augmented and Virtual Reality are becoming more and more accessible, while at the same time, huge amounts are being spent on the development of the necessary equipment and the so-called "Metaverse". These technologies are also opening new avenues in the educational process, especially in cases where practical training in skills and processes are required. All these enrich the learning experience and allow learners to learn in a better way.

Learning Experience

Learning experience is defined as any interaction, lesson, program, or other experience in which learning takes place whether it occurs in a traditional academic environment (schools, classrooms) or non-traditional (off-site outdoor environments) and whether it involves traditional educational interactions (learning from teachers) or non-traditional interactions (learning through games and interactive software applications) (Abbott, n. d.).

Similarly, according to UNESCO (IBE, 2013), it is "a wide variety of experiences across different contexts and settings which transform the perceptions of the learner, facilitate conceptual understanding, yield emotional qualities, and nurture the acquisition of knowledge, skills and attitudes. In educational settings learning experiences are ideally challenging, interesting, rich, engaging, meaningful, and appropriate to learner needs. Previous learning experiences are considered to be key factors predicting further learning".

Experiential Learning

In the context of research on learning and educational practices, the importance of the communicative and emancipatory dimension of learning rather than the instrumental one has been proposed (Alhadeff-Jones, 2011). The theory of Transformative Learning, proposed by the American thinker Jack Mezirow, incorporates different types of knowledge, which acquire the following characteristics: (1) instrumental knowledge, which is the traditional way of acquiring knowledge in education programs; (2) communicative knowledge, which is about understanding oneself in the light of the assumptions of the educator and the social system in which we live; and (3) liberating knowledge, which is the product of critical reflection and leads to self-awareness and the correct use of scientific knowledge and the broader knowledge of each individual. Transformative Learning theory focuses precisely on these points, as it "seeks to explain how adult learning is structured and to identify the processes whereby the frames of reference by which we perceive and interpret our experiences can be

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

transformed" (Mezirow, 1991: XII). According to Mezirow, the central issue in learning is the critical re-examination of learners' experiences in order to formulate "a newly revised interpretation of their experiences as a guide to empathy and agency" (Mezirow, 1991, p. 35). Thus, learning - especially when directed at students - should aim (in addition to the acquisition/accumulation of knowledge) at the acquisition of learning experiences that are considered to cultivate characteristics such as an 'open mind', a willingness to learn, a willingness to change, analytical and synthetic thinking, creativity, originality, resourcefulness, and the ability to work in teams. For this reason, educational activities and practices that provide appropriate learning experiences should be incorporated into university education programs (Stanovich & Stanovich, 2010).

As an evolution of Transformative Learning, Knud Illeris (2016), one of the most important contemporary learning theorists, proposes the Integrated Learning approach, both in the school and higher education field. Learning according to Illeris (see also Kokkos, 2016) is interrelated by three interacting dimensions:

- The Content: The content of learning includes the knowledge, skills, as well as attitudes, behaviors and values acquired through the learning process. It also includes the educational methods and practices used. In addition, Illeris includes in the context of learning the pursuits involved in critically reassessing dysfunctional stereotypical assumptions and beliefs, i.e., he emphasizes transformative learning.
- Motivation and Teacher-Learner Relationships: this dimension of learning concerns the emotional involvement of learners during the learning process and particularly in their relationships with teachers, as well as the elements of motivation, motivation, development of interest, emotion and commitment to learning.
- The Environment: this is the context in which learning takes place. It includes both the immediate context, i.e., the educational organization, and the wider social context.

In addition, Illeris (2016) considers experience as better and deeper than 'ordinary learning' as it contains a dimension of personal meaning and commitment for the diviner, who becomes motivated and emotionally invested in the learning that occurs. This results in the content and knowledge gained becoming owned because the diviner feels it is something important to them. Similarly, he states that "a learning process can be initiated when the individual receives stimulus-impulses from the environment through the senses" and then "the signals we receive are combined with our emotions [...] and with the results from relevant prior learning or experience as the foundation for both our response and the lessons we learn from the situation" (Illeris, 2016, pp. 34-35). At the same time, he believes that learning is related to two broad categories, content and stimulation, and their interaction with the environment. This creates the three dimensions of learning which are involved in every learning process.

The circle that frames the learning triangle "suggests that learning always takes place within the boundaries of an external social context which, in general, is determinant of learning potential" (Illeris, 2016, p. 46). Furthermore, it argues that the motivational dimension involves motivation, emotion

and volition, while through learning important individual characteristics such as independence, self-confidence, and responsibility, the ability to cooperate and flexibility can be developed and enhanced.

Essentially, Integrated Learning, according to Illeris, takes place when each dimension functions seamlessly and with organic interaction with the other dimensions and at the same time is designed by the teacher on the basis of his/her personal theory of teaching, learning and the integration of his/her scientific knowledge, initiatives, innovative and creative ideas.

At the heart of all this is experience, on which theories such as Experiental Learning Theory have been developed, which has been highlighted by many well-known thinkers in education, with the main exponents, apart from Illeris, Dewey and Kolb.

Kolb (as cited in Kokkos, 2005, p. 24) considers that "learning is a process in which knowledge is created in a perpetual cycle, where the individual, by acting, constantly acquires new experiences, which he then processes, interconnects with his existing knowledge and draws conclusions on the basis of which he plans new actions and so on". According to Kolb, learning is a process in which knowledge is acquired by the transformation of experience, i.e. in order for knowledge to be "established" it must first be preceded by an experience - a stimulus, then man must observe this stimulus, then reflect on all the details that caused it or that it caused in him, and finally, take actions that indicate that the stimulus has taught him something new. His theory is based on two main pillars, the process of processing the learning experience and the personal perception and interpretation of experiences. The first is based on the approach that each learner uses in dealing with a subject and the second on the emotions that he or she feels during the educational process.

Experiential learning, according to Kolb (Kedraka & Phillips, 2017), consists of six (6) main characteristics:

- Learning is better understood as a process rather than an outcome

- It is a holistic process of adaptation to the world

- It is a continuous process based on experience

- Includes interactions between the individual and the environment

- It is the process of knowledge creation, which is the result of the interaction between social knowledge and personal knowledge.

- Learning requires the resolution of conflicts between dialectically opposed ways of adapting to the world.

Learning, then, manifests itself in a change in behavior and a change in thought and action, as a result of a mental process, which gradually follows a reflective course of mental searches and signaling, triggered by a learning experience. The mental processing of a learning experience and its evaluation places cognitive issues and theoretical constructs on a new basis, thus contributing to the creation of a structured learning framework in the service of the individual's cognitive development, leading to the production of new knowledge as the individual processes a personal experience (Zarifis, 2009).

Some scholars even note the use of experience in the context of developing a culture in organizations (Marsick & Watkins, 2003), emphasizing the importance of learning experiences not only for the individual learner but also for the organizations that learn (Senge, 1990).

It becomes clear, therefore, that -especially contemporary- learning theories focus their interest not only on the traditional character of instrumental learning (which refers mainly to the acquisition of knowledge) but also on transformative learning, i.e. the essential process of critical approach, synthesis and application of the knowledge acquired, so that learners develop a critical spirit and skills to evaluate the knowledge and information with which they are equipped through their studies. When an instructor uses these contemporary theories as a framework for learning, he or she aims to lead students to learn how to investigate a scientific topic, gather evidence and information that they then turn into arguments, work in teams and collaboratively, share tasks, present and defend their views (Kedraka & Kourkoutas, 2016).

Cognitive Theory of Multimedia Learning (CTML)

In educational environments, there is increasing use of so-called multimedia which combines the five basic types (text, video, audio, graphics and motion) offering a powerful educational tool (Asthana, 2008). With their development and adoption in the educational process, various theories have been developed which try to describe how this happens.

The Cognitive Theory of Multimedia Learning was formulated by Richard E. Mayer. According to this theory, multimedia learning occurs when mental representations are created from words and images (Mayer, 2005). The principle known as the "multimedia principle" states that "people learn better through words and pictures than through words alone" (Mayer, 2009). However, simply adding words and pictures is not an effective way to achieve multimedia learning. Mayer (2002) proposes three key assumptions regarding multimedia learning:

1. There are two separate channels (audio and visual) for processing information (sometimes referred to as dual coding theory).

2. Each channel has a limited (finite) capacity.

3. Learning is an active process of filtering, selecting, organizing and integrating information based on prior knowledge.

Humans can process a finite amount of information in one channel at a time and create meaning from the incoming information through mental representations. Mayer also mentions the role of three memory stores: sensory (which receives stimuli and stores them for a very short time), working (where we actively process information to create mental constructs), and long-term (the repository of what we learn). Mayer's cognitive theory of multimedia learning presents the idea that the brain does not interpret a presentation of multimedia (words, pictures, and auditory information) individually, but rather the elements are selected and organized dynamically to produce logical mental constructs. Furthermore, Mayer (2002) highlights the importance of learning (based on content control and evidence of successful knowledge transfer) when new information is integrated with prior knowledge. This theory has also been linked by its originator to virtual reality (Moreno & Mayer, 2007).
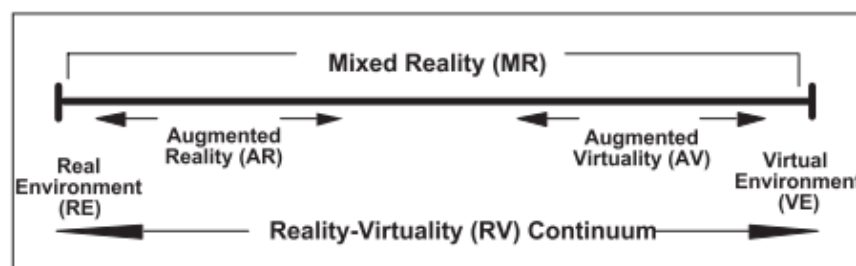
Virtual Reality

According to the Encyclopedia of Multimedia (Shen & Shirmohammadi, 2008), Virtual Reality is a technology that offers a near-real and/or believable experience in a synthetic or virtual way. To achieve this goal, a wide range of multimedia technologies such as image, video, audio and text are used. Among the key characteristics of virtual reality are Immersion, Interactivity and Information Intensity. As a definition, it was originally formulated by Jaron Lanier in 1989 who defined that something cannot be both real and virtual at the same time. Even before that, similar terms such as Artificial Reality or Cyberspace had appeared, and later the terms Virtual Worlds and Virtual Environments were introduced and widely used. The purpose of virtual reality is to make objects appear real and to allow the user to interact with them and the rest of the environment in a convincing way.

According to more recent formulations, "Virtual Reality can be defined as the use of technological means to create an artificial, interactive environment which in its optimal form the human user perceives as real. The important element is the possibility of user interaction, which modifies the environment in real-time, as would happen in the real world. The Virtual Environment can be created in correspondence with an existing or an ideal world" (Lepouras et al., 2015, p. 3).

This environment can be either real or imaginary and allows the user to interact with it using appropriate equipment (helmets, gloves, etc.) (Mikropoulos, 1998). Virtual Reality, although not a new technology, has experienced a particular growth in the last decade due to the technological maturation that has occurred in various fields with which it is associated (Russell, 2014).

It is now becoming clear that the terms Virtual Reality and Virtual Environment are in many cases used interchangeably. Milgram and Kashino (1994) tried to set a conceptual framework and formulated a classification of terms used in Virtual Reality (see Figure 2) to avoid confusion.

Figure 1. *Reality – Virtuality continuum.* Source: Milgram & Kashino, 1994

At one end is the real environment and at the other the virtual environment. In the middle is Mixed Reality which, when combined with the real world, is called Augmented Reality and, when combined with the virtual world, is called Augmented Virtuality.

To have experience in the Virtual Environment, the appropriate equipment is required. In Virtual Reality, this is achieved by "tricking" our senses and creating the illusion that the user is inside the

Virtual Environment and interacting with it. The more senses involved, the greater the immersion achieved.

Educational Software

Adopting Virtual Reality for educational purposes, appropriate software must be used. When software is developed or used for educational purposes, it is called Educational Software. According to Mikropoulos (2006) the characteristics of Educational Software should be the following:

- follow and support a specific pedagogical approach

- indicate or implement teaching objectives

- support interactive learning activities

- include interfaces and metaphors with pedagogical relevance

- target specific learning and pedagogical outcomes, making use of its specific technological features.

There are of course several cases where equipment and software are not designed to support learning but can be used for educational purposes. In this case, we talk about the educational use of software (Dimitriadis, 2015).

Virtual Laboratories

In many cases, the risk, time, cost and/or lack of specialized equipment necessitate the use of software simulations. Therefore, simulations offer an important tool in teaching and teaching practices to make concepts and processes understandable. Of course, this also implies a good understanding of them by the instructors themselves, so that they can be used in the best pedagogical way (Athanasiou, 2015).

Depending on the educational objectives, there are different models of simulations, such as conceptual and operational. In the conceptual model, concepts, principles and events are simulated allowing the learner to learn the conceptual structure of the system (e.g., implementation of experiments with different values, flight simulators). The functional model focuses on the manipulation of the system and the sequences of mental processes that are activated so that the learner learns to manipulate situations (e.g., learning the process of landing an airplane, simulating student behavior in the classroom, etc.) (Dimitriadis, 2015).

Representing the real world and performing authentic tasks arouse the interest and curiosity of learners who often perceive technology-based learning experiences as real-world activities (Santrock, 2020).

But how faithfully the real system will be represented by the model and presented to the user is the concept of fidelity. Fidelity is divided into physical, how the simulation looks, and functional, what one can do with it. Depending on the capabilities offered, we can have high or low fidelity of a simulation. Depending on the purposes for which the simulation will be used, the type of fidelity is chosen. High fidelity offers better learning conditions, since there are no significant differences from the real system, while at the same time, it provides an incentive for engagement and action for the trainees.

On the other hand, low fidelity compared to the real system can target specific functions and provide an experience with simplified processes (especially in cases with complex systems), possibly achieving cost reduction (Dimitriadis, 2015).

Serious games

Another category that can be argued to belong to educational software is serious games. Games have always been a particular source of learning. It is not surprising that computer games are accepted by both younger and older people. One trend that has been particularly prominent in recent years is serious games, which use the design principles of computer games, but their purpose is not purely recreational. They are also designed with an educational purpose and aim to promote engaged and authentic learning (Santrock, 2020). Specifically, in terms of science education, according to the National Research Council (2011), "simulations and games have the potential to promote multiple science learning goals, including motivation to learn science, conceptual understanding, scientific process skills, understanding the nature of science, scientific discourse and reasoning, and identification with science learning" (p. 54).

Marne, Wisdom, Huynh-Kim-Bang and Labat (2011) set out a conceptual framework in which the six aspects of serious games are presented. According to them, a serious game should have the following characteristics:

- Learning objectives: What do we want to teach with the game? Define the frame of reference to be taught and set the learning objectives while clarifying any misconceptions

- Field simulation: Defines the formal model that defines the foundation of the simulation.

- Interaction with the simulated field: How we make it fun to interact with the simulator.

- Problems and progress: what problems should the trainee solve? Determine the degree of difficulty and progress of the skills.

- Decoration: What elements of the games will be used to entertain and energize the learner?

- Development: The optimal conditions of use to maintain the educational properties of the application.

There is therefore an effort to target the use of digital games in education and to investigate their impact. Game-centered learning aims to create educational environments combining learning with entertainment. The expected benefits relate to motivation for increased engagement and skill development. However, creating software that is both educational and entertaining is a difficult task and requires an understanding of the educational objectives as well as the characteristics of the games. It should also be considered that time is required in secondary processes such as learning the environment familiarizing ourselves with the game etc (Dimitriadis, 2015).

Experiential learning and Virtual Reality

The use of Virtual Reality in education is directly related to experiential learning and the participatory approach to the subject matter of the course being examined (Moustakas et al., 2015), while it offers

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

many possibilities in supporting the educational process, as its specific characteristics are related to the basic principles of modern learning theories (Lepouras et al., 2015). Virtual Environments are designed to offer users the opportunity to live a specific experience in a safe environment and to be able to David Kolb's (1984) Experiential Learning model can be applied, as the learners' engagement is direct, and the Virtual Environment enables them to apply the four stages described in Kolb's Learning Cycle.

As it follows, the aim is to enhance learning experience by exploiting VR technology through the immersion it offers to create authentic experiences that will help them transform approaches and perspectives in the learning process (Kolb & Kolb, 2012). Relevant research (Moro, Stromberga, Raikos & Stirling, 2017; Jantjies, Moodley & Maart, 2018; Allcoat & von Muhlenen, 2018) shows increased learning benefits as the direct interaction they provide gives them the opportunity to apply the knowledge they acquire.

One of the most important advantages of Virtual Reality, therefore, is that it gives participants the opportunity to experience places they are unable to visit and take actions that would otherwise be dangerous or costly (Chertoff & Schatz, 2015). These methods stimulate the interest of learners, increasing their participation and motivating them while giving them the opportunity to have an authentic experience (Hu-Au & Lee, 2017).

Conclusion

In the forthcoming years, impressive technological achievements are expected. The outbreak of the COVID-19 pandemic highlighted the need to find new teaching methods, especially for laboratory courses where most problems were identified due to the suspension of the universities with the physical presence of students and teachers. But it left an important legacy in terms of the greater familiarity of teachers and students with new learning and teaching methods.

It is clear that virtual reality will be one of these solutions in the coming years, as the experience it offers in combination with the decreasing cost of acquiring the equipment, will bring a real revolution in the way of teaching laboratory courses and in general in tasks that concern laboratory environments.

References

Abbott, S. (n.d.). *The glossary of education reform. The great schools partnership*, USA. https://www.edglossary.org/learning-experience/

Alhadeff-Jones, M. (2011). Transformative learning, sustainability and the issue of time. *Adult Education, 22,* 13-22.

Allcoat, D., & von Mühlenen, A. (2018). Learning in virtual reality: Effects on performance, emotion and engagement. *Research in Learning Technology, 26*. https://doi.org/10.25304/rlt.v26.2140

Asthana, A. (2008). Multimedia in Education. In: Furht B. (eds) *Encyclopedia of Multimedia*. Springer, Boston, MA. https://doi.org/10.1007/978-0-387-78414-4_140

Athanasiou, K. (2015). *Teaching Biology*. Athens: Association of Academic Libraries.

Dimitriadis, S. (2015). *Learning Theories & Educational Software*. Athens: Association of Academic Libraries.

IBE (2013). *Glossary of curriculum terminology*, IBE-UNESCO.

Illeris, K. (2016). *How we learn. Learning and non learning in school and beyond.* Athens: Metaichmio.

Jantjies, M., Moodley, T., & Maart, R. (2018). Experiential learning through virtual and augmented reality in higher education. *ACM International Conference Proceeding Series*, (December), 42–45. doi: https://doi.org/10.1145/3300942.3300956

Kedraka, K., & Phillips, N. (2017). *Educational Programs Design. Practical guide for new adult educators.* Thessaloniki: Kiriakidis.

Kedraka, K., & Kourkoutas, Y. (2016). The teaching approach of Bioethics through debates: A good educational practice. In: Stasinakis P.K., Nila P., Kollia P. & Papadakis M. (eds), *Proceedings of 10th Panhellenic Conference "Biosciences in 21st century", 105-121*. Athens: Panhellenic Association of Bioscientists. ISBN: 978-618-81159-3-4.

Kokkos, A. (2005). *Adult Education Methodology – Volume A (Theoretical Framework and Learning Conditions)*. Patra: Hellenic Open University

Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, N.J.: Prentice Hall

Kolb, A.Y., & Kolb, D.A. (2012) Experiential Learning Theory. In: Seel N.M. (eds) *Encyclopedia of the Sciences of Learning*. Springer, Boston, MA. https://doi.org/10.1007/978-1-4419-1428-6_227

Lepouras, G., Antoniou, A., Platis, N., & Charitos, D. (2015). *Development of Virtual Reality Systems.* Athens: Association of Academic Libraries.

Marsick, V.J., & Watkins, K.E. (2003). *Facilitating Learning Organizations: Making Learning Count*. Gower Publishing, Aldershot.

Mayer, R. E. (2002). Multimedia learning. *Psychology of learning and motivation*, *41*, 85-139)

Mezirow, J. (1991). *Transformative Directions of Adult Learning.* San Francisco: Jossey-Bass.

Mikropoulos, T. (1998). Virtual Reality in Support of the Educational Process. In: Tzimogiannis A. (eds.), *Proceedings of the 1st Pan-Epirus Conference "Informatics and Education", 35-45*. Association of Informatics Teachers of Epirus.

Mikropoulos, A. (2006). *The computer as a cognitive tool.* Athens: Ellinika Grammata.

Milgram, P., & Kashino, F. (1994). *A Taxonomy of Mixed Reality Visual Displays*. IEICE Transactions on Information Systems E77-D.

Moreno, R., & Mayer, R. E. (2007). Interactive multimodal learning environments. *Educational Psychology Review, 19*, 309-326.

Moro, C., Štromberga, Z., Raikos, A., & Stirling, A. (2017). The effectiveness of virtual and augmented reality in health sciences and medical anatomy. *Anatomical Sciences Education*, *10*(6), 549–559. https://doi.org/10.1002/ase.1696

Moustakas, K., Paliokas, I., Tsakiris, A., & Tzovaras, D. (2015). *Graphics and Virtual Reality.* Athens: Association of Academic Libraries.

Marne, B., Wisdom, J., Huynh-Kim-Bang, B., & Labat, JM. (2012). The Six Facets of Serious Game Design: A Methodology Enhanced by Our Design Pattern Library. In: Ravenscroft A., Lindstaedt S., Kloos C.D., Hernández-Leo D. (eds) *21st Century Learning for 21st Century Skills. EC-TEL 2012. Lecture Notes in Computer Science*, vol 7563. Springer, Berlin, Heidelberg. 208-221 https://doi.org/10.1007/978-3-642-33263-0_17

National Research Council. (2011*). Learning science through computer games and simulations comitte on science learning: Computer games, simulations and education*. Washington, DC: National Academies Press

Russell, K. (2014). *Why Virtual Reality is Happening Now*. Retrieved January 23, from https://techcrunch.com/2014/11/24/why-virtual-reality-is-happening-now/

Santrock, W. J. (2020). *Educational Phycology*. Athens: Tziolas.

Senge, P.M. (2006), *The Fifth Discipline: The Art and Practice of the Learning Organization.* Doubleday/Currency, New York, NY.

Shen X., & Shirmohammadi, S. (2008). Virtual and Augmented Reality. In: Furht B. (eds) *Encyclopedia of Multimedia*. Springer, Boston, MA. https://doi.org/10.1007/978-0-387-78414-4_253

Stanovich, K. E. & Stanovich, P. J. (2010). A framework for critical thinking, rational thinking, and intelligence. In D. Preiss & R. J. Sternberg (Eds.), *Innovations in educational psychology: Perspectives on learning, teaching and human development*, 195-237. New York: Springer.

Zarifis, G. (2009). *Critical thinking in adult learning and education. Theoretical approaches and practical implications*. Athens: Papazisis.

Improving the daily life of women in the third age through participation in a blended learning course on using smartphones and social media

Venetis KANAKARIS & Maria PAVLIS KORRES

Aristotle University of Thessaloniki

Introduction

The progression of technology and the subsequent advent of mobile platforms such as smartphones can possibly enhance the quality of older people's lives in several ways (Carpenter & Buday, 2007; Chen & Persson, 2002; White et al., 2002). Further, a growing number of studies suggest that the use of social media and internet training may boost older adults' psychosocial well-being (Cotton et al., 2012, 2014; Shapira et al., 2007; White et al., 1999).

However, older adults still seem reluctant to engage with technology, despite its potential to improve their psychological wellness through the use of social media and internet browsing. Nowadays, smartphones are arguably among the most useful pieces of technology, as the touch screen enables physical interaction with various handy applications, a feature that elderly people may find easier to work with. At the same time, it is important for older adults to be able to communicate with family members and friends via social network apps, but it seems that their insufficient technical experience in terms of internet browsing and smartphone use discourages them from engaging with new technology (Zhou et al., 2014).

Although past research findings have indicated that healthcare smartphone applications may enhance patient health management among the elderly (Boulos et al., 2011; Grindrod et al., 2014), it appears that previous research has mostly focused on the impact of applications on older adults' physical/ psychological well-being. The majority of existing studies on older adult learning have centered around designing educational programs dedicated on technology issues (smartphone use, social media, internet web banking, etc.), how the elderly learn, and the barriers they face during the learning process. However, only a handful of studies have explored the impact of educational programs designed for older women during the Covid-19 pandemic based on their needs, which is what this study set to explore within an eight-month period.

This chapter investigates the effectiveness of a two-month blended (synchronous and asynchronous) educational program, as well as the views of older women who took part in it, regarding the impact of using smartphones in their daily lives. The aim of the program was to teach older women how to use smartphone applications that can facilitate their everyday activities. The learning course was designed based on the analysis of the learners' educational needs. Preparatory research took place, investigating the educational needs of older people who reside in two elderly care centers in Northern Greece and wish to attend an educational program on using smartphones as a communication tool

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

and joining social media platforms. Research findings revealed that elderly women were more willing to attend an educational program than men (Kanakaris & Pavlis Korres, 2020). The initial plan was to design face-to-face lessons for older women, but the concept was redesigned due to the COVID-19 pandemic and, after consulting with the participants, a blended e-learning course was implemented.

Literature Review

Mobile devices have the potential to enrich older people's lives. Smartphones and tablets provide access to the internet and a variety of applications that help people stay connected and acquire information relevant to their needs (Gao et al., 2015; Ma et al., 2016). According to Tsai et al. (2015) mobile devices allow the elderly to feel connected to family members and friends, stay up to date with current technological trends, maintain special interests that enhance their social life, and target niche lifestyles during late adulthood. Even though the use of mobile devices by the elderly has greatly increased in recent years, the majority of them only use limited functions and have not fully realized the advantages of these devices. Mackowicz and Wnek-Gozdek (2016) presented three main reasons that motivate older people to seek educational opportunities for learning new technologies: obtaining skills that are useful in daily life, acquiring new knowledge, and socialization.

The rapid increase of the ageing population has seen many studies exploring this new reality. A 2006 white paper was developed in Taiwan emphasizing the lifelong learning of the elderly and stressing the obligations of all sectors (public, private, non-profit) with the purpose of providing learning possibilities to older adults and subsequently contributing to the successful aging of the population (Hung & Lu, 2014; Lin & Huang, 2013; Wang, 2017). The COVID-19 pandemic limited older people's access to face-to-face teaching and initiated a rapid move towards online learning via social media platforms such as Facebook that provide a wide range of advantages for learners and can be used as a supplementary tool for distance learning (Chugh & Ruhi, 2018).

In distance education, the process of learning is better facilitated when participants are engaged in online classroom activities and join in the discussion. Moreover, when students are actively involved in various online activities they are allowed to take control of their own learning (Manca & Delfino, 2021). By remotely participating in online discussions, learner control is enhanced, since participants can choose with whom they engage (Ulla & Perales, 2020). This means that learners become the center of the learning process, rather than the instructor. The learning material can be designated by the participants, who are given the choice of deciding on the learning material and determining the means of communication. Within this context, therefore, social media platforms such as Facebook could be used to increase learner involvement in the learning process. In addition, Facebook has been found to be a potentially useful tool in social learning, distance learning, as well as arts education. This is why using Facebook as an online educational platform during the COVID-19 pandemic may promote active learning and community building, which in turn can help alleviate feelings of "isolation" among students (Aydin, 2012; Greenhow & Chapman, 2020; Ulla & Perales, 2021).

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Methodology

The study

This study is the last stage of a postdoc research focusing on the educational needs of the elderly and on the design, implementation, and evaluation of an educational program on the use of smartphones. At the same time, the study also explores the possibilities these programs offer in improving older adults' daily lives and promoting communication and social networking. Initially, research was conducted in order to determine the content of the program and other elements regarding its implementation (Pavlis Korres & Leftheriotou, 2020). The research took place in two Elderly Care Centers (E.C.C.), sited in different cities in the region of Eastern Macedonia and Thrace, Greece. The Elderly Care Center provides elderly people with health care services, fitness programs, and a variety of educational programs. At first, the research sample was comprised of 20 older people from the two E.C.C.s. and the results suggest they are interested in learning how to use social media, web banking, and how to send emails from their smartphones during face-to-face lessons (Kanakaris & Pavlis Korres, 2020).

After the outbreak of the Covid-19 pandemic, the research sample was reduced from 20 persons to 7 older women. Even though the original plan was to provide face-to-face lessons to older women, the study was redesigned after the death of two women who contracted the virus. As a result, after consulting with the participants, the researcher decided to implement a blended (synchronous/asynchronous) teaching method based on video lessons (asynchronous mode) with narration, as well as written instructions via Youtube and FB-Room (Facebook Room) (synchronous mode), where a closed group covered the communication needs between the learners and educator. The educational program was based on the ADDIEM model, which -when fully functional- offers not only a good structural design of an educational program, but also provides participants with opportunities for further personal, social, and professional development within the context of lifelong learning and education (Maintenance of the learning community network / Stage "M") (Pavlis Korres, 2010). Eight video courses were created, ranging from 1 minute and 15 seconds to 4 minutes and 15 seconds. The videos were designed to meet the needs of the women, as determined during the needs assessment process. The videos included instructions on how to compose and send emails, navigate basic Facebook functions, and use the Cosmote (Greek Telecom Service Provider) application for mobile balance top-up. The duration of the course was eight weeks and the first week featured an introduction to the video lessons and instructions on how to use Facebook (FB) Room (Kanakaris & Pavlis Korres, 2022).

Considering that at the end of this particular program the women evaluated the content, the educational process, and its usefulness in their daily lives positively (Kanakaris & Pavlis Korres, 2022), this chapter focuses on the impact the program had on their daily lives eight months after its completion.

Participants

The participants were 7 old women, aged between 61 and 74. Table 1 includes the demographic profiles of the participants in terms of age range and educational level.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Table 1. Age range and educational level of course participants

Number of Women/Age range	Education Level			
	Elementary School	High School	Technical College	University
61-65	2			1
66-70	1	1		
71-74	1		1	

Due to the fact that the sample size is quite small, there is difficulty in drawing generalized conclusions regarding the general population of the elderly, however, it provides useful information about how smartphone use improved older adults' daily lives through the use of online services and how it promoted social networking and communication.

Research Methodology

For the purposes of this study, a qualitative research approach (Cohen et al., 2013) was implemented, which means that fundamental data was gathered using interviews as a research method. The interviews were conducted face-to-face by the researcher on the premises of the Elderly Care Center (E.C.C.) by specific appointment with each interviewee due to Covid-19 restrictions. The Elderly Care Center (E.C.C.) was selected as the interview site because participants would feel more comfortable in a familiar environment. Each interview was semi-structured, lasted between 15 to 20 minutes, and consisted of open-ended questions (Cohen et al., 2013). The research questions concerned participants' views on:

- How their everyday life improved by learning how to use smartphones and navigate apps

- How the use of Facebook or other applications may improve communication with family members and friends

- How the learning community was maintained after the end of the educational program as per ADDIEM model's "M" phase

- How video lessons continued to support users

- Their willingness to attend a future educational program

Thematic analysis was also used to ensure data analysis was conducted in a precise, consistent, and exhaustive manner by recording older women's views. Thematic analysis is a widely used method in qualitative research (Braun & Clarke, 2006), albeit hardly ever recognized in the same manner as

grounded theory, ethnography, or phenomenology. Thematic analysis is a qualitative research method used to depict and quantify phenomena as well as to analyze documents (Nowell et al., 2017; Braun & Clarke, 2012), and it was implemented in this study to analyze the gathered data. The thematic analysis allows the researcher to examine theoretical issues, as it provides a more robust understanding of correlations within the information collected. By using thematic analysis, it is possible to refine words into fewer content-related categories. It is assumed that, when classified into the same categories, words and phrases share the same meaning (Elo & Kyngäs, 2008). The main goal is to get both a detailed and a broader view of the phenomenon that results in concepts or categories that describe it. Usually, the scope of these concepts or categories is to create a model, a conceptual system, or conceptual categories (Stemler, 2015).

Research Findings and Discussion

For the readers' convenience, the answers to the main research questions are presented in the figures containing the basic codes and themes that emerged from the thematic analysis, while quotes from the interviews are also provided.

Figure 1 presents how older women's daily lives improved through the use of smartphones and applications.
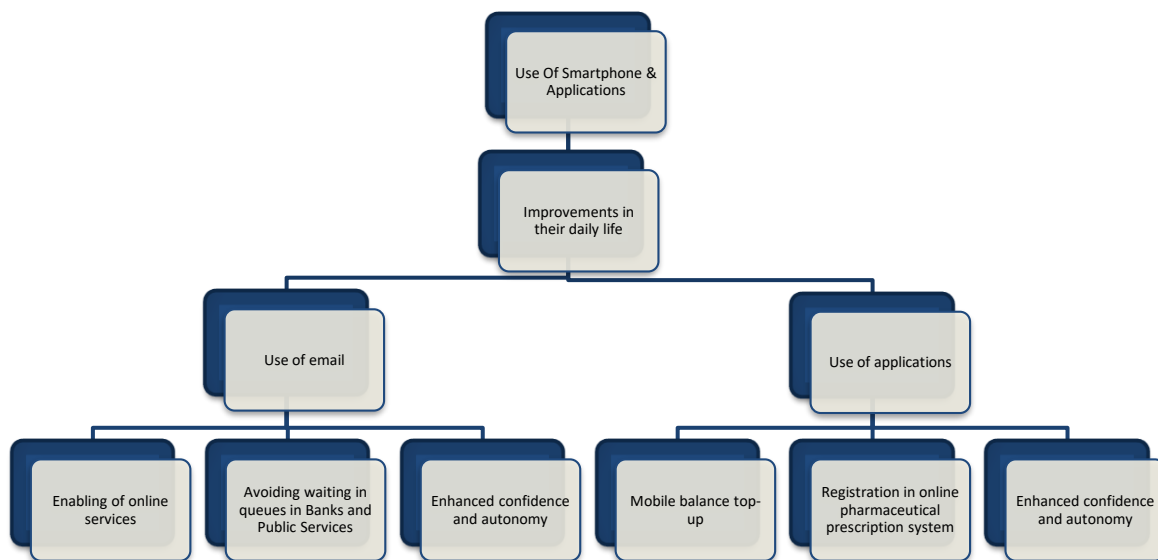
Figure 1. *Older women's views on the impact of the use of smartphone and applications*

Thematic analysis shows that after the blended educational program was concluded, older women acknowledged that smartphone use facilitated their everyday life, as they learned how to send emails and managed to avoid queues in banks and public services. Moreover, the qualitative findings indicated that the use of smartphone applications allowed them to perform online payments such as mobile top up and register on the online pharmaceutical prescription system, which in turn helped them to avoid overcrowded spaces during the quarantine period. Also, five of the seven older women said that they still use smartphones and applications at least twice per day, indicating that smartphone

use is now integrated into their daily life. Additionally, learning how to use a smartphone boosted older women's confidence and autonomy, as they were able to go about their everyday activities without having to constantly ask relatives and friends for help. Among other things, participants mentioned: *"I can top up my balance on my mobile phone using the application you showed us, so I don't need my son to help me all the time now"* (L3), *"I was able to register on the online pharmaceutical prescription system and carry out prescriptions faster and contactless" (L5), "I had to speak with a representative at the bank online and it was easier for me after the lessons" (L7).* The participants continued to use email and smartphone applications as they found them to be useful in their everyday life, a result which is in line with the findings of previous studies (Morrell, Mayhorn, & Bennet, 2000; Hwangbo et al., 2013; Chiu et al., 2016).

Figure 2 illustrates how using Facebook improved older women's lives and facilitated communication with family members and friends.
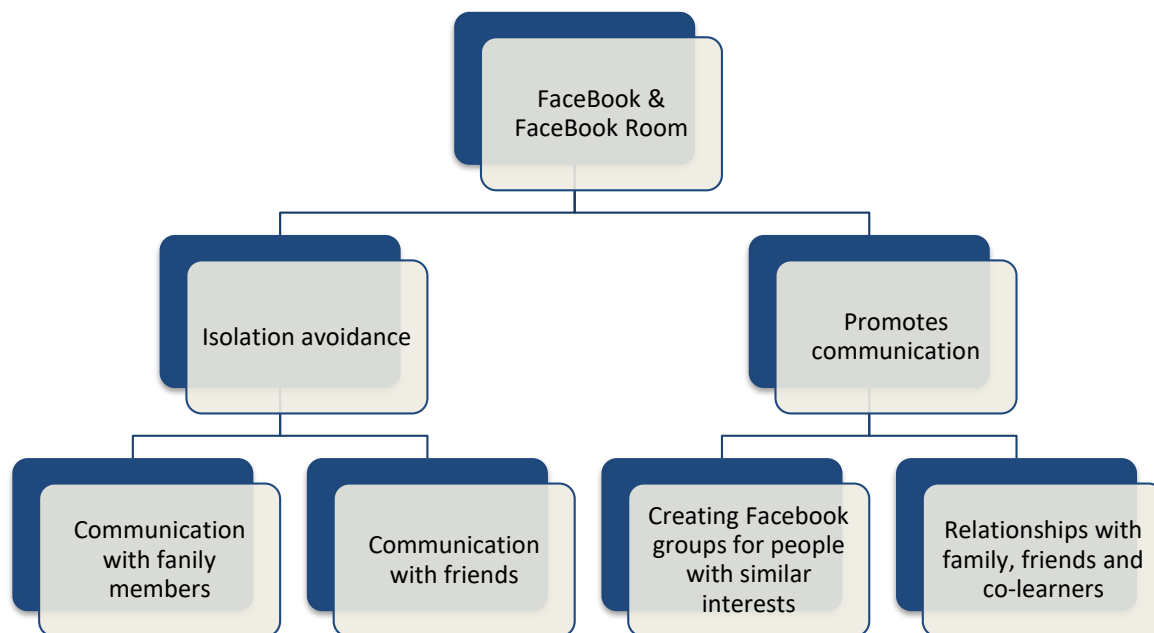
Figure 2. *Older women's views on the use of Facebook in terms of improving communication and strengthening relationships with family and friends*

Figure 2 shows that the use of Facebook and Facebook Room provided seniors with a medium for simulated face-to-face contact with family members and friends and helped alleviate feelings of isolation during the quarantine period. Further, after discussion with four of the seven older adults, it was revealed that, although they had the knowledge and willingness to create Facebook groups for people with similar interests, they had no friends who knew how to join such groups. There was, however, one elderly woman (L4) who participated in two groups at the same time -one with her classmates and one with friends outside the course. Moreover, five of the seven older women created a private group to chat with each other. When asked about creating Facebook groups, five participants said: *"Of course, I can create a Facebook group like you showed us and I use it to chat with my friends from class"* (L3), *"Of course, now I can create a Facebook group easily. Right now I am moderating two*

groups -one to chat with my friends from the course and another to chat with my friends outside the course" (L4), "*Creating a Facebook group is very easy, but I can only use it with my classmates, since I don't have any other friends who know how to join*" (L5), "*Yes, now I can create a Facebook group easier, but for the time being, I only use it to chat with my classmates, as it is difficult for someone to use all Facebook functions*" (L6), "*Yes sure, now it is more than easy for me to create a Facebook group thanks to you, but I only use it to chat with my classmates, because my friends don't know how to use it*" (L7). Moreover, the thematic analysis revealed that the use of Facebook and Facebook groups can further enhance and promote communication among members, a finding that is corroborated by Pandele et al. (2021) and Hsu et al. (2021), who suggest that, during the pandemic, feelings of loneliness among the elderly decreased thanks to the frequent use of Facebook.

Figure 3 shows how the community was maintained after the end of the educational program according to the phase "M" of ADDIEM model.
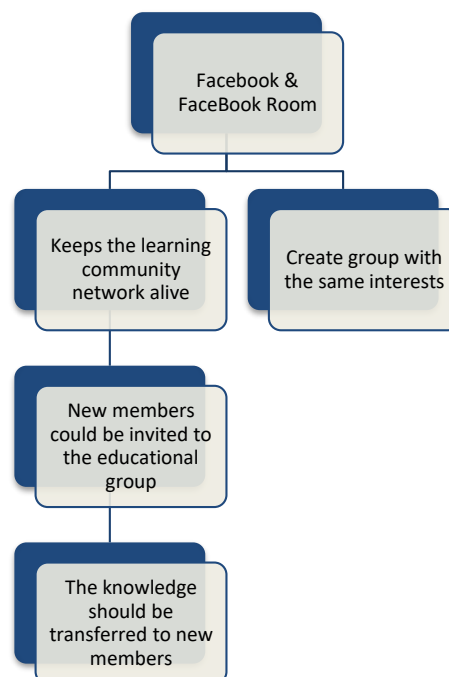
Figure 3. Older women's views regarding the maintenance of the learning community network after completion of the training program

Figure 3 indicates that the learning community was kept alive, as its members continued to contact each other via Facebook Room, although some participants preferred face-to-face contact after the quarantine. Three women, in particular, said: "*Even though we are all still in touch on FB Room, now that the quarantine ended, I need face-to-face contact.*" (L2), "*Yes, of course, it has become a habit now*" (L3)," *Of course, we chat a lot, especially about problems we face with smartphones*" (L5). These results are consistent with the findings of Pavlis Korres (2020), who suggested that a well-designed educational program should follow the ADDIEM model. According to the model's "M" stage, learning communities may be kept alive after the end of the educational program through social networks,

offering opportunities for further personal, social, and professional development within the context of lifelong learning and education. The "M" phase can also be linked to connectivism, a theory developed by Siemens (2005), who emphasized that frequent access to multiple types of networks and environments creates new possibilities for learning, as people continuously search, retrieve and evaluate information, thus acquiring new knowledge within these networks.

Figure 4 depicts how video lessons helped the elderly use their smartphones effectively in their daily life.
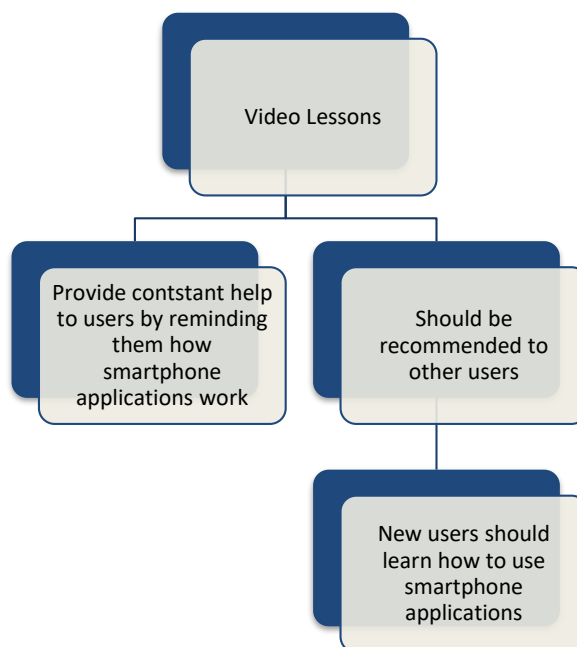
Figure 4. *Older women's views regarding the usefulness of video lessons in everyday life*

As shown in figure 4, the qualitative findings revealed that the video tutorials - which can be accessed anywhere and everywhere via YouTube, were still effective and helpful eight months after the educational program was concluded. All participants mentioned that they are still watching the videos when they want to remember the steps of the procedures. As they said, "*Yes I watch them when I need help or when I've forgotten something*" (L1), "*Yes of course I watch them, whenever I want to remember how certain things work*" (L5), "*Absolutely, I use them to remember things I forgot*" (L7). The results revealed that regardless of the education level, all participants watched the video tutorials multiple times in order to remember the various steps of the process they forgot. These findings are consistent with previous studies investigating the appeal of video tutorials to older adults (Choi et al., 2013; Ferreira & Veloso, 2019). Moreover, the findings are in line with past research on the decreased use of trial-and-error procedures, indicating that the older women continued to use video lessons due to the ease of access via YouTube and the embedded narration and subtitles (Leung et al., 2012; in et al., 2008).

Figure 5 presents the older women's willingness to enroll to a new course.

Figure 5. *Older women's views regarding the prospect of joining a future educational program*

Figure 5 presents the older women's willingness regarding their participation in a future educational program. It is important to mention that all participants in the program wish to attend a training program in the future. Among the seven older women, four of them seem to prefer face-to-face teaching, while the rest of them said they were open to the prospect of attending a distance learning program or a face-to-face program in the future. However, most of the participants (4/7) rated the experience of attending a distance learning program positively and said they would be willing to participate in distance learning programs in the future as well: "*I would definitely attend a learning course again, but I would prefer it if it was conducted face-to face, because I am a sociable person. That being said, I wouldn't mind if it was a distance learning course like the one I attended*" (L1), "*Yes, I would love to learn new things and I don't mind whether it's through a distance learning course or a face-to-face one – I feel it's the same*" (L3), "*I most definitely want to learn how to navigate new applications, but I would rather participate in a face-to-face course. But I didn't mind the distance one either*" (L4), "*I would certainly partake in a future learning program, be that a distance or a face-to-face one. It's the same thing*" (L6). Further, the results showed that the majority of the participants wanted to learn new applications, while only one older woman wanted to perfect the applications she had already learned.

After processing the data included in the categories and the patterns that emerged during the thematic analysis, it is obvious that older women acquired a positive attitude toward new technologies. Smartphone use facilitated communication and social relationships and the women managed to incorporate them into their lives by using online services to ease their daily needs. Moreover, the attendance of this program positively contributed to the formation of positive attitudes in terms of attending educational programs in the future and the majority of the participants expressed an interest in attending future distance programs, which they consider as effective as face-to-face ones.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Figure 6 includes the overall results that emerged from the thematic analysis of the interviewee's responses in relation to the program's outcomes.
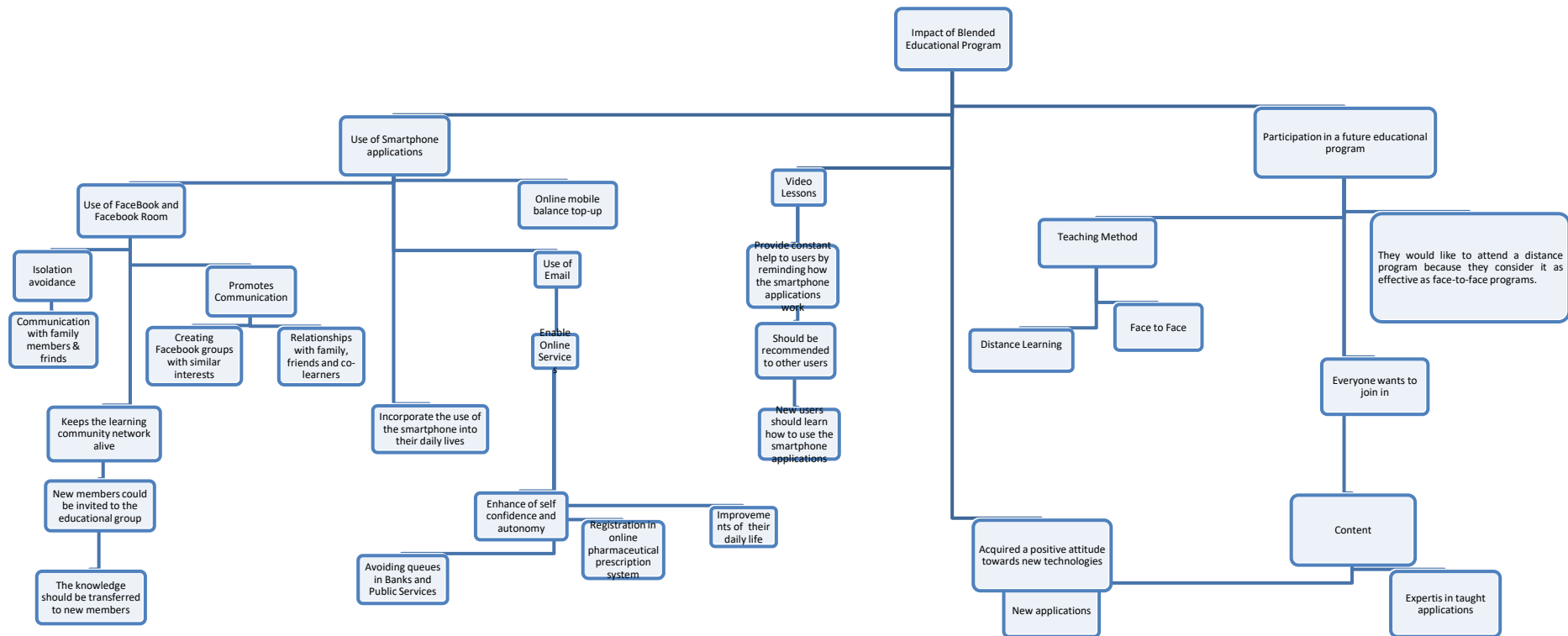
Figure 6. *Overall Thematic Analysis Results*

Future Research

More research could be conducted in other E.C.C.s (Elderly Care Centers) to investigate the outcomes of educational programs and the factors that facilitate older people's learning in order to generalize results. Future research could further investigate important factors in adult education, such as the standards educational material for mobile phones should meet, as well as learner training on the safe use of the internet and the use of social media to develop social relationships. Additionally, future studies could focus on the ways smartphones can act as a two-way educational tool that allows trainees and trainers to be in constant contact, maximizing educational activity when used in conjunction with a variety of hybrid educational tools (video with narration/subtitles and virtual workshops) at the learners' disposal.

Conclusion

This study has shown that mobile phones and social media can be used by the elderly to enhance communication and social networking. Learning how to use smartphones seems to have facilitated older women's daily lives through the use of online services, which, among other things, helped them avoid overcrowded spaces, especially during the pandemic. As the results of the study showed, even after the eight-month blended educational course, older women still used smartphones and applications at least twice per day, indicating that they managed to integrate the knowledge they acquired and apply it in their daily lives. Moreover, results showed that the learning community was kept alive even after the course, as participants stayed in touch on Facebook and Facebook Room, a finding that is consistent with what the ADDIEM educational model proposes. In other words, learning how to use Facebook Room prompted students to keep in contact with one another and ultimately helped maintain the learning community network. This seems to be in line with the findings of intoand Wnek-Gozdek (2016), who found that, when older people enroll to an educational program on new technology, they tend to socialize more and their life is improved. Further, the study's findings revealed that all older women were willing to attend an educational program in the future, regardless of the teaching mode (face-to-face or distance learning), as they were keen on learning how to use new applications – with the exception of one participant who expressed interest in perfecting the applications they had already learned. Overall, the study indicated that older women developed a positive attitude towards technology (use of mobile phones and applications) and distance learning courses.

Summary of the main findings that emerged from this research:

1. Older women developed a positive attitude towards new technologies.

2. Participants managed to integrate smartphones in their lives, as their daily activities were facilitated through online services.

3. Smartphone use promoted communication and social relationships.

4. The older women's confidence and autonomy are enhanced by learning how to use a smartphone

5. After participating in the program, older women were open to the prospect of attending future educational courses.

6. The majority of the participants positively evaluated distance programs, which they consider as effective as face-to-face ones.

References

Aydin, S. (2012). A review of research on Facebook as an educational environment. *Educational Technology research and development*, *60*(6), 1093-1106.

Boulos, M. N., Wheeler, S., Tavares, C., & Jones, R. (2011). How smartphones are changing the face of mobile and participatory healthcare: an overview, with example from eCAALYX. *Biomedical Engineering Online, 10*(1), 24.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

Braun, V., & Clarke, V. (2012). Thematic analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds), *APA handbook of research methods in psychology, Vol. 2: Research designs: Quantitative, qualitative, neuropsychological, and biological* (pp. 57-71). American Psychological Association.

Carpenter, B. D., & Buday, S. (2007). Computer use among older adults in a naturally occurring retirement community. *Computers in Human Behavior, 23*(6), 3012-3024

Chen, Y., & Persson, A. (2002). Internet use among young and older adults: relation to psychological well-being. *Educational Gerontology*, *28*(9), 731-744.

Choi, W., Carranza, J., & Fox, M. (2013). Guidelines for older-adult-friendly online tutorial for Facebook: Content, design, and training principles. *Proceedings of the American Society for Information Science and Technology, 50*(1), 1-4.

Chiu, C. J., Hu, Y. H., Lin, D. C., Chang, F. Y., Chang, C. S., & Lai, C. F. (2016). The attitudes, impact, and learning needs of older adults using apps on touchscreen mobile devices: Results from a pilot study. *Computers in Human Behavior*, *63*, 189-197.

Chugh, R., & Ruhi, U. (2018). Social media in higher education: A literature review of Facebook. *Education and Information Technologies*, *23*(2), 605-616.

Cohen, L., Manion, L., & Morrison, K. (2013). *Research methods in education* (7th ed.). Routledge. doi:10.4324/9780203720967

Cotten, S. R., Ford, G., Ford, S., & Hale, T. M. (2012). Internet use and depression among older adults. *Computers in Human Behavior*, *28*(2), 496-499.

Cotten, S. R., Ford, G., Ford, S., & Hale, T. M. (2014). Internet use and depression among retired older adults in the United States: a longitudinal analysis. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 69(5), 763-771.

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of advanced nursing*, *62*(1), 107-115.

Ferreira, S., & Veloso, A. I. (2019, July). Older adults in ICT contexts: recommendations for developing tutorials. In International *Conference on Human-Computer Interaction* (pp. 376-387). Springer, Cham.

Gao, S., Yang, Y., & Krogstie, J. (2015). The adoption of smartphones among older adults in China. In K. Liu, K. Nakata, W. Li, & D. Galarreta (Eds.), *Information and Knowledge Management in Complex Systems. ICISO 2015. IFIP Advances in Information and Communication Technology* (pp. 112–122). Springer.

Greenhow, C. & Chapman, A. (2020). Social distancing meet social media: digital tools for connecting students, teachers, and citizens in an emergency. *Information and Learning Sciences*, *121*(5/6), 341–352.

Grindrod, K. A., Gates, A., Dolovich, L., Slavcev, R., Drimmie, R., Aghaei, B., et al. (2014). ClereMed: lessons learned from a pilot study of a mobile screening tool to identify and support adults who have difficulty with medication labels. *JMIR mHealth and uHealth, 2*(3).

Hsu, L. J., Yueh, H. P., & Hsu, S. H. (2021). Subjective Social Capital and Loneliness for the Elderly: The Moderator Role of Line and Facebook Use. *Social Media+ Society*, *7*(3), 20563051211043906.

Hung, J.-Y., & Lu, K.-S. (2014). Research on the healthy lifestyle model, active ageing, and loneliness of senior learners. *Educational Gerontology*, *40*(5), 353–362.

Hwangbo, H., Yoon, S. H., Jin, B. S., Han, Y. S., & Ji, Y. G. (2013). A study of pointing performance of elderly users on smartphones. *International Journal of Human-Computer Interaction*, *29*(9), 604-618.

Kanakaris, V., & Korres, M. P. (2020). Investigating the educational needs of elderly people within the scope of an educational program on the use of social media networks by smartphones. In *Research Anthology on Supporting Healthy Aging in a Digital Society* (pp. 474-495). IGI Global.

Kanakaris, V., & Pavlis-Korres, M. (2022). OLDER WOMEN'S VIEWS ON THEIR PARTICIPATION IN A BLENDED EDUCATIONAL PROGRAM USING FB ROOM PLATFORM. *European Journal of Open Education and E-learning Studies*, *7*(1).

Leung, R., Tang, C., Haddad, S., Mcgrenere, J., Graf, P., & Ingriany, V. (2012). How older adults learn to use mobile devices: Survey and field investigations. *ACM Transactions on Accessible Computing (TACCESS)*, *4*(3), 1-33.

Lin, Y.-Y., & Huang, C.-S. (2013). Policies and practices in educational gerontology in Taiwan. *Educational Gerontology*, *39*(4), 228–240.

Ma, Q., Chan, A. H. S., & Chen, K. (2016). Personal and other factors affecting acceptance of smartphone technology by older Chinese adults. *Applied Ergonomics*, *54*, 62-71. doi:10.1016/j.apergo.2015.11.015.

Mackowicz, J. & Wnek-Gozdek, J. (2016). "It's never too late to learn"–how does the Polish U3A change the quality of life for seniors? *Educational Gerontology*, *42*(3), 186197.

Manca, S., & Delfino, M. (2021). Adapting educational practices in emergency remote education: Continuity and change from a student perspective. *British Journal of Educational Technology,* (52), 1394-1413.

Mitzner, T. L., Fausset, C. B., Boron, J. B., Adams, A. E., Dijkstra, K., Lee, C. C., ... & Fisk, A. D. (2008, September). Older adults' training preferences for learning to use technology. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 52, No. 26, pp. 2047-2051Sage Publications.

Morrell, R. W., Mayhorn, C. B., & Bennett, J. (2000). A survey of World Wide Web use in middle-aged and older adults. *Human Factors*, *42*(2), 175-182.

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International journal of qualitative methods, 16(1).*

Pandele, V. F., Tucmeanu, A., Antohi, M. E., & Ciubara, A. (2021). The effect of using Facebook on elderly people during COVID-19 pandemic. *Archiv Euromedica*, *11*(5), 69-71.

Pavlis Korres, M. (2010). *Development of a framework for the e-education of educators of special groups aiming to improve their compatibility with their Learners* (PhD Thesis). Spain: University of Alcalá.

Pavlis Korres, M. (2020). *Design of e-learning programmes for adults*. In M. Pavlis Korres & P. Leftheriotou, *Design of Face to Face and E-learning non-Formal Education Programs for Adults*. Ypsilon/books (in Greek).

Pavlis Korres, M., & Leftheriotou, P. (2020). *Design of Face to Face and E-learning non-Formal Education Programs for Adults*. Ypsilon/books. (in Greek).

Shapira, N., Barak, A., & Gal, I. (2007*).* Promoting older adults' well-being through Internet training and use. *Aging & Mental Health, 11*(5), 477–484. https://doi.org/10.1080/13607860601086546

Siemens, G. (2005). A learning theory for the digital age. *Instructional Technology and Distance Education, 2*(1), 3-10.

Stemler, S. E. (2015). Content analysis. *Emerging trends in the social and behavioral sciences: An Interdisciplinary, Searchable, and Linkable Resource*, 1-14.

Tsai, H.-Y. S., Shillair, R., Cotten, S. R., Winstead, V., & Yost, E. (2015). Getting grandma online: Are tablets the answer for increasing digital inclusion for older adults in the U.S.? *Educational Gerontology*, *41*(10), 695–709.

Ulla, M. B., & Perales, W. F. (2021). Facebook as an integrated online learning support application during the COVID19 pandemic: Thai university students' experiences and perspectives. *Heliyon*, e08317

Ulla, M. B., & Perales, W. F. (2020). The adoption of Facebook as a virtual class whiteboard: Promoting EFL students' engagement in language tasks. *TESOL Journal*, 1-4.

Wang, W.-N. (2017). Continued learning in an aging society: A university–community collaborative educational intervention in Taiwan. In C. S. Collins (Ed.), *University-community engagement in the Asia pacific: Public benefits beyond individual degrees* (pp. 103–122). Palgrave Macmillan.

White, H., McConnell, E., Clipp, E., Bynum, L., Teague, C., Navas, L., et al. (1999). Surfing the net in later life: a review of the literature and pilot study of computer use and quality of life. *Journal of Applied Gerontology*, *18*(3), 358-378.

White, H., McConnell, E., Clipp, E., Branch, L. G., Sloane, R., Pieper, C., & Box, T. L. (2002). A randomized controlled trial of the psychosocial impact of providing internet training and access to older adults. *Aging & Mental Health*, *6*(3), 213-221.

Zhou, J., Rau, P.-L. P., & Salvendy, G. (2014). Older adults' use of smart phones: an investigation of the factors influencing the acceptance of new functions. *Behaviour* & *Information Technology, 33*(6), 552-560.

Self-directed learning through art

Alexis KOKKOS

Hellenic Open University

The learning potential of works of art[*]

We usually have a sense of incompletion as we experience an alienating reality that hinders the fulfillment of essential social needs and the expression of subjectivity and sensitivity. What normally dominates is, on the one hand, the entrepreneurial and instrumental rationality which fetishizes financial efficiency, and, on the other hand, the populist mentality, which subjugates reflectivity to emotional manipulation or to uncritical denouncement. In this framework, social and individual consciousness atrophy. People can hardly think of anything new, radical or alternative, and the humanization of society seems like a utopia.

Furthermore, the adult education systems barely contribute to the diversification of this situation. On the one hand, those who participate in relevant educational activities are few. On the other hand, the adult education systems mostly adopt the overarching goal of the international policy agenda that is focused on linking learning to the actual requirements of the economic system.

Under these circumstances, our contact with art - the aesthetic experience- becomes one of the few social areas where we are able to reflect on our thoughts, feelings, and actions and gain insights into ourselves and the world. The exploration of significant works of art, that are differentiated from those that are primarily profit-oriented and serve as popular entertainment media, may broaden the vital setting where freedom of thought and contemplation can thrive. They make us wonder, doubt, challenge the static, and detach ourselves from conventional social norms and assumptions (e.g., Camus, 2011; Castoriadis, 2008; Dewey, 1980; Nussbaum, 1990; Picasso, 2005).

The scope of theorists

Major thinkers, such as Aristotle, Dewey, Gardner, Adorno, Horkheimer, and Marcuse have contributed to highlighting the learning potential of the significant aesthetic experience.

Aristotle's *Poetics*

Aristotle, in his treatise *Poetics* (335BC/1999) offered crucial views about what we may learn through tragedy.

---

[*] Parts of the paper are based on Alexis Kokkos' book Exploring Art for Perspective Transformation (2021). Brill/Sense.

The first area of learning resulting from the experience of tragedy pertains to the way 'edge emotions' can be handled. As the perceivers are overwhelmed with fear and pity, they can only attempt to temper their excessive emotional responses and restore them to the mean state. Through this process, they learn how not to be driven by extreme feelings and, instead, they learn how to balance their emotions and experience them in the way that mature people do.

The second area of learning involves recognizing and challenging the reasons that cause fear and pity. The perceivers become aware of the fact that an agent's fearful sufferings are due to one's own fault and, furthermore, they realize that they are in a similar moral state as well. They learn to recognize, therefore, that their morally unjustified ideas and actions are likely to lead to painful situations; consequently, they begin to develop a disposition to bring about a reconsideration of their blameworthy assumptions and behaviors. This may involve various ethical, philosophical, and social issues depending on the topic of the tragedy, such as issues related to authority and tradition (*Antigone*, *The Eumenides*), power relations (*Ajax*, *Seven Against Thebes*), diversity (*The Trojan Women*, *Ion*), gender relations (*Medea*, *Helen*) and so forth.

Third, the idea that human existence is tightly associated with misfortunes, changes, and transitions emerges into the recipients' consciousness. As a result, they realize that the assumption that we can fully control the course of our lives is questionable and they are reconciled with the idea that they themselves are vulnerable. They learn this way how to afford unpredictable situations, how to develop their readiness for creating alternative perspectives, and, in general, how to experience the whole richness of life in a reflective way.

Finally, the perceivers realize that the assumption that one can be aware of the pure truth is unjustified. New facts and changes in situations may reveal aspects of reality that we had not thought of before and which can then be perceived differently in the light of new circumstances. Consequently, the audience of tragedy learns to challenge what has been taken for granted and to be open to new ways of seeing things.

Dewey's view

Dewey (1980, 1985, 1989) argued that aesthetic experience can push us to reveal possibilities that cannot be actualized in the ordinary occupations of existence and prompt us to reconsider our established assumptions and practices: "The moral function of art itself is to remove prejudice, do away with the scales that keep the eye from seeing, tear away the veils due to wont and custom, perfect the power to perceive" (ibid., p. 338). In addition, as the experience of art weakens the barriers to understanding, it allows us to contemplate on our similarities and divergences, thus referring to a significant form of interpersonal communication. For these reasons, the experience of art becomes a means that keeps alive the ability to overcome indurated habits or fragmented understandings and relationships, as well as to conceive alternative patterns of behavior that can increase the meaningfulness of living.

Gardner and the reinforcement of intelligence

Howard Gardner (1983, 1990) has argued that in order to achieve a multifaceted reinforcement of our intelligence, we need an extended use of symbols. The aesthetic experience serves this aim, as it offers the participants the possibility to process a variety of symbols through which it is possible to articulate holistic and delicate meanings, draw on emotional and imaginative situations, use metaphors, and, in general,

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

express different perspectives of reality – thus leading to the awareness of issues which may not be easily comprehended through rational argumentation.

The perspective of the Frankfurt School

An important approach to the role of art in the growth of critical reflection was realized by Adorno and Horkheimer, the founders of the critical theory which has been developed within the Institute of Social Research in Frankfurt (widely known as the "Frankfurt School"). In a series of papers (e.g., Adorno, 1977; Marcuse, 1978), the German theorists elaborated on Kant's view that the aesthetic experience provides the possibility of a thinking mode that is distinct from the dominant one, and re-wrote this idea claiming that contact with authentic art contributes in the process of human liberation. The core of their reasoning was that the spiritual content and the structure of art masterpieces contain attributes that are rarely identified in other mechanisms of social reality which are dominated by instrumental rationality and conformism. Consequently, the encounter with authentic art cultivates a thinking mode that is opposed to the alienating norms of social life. This happens because a great work of art is characterized, firstly, by the deep internal cohesion of its elements, which provides a holistic dimension.

Another characteristic of authentic works of art is the *truth* they contain. They express deep emotions about human existence, an explanation of life, ripe with meanings. When somebody experiences a genuine aesthetic experience, then, in certain unique moments, she conceives in awe the truth as something more than subjective experience, as one objective "so it is" that exceeds the limits of the system of perceptions of the Ego.

Finally, authentic works of art are characterized by their anti-conventional texture. Their structure and content differ from the usual, they oppose the stereotypes, the standardization, and the obvious and they lead us to inquiries we are not used to. The channels for their comprehension do not follow known patterns and clichés. One does not easily guess the meanings. Single-meaning expressions of a situation do not exist. The interpretations that emerge are unexpected. Solutions to conflicts are not schematically "merciful". The questions placed by the artist don't have one and only "clear" answer, as the dominant way of thought would expect. Important works of art have unlimited possibilities for interpretation. They give everyone the possibility of shaping a dialectic relation with them, of approaching them in a unique way, and discovering personal meanings.

Prerequisites for contemplating and enjoying art

Nevertheless, we rarely explore the realm of art in depth. We usually overlook it or content ourselves with a short visit to art museums or galleries, with the basic reading of a novel or poem, selecting simply entertaining films or plays, with listening to commercialized music. Not even educational systems attach to art, with some exceptions, the importance it deserves.

However, meaningful art could be widely accessible and could offer important triggers for perspective transformation, if we were used to coming into contact with it and exploring it more thoroughly. In practice, a vast range of people has the opportunity to visit art exhibitions, watch plays or films, music or dance performances, and read literature.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

With the aim of reinforcing the self-directed approach of meaningful art, a number of suggestions are presented in the following paragraphs which regard the relevant prerequisites.

Disposition

The first prerequisite is the disposition to explore the artworks. A self-directed learner should activate his or her mental and emotional energies to grasp their meaning. This is because there is a gap between the meanings the artist has included in the artwork and what insights people can draw from it. Unlike a machine, which – although originally made through the imagination of its creator – produces the same physical effects as other similar objects and its function is understood by everyone in the same or almost the same way, a work of art is susceptible to being interpreted in multiple ways, depending on the experiences, the assumptions and the cultural background of each perceiver. Consequently, the work of art can become meaningful only if the persons who experience it employ their creative imagination in order to capture, in their own way, the meanings that have been imaginatively evoked by the artist and are contained within the artwork.

More specifically, the learners need to determine how the meanings of the artwork relate to their own ideas and feelings about themselves and their human and social surroundings. They may also need to explore their stored experiences through which they have shaped their assumptions and by which they attempt to capture the meaning of the artwork. The more the perceivers go through this process, the more they acquire an expanded understanding of the artwork, which includes not only the meanings that are anchored within it but also the reconstruction of their own past and present in the world, as well as their conception of the future.

Use of creative and critical questions

A number of creative and critical questions, created by the learners themselves as a self-directed learning tool, may be used for motivating their involvement in exploring the works of art (ARTiT, 2012; Kokkos, 2021; Perkins, 1994).

a. The *creative questions* aim at encouraging the expression of learners' impressions and feelings of artwork, at focusing their interest on certain of its aspects, as well as at relating its meaning content with their own experiences and social milieu.

Indicative examples of creative questions:

- What does the title of the artwork is related to?
- What is the main theme?
- Who is telling the story?
- What is the time span of the story?
- Which features of the artwork are the most interesting?
- What feelings does the artwork evoque?
- Are there any symbols? Which is their message? How does it fit into the whole work?

- How is the meaning content related with our own experiences?

- What are the emerging insights?

b. The exploration of *critical questions* is useful so that a reflective process focuses *effectively* on challenging issues. The content of the critical questions should be related to the meaning content of the artworks at hand and serve as trigger with a view to examine them creatively and prompt essential learning.

Unlike closed-ended questions which are definite and seek mainly to ask learners to recall facts or ideas, the critical questions are open-ended, can elicit multiple responses, invite reflection and wondering, and motivate learners to dig deeper into their frame of reference, challenge their assumptions and seek for a more integral understanding (Kokkos, 2021). Furthermore, Cranton (2016) claimed that critical questioning may refer to *what* we think, feel, or act, as well as to *why* we think, feel, and act in the way we do. Under this scope, a set of critical questions that are related to the exploration of artworks that deal with diversity might be, indicatively, "What can we learn from different others?", "Why should a foreigner be always a foreigner?", "Why should we learn about the other?", "Why should we care about this?", "What led us to come to our own view on these topics?". Another set of critical questions that regard sex relationships might be, indicatively, "Why is it worth getting married nowadays?", "Why do many people think that there is gender inequality?", "What do we think and feel when some men take on 'female' roles, such as household chores, children's upbringing, etc.?"

Selection of meaningful artworks

The artworks that will be chosen as incentives for purposeful learning should be selected so that they bring to life reflection and emotional involvement on as many aspects of the critical questions as possible. Accordingly, the primary selection criterion for artworks should be their *learning value*, that is, their potential to offer learners incentives to probe into their experiences, assumptions, feelings, and actions. On the contrary, according to many major thinkers, e.g., Adorno (1977), Castoriadis (2008), Dewey (1980), Gardner (1990), Greene (2000), the works of art that are products of the culture industry- understood as artistic products (especially films, TV series, and popular music) which, like the industrial ones, are manufactured through standardized norms and are adapted to the logic of commerce and profit- cannot promote reflection and significant learning. Given that the works of the culture industry are designed with the purpose of entertaining the broad public, they have the intrinsic tendency to be pleasurable and easily understood, therefore they must be free from dimensions that might cause beholders' tension, anxiety, or doubts and might ask them to reflect on the foundations of their actual situation. Their meaning content romanticizes and conceals unpleasant aspects of social reality. Furthermore, they are full of ready-made clichés, repetitions, and undifferentiated formulas that block the mind within the limits of established standards. As Adorno and Horkheimer (1972) put it:

> As soon as the film begins, it is quite clear how it will end, and who will be rewarded, punished, or forgotten. In light music, once the trained ear has heard the first notes of the hit song, it can guess what is coming and feel flattered when it does come […]. (p. 125)

Let us look, for example, at some excerpts from Giroux's comments (1994) on *Pretty Woman*. The plot of the film refers to how Edward (Richard Gere), a ruthless yuppie, is seduced by and finally marries Vivian (Julia Roberts), a working-class worker of sex whose most obvious ability, according to the plot, is to "purchase and wear fashionable clothing" (p. 42):

In Disney's terms, the agency of women outside of the traditional family is reduced to the freedom to buy expensive clothing and to reinvent their identities within the logic and terms of white, middle-class cultural capital (p. 42). In this film, white men constitute the source of all authority; women provide sexual pleasures and the potential for new markets; and people of color and working-class people 'dream' about the possibilities of upward mobility" (p. 43).

An example of implementation

A reference to an example may illustrate the way in which a self-directed exploration of an important artwork, through the lens of the stated prerequisites, may serve as an opportunity to examine crucial questions and draw insights. In what follows, the main points of the exploration of Seferis' poem *Piazza San Nicolo* (1937) from three of my students are presented. The meaning content of the poem is related to the challenges, dilemmas, pains, and possibilities of the process of personal transformation - an issue that the students were highly disposed to explore.

Longtemps je me suis couche de bonne heure*

                    the house

full of grilles and distrust when you examine it closely in its

dark corners—

"For years I used to go to bed early," it whispers

"I would gaze at the picture of Hylas and the picture of

Mary Magdalene*

before saying goodnight. I would gaze at the white light of

the candelabra

the glistening metal, and it would be difficult for me to leave

the last voices of day."

The house, when you examine its old cornices closely,

wakens with a mother's footsteps on the stairs

the hand that arranges the covers or fixes the mosquito net

the lips that put out the candle's flame.

And all this is an old story that no longer interests anyone;

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

we've hardened our hearts and grown up.

The mountain's coolness never descends lower than the

bell-tower

that counts out the hours in monologue, as we observe

when aunt Daria Dimiftrovna nee Trofimovitch
comes into the courtyard of an afternoon.
The mountain's coolness never touches the steady hand of

St. Nicholas
nor the druggist who looks out between a red and black

sphere
like a petrified transatlantic liner.
To find the mountain's coolness you must climb higher

than the bell-tower
and the hand of St. Nicholas
about 70 or 80 meters higher, nothing really.
Yet there you whisper as you would when going to bed early

and in the ease of sleep the bitterness of separation would

disappear
not many words, One or two only and that's enough
singe the water rolls on and they're not afraid it will stop

you whisper resting your head on a friend's shoulder
as though you hadn't grown up in the silent house
with faces that became heavy and made us awkward

strangers.
Yet there, a little higher than the bell-tower, your life

changes.
It's no great matter to climb up but it's very difficult for you

to change
when the house is in the stone church and your heart in

the darkening house
and all the doors locked by the huge hand of St. Nicholas.

Pelion—Koritsa, summer-fall '37

Firstly, the students read carefully the poem. Afterward, they formulated and examined three critical questions, as well as a set of self-directed creative questions, that are related to the poem's meaning and content. The critical questions were: "What 'I change' means?", "Why is it difficult for us to change?", "Which is the process of change?" The main statements of the participants' approach were as follows:

What 'I change' means?

- 'I change' means getting out of the stifling context of what one learned in

childhood and adopted as important, but which was not functional.

[Reference to the poem:

To find the mountain's coolness you must climb higher than the bell-tower

and the hand of St. Nicholas]

- 'I change' means I change the norms of my life.

[Yet there, a little higher than the bell-tower, your life

changes]

- Authentic change cannot have anything to do with old perceptions and

values.

[The mountain's coolness never touches the steady hand of

St. Nicholas]

Why is it difficult for us to change?

- It is extremely difficult to approach a new situation.

[The mountain's coolness never descends lower than the

bell tower]

- The oppressive experiences of the past weigh heavily on individuals.

[the house full of grilles and distrust

in its dark corners]

- Old values are extremely difficult to change.

[we've hardened our hearts and grown up]

[the house is in the stone church and your heart in

the darkening house]

- Our religious education is a hindrance to change.

[all the doors locked by the huge hand of St. Nicholas]

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

- The relationships we have experienced in the past are a mental burden and

hinder the formation of new relationships.

[as though you hadn't grown up in the silent house

with faces that became heavy and made us awkward

strangers]

- The tender moments that may have existed in the past and make us nostalgic

for it, make change even more difficult.

[it would be difficult for me to leave

the last voices of the day [...]

the (mother's) hand that arranges the covers or fixes the mosquito net

the lips that put out the candle's flame]

- It is not enough to break away from past habits. What is most difficult is to

change our identity.

[It's no great matter to climb up but its' very difficult for you

to change]

- The "home" in the poem is our own self. It is full of "dark corners", walled

 inside what we have experienced ("in the stone church"), with no way out ("all the doors locked").

Which is the process of change?

- Life goes on, time flows, everything changes; the question is whether you will

have time to make the change.

[since the water rolls on and they're not afraid it will stop [...]

[Yet there, a little higher than bell-tower, your life

changes]

- One cannot change alone; companionship is needed.

[resting your head in a friend's shoulder]

- Conteplation is needed.

[you whisper]

- To change, you first need to deconstruct your existing situation (get out of "stone church").

- Change is every person's choice. It is feasible, although very difficult.

Final thoughts

The learning potential of aesthetic experience is barely exploited within educational settings and everyday life. It would be worthwhile, therefore, to reorient our disposition so that contact with meaningful art becomes an essential part of our lifeworld. Even more, we might approach the artworks aiming to connect their meaning with our experiences, concerns, challenges, desires, hopes, and understandings, so that we grasp multidimensional aspects of reality and foster our awareness. Doing so may render aesthetic experience a vital means of self-directed lifelong learning.

References

Adorno, T. (1977). *Aesthetic theory*. Continuum. (Original work published 1970)

Adorno, T., & Horkheimer, M. (1972). *Dialectic of enlightenment*. Herder and Herder.

(Original work published 1947)

Aristotle. (1999). *Poetics* (S. Halliwell, Trans.). Loeb Classical Library. Harvard University Press. (Original work published 335 BC)

ARTiT (2012). *The ARTiT methodology and modules*. Hellenic Adult Education Association.

Camus, A. (2011). *Discours de Suéde* (P. Liadis et al., Trans.). Kastaniotis. [in Greek]

Castoriadis, K. (2008). *Window onto the Chaos* (E. Tselendi, Trans.). Ypsilon. [in Greek]

Cranton, P. (2006). *Understanding and promoting transformative learning*. Jossey-Bass.

Dewey, J. (1980). *Art as experience*. Perigee Books. (Original work published 1934)

Dewey, J. (1985). *The public and its problems*. Shallow. (Original work published 1927)

Dewey, J. (1989). *How we think: A restatement of the relation of reflective thinking to the educative proces*s. D.C. Heath and Co Publishers. (Original work published 1933)

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. Basic Books.

Gardner, H. (1990). *Art education and human development.* The Getty Center for Education in the Arts.

Giroux, H. (1994). *Disturbing pleasures: Learning from popular culture.* Routledge.

Greene, M. (2000). *Releasing the Imagination*. Jossey-Bass.

Kokkos, A. (2021). *Exploring Art for Perspective Transformation*. Brill/Sense.

Marcuse, H. (1978). *The aesthetic dimension: Toward a critique of Marxist aesthetics*. Beacon Press.

Nussbaum, M. (1990). *Love's knowledge: Essays on philosophy and literature*. Oxford University Press.

Perkins, D. (1994). *The intelligent eye: Learning to think by looking at art*. The Getty Education Institute for the Arts.

Picasso, P. (2005). *Picasso on art: A selection of views* (A. Dimitriadi & G. Ioannidis, Trans.). Printa. [in Greek].

Seferis, G. (2014). *George Seferis*. Princeton University Press.

Serious Play for Serious Skills: Human Resources Development through game-based adult training activities

Niki PHILLIPS

Academic in Adult Education and Lifelong Learning

The need for upskilling and reskilling Human Resources in the new era of an ambiguous and complex corporate life[1]

Research in the past decades (Deming, 2017; Hawkins, 1999; Wesley et al. 2017 as cited in Grama, 2022) had already proven the increasing request for soft skills and had observed how the employees who have such skills manage to earn higher salaries for their work in comparison to the ones who lack them. In the relevant literature, it was also, pinpointed that soft skills are closely connected to a person's ability to find a job and to manage to change their job in a constantly shifting social, economic, and political context.

Since 2020 and the beginning of the Covid-19 pandemic a new reality for many has occurred; unemployment rates have skyrocketed while massive workforce shifts forced countless employees to reskill (refresh their current skills) and/or upskill (build new ones). These new conditions demonstrated to all of us the unstable, complex, and ambiguous characteristics of the marketplace and the corporate world. In addition, the hasty and abrupt changes to the way we work have led to the reassessment of the skills required to - not only survive but also - thrive in the workplace. As a result, we - now more than ever - place a stronger emphasis on skills development, reskilling, and upskilling[2].

More specifically, Upskilling focuses on enhancing employees' existing skills by developing additional skills or reinforcing their previous ones. This allows them to gain more confidence in their professional role and to take on additional responsibilities and duties. By ensuring that employees have the skills and knowledge necessary to perform their roles, upskilling offers a solution to the rapid transformation that many companies

---

[1] To meet the objectives of this article the concept serious play is associated with gameful experiences for purposes beyond entertainment. More specifically, it relates to the game-based learning activities in which trainees/employees deliberately engage during an adult training workshop, intending to achieve serious, work-related objectives and soft skills development.

The term executive employees refers to the senior officers of an organization appointed by the management board and vested with powers to manage and supervise the day-to-day affairs of the organization and may include the general manager, senior directors, supervisors, heads of departments, etc.

In this article, the term social skills (also mentioned as soft skills) refers to a set of interpersonal competencies employees need to successfully and significantly communicate, interact and build relationships with their colleagues. They include communication (both verbal and non-verbal), leadership, teamwork, time management, problem-solving, change management, resilience, creative thinking, etc.

[2] The difference between reskilling and upskilling lies in the objective of the training: whereas *upskilling* aims to teach employees new skills to optimize their performance; *reskilling* — also known as professional recycling — sets out to train employees to adapt to a different post within the company. In general terms, the former is said to create more specialized workers and the latter more versatile ones (https://www.iberdrola.com/talent/reskilling-upskilling)

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

have faced. As employees grow in their current position, they can add value to their organization. Likewise, further training helps employees improve their career path thus, expanding employees' skills helps them discover new talent and reach their full potential.

Reskilling, on the other hand, is the process of developing new skills for the employees. Typically, individuals pursue to reskill by changing their occupation, industry, or professional role. As reskilling involves a shift in career trajectory, it's an attractive option for employees looking for new opportunities, as these activities equip them with new skills that can benefit them greatly. However, this doesn't mean that organizations don't or shouldn't offer training initiatives that focus on reskilling. For example, an employee may be better suited to another role within the organization but lack a specific skill. Therefore, reskilling is quite beneficial for repurposing employees. https://www.growthengineering.co.uk/upskilling-and-reskilling/

Despite the profound need for skills development and/or upskilling and reskilling within the Human Resources industry, many organizations reduced learning and development opportunities during the pandemic. As a result, employees became less confident that they have the competencies to do their job effectively and felt compelled to remain employable.

According to Lemos and Brunstein (2022), studies in different countries and market segments show that *communication*, *problem-solving*, and *teamwork* are the skills most desired by companies. However, at the same time, there is a gap between the need for those skills and the current skills of professionals (Mishra, 2014; Robles, 2012; Sharma, 2018).

Research (Robles, 2012) performed amongst executives who were asked to list the ten most attractive soft skills they wish new employees possess when hired for a position within their organization, showed the following "*Serious Skills*":

1	Communication	oral, speaking capability, written, presenting, listening
2	Courtesy	manners, etiquette, business etiquette, gracious, saying please and thank you, respectful
3	Flexibility	adaptability, willingness to change, lifelong learner, accepts new things, adjusts, Teachable
4	Integrity	honest, ethical, high morals, has personal values, does what's right
5	Interpersonal Skills	nice, personable, sense of humor, friendly, nurturing, empathetic, has self-control, patience, sociability, warmth, social skills
6	Positive Attitude	optimistic, enthusiastic, encouraging, happy, confident
7	Professionalism	businesslike, well-dressed, appearance, poised

8	Responsibility	accountable, reliable, gets the job done, resourceful, self-disciplined, wants to do well, conscientious, common sense
9	Teamwork	cooperative, gets along with others, agreeable, supportive, helpful, collaborative
10	Work Ethic	hard-working, willing to work, loyal, initiative, self-motivated, on time, good attendance

Figure 1. *Ten soft skill attributes categorized from executive listings[3]*

According to McKinsey & Company[4] the soft skills that may be most important in a changing job market for 2022 and beyond, include:

Critical thinking skills, Communication skills, Mental flexibility, Teamwork ability, Self-leadership, and Digital fluency (as shown below in *Exhibit 1a* and *Exhibit 1b*).

Exhibit 1a

---

[3] https://journals.sagepub.com/doi/10.1177/1080569912460400

[4] https://www.mckinsey.com/industries/public-and-social-sector/our-insights/defining-the-skills-citizens-will-need-in-the-future-world-of-work

Self-leadership

Self-awareness and self-management
- Understanding own emotions and triggers
- Self-control and regulation
- Understanding own strengths
- Integrity
- Self-motivation and wellness
- Self-confidence

Entrepreneurship
- Courage and risk-taking
- Driving change and innovation
- Energy, passion, and optimism
- Breaking orthodoxies

Goals achievement
- Ownership and decisiveness
- Achievement orientation
- Grit and persistence
- Coping with uncertainty
- Self-development

Digital

Digital fluency and citizenship
- Digital literacy
- Digital learning
- Digital collaboration
- Digital ethics

Software use and development
- Programming literacy
- Data analysis and statistics
- Computational and algorithmic thinking

Understanding digital systems
- Data literacy
- Smart systems
- Cybersecurity literacy
- Tech translation and enablement

¹Distinct elements of talent.

Exhibit 1b

These research findings indicate that a lack of soft skills can and may cause major issues in the everyday life of employees and lead to serious business problems regarding cost, quality, or time. Therefore, on 4 March 2021, the European Commission[5] set out its ambition for a stronger social EU to focus on jobs and skills, creating the conditions for a resilient, inclusive, and fair socioeconomic COVID-19 pandemic recovery. The *European Pillar of Social Rights Action Plan* outlines a set of specific actions and headline targets for employment, skills, and social protection in the EU (https://ec.europa.eu/eurostat/documents/15234730/15241943/KS-HA-21-001-EN-N.pdf/202462e1-b947-a2c5-6da2-c3d999018134?t=1667396809671).

Learning Strategies for Soft Skills development

The essential social skills described above, which employees need to develop and practice in their daily work, are not mere knowledge that can be looked up in books or acquired through other learning sources. Soft skills need to be continuously (and lifelong) trained through well-planned learning events.

The European Commission recognized long ago that soft skills development should be promoted in the context of lifelong learning. According to the *Memorandum on Lifelong Learning[6]* education is extremely important as it can influence people's chances to "succeed" in life by developing citizens' adaptability to new

---

[5] *Eurostat regional yearbook 2021* https://ec.europa.eu/eurostat/web/products-flagship-publications/-/ks-ha-21-001

[6] https://arhiv.acs.si/dokumenti/Memorandum_on_Lifelong_Learning.pdf

circumstances. The *European Skills Agenda* (2021)[7] includes twelve (12) actions organized around four (4) building blocks:

Building Block 1. A call to join forces in a collective action	
ACTION 1	A Pact for Skills
Building Block 2. Actions to ensure that people have the right skills for jobs	
ACTION 2	Strengthening skills intelligence
ACTION 3	EU support for strategic national upskilling action
ACTION 4	Proposal for a Council Recommendation on vocational education and training (VET)
ACTION 5	Rolling out the European Universities Initiative and upskilling scientists
ACTION 6	Skills to support the twin transitions
ACTION 7	Increasing STEM graduates and fostering entrepreneurial and transversal skills
ACTION 8	Skills for life
Building Block 3. Tools and initiatives to support people in their lifelong learning pathways	
ACTION 9	Initiative on individual learning accounts
ACTION 10	A European approach to micro-credentials
ACTION 11	New Euro-pass platform
Building Block 4. A framework to unlock investments in skills:	
ACTION 12	Improving the enabling framework to unlock Member States' and private investments in skills

---

[7] https://ec.europa.eu/social/main.jsp?catId=1223&langId=en

Discourse in the Adult Education field emphasizes that training and development can highly contribute towards seizing new opportunities and successfully dealing with potential threats. Jarvis (1999) long ago observed that training can help adults establish a more creative relationship with modern realities, improve their lives and eventually acquire the social skills mentioned above. However, which form of training is considered most effective for developing social skills? What training techniques, principles, and conditions will help adult trainees develop social skills and consequently face their challenging careers? (Phillips et al., 2010).

The effectiveness of utilizing active learning approaches that promote self-regulated learning to maintain the development of 21st-century skills is well recognized. Training techniques and tools that promote the strengthening of learner skills are a part of active learning approaches. The term "active learning" refers to learning methods where the trainee has some control over the knowledge intake. It improves student participation in educational tasks and generates a substantial amount of value by giving students the skills they need to deal with new situations, seek solutions, and respond to changes in knowledge, technology, and employment, (Romero et al., 2015).

Soft skills development calls for both consistent training (and learning techniques that are in line with the adult education principles and methodologies), as well as the support and coaching of established individuals (such as mentors, supervisors, and tutors) who have already achieved professional success. Particularly helpful in the process of building one's soft skills are mentors who can personally encourage and monitor individual growth and learning. Academic tutors can assist students with more than just exam preparation; they can also help them better understand their attitudes, develop their abilities, and navigate the world of work (Ciappei, 2015 as cited in Cimatti 2016).

According to Moore (2004, as cited in Kechagias, 2011), there are two schools of thought on the teaching and development of "soft skills": The *generalists* and the *specifists*. The *generalists* first rose to prominence in the 1970s and argue that soft skills may be taught separately from the curriculum and applied to any subject since they are, in fact, generic. The generalist perspective, for instance, contends that since the

Figure 1.

Foundational Scholars of Experiential Learning

John Dewey
• Experiential Education

William James
Radical Empiricism

Jean Piaget
• Constructivism

Kurt Lewin
• Action Research
• The T-Group

Lev Vygotsky
• Proximal Zone of Development

Carl Rogers
• Self-actualization through the Process of Experiencing

Paulo Freire
• Naming Experience in Dialogue

Carl Jung
• Development from Specialization to Integration

Mary Parker Follett
• Learning in Relationship
• Creative Experience

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

quality of critical thinking is universal, it can be taught separately as a collection of cognitive processes and then used in any situation. *Specifists*, on the other hand, claim that competencies like critical thinking cannot be divorced from their disciplinary setting. It is believed that knowledge is inherently placed. According to this viewpoint, critical thinking cannot be taught to students as a "one-shot" distinct from their chosen disciplines.

The Experiential Learning Theory (ELT) is one of the most prominent theories utilized in adult skills training and development. According to the Experiential Learning Theory[8], adults are motivated to learn (or act differently and even transform) by reflecting upon their personal experiences or by witnessing the experiences of others. In some professional fields, experiential learning can be used to provide trainees with a firsthand understanding of what it is like to be a particular professional (i.e. hairdresser, bank teller, trainer, etc.).

Figure 2. The Experiential Learning Cycle
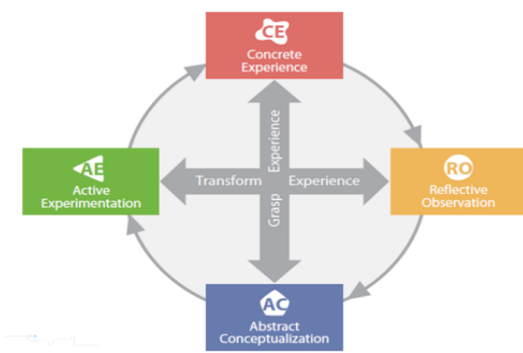
As stated by the *ELT* an experience can be characterized as a learning experience only when we can reflect upon it as well as the knowledge obtained from it, or when it can be related to some theoretical concepts which can subsequently be applied (see *figure 2* (Kolb, 1984).

In addition, the trainees' different learning styles (Kolb 1984)[9] are taken into account when designing, delivering and evaluating any learning event. Educators and adult trainers select learning strategies and training techniques and tools depending on the fact that different people learn in different ways.

The effectiveness of utilizing active learning approaches that promote self-regulated learning to maintain the development of 21st-century competencies is well recognized. Activities that promote the strengthening of learner skills are a part of active learning approaches. The term "active learning" refers to learning methods where the trainee has some control over the knowledge intake. It improves student participation in educational tasks and generates a substantial amount of value by giving students the skills they need to deal with new situations, seek solutions, and respond to changes in knowledge, technology, and employment (Romero et al., 2015).

Games are a type of active training that enables the learners to interact as well as have some power over the game activity. Game-based learning (GBL) is founded on active learning methodologies and encourages learning activities by building on engagement and challenges to achieve the intended learning objectives.

---

[8] The Experiential Learning Theory (ELT) was based on the ideas of twentieth-century leading thinkers and scholars such as John Dewey, Kurt Lewin, Jean Piaget, Carl Rogers, Carl Jung, etc. David Kolb (1984) is widely known in the Adult Education field and Organizational Learning and Development, for his pivotal work *Experiential Learning: experience as the source of learning and development*, while other theorists such as Stephen Brookfield, Peter Jarvis, David Boud, Rosemary Keogh & David Walker, were also great contributors to the holistic model of learning through experience and reflection.

[9] Learning styles assist us in defining how learners assimilate and retain knowledge. More information on the learning styles can be reached at https://www.researchgate.net/profile/David-Kolb-2/publication/303446688_The_Kolb_Learning_Style_Inventory_40_Guide_to_Theory_Psychometrics_Research_Applications/links/57437c4c08ae9f741b3a1a58/The-Kolb-Learning-Style-Inventory-40-Guide-to-Theory-Psychometrics-Research-Applications.pdf

Games can therefore be regarded as training tools for developing new skills (Prensky, 2006; Redecker et al., 2011 as cited in Romero et al, 2015).

Serious Play for the development of Social Skills

Play is universally regarded[10] as a natural human activity with major emotional, social, and cognitive advantages. According to the *psychological* literature, the primary developmental activity by which humans achieve cognitive and emotional maturity is play. The *sociological* literature focuses on play primarily as a social relationship-building and social relationship-adapting activity. The *anthropological* literature primarily discusses play as a narrative process that shapes and changes cultural identity. Ultimately, the *philosophical* literature argues that we could not even begin to recognize ethical principles, much less act in line with them, without our playful imagination (Statler et al., 2009).

The rhetoric regarding play can be directly related to the Learning and Development (L&D) of corporate HR and game-based training. The psychological literature's conclusion for organizations is that people can improve through play and gamified activities the cognitive and emotional skills required for efficient, effective work. The sociological literature, on the other hand, portrays play as an activity through which people shape and modify the social surroundings and connections required for labor. The anthropological literature suggests that people may create and change their cultural identities through play and that this framework can be used to judge the purpose and worth of employment. Finally, according to the philosophical literature, ethical judgment, which can effectively direct work activity, depends on our lively imagination (Statler et al., 2009).

Organizations and adult educators are beginning to realize that purposefully engaging in play can bring a sense of joy to human resources and add significant value to corporate life. It is becoming evident that when people play with the direct intention to produce something which will be related to everyday work, a range of significant benefits can emerge through these game-based learning activities, while the development of valuable - for the business roles assigned to employees - social skills can occur. Research also associates "Serious Play" with numerous processes and outcomes such as strategic thinking, strategic innovation, and the development of ethical leadership habits (Statler et al., 2011).

Definitions of GBL mostly emphasize that it is a type of game or play with tangible learning outcomes (Shaffer, Halverson, Squire, & Gee, 2005 as cited in Plass et al., 2015).

Although it is frequently assumed that the game is digital, this is not always true. Recent organizational research uses Serious Play to describe situations in which people intentionally engage in playful behaviors to achieve work-related goals. Its primary aim is the development of new skills and reflection upon older ones, rather than mere entertainment. Therefore Learning & Development (L&D) specialists have been shifting their key strategy from traditional adult training techniques towards that more fun and engaging learning strategies such as Serious Play and Game Based Learning (GBL).

---

[10] Piaget 1958, Vygotsky, 1978, Erikson, 1964

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

In the related literature for GBL and Serious Play, researchers explore a full range of large contextual and behavioral factors that are not a normal part of the adult workplace, including, for example, the use of materials such as LEGO bricks and the involvement of the body in the creation of meaning. (Roos et al., 2004).

The *main characteristic of Serious Play* is that the actions taken by the participants have no real-world consequences, thus enabling them to practice safely without the fear of error. Other GBL and Serious Play characteristics are *competition, complex collaboration, strategy, challenge, fantasy, complexity, interaction, sense of control, rules, goal, expressiveness, etc*. These characteristics can assist trainees in completing the learning activities and provide them with authentic learning experiences where entertainment and learning are seamlessly integrated, and therefore acquire and practice the new skills. A review of the literature demonstrates the significance of these fundamental characteristics when creating and executing Serious Play to develop 21st-century skills. Thus, Serious Play developers and educators intentionally exploit these characteristics and apply them in diverse manners to various game genres (racing games, fighting games, and role-playing games) to support learning and skills development objectives, (Romero et al., 2015).

Each of the game characteristics previously described has been associated with the development of specific skills to determine how to better profit from Serious Games during training programs that aim at skills development. For instance, the characteristic *expressiveness* assists cultural and expression skills, as well as ICT development skills. Moreover, *strategy* could reinforce skills such as critical thinking, problem-solving, learning to learn, self-direction, planning, flexibility and adaptability, risk-taking, and a sense of initiative and entrepreneurship. Game *rules* could help develop citizenship, adaptability, and productivity skills. *Fantasy* is related to creativity—but few other skills; additionally, *fidelity* and *context* could help the development of flexibility, adaptability, as well as social and cultural skills. Furthermore, there appears to be a connection between *competition* and *goal* for the development of collaborative and social skills, (Romero et al., 2015).

To conclude*, complex collaboration* appears to be the characteristic that best contributes to the development of 21st skills. Providing *original* and *enhanced* learning scenarios is the second most important game characteristic that contributes to the attainment of 21st-century skills. *Choice*, *strategy*, and *tactical* also seem crucial when designing games for skills development. Hence, the analysis of serious play from the perspective of *characteristics* suggests that serious play might be effectively incorporated throughout the development of the skills needed to properly live and function in modern society. Although games are utilized and studied regarding skills development, this analysis has also revealed that the majority of games were not initially designed and developed with that goal in mind. The majority of games have been devised with domain-specific learning objectives, with the acquisition of one or more additional 21st-century skills being regarded as a complementary outcome. The competency-based approach of contemporary educational policy has not yet been aligned with serious games. Such a finding indicates that it is essential to remind game designers that one of the main learning objectives should be social skills development. What's more, it implies that further research into the analysis of social skills development through gamified learning is vital (Romero et al., 2015).

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Preconditions of successful Serious Play and Game-Based Learning

Without a doubt, a broad range of factors influences the effectiveness of learning through serious play. To successfully implement game-based learning and potentially end long-running arguments about pedagogy over enjoyment, designers of serious play and adult educators who wish to facilitate their learning events through such strategies, should make a conscious effort to include those practical guidelines and report on these factors. Available academic literature (from 2000 to 2015) releases serious game success factors that have had an encouraging impact on game-based learning experiences (Ravyse et al., 2017)

However, the challenge regarding play and game-based education is to balance playing and learning in such a manner so that there is neither a dominant play mode (removing the learning outcomes) nor a learning mode (removing the element of fun), (Giessen 2015 as cited in Ravyse, et al., 2017).

Therefore, the question to be answered is what practical guidelines can serious play designers and adult training facilitators should incorporate to guarantee successful learning with games? According to the experts[11], Success in designing and delivering game-based learning and serious play depends on a few key factors. These consist of the following:

o   Realistic, engaging, and meaningful tasks, scenarios, challenges, etc., that require problem-solving and critical-thinking skills.
o   Increasingly complex tasks as participants move through the learning event, inviting them to draw on existing skills and uncover/discover new approaches to take on an unknown challenge.
o   Emphasis on habits and behavior that reflect what modern learners need in the modern world.
o   Recognition of the different ways people learn, and the unique ways they are motivated. Tasks and incentives must match these qualities for them to be meaningful.
o   Incentives that do not focus on rewards or competition, but on achievement. The result should always be that participants know they have learned something. Built-in mechanisms that provide learners with immediate assessment-based feedback on their progress.
o   Strategies that are linked to clear learning objectives and outcomes (clearly defining what success will be and guiding evaluation/assessment therein), which are directly linked to the workplace or environment where learners will apply skills and knowledge.
o   Game-based learning and gamification resources should be carefully designed or selected in that the possible drawbacks could lead to a wasted learning opportunity. You do not want the following:
o   Incentives that are simply a function of game mechanics rather than tools that encourage learners to achieve goals;
o   Participants to be centered on the competitive aspect of the gaming experience: it's not about winning...it's all about learning;
o   Feedback that does not guide learners in constructively working through mistakes. The assets must support experimentation, exploration, and the option to repeat a task if a learner does not feel he or she achieved what was required (basically, the chance to try again!);

---

[11] *Game-Based Learning and Gamification: Guidance from the Experts* WHITE PAPER, SEPTEMBER 2017, p. 12, https://epale.ec.europa.eu/sites/default/files/game-based-learning-gamification.pdf

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

o Repetitive and predictable tasks that do not challenge learners to up their game; and Gaming assets that have no relationship to the participants' lives beyond the learning environment, i.e., the actual workplace.

Conclusion

Play is a crucial component of learning throughout life and shouldn't be overlooked. Literature review shows that Serious Play and Game-Based Learning provide a fresh perspective when combining motivation and self-regulated learning within a constructivist framework that aspires to effectively incorporate practice and reflection, training and development into a smooth and consistent learning experience. Therefore the designing of training events within a corporate environment, aiming at the *Skilling*, *Upskilling*, and *Reskilling* of an organization's human capital, can and will benefit from recognizing the above-mentioned notion.

Play that is serious and devoted to achieving learning objectives can assist participants in acquiring a more individualized and self-reflective perspective regarding their own personal and professional growth. Our challenge, as adult educators, is to incorporate stimulus into learning through its gamification and to acknowledge that play has a significant cognitive role in educational contexts.

Perceiving Serious Play as a sequence of learner engagements on various levels (cognitive, behavioral, and sociocultural) can provide a more structured methodology of gamified learning. Thus, resulting in the exploitation of learning strategies that have the impact that the literature review suggests in this article and that can make possible a new chapter to be written in the fields of adult education and human capital development.

References

Cimatti, B., (2016). "Definition, Development, Assessment Of Soft Skills And Their Role For The Quality Of Organizations And Enterprises". *International Journal for Quality Research 10*(1), 97–130, 97-130. DOI – 10.18421/IJQR10.01-05   http://ijqr.net/journal/v10-n1/5.pdf

Deming, D.J., (2017). "The Growing Importance of Social Skills in the Labor Market" *The Quarterly Journal of Economics*, *132*(4), 1593–1640, https://doi.org/10.1093/qje/qjx022

Grama, A.V., (2022). "Evolution of Soft Skills Training Needs in Romania Due to the Digitalization and Robotization Brought by the Covid-19 Pandemic" *European Review Of Applied Sociology*, 15, (*24*), 42-56. https://doi.org/10.2478/eras-2022-0005

Hawkins, P., (1999*), The Art of Building Windmills: Career Tactics for the 21st Century*, Graduate into Employment Unit.

Jarvis, P. (1999). *Adult & Continuing Education* (2nd Ed.). Routledge. https://doi.org/10.4324/9780203561560

Kechagias, K. (Ed.). (2011). *Teaching and Assessing Soft Skills*. https://www.semanticscholar.org/paper/Teaching-and-assessing-soft-skills-Kechagias/f09d4e65247b45797ecaad254cb03260ac0cdf4e

Kolb, D.A. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. Prentice Hall.

Lemos, V.A.F., & Brunstein, J. (2022). "Fostering soft skills leadership through a critical reflection approach". *Industrial and Commercial Training*, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/ICT-01-2022-0001

McKinsey & Company. https://www.mckinsey.com/industries/public-and-social-sector/our-insights/defining-the-skills-citizens-will-need-in-the-future-world-of-work

Mishra, K. (2014). "Employability skills that recruiters demand*". IUP Journal of Soft Skills, 8*(3), 50-55. https://www.econbiz.de/Record/employability-skills-that-recruiters-demand-mishra-krishna/10010459866

Phillips, N., Karatza, M., Tzikopoulos, A. (2010). "Developing Social Skills through an On-Line Learning Environment: a qualitative study". In Kidd, T.T (Ed.), *On-Line Education and Adult Learning: New frontiers for teaching practices*. Idea Group Inc. Publishing.DOI: 10.4018/978-1-60566-984-7.ch094

Plass J. L., Homer B. D. & Kinzer C. K. (2015). "Foundations of Game-Based Learning" *Educational Psychologist*, *50*(4), 258–283. Routledge. DOI: 10.1080/00461520.2015.1122533 https://doi.org/10.1080/00461520.2015.1122533

Ravyse, W., A. Blignaut, S., Leendertz, V., & Woolner, A., (2017). "Success factors for serious games to enhance learning: A systematic review", *Virtual Reality 21(1).*DOI: 10.1007/s10055-016-0298-4

Robles, M. (2012). "Executive Perceptions of the Top 10 Soft Skills Needed in Today's Workplace", *Business Communication Quarterly*, *75*(4), 453–465. Sage Journals.DOI: 10.1177/1080569912460400

Roos, J., Victor, B., & Statler, M., (2004). "Playing Seriously with Strategy", *Long Range Planning*, *37*, 549-568. Elsevier Ltd. DOI:10.1016/j.lrp.2004.09.005

Romero, M., Usart, M., & Ott, M., (2015). "Can Serious Games Contribute to Developing and Sustaining 21st Century Skills?", *Games and Culture*, *10*(2), 148-177. Sage. https://doi.org/10.1177/1555412014548919

Sharma, M. (2018), "How important are soft skills from the recruiter's perspective". *IUP Journal of Soft Skills, 3*(2), 19-28. https://www.iupindia.in/609/IJSS_Soft_Skills_from_Recruiter%27s_Perspective_19.html

Statler, M., Roos, J., & Victor, B., (2009). Ain't Misbehavin': Taking Play Seriously in Organizations, *Journal of Change Management*, *9*(1), 87-107. DOI:10.1080/14697010902727252

Statler, M., Heracleous, L., & Claus, J.D. (2011). "Serious Play as a Practice of Paradox'. *The Journal of Applied Behavioral Science* 47(2), 236-256. Sage.DOI: 10.1177/0021886311398453

Wesley, S.C., Jackson, V.P., & Lee, M., (2017). "The perceived importance of core soft skills between retailing and tourism management students, faculty and business". *Employee Relations, 39*(1), 79-99. https://doi.org/10.1108/ER-03-2016-0051

Internet sources

https://www.mckinsey.com/industries/public-and-social-sector/our-insights/defining-the-skills-citizens-will-need-in-the-future-world-of-work

https://www.investopedia.com/personal-finance/most-valuable-career-skills/

https://www.iberdrola.com/talent/reskilling-upskilling

https://eur-lex.europa.eu/legal-content/EL/TXT/HTML/?uri=CELEX:52001DC0059&from=EL

https://ec.europa.eu/social/main.jsp?catId=1223&langId=en

https://arhiv.acs.si/dokumenti/Memorandum_on_Lifelong_Learning.pdf

http://www.learningfromexperience.com/

https://epale.ec.europa.eu/sites/default/files/game-based-learning-gamification.pdf

Can All Grown-Ups be Adult Learners?

Maria PAPATHANASIOU

University of Thessaly

Being an adult

According to Stephen Brookfield (1986), Karl Rogers (1998), Peter Jarvis (2003), and Malcolm Knowles (1998) adult learners display specific characteristics that differentiate them from children and adolescent learners. First, they hold their own worldview, which comes from the knowledge, experiences, and ideologies they have already acquired and favored in the past. They have very often previously developed a personal style of learning and expect precise results from educational practice because they usually know exactly what they want to learn. Usually, most adults decide to return to some type of education for specific reasons (for professional, personal, or social development) and/or because a specific need has arisen. In contrast, in the world of minors, education is taken for granted and, in most countries worldwide is linked to the age and developmental stage at which they have arrived.

By contrast, adulthood is generally considered to be intertwined with the tendency of individuals to self-determine, emancipate, and actively participate in the formation of situations that concern them, as well as in the adoption at some point of additional roles, which affect the available time and energy they can devote as learners (Polson, 1993). Their desire to be treated as responsible beings in the field of education, as in other areas of their lives, is also characteristic, resulting in the desire for continuous dialogue and communication with the instructor. They usually seek to have their opinion considered and the curriculum adapted to their own learning objectives and needs. These traits are obviously more specifically determined in relation to the distinctive features of adulthood such as maturity, the sense of perspective and evolution, and the responsible and autonomous decision making that is characteristic of adults as learners.

Adults' learning as a term

UNESCO during the 1976 conference of the United Nations Educational, Scientific and Cultural Organization gave perhaps the broadest definition of Adult Education, according to which, "[Adult Education is] the entire body of organized educational processes, whatever the content, level, or method, whether formal or otherwise, whether they prolong or replace initial education in schools or colleges, and universities as well as in apprenticeship, whereby persons regarded as adult by the society to which they belong develop their abilities, enrich their knowledge, improve their technical or professional qualifications, or turn them in a new direction and bring about changes in their attitudes or behavior in the two-fold perspective of full personal development and participation in balanced independent, social, economic, and cultural development." (Encyclopedia of Canadian Adult Education).

Steps in the development of Adult Learning theories

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Adult education was considered necessary from one point onwards in recent history, due to rapidly changing social and cognitive requirements needed to increase the active adaptability of individuals. Increasing the competitiveness of people in the labor market and avoiding the social exclusion of certain social groups at risk of being marginalized, were two factors that influenced the development of organized adult education (Rogers, 2001). Later, the personal development of the individual (self-realization) and the expansion of the possibilities/need for participation in politics (e.g., in labor movements), in "social becoming" (Anc. Greek: koinonikon gignesthe) were sought again in adult education All this happened thousands of years after philosopher/educators, Socrates, Plato, Aristotle, and other ancient philosophers had sought to educate adults not only to help them become better citizens but also for their own well-being.

Socrates' work was a cornerstone of adult education, as his applied pedagogical methods (dialectical, control, obstetrics-maieutica) revealed that spiritual exercise and education are not confined to a specific age but last for a lifetime. In this way he engaged in a continuous struggle to educate the citizens to help them activate their critical ability to be led to self-knowledge (Kalfas, 2015). The dialogue—and more specifically the rational dialogue of Socrates—motivated adherents to acquire a permanent critical stance. Thus, rational dialogue and critical reflection have for many centuries been inextricably linked concepts and practices.

Plato, with his Theory of Ideas (Greek: Theoria ton Ideon), used the philosophical/Platonic dialogue to free his adult students from stereotyped views and lead them to a voluntary (self-directed) acquisition of knowledge which would ultimately benefit society. He had a close, trusting relationship with his students, and he adapted his programs to their capabilities and interests (Sipitanou, 2004)—always pointing out the role of critical ability and critical reflection in the acquisition of knowledge.

Aristotle, on his part, emphasized dialectics, linking it to logic, in so doing, trying to ensure that one can dialectically arrive at appropriate positions on an issue using right reasoning. In sum, he taught dialectical reasoning—the art of rational argumentation in its dialectical form—and made a guide to conversing "dialegesthai".

The great differences in current adult education compared to the past have probably arisen because of the diverse aims that modern education adapted. In other words, adult education regenerated because, in recent times, specialized training was provided to advance financial competitiveness and employability, was not aimed at the learner, and did not serve their deeper needs. Moreover, in the current era, it was unable to support modern learners in social skills, communication, collaboration, adaptability, inquiry, and production of new knowledge, i.e., "learning how to learn." It is obvious that such a revision of training, would presuppose a great conversion in the role of the trainer, from a simple transmitter of the process of dialogic and then current knowledge, to a coordinator, a facilitator, and a mediator. From the early 1980's, the European Union started to support and fund activities aimed at adult education, and later, on Life-long Learning (European Commission, 2021). Many researchers in the same period have studied and researched this topic placing special emphasis on theories, teaching methods, and cognitive functions that control learning, and the motivations that drive learners to high performance.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

In addition, for adult learning to be considered successful now it needs, primarily, to take into serious consideration the adult learner's motivation and barriers, learning environment, and learning goals and purposes (Merriam, 2013).

Motivation

According to Maslow (1954), human needs are classified in a pyramidal form where the most basic ones (hunger, thirst, etc.) are placed at the base of the pyramid while self-realization is at the top. In between are placed a hierarchy of other needs such as those for security, for social inclusion and acceptance, but also for emotional integration. The different needs of everyone at the individual level shape the internalized and/or externalized motivations (driving forces) that drive adults to start or continue their learning. Another well-known theory of motivation is that of the behaviorists, Pavlov, Thorndike, and Skinner, according to whom stimuli lead the learner toward reward and (usually) away from punishment. The Cognitive Motivation Theory also examines, in its own way, the driving force of adult learning. According to this model, the reward for learning can have different meanings and significances from person to person (Lewin, 1935). After all, adult learning motivation is a complex issue for both the instructor and the learner who can seek learning to meet different types of needs.

Barriers

Unlike children and adolescents, adults must face various constraints when deciding to start or continue their studies. Adult learners, during their training, face obstacles which can be due to both external and internal factors. Obstacles such as distance and time constraints, family responsibilities, etc., are mentioned as external factors, while pre-existing knowledge, values, and perceptions, and/or psychological factors that often hinder learning are characterized as internal. Perhaps the most important obstacles, nowadays, are usually the lack of convenient time and financial resources that result from the increased responsibilities of adulthood. There are also obstacles related to lack of information about the opportunities offered for education in various practices (especially in marginalized and technologically degraded communities), bureaucracy, distance from the place of residence (although more online programs are being developed lately), but also the requirements/responsibilities of family life.

Other times, the motivating factors for adults continuing their studies can turn into obstacles. As already mentioned, an important motivation is the demand for professional development, the acquisition of new skills, the upgrading of prior knowledge. However, the need to adapt to a different work environment, with different requirements, obligations, and policies, or even the uncertainty of a new beginning, can negatively affect an adult's decision to start/continue their studies (Merriam, et.al. 2007).

In addition, adults feel, much more strongly than children and adolescents, that their self-esteem and dignity are at stake when asked to return to education as members of a learning group. In many cases personal negative experiences and/or memories from traditional education work as a deterrent (Knowles, 1973). Because most of the above factors cannot be controlled and addressed by the education system, the goal of adult education/educators is, on the one hand, to attract learners and, on the other, to keep them actively involved until the completion of each program.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Learning environments and Mentors

The endless hours of lectures and the lack of practice, which historically have been required by formal education, are often what comes first to adults' minds (Coombs, 1985) and currently create a deterrent in the learning environment. Discomfort and rejection increase when the learner's expectations for the program they are attending do not coincide with their trainer's goals as well as when the value of the learners' experiences is not recognized and exploited. Therefore, it is important for trainers/educators to realize, appreciate and take into serious consideration their learners' knowledge, and recognize their many ways of learning in various ways and places that can turn them into active learners in all learning environments including the formal, the informal, the non-formal and, lately, the online environment (Merriam & Baumgartner, 2020) which intersects with the other three.

Whichever learning environment the learner chooses consciously or unconsciously there are characteristics that have positive effects such as: being well organized, with knowledgeable and caring instructors, participatory instructional methods, well-crafted lectures, and relevant and useful materials (Merriam & Baumgartner, 2020, p.55). In addition, Knowles (1980, p.47) suggested that the classroom climate should cause "adults to feel respected, accepted and supported". Consequently, the student's effort should best be focused on the integration of new knowledge into the previous set in a strictly interactive environment through creative dialogue, exchange of ideas and opinions, reflection of thought, co-construction of meanings, an organized time schedule, goal-oriented, activity-oriented, learning-oriented (Knowles et.al, 2005), self-directed, and technologically updated (online, hybrid, etc.) means wherever it is possible and/or preferable mainly because it compensates for the constraints that were mentioned before.

It is, however, important to bring to the learner's attention the significance of those adult educators who can incorporate and implementing a plethora of techniques in a wide array of educational—or even non-educational—settings to successfully foster the complex growth of learning. "Becoming an effective teacher of adults depends on acquiring a balance between an appropriate philosophical vision of teaching and the understanding and translation of that vision into a practical instructional process with all its requisite elements" (Galbraith, 2004, p.3-4)

Critical Theory in Adult Education: How do Adult Education and Critical Theories connect in a dialogic process?

As we know, starting in 1930s, the Frankfurt School in Germany began to develop "Critical Theory," a model that links critical thinking to a critical perspective on the wider context of a society in which an individual belongs and that influences the way they think. It is a theory that derives from Marxist philosophy, draws elements from psychoanalysis and sociology, embraces several fields of science, and relies primarily on political and moral assumptions. In that context, critical theory aims at the development of autonomous thinking by reinforcing the critical thinking that leads the individual to doubt and/or disagree with entrenched ideologies, and finally to free him/herself from prior absolute, dogmatic, and dysfunctional assumptions and to consider and weigh alternative principles for action (Brookfield, 2005). As Brookfield (2005, p. vii) very characteristically points out ". . . critical theory should be considered seriously as a perspective that can help

them [adult learners & adult educators] to make some sense of the dilemmas, contradictions, and frustrations they experience in their work . . . a useful lens through which they could view their practice".

The fact that critical pedagogy, which generally analyzes education as a process in which the social and economic groups in power impose values and views that legitimize the power and control that they exercise in the world, has its ideological roots in the writings of Hegel and Marx, and is practically based on the work of the thinkers of the Critical Social Theory movement of the Frankfurt School such as Jürgen Habermas, Theodore Adorno, Max Horkheimer, Herbert Marcuse and Erich Fromm, but also on the ideas of Antonio Gramsci (Brookfield, 2005). However, as approached by most scholars in the field of adult education, critical theory has its starting point in Habermas' theory of Communicative action. The specific theory premises a dialogue in which two agents are trying to reach understanding of and perhaps agreement with one another's points of view, while putting aside egocentric calculations of success (Brookfield, 2002b).

Critical Theory as Dialogue in the System of the Frankfurt School

Beyond the strong influence of Habermas, there are scholars such as Stephen Brookfield (2002a), who recognize both the influence of Marcuse on organization of the critical theoretical framework in adult education (subjectivity & integration) and that of Eric Fromm (the alienation that is caused by the capitalist system and its amelioration with the help of adult education). Despite what has already been mentioned above, if we look for the *first* theoretical learning framework in adult education with roots in critical theory, we would probably end up with Paolo Freire. Especially in the 1970s, Freire seems to have played a very important role in linking critical theory to emancipation in adult education. Perhaps a connection even more intense resulted from Habermas' attempt in the 1980s to approach Critical Theory in the context of communicative action and his differentiation of the three areas in which human interest generates knowledge: the technical/instrumental, the practical/communicative and the emancipatory (Mezirow, 1991).

The famous theorist distinguished learning initially in two main areas, instrumental learning which involves controlling the environment or people, and communicative learning that refers to the understanding of others during a conversation (Habermas, 1971). A third one, the emancipatory, derives from a critical questioning of ourselves and the social systems around us, where self- reflection is seen as the feature of reconstruction that frees the individual from problematic attitudes and views (Deakin-Crick & Joldersma, 2007).

Mezirow sees transformations as occurring via critical thinking

It is at this point that Jack Mezirow undertakes to extend the aforementioned theory by highlighting transformational learning as occurring through critical thinking. Moreover, he sees that by reflecting, the individual is able not only to process data and understand new information but also to enrich practice with it, thus linking theory with practice in "the creative implementation of a purpose" (Mezirow, 1991, p.12). The conclusory outcome is that to produce knowledge, critical thinking must influence experience.

Habermas has long been a dominant figure of the Frankfurt School and was a source of inspiration and influence for the theory of Transformational Learning to which we will refer in more detail below. He is a seminal thinker, as seen in his work, *Theory of Communicative Action* on the importance of interactive

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

discourse based on which one can detach oneself from the operation of the system that subjugates and excludes the individual. During the discourse the interlocutors stand in the same relative positions and have equal rights to express their judgments, views, and reasoning, or to express their objections and disagreements about the stereotypes in the ideas of others (Brookfield, 2005). An analogous form of a democratic dialogue is proposed in the writer's innovative model (Papathanasiou, 2021) for enhancing the school-family relationship via transformative learning of its interlocutors as presented hereby.

Concluding Briefly in Comparison with Other Adult Learning Theories

In a brief attempt to compare dialectically two of the abovementioned adult learning theories directed toward powerful individual change, contrasting but also connecting elements become apparent. In transformational learning, Mezirow and Freire differ in their views on action. Mezirow favors the psychological dimension, while Freire emphasizes the importance of active resistance to various forms of power and control. Further, Freire advocates that learning achieves its purpose when change occurs through awareness and action (Freire, 1972), while Mezirow embraces the view that learning is a process that gives the individual the opportunity to reexamine experience, resulting in a fuller understanding of both his own existence in the world and the world itself (Mezirow, 2004, p. 2). Mezirow also considers that the process of transformation can be either ". . . individual (as in psychotherapy), or group (as in Freire), or collective (as in the case of social movements)." (Mezirow, 1989), seems to reduce the importance of social action in adult education by separating it from the sociological dimension of Habermas' critical theory (Brookfield, 2005). A similar critique concerning transformative learning is made by Fleming (2002), who considers that it is not directly related to social action, because it does not seem to provide a satisfactory understanding of the concept of what is "social". Another common ground between Mezirow and Freire's models is the role of the teacher, whom the former defines as a cultural activist, who enhances critical thinking, creative dialogue and the active participation of learners, while the latter speaks of his/her providing "political clarity" (Freire, 1984) referring to his ability to perceive the current operational socio-political conditions with the aim of overthrowing them if they are against working class interests (Freire, 1984, p. 51).

Jarvis on the other hand, considers learning to be a process in which experience is transformed into knowledge, skills, attitudes, values, and emotions (Jarvis, 2004). Moreover, the theory of transformational learning differs from Andragogy in that the design of a program can be created by the person in charge without the student being responsible or aware of it. In terms of motivation, there is also a difference from Andragogy, as, according to Knowles, intrinsic motivations are the strongest, while in the other two theories the extrinsic ones seem to play a dominant role. While in the theories of Knowles and Freire, pre-existing knowledge is used as a background for acquiring knowledge that is new, in Mezirow's theory it is the conflict with the "old mentality" that prompts the desired result of transformation of mind and the change of behavior. A connecting point of Freire's and Habermas' theories is the special consideration they both give to "vulnerable" social groups, whether they are illiterate adults, adolescents with no motivation to learn, the working class, or manipulated citizens (Morrow & Torres, 2000). In addition, they both maintain that human autonomy and high levels of knowledge and ethics can only be achieved through a learning process where individuals interact. Emphasis is placed on the interaction of oral and written speech in the development and transformation of the consciousness of each person (Morrow & Torres, 2000, p. 116; McLaren & Silva, 1993,

p. 67). Finally, collaborative learning supports the last three theories, with the only difference being that Freire considers disagreement to be part of the process of discovering knowledge.

Conclusively, I agree with Mezirow's claim that "because no one can live without other people since experiences, goals, and values are better understood through communication, the central theme of adult learning is rational dialogue and critical reflection (Mezirow, 1991).

> "Consequently, education for adults may be understood as centrally involved in creating and facilitating dialogic communities to enable learners to engage in rational discourse and action" (Mezirow, 1990, p. 354).

Therefore, the goal of the transformational educator is to involve adult learners in a process of transformative learning in a communicative way and invite them to an internal and external dialogue among them, where they are given the opportunity to critically reflect on their own and others' sociocultural, epistemic, psychological distortions, change them, and be willing to act upon the reformed set of beliefs (Mezirow, 1990). This exact theoretical framework is the foundation of PCI, the innovative model that could possibly enhance the capacity of parents to cooperate, dialogue critically, reflect within the school community as a partner, and institutionalize active engagement in educational dialogue with their children as a primary effort (Papathanasiou, 2021).

Habermas' Public Sphere Equated with the School Community

Parents' Community of Inquiry (PCI) is an adults' learning illustration that embraces transformational versus informational learning for parents within Habermas' "public sphere" which, in this case, is the school community. Habermas' public sphere, according to Brookfield (2005), is the domain where people meet others to explore, discuss, organize, and conduct their communal affairs, and which is threatened by certain social developments that prevent the democratic way of life (Habermas, 1976).

It is no coincidence that even in modern philosophy, thinkers of great substance raised the question of critical thinking directly, even if, as might be expected, the question arose through their own framework of concepts, propositions, and their own aims. In many ways, of course, this focus on thought, had been seen as an evasion of the object for action, with all the possible interpretations of the term. An action could possibly mean I act, I set, I declare, I claim, I come to a rupture, I challenge, I transform, I change. But insofar as all these are projected into a system, they take place within a system (i.e.: a structure, a society, a state, a formation of states, communities, a mechanism, an institution, or a grid of them). As Zinn argues in Brookfield's (2005, p.33), "it is precisely this self-critical posture toward its own propositions that a critical theory of adult learning must display". The relevance of adult learning to the principal values of Critical theory is elaborated and acknowledged by Brookfield (2005) in relation to formation of the philosophical vision of a democratic society. Brookfield (2005, p.39-40) continues, emphasizing the "learning tasks of Critical Theory" that embraces "learning recognizing and challenging ideologies, unmask power, overcome alienation, reclaim reason, pursue liberation and practice democracy". These skills could be in the case of the suggested PCI Model not just relevant but also very significant in its success as albeit implicitly, how things work in critical

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

theory, brings within it an idea of how things should be. This is how things should be and where we could look to activate dynamics of change in the situation in parents-school partnership, touch many fields at the same time and this common place be defined by the meeting of the learning fields that were mentioned and have been attributed to Critical Theory.

In conclusion, critical theory in adult learning, as it emerges from the literature, could begin with the "learning tasks that are embedded in Critical Theory" (Brookfield, 2005, p.39), and which can be enhanced with a critical and reflective discussion by all actors in the school community (students, teachers, parents). They would therefore engage their daily thoughts through critical thinking—which they can certainly use in their everyday conversation and pass it along from one generation to the next. Naturally, thinking and reflecting cannot be *taught* from one day to the other. But they can be *practiced*, grown and nurtured. People should have the opportunity to ask questions, to think, to reflect, to reason, to decide, and act. This whole process reflects the thinking of the human mind. The key to deep thinking, then, would be to ask dynamic questions, reflect on one's own and on others' ideas, perceptions, and assumptions, and explore multiple possible answers. The power of thought is fueled by the dynamics of our questions that, in turn, direct the search for different paths that may or may not be based on experiences that may be personal or not, previous, or new. The questions are drawn to provoke deep thinking into dialogue and make the learners responsible for looking at a perplexing question from different angles. The internal or external dialogue that is born from the question or questions can become the spark to ignite new learning.

The Parents' Community of Inquiry is the mean by which potential adult learners, parents, and teachers, could develop *together* from a relatively early stage, a democratic and critical way of thinking, that helps them become familiar with active listening, democratic interaction, acceptance of different views and diversity in general, as well as a collaborative search for effective, creative options rather than the same old easy solutions.

References

Brookfield, S.D. (1986). *Understanding and Facilitating Adult Learning*. Open University Press.

Brookfield, S.D. (2002a) Overcoming alienation as the practice of adult education: The contribution of Erich Fromm to a Critical theory of adult learning and education. *Adult Education Quarterly*, 52(2), 96-111.

Brookfield, S.D. (2002b). Reassessing subjectivity, criticality, and inclusivity: Marcuse's challenge to adult education. *Adult Education Quarterly*. 52(4), 265-280.

Brookfield, S.D. (2004). *The Power of Critical Theory: Liberating Adult Learning and Teaching.* San Francisco, CA: Jossey-Bass.

Brookfield, S.D. (2005). Learning Democratic Reason: The adult education Project of J. Habermas. *Teachers College Record*, 107(6), 1127-1168.

Coombs, P.H. (1985). *The world crisis in education: A view from the eighties*. New York: Oxford University Press.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Deakin- Crick, R. & Joldersma, C.W. (2007). Habermas, lifelong learning, and citizenship education. *Studies in the Philosophy of Education*, 26, 77–95.

Encyclopedia of Canadian Adult Education. https://www.ufv.ca/adedfiles/encyclopedia/unesco.htm

European Commission. (2001). Com 678. https://ec.europa.eu/education/education-in-the-eu/council-recommendation-on-key-competences-for-lifelong-learning_en

Fleming, T. (2002). *Habermas on civil society, lifeworld, and system: Unearthing the social in transformation theory.* Teachers College Record, Art. 10877. http://www.tcrecord.org/content.asp?ContentID=10877

http://www.tcrecord.org/content.asp?ContentID=10877

Freire, P. (1972). *Cultural Action for freedom*. Harmondsworth: Penguin.

Freire, P. (1984). *Education in progress path*. (Ahmad Birshak, Trans.). Kharazmi Publications.

Galbraith, W.M. (2004). *Adult Learning Methods: A Guide for Effective Instruction* (3rd.ed.). Krieger Publishing Company.

Habermas, J. (1971). *The Theory of Communicative Action*. Beacon Press.

Habermas, J. (1976). *The Critical Theory of Jurgen Habermas*. Cambridge.

Jarvis, P. (2003). *Συνεχιζόμενη Εκπαίδευση και Κατάρτιση ¨Θεωρία και Πράξη*. Μεταίχμιο.

Jarvis, P. (2004). *Adult education and lifelong learning: Theory and practice* (3rd ed.). Routledge.

Kalfas, B. (2015). *Η Φιλοσοφία του Αριστοτέλη*. Healink: www.kallipos.gr

Knowles, M.S. (1973). *The Adult Learner: A Neglected Species*. Gulf.

Knowles, M.S. (1980). *The Modern Practice of Adult Education*. Follett.

Knowles, M.S. (1998). *The Adult Learner*. Gulf Publishing Company.

Knowles, M. S., Holton III, E. F. & Swanson, R. A. (2005). *The adult learner* (6 ed). Elsevier.

Lewin, K. (1935). *A dynamic theory of personality.* McGraw-Hill.

Maslow, A.H. (1954). *Motivation and personality*. Harpers.

McLaren, P. & da Silva, T.T. (1993). Decentering pedagogy: Critical literacy, resistance, and the politics of memory. In P. McLaren & P. Leonard (Eds.), *Paulo Freire: A critical encounter* (pp. 47-89). London: Routledge.

Merriam, B.S., Caffarella, S.R. & Baumgartner, M.L. (2007). *Learning in Adulthood: A Comprehensive Guide,* (3rd.ed). John Wiley & Sons: Inc.

Merriam, B.S. & Baumgartner, M.L. (2020). *Learning in Adulthood: A Comprehensive Guid*e, (4th.ed). John Wiley & Sons: Inc.

Mezirow, J. (1989). Transformation theory and social action: A response to Collard and Law. *Adult Education Quarterly, 39*(3), 169-175. https://doi.org/10.1177/0001848189039003005

Mezirow, J. (1990). Fostering critical reflection in adulthood: A guide to transformative and emancipatory learning. Jossey-Bass.

Mezirow, J. (1991). *Transformative Dimensions of Adult Learning*. Jossey-Bass.

Mezirow, J. (2004). Forum Comment on Sharan Merriam's "The Role of Cognitive Development in Mezirow's Transformational Learning Theory." *Adult Education Quarterly*, Vol. *55*(1), p. 69–70. https://doi.org/10.1177/0741713604268892

Morrow, A.R. & Torres, C. A. (2002). *Reading Freire and Habermas: critical pedagogy and transformative social change.* NY: Teachers College Press.

Papathanasiou, M. (2021). *Parents-Teachers Transformational Community of Philosophical Inquiry: An Innovative Model*. University of Naples, Federico II, Italy.

Polson, J.C. (1993). Teaching Adult Students. *IDEA Paper 29*, Kansas State University. https://files.eric.ed.gov/fulltext/ED395136.pdf

Rogers, A. (1998). *Η Εκπαίδευση Ενηλίκων*. Αθήνα.

Rogers, R.R. (2001). Reflection in Higher Education: A Concept Analysis. *Innovative Higher Educatio*n, *26,* 37–57. https://doi.org/10.1023/A:1010986404527

Sipitanou, A. (2004). Οι εκφάνσεις της Εκπαίδευσης Ενηλίκων κατά την ελληνική αρχαιότητα. Στο *Ιστορία της Εκπαίδευσης*. Πάτρα 1 -3 Οκτωβρίου 2004. Πρακτικά του 3ου Επιστημονικού Συνεδρίου, 2004. http :// www. eriande. elemedu. upatras. gr/eriande/synedria/synedrio 3/ praltik a %2011/ sipitanou. htm

Lifelong development through the lens of the theoretical approaches for adulthood: Some implications for lifelong learning and adult education

Natassa RAIKOU & Thanassis KARALIS

University of Patras

Introduction

A great scholar of Adult Education, Patricia C (1981), stated during the first years of the *lifelong learning* evolution, that although lifelong learning gathers a growing interest, there is some confusion as to its scope and content. This confusion is twofold (Karalis, 2009), on the one hand, lifelong learning is considered a synonym for adult education, and on the other hand, is equated to the evidence that human beings learn through their lives. Of course, both approaches are poor to explain the conceptual amplitude of the term and much more there are not able to explain the theoretical and methodological agenda of lifelong learning and education.

Given the above misconceptions it is not surprising that even researchers of the relevant fields do not understand why, for example, preschool education is one of the most crucial parts of lifelong learning, since the first years in educational settings are the most formative ones for the lifelong learner of the future. Just to add that one of the two indices introduced by in (2002) for the assessment of lifelong learning is that of the access to preschool education, the other being the participation rates of adults to educational programs (Karalis, 2017). In fact, OECD introduced three different sub-indices and not simply the kindergarten enrollment rates (ages, 3,4, and 5) in order to highlight how important participation in educational settings is for the creation of the lifelong learner (Karalis, o.c., p. 71).

To approach the concept and content of lifelong learning and education we will use the following definition (Karalis, 2020, p. 532):

> The scientific discourse on lifelong learning and education refers to a different approach and perspective from the conventional one, in order to understand, comprehend and design those processes that refer to learning, education, educational institutions, and the learning citizen; with the concept of *continuum* as a key element of differentiation. Lifelong learning encompasses all learning and educational activities of any type, content, or level, taking place in formal, non-formal, and informal educational contexts and involving citizens of all ages and levels of education at any stage of their biological and social cycle. It is a radically different conception of learning and education, based on the assumption of the continuity (continuum) of the learning phenomenon and the educational institution.

As this definition proposes, this theoretical approach is more holistic than the conventional one. Regarding the issue we address in this article, we believe that the above definition can provide some interesting starting

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

points. The first point is that the main new element introduced by the theoretical approach of lifelong learning is the concept of the continuum. Learning is not seen as a set of discrete learning episodes but as a continuous chain of interconnected and interdependent learning experiences. The second element, a direct consequence of the first, is that this continuity must be "followed" by educational institutions. In other words, in the context of this approach, it is necessary for educational institutions to "communicate" with each other, providing the necessary channels so that citizens can pass from one to another without artificial barriers, but based solely on their educational achievements.

Another point - one that is at the core of the question of adulthood - is that the notion of continuity (continuum) also refers to the citizen learner, the constantly learning subject. This means that future intakes of learning experiences are directly related to present ones, and vice versa. This basic principle of continuity (should) be at the heart of the design of educational interventions, but also of the analysis of the interpretation and reception of learning experiences. Therefore, certain critical transitions such as the transition from adolescence to adulthood or from childhood to adolescence are also key points for the lifelong learning research agenda.

In the above context, i.e. that of lifelong learning, relevant research, and theoretical approaches are identified. However, the theoretical and empirical data on the issues of adulthood and the transition to adulthood is mainly to be found in the field of Adult Education. A roughly self-evident point for the social sciences is that age is a very relevant factor in determining the transition to adulthood and one's entrance into this stage of life. This age cannot be precisely defined although it does not deviate much from the age of 18 or 20. The legal convention chosen by societies (usually the age of 18) is not far from the threshold of adulthood. Already a century ago, the classical adult education theorist (considered by many to be the founder of the academic field) Eduard Lindeman had clarified that Adult Education is not called so because it is limited to adults, but because the maturity of the learners determines the boundaries, content, and ways of designing an educational intervention (Lindeman, 1926).

About half a century later Malcolm Knowles in his formulation of the theory of andragogy (Knowles, 1970) defined four assumptions about adult learners, which he then made six in the final proposal of his approach, in direct correlation with Lindeman's view. According to Knowles, adults (a) perceive themselves as independent human beings, (b) have a remarkable and extensive depository of experience, (c) their learning is focused on the demands of their life stages and social roles, (d) have a need for immediate application of what they learn, (e) their motivation for learning is primarily internal, and (f) adults want to know why they are learning something. If we attempt to "read" those assumptions under the research prism of the transition to adulthood, we find that (a) and (c) are particularly important. That is, individuals need to have a self-image of adulthood, while the demands of the roles they gradually assume play a role in the transition to adulthood. Alexis Kokkos (2005) also raises the issue of self-image and the image that others have of them to define the concept of adulthood when he states that the individual recognizes in himself elements of maturity and self-determination that characterize the adult phase of life and at the same time is recognized by others in the same way. Thus the transition to adulthood must be defined as a path toward maturity, autonomy, and responsibility.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Jack Mezirow, in various parts of his work on transformative learning, considers that the adult is required the ability and disposition to become critically reflective and examine his/her own assumptions, the assumptions of others, the full and free participation in discourse to validate beliefs and to take reflective action to implement them (Mezirow, 2000, p. In close relation to the notion of a continuum of the aforementioned approaches to lifelong learning, he states that although interests and priorities may change in the different "seasons" of our lives, development in adulthood should be understood as a learning process, a continuing but phased, and often transformative, process of meaning.

Of particular interest is the constructive-developmental approach of Robert Kegan. Kegan borrows the concept of "hidden curriculum", from the domain of curriculum development to create a metaphor for adult life. He notes that if we look at the contemporary culture in the West as a kind of school, considering adult roles as the courses in which we are enrolled, most adults have a very demanding schedule. Although the "courses" such as parenting, partnering, working, and living in an increasingly demanding and changing society, are very demanding, the majority of adults enroll and attend them. An important element in Kegan's approach is that he considers transformative learning as a lifelong phenomenon. Like Mezirow and other theorists, he denies a simplistic approach to learning, that of an instant and alienating learning experience, adopting the approach of *continuum*: "every student comes with a "learning past" that is an important part of his or her present and future learning (Kegan, o.c., p. 58).

According to Kegan, growth is understood as a *movement* through five increasingly complex epistemologies in the way we make sense of our experiences, which he calls *orders of consciousness*. Each successive principle "goes meta" on the last; each is "at a whole different order" of consciousness (Kegan, 1994, p. 34). In the first order of consciousness, our way of thinking is imaginary, while the second order is characterized by an instrumental way of acquiring knowledge. We develop a sense of who we are and what we want while forming the first core of a structure that comes mainly from the rules and advice of our parents or teachers. However, we are guided by our needs and individual interests, often using others to achieve our goals. The third stage is dominated by a commitment to social groups, while our sense of self and assumptions are determined by the expectations that significant others have of us, as well as the system of ideas we have adopted. In the fourth stage, the self-determined mind, we take responsibility for ourselves and critically and synthetically examine the perceptions and assumptions that have been formed by our environment, as well as the expectations of others, through the prism of our own value system. In this order, self-reliance and self-regulation are possible, in a functional and emancipatory way for us. The move to this order is considered in adult education the most critical, since it enables self-regulating learning, while at the same time it is related to Mezirow's transformative learning, through the critical reassessment of our assumptions. The fifth order, which according to Kegan is rarely achieved, is the self-transforming mind. The individual creatively manages the contradictions and complexity both in himself and in others, accepting the limitations of each system of perceptions, reconstructing the multiple dimensions of each situation, and approaching his experience in a holistic and synthetic way.

The above orders are closely related to each other, and their relationship is transformative and qualitative. The move to each order involves a change not only in *what* we know (informational knowledge) but mainly in *how* we know (change of epistemological paradigm and therefore transformation). In fact, the second type

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

of learning is considered by Kegan as the essence of adult development and leads to the next order of consciousness. The construction of meaning follows a spiraling process, in the sense that each higher order incorporates the previous one as part of its system, while it is formed on the limitations and contradictions of this previous and is a new way of understanding the world. Essentially every qualitative movement from one order to the other means that a structure of knowledge and perceptions that we had experienced as a 'subject', that is, it was embedded within us, is transformed so that we now perceive it as an 'object', in the sense that we distance ourselves from our assumptions, reflect critically on them, evaluate them, and control them. What we take as an object and as a subject neither necessarily suits us nor it is permanent, but it can be changed. In fact, the development of the mind occurs when the subject of one order is transformed each time into an object of the higher order, forming a central rhythm in the developmental process of the personality.

Illeris states that the individual takes over the management and responsibility of his or her life gradually as a major process through the years of youth, during early adulthood (Illeris, 2007). He even considers that this process can either reach a level of completeness or remain incomplete. According to Illeris, when we begin to perceive the end of life on the distant horizon, to accept and relate to it, in the 'turn of life' as he mentions, we have the transition to mature adulthood, which is also highly fluid within the period spanning between the ages of about 45 and 65, and there are also significant gender differences in the character of this transition.

Another interesting approach to adulthood and the transition to it is that of psychologist J. J. Arnett. This is the view of *emerging adulthood*, which extends from the end of adolescence to the entrance into the first phase of adulthood. During this period the individual has left the dependency of childhood behind but has not yet entered the phase of responsibility that characterizes adulthood. Arnett described his view of emerging adulthood in detail in his book *Emerging Adulthood: The Winding Road From the Late Teens through the Twenties*, written in 2004, following a systematic work and numerous articles before this publication. According to Arnett, emerging adulthood has five main features (Arnett, 2004), namely: identity exploration, instability, the most self-focused age of life, and feeling in-between, it is the age of possibilities.

During the period of *identity exploration*, young people test possibilities, access the ways they want to live their lives and think about the commitments they will make as a consequence of their choices. Arnett considers this period as the best opportunity for such a form of self-discovery (Arnett, o.c.). This period is also the most *unstable* period of human life, precisely because of this continuing identity exploration. Facing the reality is leading them to change their original plan towards a great variety of matters, including what they really want to study or what profession they will choose in the future. At this time the person *focuses on himself*, as at no other time in his life. The demands of the parents and the school of adolescence absorb the individual so that he cannot turn to himself and think about himself. On the contrary, young people in emerging adulthood probably have the most time to do so, because their obligations are usually less. The *in-between* situation is about the feeling the young persons have, that of an intermediate situation because they may feel that they cannot identify themselves either as teenagers or as adults. In many cases, they are partially dependent on parents and do not yet fully feel the ability to take responsibility and make independent decisions, which young people associate with adulthood, because this ability is gradually

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

acquired (Arnett, 2004). And, finally, emerging adulthood is a period *filled with possibilities* and optimism. Young people, despite the difficulties they often have to manage, have a positive attitude and high expectations for their future. Since most of them have not yet experienced serious problems or critical life events and have not been forced to make important decisions, they feel optimistic and have a great choice, as well as many possible scenarios for their future (Kapogiannis, et al., 2021).

An interesting point in the way Arnett introduces emerging adulthood is that he accompanies it with a critique of sociological theories about the transition phases and criteria. As he typically states (Arnett, o. c., p. v-vi): "... when I began to ask college students about what they believed marked the transition to adulthood and found that for them entering full-time work and marriage had nothing to do with it.... the most important criteria for adulthood to these college students were more intangible and psychological: accepting responsibility for one's actions, making independent decisions and becoming financially independent". Perhaps on first reading this might seem to contradict some of the considerations we have mentioned, however, it seems that what Arnett refers to as psychological criteria, are also the very criteria that define and describe the sociological transition phases; mainly parenting or work are closely related to the three criteria of entering adulthood. For example, it is rather difficult and rare to be a parent or take the decision to be, without accepting responsibility, making independent decisions, or being financially independent. Also, the fact of the massification of higher education, makes college students an interesting population, but probably with different characteristics than their coevals fifty years ago.

In the rest of the article, we will examine in the light of the above theoretical approaches some studies in most of which, but not all of which, both authors participated. These studies were carried out in the framework of the research activities on Lifelong Learning and Teaching and Learning in Higher Education of the Laboratory of Pedagogical Research and Lifelong Education (LPRLE) at the Department of Educational Sciences and Early Childhood Education, University of Patras. A critical meta-analysis of those studies, referring to the transition to adulthood, could illuminate some of the above-mentioned theoretical approaches.

Research Review

During the last seven years, six studies have been carried out by LPRLE on the dimensions of emerging adulthood in the Greek university context, including various faculties. Four of them involve quantitative research and two of their qualitative research methods. In four cases the participants were students at the University of Patras, in one case were students at the Hellenic Air Force Academy, and in one other were students from various universities.

As far as the quantitative research (see Table), in all cases, the research tool was Arnett's IDEA (Inventory of the Dimensions of Emerging Adulthood) questionnaire (2004), adjusted by the researchers. Specialized questions were also added to this questionnaire concerning the way and phases of training in each discipline. In the first part, demographic data are collected, while in the next part the corresponding research questions, which poses each study, are examined. In all cases, the aim of the research was the detection of emerging adulthood characteristics in students and possible correlation with each discipline.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

More specifically, Tsipianitis and Karalis' study (2018) was carried out during 2015-2016 with a sample of 332 students from the Departments of Electrical & Computer Engineering (200 students) and Educational Sciences & Early Childhood Education (132 students). Of them, 136 were men, and 196 were women. The next study took place during 2017-2018 at the Hellenic Air Force Academy (Kapogiannis et al., 2021), with a sample of 81 fighter pilot students, four of whom were women. In the third study, which was carried out during 2019-2020, 110 medical students participated, 37 men and 73 women (Raikou & Konstantopoulou, 2021). The fourth quantitative research was carried out during 2020-2021, meaning during COVID quarantine, and the sample was 206 students from the Department of Educational Sciences & Early Childhood Education (Raikou, 2022). Of them, 195 were women and 11 were men.

Table: Perceived adult status in various disciplines (quantitative research)

Study	Discipline	Sample	YES (%)	In some cases YES (%)	In some cases NO (%)	NO (%)
Tsipianitis & Karalis, 2018	Engineering & Education	332 undergraduate students from two Departments of the University of Patras	16.9	67.6	12.2	3.3
Kapogiannis, Karalis & Raikou, 2021	Air Force	81 fighter pilot students of the Hellenic Air Force	74.1	21.0	3.7	1.2
Raikou & Konstantopoulou, 2021	Medicine	110 undergraduate students from the Department of Medicine, University of Patras	38.2	50.9	9.1	1.8
Raikou, 2022	Education	119 undergraduate students from the Department of Education, University of Patras	18	67.2	11.4	3.4

According to the above Table, the extent to which students consider themselves as adults, meaning the subjective transition to adulthood or perceived adult status, varies significantly between students of different disciplines. In the question "do you think you have reached adulthood", the vast majority – with the exception of fighter pilot students, respond mostly 'in some cases yes', particularly engineer and teacher students

(about 67%), suggesting an incapability of identifying themselves definitely as adults. The second most popular answer is 'yes', meaning the clear choice that they feel like adults, with fighter pilot students having by far the highest percentage (74.1%). On the other hand, it seems that a small percentage in all cases answers 'no'.

As for the qualitative research, the first study took place in 2018, with the participation of 116 students from the Department of Educational Sciences & Early Childhood Education at the University of Patras (Raikou & Filippidi, 2019). The methodological approach included content analysis of the reflective questionnaire that students answered after completing their practicum in kindergarten schools. The aim of the research was the detection of emerging adulthood characteristics in teaching students in the frame of their practicum. The analysis revealed emerging adulthood characteristics, while practicum, which simulates the professional life of future teachers, seems to be a potential factor in fostering the process toward adulthood.

The purpose of the second qualitative study (Mastora et al., 2020) was to seek and highlight the characteristics of the emerging adulthood of Greek students who had participated in Erasmus mobility programs in different countries and higher education environments. A qualitative analysis with in-depth interviews of 20 Greek university students of various disciplines (Humanities, Economics, Sciences, etc.) was applied, in order to investigate the implications of this experience for emerging adulthood. The research revealed empowerment of specific emerging adulthood characteristics of the participants, while it seems that studying abroad emerges as a significant learning experience that could foster students' developmental process to adulthood because it pushes students to gradually shape their social and professional identity, as well as to take responsibility, initiatives, and decisions.

Discussion and conclusions

A first comparison of the findings of the studies presented leads us to the conclusion that the course and transition to adulthood in Greece do not differ radically from that of other Western societies. Certain experiences, such as Erasmus mobility or the pandemic period seem to accelerate the transition threshold (Mastora et al., 2020; Raikou & Karalis, 2010; Raikou et al., 2020).

However, one advantage of the studies presented is the differentiation of university students in terms of disciplines and scientific fields. We believe that this differentiation leads us to a key conclusion that contributes to the analysis of transitions, but also to the emerging adulthood approach. As we observe for students studying Engineering those who identify themselves definitely as adults, are slightly under those who study Education. Then we have those studying Medicine and then the higher rate is that of Air Force cadets. For the case of student teachers, we observe a percentage of 18% (definitely yes), for medical students this percentage is almost double (38,2%), while for young cadets this percentage rises up to 75%. It should be noted here that the survey of student teachers was carried out during the COVID quarantine when there was no practicum at schools and therefore it may be that in another period with the smooth implementation of the practicum program, the percentage of students who clearly declared themselves adults was greater. This hypothesis could be based on the qualitative research that was carried out before the quarantine (Raikou & Filippidi, 2019), where, according to its findings, there seems to be a significant

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

influence of the students' practical experience at school on their characteristics of responsibility, responsibility, and initiative, identity formation, etc.

One explanation for this variation is the gradual exposure to the conditions of the profession and the responsibility that students take on. In the case of Education, Studies is the practicum in real educational settings, in the case of Medicine is the clinical training, while for the Air-Force cadets is the first flight with training aircraft. In terms of Kegan approach, perhaps this is the first time that young adults "enroll" in "life courses", they are a kind of fresh people to the obligations of the hidden curriculum of life. In terms of Arnett approach surely this increase in percentages for the three different cases implies higher levels of two of the three criteria he has identified (accepting responsibility and making independent decisions). The experiences that constitute the gradual contact with the conditions of working life seem to act as a booster for the transition to adulthood, as Knowles proposed.

In this article, we have examined some theoretical approaches to the transition to adulthood in light of the continuum, which is the key feature of the lifelong learning approach and the determinant factor for its differentiation from traditional approaches. It is precisely this continuum that needs to be present and taken into account in all major life transitions, particularly in relation to learning and education. As pointed out above, the contribution of educational institutions to the preservation of continuity (continuum) in human education and learning is crucial. If now the holistic lifelong development of the individual is the main aim for any form of education and learning, taking also into account the 'hidden curriculum', then the basic destination of the educational institutions seems to be the support of each individual, regardless of characteristics, to gradually become an object of himself according to Kegan, in other words, to have the opportunity for a lifelong developmental path towards adulthood.

The research data we examined only concern university students; thus we cannot generalize for the whole population of these cohorts. However, given the massification of higher education, we consider those findings competent enough to describe the situation of people entering adulthood nowadays.

References

Arnett, J. J. (2004). *Emerging Adulthood: The Winding Road from the Late Teens through the Twenties*. Oxford University Press.

Cross, P. K. (1981). *Adults as Learners: Increasing Participation and Facilitating Learning.* Jossey-Bass.

Illeris, K. (2007). *How we learn. Learning and non learning in school and beyond*. Routledge.

Kapogiannis, A., Karalis, T., & Raikou, N. (2021). A study on Emerging Adulthood in Hellenic Air Force Cadets in Greece. *European Journal of Human Resource Management Studies, 5*(1), 121-135. DOI: 10.46827/ejhrms.v5i1.1028

Karalis, T. (2009). Lifelong Learning and Preschool Education: Odd Couple or Eclectic Relationship? *Problems of Education in the 21st Century*, *12*, 68-73.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Karalis, T. (2017). Shooting a moving target: The Sisyphus boulder of increasing participation in adult education during the period of economic crisis, *Journal of Adult and Continuing Education, 23*(1), 78-96.

Karalis, T. (2020). Lifelong Learning and Adult Education. In A. Androusou, & V. Tsafos, *Sciences of Education: A Dynamic Interdisciplinary Field* (529-544). Gutenberg.

Kegan, R. (1994). *In Over Our Heads: The Mental Demands of Modern Life*. Harvard University Press.

Kegan, R. (2000). What "Form" Transforms? A Constructive-Developmental Approach to Transformative Learning. In J. Mezirow and Associates, *Learning as Transformation: Critical Perspectives on A Theory in Progress* (35-70). Jossey-Bass.

Knowles, M. S. (1970). *The Modern Practice of Adult Education: Andragogy Versus Pedagogy.* Association Press.

Knowles, M. (1973). *The adult learner: A neglected species*. Gulf.

Kokkos, A. (2005). *Adult Education: Detecting the Field*. Metaihmio.

Lindeman, E. C. (1926). *The Meaning of Adult Education*. New Republic.

Mezirow, J. (2000). Learning to Think Like an Adult: Core Concepts of Transformation Theory. In J. Mezirow and Associates, *Learning as Transformation: Critical Perspectives on A Theory in Progress* (3-33). Jossey-Bass.

Mastora, V., Panagopoulou, N., & Raikou, N. (2020). Erasmus Student Mobility and Emerging Adulthood: implications on students' development. *Educational Journal of the University of Patras UNESCO Chair, 7*(2), 87-99. DOI: https://doi.org/10.26220/une.3379

OECD (2002). *Education Policy Analysis*. OECD.

Raikou, N. (2022). Emerging adulthood and university students: The case of an Educational Greek Department*. Mediterranean Journal of Education, 2*(1), 1-12.

Raikou, N. (2021). Redefining adulthood: students' emerging adulthood and the role of the university in adult development and education. In Walker, G. Maestrini, & S. Smythe (Eds.), *Proceedings of the Adult Education in Global Times Conference*, 3rd- 6th June 2021, Vancouver, Canada: The University of British Columbia, 410-415.

Raikou, N. (2022). Kegan. In T. Karalis, & P. Lintzeris (Eds.). *Dictionary of Adult Education* (349-353). Hellenic Adult Education Association [in Greek].

Raikou, N., & Karalis, T. (2010). Non-formal and Informal Education Processes of European Lifelong Learning Programmes for Higher Education: The Case of the Erasmus Programme in a Greek Peripheral University, *International Journal of Interdisciplinary Social Sciences*, *5(1),* 103-114.

Raikou, N., Kaltsidis, C., Kedraka, K., Karalis, T. (2020). Teaching in Times of COVID-19 Pandemic in Two Peripheral Greek Universities: Lessons Learned from Students' Experiences and Opinions, *Research Journal of Education, 6*(8), 135-143.

Raikou, N. & Konstantopoulou, G. (2021). Tracing Emerging Adulthood on University Students: the case of Medicine School at a Greek University. *European Journal of Social Sciences Studies*, *6*(4), 83-94. DOI: 10.46827/ejsss.v6i4.1074

Raikou, N., & Filippidi, A. (2019). Emerging adulthood and university teachers' education, In Proceedings of the *11th Panhellenic Conference of Hellenic Educational Society* (108-116). DPE University of Patras [in Greek].

Tsipianitis, D., & Karalis, T. (2018). An investigation of emerging adulthood in Greek higher education students, *Educational Journal of the University of Patras UNESCO Chair, 5*(1), 47-57.

Lifelong learning from the perspective of neuroscience

Anna TSIAKIRI

Democritus University of Thrace

Lifelong Learning

The idea of lifelong learning has been described by Cropley (2014) as the ability of humans to continue learning throughout their lives, independent of structured learning environments. This holistic process, therefore, includes both formal education systems, such as school and the work environment, as well as non-formal forms of learning, which include all the influences that the individual receives through all his senses. Experiential learning allows the individual to better adapt to the ever-increasing needs arising from the environment, on an individual, social, interpersonal, and professional level. No theoretical model for understanding the phenomenon has been proposed, but only a differentiation between spontaneous, random learning and structured learning, which is accompanied by a deliberate intent to learn, awareness that learning is occurring, and systematic attempts to facilitate it. Deliberate learning is supported by educational policies and requires systems of lifelong education.

Lifelong Education

Lifelong education refers to changes in education that can promote lifelong learning and is characterized by a) lifelong duration, b) systematic acquisition of knowledge, c) depends on the motivation of individuals to engage in learning activities, and d) includes all forms of formal and informal education.

General principles of lifelong education:

1. the purposeful fostering of lifelong learning throughout formal and informal settings

2. educational effects beyond the school context, social interactions, cultural events, and vocational roles can offer, without requiring you to pay for them, and that they are structured

3. the learner's motivation and engagement in the learning process are important, as among them he sets goals and creates a positive attitude toward learning

4. it should be considered as a unifying principle making visible the common ground among a number of trends and practices which already exist

Brain plasticity

Understanding learning is a major research challenge in neurosciences. The most popular and well-documented cellular learning mechanism is related to postsynaptic transmission. This theory was introduced by Donald Hebb (1950) and later tested experimentally in rodent models by Bliss and Lomo (Bliss & Lomo, 1973). Synaptic plasticity refers to use-dependent changes in synapse function, a concept introduced by

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Donald Hebb. Hebb's statement about the "cells that fire together, wire together" phenomenon came at a time when neuroscience was in its infancy. It is remarkable that this theory was proposed over 60 years ago and in a completely different era of neuroscience, but it still remains contemporary and relevant. The theory holds that repeated correlated firing between two neurons leads to a long-term increase in the efficiency of synaptic transmission between those two neurons. Today, we know that plasticity still exists even in the aged brain, but possibly the integration of different signals and molecular networks at the membrane or cellular levels is less efficient possibly due to changes in three-dimensional conformations and/or protein turnover.

The framework of brain neuroplasticity

Mechanisms of neuroplasticity

Four plasticity mechanisms are proposed, which appear to be necessary for the formation and maintenance of learning and memories (Bruel-Jungerman et al., 2007):

a) Long-term potentiation in the hippocampus, a brain structure involved in the formation of many types of memory (Bliss & Lomo, 1973). The characteristics of long-term reinforcement that make it a viable mechanism for learning and memory are that it can be long-lasting, from weeks to several months and that it is associative in nature, giving it the ability to process converging inputs in a manner reminiscent of associative learning.

b) Long-term depression, a form of long-term activity-dependent weakening of synaptic strength. Synaptic elimination, the withdrawal, and damping of synaptic connections within complex networks, is a means by which synaptic connections can be lost. Based on the use-it-or-lose-it rule, undoing or losing connections may reflect a mechanism for failure to acquire or recover.

c) Synaptogenesis, a term that refers to the development of new functional synapses. A key question is whether the cellular mechanisms of memory lead to true synaptogenesis, i.e. the growth of new synapses, or merely the morphological remodeling of existing synapses. It is clear, however, that the full characterization of these changes after learning in different structures and in relation to different forms of memory requires further investigation (Geinisman, 2000; Marrone & Petit, 2002).

d) Neurogenesis, describing the birth and growth of new neurons. Contrary to the traditional view that neurogenesis is strictly a developmental phenomenon, Altman (1962) was the first to suggest that new neurons continue to be added to the adult brain throughout life. Several factors can regulate neurogenesis and influence the fate of newly born cells, promoting either their survival or their death. These include almost all neurotransmitters, hormones, and growth factors, as well as epigenetic factors and external/environmental factors such as stress, social isolation, drug abuse, alcohol consumption, and aging as negative regulators, physical exercise, environmental enrichment, and learning as positive moderators (Ming & Song, 2005).

Types of plasticity

According to Kolb and Kolb (2017), three types of plasticity can be distinguished in the developing brain:

I. **Plasticity independent of experience.** This type of plasticity, which is independent of external sensory input, allows the nervous system to be more precise in its connectivity without requiring complex genetic instructions.

II. **Plasticity expected due to experience**, which occurs mainly during development and

III. **experience-dependent plasticity**, refers to a process of changing neural ensembles that are already present.

Lifelong learning as a neuroprotective factor

Neuroplasticity in adulthood

Neuroplasticity can be defined as the final common pathway of neurobiological processes, including structural, functional, or molecular mechanisms, leading to stability or compensation of age- or disease-related changes. Studies in animals and humans, and across psychiatric and neurological conditions (addictions, mood and anxiety disorders, stroke, brain injury, and neurodegenerative diseases) are critical to advancing neuroplasticity interventions (Smith, 2013).

The hypothesis of de Magalhães and Sandberg (2005) on brain plasticity in adulthood is that at later stages, this developmentally linked process continues – because there is no evolutionary pressure not to continue – and causes cognitive dysfunction. Their proposal is that changes in brain plasticity aim to increase the robustness of the human mind in childhood and adolescence, contributing later to cognitive aging. On the one hand, age-related changes occur in neuronal and synaptic numbers that can be seen as extensions of development.

During development, the mechanisms of neurogenesis and synaptogenesis emerge, but these processes decline as we age (Katz & Shatz, 1996). Similarly, both neuronal death and synaptic decline appear to occur during the developmental process. Synaptic density in the human brain reaches its peak in infancy, followed by a sharp selective decline until adulthood. Neuronal numbers appear to reach a prenatal peak followed by a steady decline (Gopnik et al., 2000). One hypothesis is that the steady, programmed decline in synaptic and neuronal numbers is necessary for brain development, but later causes cognitive aging (Waters et al., 1994). Indeed, programmed cell death occurs during early childhood. Apoptosis pathways could play a role in brain development and later affect cognitive aging. In contrast to apoptosis, the decline of neural stem cells in the adult brain could account for the loss of plasticity and increase in robustness during adulthood, while indirectly playing a role in cognitive aging at later ages.

The cognitive reserve theory

Cognitive reserve theory refers to the individual's ability to cope with the progression of brain pathology in order to minimize the symptomatology it causes. Factors potentially creating this reserve may be education (Stern et al., 1992), IQ (Snowdon et al., 2000), occupational status (Stern et al., 1995), and employment activities. (Scarmeas et al., 2001). Two theoretical models have been proposed to understand how it works:

✓ passive model: brain reserve is an example of a passive model, where the reserve is derived from brain size or the number of neurons (Katzman, 1993). Brains with a greater number of neurons can

sustain more damage before clinical deficit occurs because enough neural substrate remains to support normal function. This approach has been codified as the "brain reserve capacity" model (Satz, 1993). It assumes that once the brain's reserve capacity is exhausted, some fixed critical limits or functional deficits emerge. Once depleted by increasing levels of neuropathology, vulnerability to brain damage is inevitable and, eventually, clinical and functional deficits become apparent. A proposed shortcoming of the passive model is that it does not account for individual differences in cognitive or functional processing.

✓ active model: refers to cognitive reserve, which suggests that the brain actively tries to cope with brain damage by using pre-existing cognitive processes or by enlisting compensatory processes (, 2002). It focuses on the processes that enable people to cope with brain damage and maintain their functioning.

The difference between the two models can also be interpreted from the analysis of Stern (2009). Cognitive reserve implies anatomical variability at the level of brain networks, while brain reserve implies differences in the amount of neural substrate available. Second, many of the factors associated with increasing cognitive reserve, such as cognitively stimulating experiences, have a direct effect on the brain. The child developmental literature suggests that not only do individuals with higher IQ have larger brain volumes (et al., 1991), but that cognitively stimulating aspects of life experience may also be associated with increased brain volume. Both exercise and cognitive stimulation are factors that increase neuronal plasticity and resistance to cell death. Finally, there is evidence to suggest that environmental enrichment may act directly to prevent or slow the accumulation of brain pathology.

Another approach taken in a review by Lövdén et al. (2013) creates a bridge between the two models. It suggests that people use knowledge-based strategies to perform tasks, but when faced with a prolonged mismatch between functional supply and challenge (either internal or external), the brain itself must exhibit plastic and compensatory changes that may lead to a mechanism similar to with neural compensation. When the brain faces a challenge, it relies on compensatory network activations to maintain performance. These challenges cause changes in the brain itself, which Lövdén defines as true plasticity.

The "scaffolding theory" of aging and cognition is similar to that of Lövdén et al. (2013) and explains that compensatory mechanisms reflect a general feature of the brain that they call scaffolding: the ability to adapt to structural changes (and task-induced functional limitations) by engaging in a functional reorganization, developing and/or relying on compensatory networks when primary networks are no longer effective in performing a task (Park & Reuter-Lorenz, 2009). This can happen either because more specialized networks are recruited, which are better at the task (an example of scaffolding that occurs during learning), or because the core networks suffer damage of any kind that renders them suboptimal (a case of scaffolding that occurs with age-related deterioration).

Thus, age-related brain changes are addressed by functional adaptations in the affected regions and those downstream in order to minimize the cognitive impact of the brain changes. Proponents of scaffolding theory suggest that it differs from mental stock theory in that it applies not only to aging but also to the brain's

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

response to other pathologies or damage across the lifespan, as well as to common challenges associated with performing a task, such as learning a new skill.

A possible conceptual approach is to consider the reserve as an indicator of plasticity. Within this view, sustained exposure to highly cognitively stimulating environments could endow certain individuals with increased brain plasticity potential (Bartrés-Faz & Arenaza-Urquijo, 2011). Here, as in the two-step plasticity model proposed by Pascual-Leone et al. (2005), lifetime exposure (particularly early exposure) to highly cognitively stimulating environments can influence the formation and development of the characteristics of the main neural pathways.

Therefore, when age-related or neuropathological changes in the brain occur, individuals face particular social or cognitive challenges. This higher "baseline adaptive neuroplasticity" may function to provide a greater dynamic capacity to adapt and remodel cortices, particularly prefrontal networks. This in turn favors more efficient cognitive processing strategies or more stable types of behavior among patients in the early stages of dementia (Mercado, 2008).

Epidemiological data suggest that higher education, occupation, and more active engagement in intellectual, social, and physical activities are associated with a reduced risk of incident dementia (Scarmeas et al., 2001; Scarmeas et al., 2003). Patients with high education, occupation, or high-stimulus lifestyles can maintain similar clinical deficits to Alzheimer patients with low education, occupation, or low-stimulus lifestyles, despite severe brain pathology as assessed by positron emission tomography. Furthermore, it has been shown that Alzheimer's patients with higher education and occupational performance have faster cognitive decline than those with lower performance, consistent with the idea that, at any level of clinical severity, the underlying pathology of Alzheimer's disease is more advanced in patients with more cognitive reserve.

Lifelong learning in the third age

The goal of educating adults, and especially older adults, is to improve performance in cognitive skills, in which deficits have been observed associated with advancing age. That is, the purpose of these interventions is not to enhance or promote the development of new skills, but to restore skills that have declined with aging (Winocur et al., 2007). Cognitive interventions may be useful not only for reversing declines in cognitive performance but also for those that may be related to physical functioning (Jobe et al., 2001). Another component in the rehabilitation of older adults is that retraining skills will ensure that functional ability is maintained. The benefits of training may be less about enhancing functional ability and more about maintaining it, so untrained individuals are impaired but trained ones are not (Ball et al., 2002).

The goal of education in aging, whether to reverse decline or promote stability, is to support older adults so that they can remain independent for longer, an issue with significant policy and fiscal implications for aging societies. Two major approaches have been used successfully to train older adults in cognitive skills. Strategy training is a "top-down" approach and has been used to train memory, reasoning, and complex planning skills. Extended practice is a bottom-up approach and has been used to train memory, dual-task performance, and attention and discrimination skills. Strategy training outcomes are measured using paper-and-pencil psychometric tests, while extended practice outcomes are measured using computer-based tests (Zelinski, 2009).

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Barulli & Stern (2013) theorize that cognitive training can lead to focal changes in areas related to task performance, suggesting that both long-term mental stimulation and focused cognitive interventions can induce structural changes (Nithianantharajah & Hannan, 2009). Many studies have suggested that volumetric changes occur in humans after years of intellectual stimulation, associated with higher education, specialized occupation, and reading.

How healthy do older adults train their brains?

The research of was et al. (2009) studies the use of the internet as a multifactorial intervention, as it is an intrinsically rewarding activity. Similar research were conducted by other researchers (Cody et al., 1999; White et al., 2002) highlighting the benefits of the interventions in the healthy elderly. Using the internet requires cognitive abilities drawn from everyday functionality. This means that one can use the same cognitive functions required to perform everyday activities. More specifically, the researchers mention the memory subsystems that actively participate in the process of using the internet. Long-term and procedural memory for reproducing basic steps in using a computer program, short-term and working memory for tracking information, executive skills for sorting and sequencing information, attention for selecting information, and spatial orientation to search for information on the Internet. In addition, they emphasize the effect on the psychosocial health of the participants, as it increases self-confidence and social interaction, while simultaneously reducing the feeling of loneliness and depression, observations that have also been made by other researchers (McConatha et al., 1994).

In the same year, the research of Smith et al. (2009) was published in which two approaches are proposed to maintain and improve cognitive functions in healthy elderly people. The first approach focuses on learning useful strategies, while the second on non-specific cognitive stimulation. Encouraging the elderly to participate in daily cognitively stimulating activities is also based on the second approach (Fillit et al., 2002; Small, 2002).

Rabipour and Raz (2012) argue that training programs strengthen the case for enhancing or restoring behavior and brain function. Trying to give a definition of what cognitive training means, they mention "participation in a specific program or activity aimed at enhancing a cognitive ability or general cognitive ability as a result of repetition over a specific time frame."

As computer-based cognitive interventions begin to gain intense research interest, Lampit et al. (2014) attempt a systematic review and meta-analysis of research results that apply to computational cognitive programs, as well as the factors based on which corresponding interventions should be designed. They concluded that effectiveness may vary between cognitive domains depending on the design of intervention programs. The advantages of computer-based interventions are considered to be visually appealing stimuli, efficient and scalable access, and the ability to continuously adjust educational content and difficulty to individual performance (Jand et al., 2013; Kueider et al., 2012).

Serious games

"Serious games" are mental and physical competitions conducted with a computer, according to specific rules, which use entertainment to promote education, health, public order, and communication strategies

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

(Zyda, 2005). Zyda describes the contents of serious games as history, art, and software, but also pedagogy, referring to activities that educate or teach, thereby imparting knowledge or skills. This dimension is what makes games serious. But he emphasizes that the educational dimension must follow the entertainment component, which must come first. Once finished, pedagogy follows.

Cognitive interventions for elderly

According to Clare and Wood (2003), cognitive interventions are divided into three main categories:

I. cognitive training, refers to a guided practice that incorporates a set of standardized tasks with a range of difficulty levels and is intended to improve in specific cognitive domains with the possibility of generalization beyond standardized tests, It includes structured exercises done either with paper or pencil or by using electronic software.

II. cognitive activation, with participation in a wide range of group-oriented social events, focuses on the general improvement of individual cognitive functioning and behavior. It includes activities of orientation and reminiscence through the recall of pleasant memories.

III. cognitive rehabilitation, as an individualized method with individualized goals, should be applied flexibly, supported by the commitment of health professionals, and be of sufficient duration in order to achieve the result of the optimal level of physical, psychological, and social functioning in the daily context. It consists of psychotherapeutic methods of solving everyday issues, methods of recovering memory, cultivating important practical skills in everyday life, and ways of compensating for memory deficits.

Presentation of a cognitive training program, specially designed for elderly

The online application Memory Motivation (MeMo) is designed to meet the needs of patients with mental disorders, health professionals involved in the prevention of cognitive decline and cognitive activation, and people who want to exercise their memory and attention (Robert et al., 2020). The MeMo program was implemented by a group of health professionals from the Institut Claude Pompidou, Association IA, CoBTeK lab, Université Côte d'Azur, Nice, France and was translated into Greek at the initiative of the University Neurological Clinic of the Democritus University of Thrace, after the relevant licensing of its creators.

The structure of the program consists of recreational activities and exercises aimed at strengthening and practicing cognitive functions. It includes three main target categories: memory, adaptive capacity, and attention. Each exercise was designed to train a specific cognitive function in order to allow individualized training according to the observed deficits. The training activities proposed in MeMo are divided into two parts. The first part involves memory, which includes the following three activities: "recognition" for visual memory training, "MeMo quiz" for working memory training, and "faces" for memory training. The second part involves mental flexibility/attention, which includes the following three activities: "arrows" for processing speed, inhibitory control, and mental flexibility training. "Complex cards" for working memory training. and "square jumps" to train response anticipation and inhibitory control. Exercises have grading levels and save each user's personal scores and progress estimate. Whenever users get the maximum score in a level, they level up automatically. After creating an account, users can track the progress of their exercise

performance. This also allows therapists to track the evolution of patient performance over time. It is available for free at the following link: http://www.memory-motivation.org/home-4/ and in three available languages.

The MeMo program was designed to increase intrinsic motivation to continue exercise thanks to several features. First, the game interface was designed specifically for the target population of older adults (eg, simplified graphical user interface, simplified instructions with regular reminders, and clear game rules). In addition, the difficulty level of the exercises was dynamically adjusted to the performance of the participants in order to provide an error-free type of training and to keep the participant in a "challenge zone".

Conclusions

The contribution of neuroscience to the understanding of the cognitive processes that mediate lifelong learning enriches the theoretical background, but also the practical techniques that can enhance brain plasticity. Multidimensional environment, life experiences, participation in cultural and social events, cognitive activation through structured and unstructured projects can enhance brain health and provide a protective shield throughout our life span. Approaching the subject from the perspective of various scientific aspects can expand the field of research and the understanding of the multifaceted issue of lifelong learning.

References

Altman, J. (1962). Are new neurons formed in the brains of adult mammals? *Science (New York, N.Y.)*, *135*(3509), 1127–1128. https://doi.org/10.1126/science.135.3509.1127

Ball, K., Berch, D. B., Helmers, K. F., Jobe, J. B., Leveck, M. D., Marsiske, M., Morris, J. N., Rebok, G. W., Smith, D. M., Tennstedt, S. L., Unverzagt, F. W., Willis, S. L., & Advanced Cognitive Training for Independent and Vital Elderly Study Group. (2002). Effects of cognitive training interventions with older adults: A randomized controlled trial. *JAMA*, *288*(18), 2271–2281. https://doi.org/10.1001/jama.288.18.2271

Bartrés-Faz, D., & Arenaza-Urquijo, E. M. (2011). Structural and Functional Imaging Correlates of Cognitive and Brain Reserve Hypotheses in Healthy and Pathological Aging. *Brain Topography*, *24*(3), 340. https://doi.org/10.1007/s10548-011-0195-9

Barulli, D., & Stern, Y. (2013). Efficiency, capacity, compensation, maintenance, plasticity: Emerging concepts in cognitive reserve. *Trends in Cognitive Sciences*, *17*(10), 502–509. https://doi.org/10.1016/j.tics.2013.08.012

Bliss, T. V., & Lomo, T. (1973). Long-lasting potentiation of synaptic transmission in the dentate area of the anesthetized rabbit following stimulation of the perforant path. *The Journal of Physiology*, *232*(2), 331–356. https://doi.org/10.1113/jphysiol.1973.sp010273

Bruel-Jungerman, E., Davis, S., & Laroche, S. (2007). Brain Plasticity Mechanisms and Memory: A Party of Four. *The Neuroscientist*, *13*(5), 492–505. https://doi.org/10.1177/1073858407302725

Clare, L., Woods, R. T., Moniz Cook, E. D., Orrell, M., & Spector, A. (2003). Cognitive rehabilitation and cognitive training for early-stage Alzheimer's disease and vascular dementia. *The Cochrane Database of Systematic Reviews*, *4*, CD003260. https://doi.org/10.1002/14651858.CD003260

Cody, M. J., Dunn, D., Hoppin, S., & Wendt, P. (1999). Silver surfers: Training and evaluating internet use among older adult learners. *Communication Education*, *48*(4), 269–286. https://doi.org/10.1080/03634529909379178

Cropley, A. J. (2014). *Towards a System of Lifelong Education: Some Practical Considerations*. Elsevier.

de Magalhães, J. P., & Sandberg, A. (2005). Cognitive aging as an extension of brain development: A model linking learning, brain plasticity, and neurodegeneration. *Mechanisms of Ageing and Development*, *126*(10), 1026–1033. https://doi.org/10.1016/j.mad.2005.04.004

Fillit, H. M., Butler, R. N., O'Connell, A. W., Albert, M. S., Birren, J. E., Cotman, C. W., Greenough, W. T., Gold, P. E., Kramer, A. F., Kuller, L. H., Perls, T. T., Sahagan, B. G., & Tully, T. (2002). Achieving and maintaining cognitive vitality with aging. Mayo Clinic Proceedings, 77(7), 681-696. https://doi.org/10.4065/77.7.681

Geinisman, Y. (2000). Structural synaptic modifications associated with hippocampal LTP and behavioral learning. *Cerebral Cortex (New York, N.Y.: 1991)*, *10*(10), 952–962. https://doi.org/10.1093/cercor/10.10.952

Gopnik, A., Meltzoff, A. N., & Kuhl, P. K. (2000). *The Scientist in the Crib: What Early Learning Tells Us About the Mind* (Reprint edition). William Morrow Paperbacks.

Hebb, D. O. (1950). The organization of behavior: A neuropsychological theory. New York: John Wiley and Sons, Inc., 1949. 335 p. $4.00. (1950). *Science Education*, *34*(5), 336–337. https://doi.org/10.1002/sce.37303405110

Jak, A. J., Seelye, A. M., & Jurick, S. M. (2013). Crosswords to computers: A critical review of popular approaches to cognitive enhancement. *Neuropsychology Review*, *23*(1), 13–26. https://doi.org/10.1007/s11065-013-9226-5

Jobe, J. B., Smith, D. M., Ball, K., Tennstedt, S. L., Marsiske, M., Willis, S. L., Rebok, G. W., Morris, J. N., Helmers, K. F., Leveck, M. D., & Kleinman, K. (2001). ACTIVE: A cognitive intervention trial to promote independence in older adults. *Controlled Clinical Trials*, *22*(4), 453–479. https://doi.org/10.1016/s0197-2456(01)00139-8

Katz, L. C., & Shatz, C. J. (1996). Synaptic activity and the construction of cortical circuits. *Science (New York, N.Y.)*, *274*(5290), 1133–1138. https://doi.org/10.1126/science.274.5290.1133

Katzman, R. (1993). Education and the prevalence of dementia and Alzheimer's disease. *Neurology*, *43*(1), 13–20. https://doi.org/10.1212/wnl.43.1_part_1.13

Kolb, Alice Y. & Kolb, David A. (2017) "Experiential Learning Theory as a Guide for Experiential Educators in Higher Education," *Experiential Learning & Teaching in Higher Education*, 1(1). https://nsuworks.nova.edu/elthe/vol1/iss1/7

Kueider, A. M., Parisi, J. M., Gross, A. L., & Rebok, G. W. (2012). Computerized cognitive training with older adults: A systematic review. *PloS One*, *7*(7), e40588. https://doi.org/10.1371/journal.pone.0040588

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Lampit, A., Hallock, H., & Valenzuela, M. (2014). Computerized cognitive training in cognitively healthy older adults: A systematic review and meta-analysis of effect modifiers. *PLoS Medicine*, *11*(11), e1001756. https://doi.org/10.1371/journal.pmed.1001756

Lövdén, M., Wenger, E., Mårtensson, J., Lindenberger, U., & Bäckman, L. (2013). Structural brain plasticity in adult learning and development. *Neuroscience & Biobehavioral Reviews*, *37*(9), 2296–2310. https://doi.org/10.1016/j.neubiorev.2013.02.014

Marrone, D., & Petit, T. (2002). Marrone, D. F. & Petit, T. L. The role of synaptic morphology in neural plasticity: Structural interactions underlying synaptic power. Brain Res. Brain Res. Rev. 38, 291-308. *Brain Research. Brain Research Reviews*, *38*, 291–308. https://doi.org/10.1016/S0165-0173(01)00147-3

McConatha, D., McConatha, J. T., & Dermigny, R. (1994). The use of interactive computer services to enhance the quality of life for long-term care residents. *The Gerontologist*, *34*(4), 553–556. https://doi.org/10.1093/geront/34.4.553

Mercado, E. (2008). Neural and cognitive plasticity: From maps to minds. *Psychological Bulletin*, *134*(1), 109–137. https://doi.org/10.1037/0033-2909.134.1.109

Ming, G., & Song, H. (2005). Adult neurogenesis in the mammalian central nervous system. *Annual Review of Neuroscience*, *28*, 223–250. https://doi.org/10.1146/annurev.neuro.28.051804.101459

Nithianantharajah, J., & Hannan, A. J. (2009). The neurobiology of brain and cognitive reserve: Mental and physical activity as modulators of brain disorders. *Progress in Neurobiology*, *89*(4), 369–382. https://doi.org/10.1016/j.pneurobio.2009.10.001

Park, D. C., & Reuter-Lorenz, P. (2009). The Adaptive Brain: Aging and Neurocognitive Scaffolding. *Annual Review of Psychology*, *60*, 173–196. https://doi.org/10.1146/annurev.psych.59.103006.093656

Pascual-Leone, A., Amedi, A., Fregni, F., & Merabet, L. B. (2005). The plastic human brain cortex. *Annual Review of Neuroscience*, *28*, 377–401. https://doi.org/10.1146/annurev.neuro.27.070203.144216

Rabipour, S., & Raz, A. (2012). Training the brain: Fact and fad in cognitive and behavioral remediation. *Brain and Cognition*, *79*(2), 159–179. https://doi.org/10.1016/j.bandc.2012.02.006

Robert, P., Manera, V., Derreumaux, A., Ferrandez Y Montesino, M., Leone, E., Fabre, R., & Bourgeois, J. (2020). Efficacy of a Web App for Cognitive Training (MeMo) Regarding Cognitive and Behavioral Performance in People With Neurocognitive Disorders: Randomized Controlled Trial. *Journal of Medical Internet Research*, *22*(3), e17167. https://doi.org/10.2196/17167

Scarmeas, N., Levy, G., Tang, M. X., Manly, J., & Stern, Y. (2001). Influence of leisure activity on the incidence of Alzheimer's disease. *Neurology*, *57*(12), 2236–2242. https://doi.org/10.1212/wnl.57.12.2236

Satz, P. (1993). Brain Reserve Capacity on Symptom Onset after Brain Injury: A Formulation and Review of Evidence for Threshold Theory. Neuropsychology, 7, 273-295. https://doi.org/10.1037/0894-4105.7.3.273

Scarmeas, N., Zarahn, E., Anderson, K. E., Habeck, C. G., Hilton, J., Flynn, J., Marder, K. S., Bell, K. L., Sackeim, H. A., Van Heertum, R. L., Moeller, J. R., & Stern, Y. (2003). Association of life activities with cerebral blood flow in Alzheimer disease: Implications for the cognitive reserve hypothesis. *Archives of Neurology*, *60*(3), 359–365. https://doi.org/10.1001/archneur.60.3.359

Small, G. W. (2002). What we need to know about age-related memory loss. *BMJ (Clinical Research Ed.)*, *324*(7352), 1502–1505. https://doi.org/10.1136/bmj.324.7352.1502

Smith, G. E., Housen, P., Yaffe, K., Ruff, R., Kennison, R. F., Mahncke, H. W., & Zelinski, E. M. (2009). A Cognitive Training Program Based on Principles of Brain Plasticity: Results from the Improvement in Memory with Plasticity-based Adaptive Cognitive Training (IMPACT) Study. *Journal of the American Geriatrics Society*, *57*(4), 594–603. https://doi.org/10.1111/j.1532-5415.2008.02167.x

Smith, G. S. (2013). Aging and neuroplasticity. *Dialogues in Clinical Neuroscience*, *15*(1), 3–5.

Snowdon, D. A., Greiner, L. H., & Markesbery, W. R. (2000). Linguistic ability in early life and the neuropathology of Alzheimer's disease and cerebrovascular disease. Findings from the Nun Study. *Annals of the New York Academy of Sciences*, *903*, 34–38. https://doi.org/10.1111/j.1749-6632.2000.tb06347.x

Stern, Y., Alexander, G. E., Prohovnik, I., & Mayeux, R. (1992). Inverse relationship between education and parietotemporal perfusion deficit in Alzheimer's disease. *Annals of Neurology*, *32*(3), 371–375. https://doi.org/10.1002/ana.410320311

Stern, Y., Alexander, G. E., Prohovnik, I., Stricks, L., Link, B., Lennon, M. C., & Mayeux, R. (1995). Relationship between lifetime occupation and parietal flow: Implications for a reserve against Alzheimer's disease pathology. *Neurology*, *45*(1), 55–60. https://doi.org/10.1212/wnl.45.1.55

Stern, Y. (2009). Cognitive reserve. *Neuropsychologia*, *47*(10), 2015–2028. https://doi.org/10.1016/j.neuropsychologia.2009.03.004

Waters, C. M., Moser, W., Walkinshaw, G., & Mitchell, I. J. (1994). Death of neurons in the neonatal rodent and primate globus pallidus occurs by a mechanism of apoptosis. *Neuroscience*, *63*(3), 881–894. https://doi.org/10.1016/0306-4522(94)90532-0

White, H., McConnell, E., Clipp, E., Branch, L. G., Sloane, R., Pieper, C., & Box, T. L. (2002). A randomized controlled trial of the psychosocial impact of providing internet training and access to older adults. *Aging & Mental Health*, *6*(3), 213–221. https://doi.org/10.1080/13607860220142422

Winocur, G., Craik, F. I. M., Levine, B., Robertson, I. H., Binns, M. A., Alexander, M., Black, S., Dawson, D., Palmer, H., McHugh, T., & Stuss, D. T. (2007). Cognitive rehabilitation in the elderly: Overview and future directions. *Journal of the International Neuropsychological Society: JINS*, *13*(1), 166–171. https://doi.org/10.1017/S1355617707070191

Zelinski, E. M. (2009). Far transfer in cognitive training of older adults. *Restorative Neurology and Neuroscience*, *27*(5), 455–471. https://doi.org/10.3233/RNN-2009-0495

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Zyda, M. (2005). From visual simulation to virtual reality to games. *Computer*, *38*(9), 25–32. https://doi.org/10.1109/MC.2005.297

Workplace Mobbing, Bullying, and Sexual Harassment, and the role of Lifelong learning programs

Anna TSIBOUKLI

National and Kapodistrian University of Athens

Introduction

Workplace mobbing, bullying and sexual harassment are not new phenomena. There were always there. Nonetheless, the recent few years more studies have highlighted their significance for the well-being of the employees and the workplace.

First and foremost, it is apparent to clarify the differences between mobbing, bullying and sexual harassment. In the first part of this paper, we are going to focus on workplace mobbing and bullying and in the second part on sexual harassment.

The term workplace bullying is usually encountered more often than mobbing. The differences between the two, mainly represent the differences between two schools of thought: a) the British School, where the term workplace bullying prevails and b) the Scandinavian countries and Germany, where the term mobbing is more commonly used.

Workplace bullying includes mobbing, that is the moral and emotional violation of another person, but it also expands to include the physical and sexual violation that derives from abuse of power. Workplace bullying refers to direct repeated aggressive behavior towards a person. This behavior results in the victim suffering psychological, physical, financial and/or sexual harassment.

Mobbing is a more passive aggressive form of moral and emotional harassment that offends the dignity of an individual and may cause him/her emotional damage. Mobbing, or else, moral, and emotional harassment, has several consequences for the person exposed to this experience but furthermore for the workplace as well.

Both, mobbing and bullying, can happen either, a) vertically, from top to bottom, b) horizontally, amongst colleagues and c) bottom up. Most reported cases are vertical (65%), around 21% of cases are horizontal and 14% are bottom-up. The most used questionnaire for measuring workplace mobbing and bullying is the *Negative Acts Inventory*, that measures the frequency with which a person can experience mobbing or bullying at the workplace (Einarsen et.al., 2009).

Studies relevant to workplace mobbing, bullying and sexual harassment have been carried out mostly in corporate America where the above phenomena received significant attention. Focusing on workplace mobbing, a recent study by the Institute for Workplace Bullying (2021) revealed that almost 80 million Americans, are exposed to this phenomenon even when they are working remotely. The perpetrators are in their majority (67%) men, however a 37% are women and most of them (65%), target other women. Similar

data also derives from UK, where one (1) out of 4 employees report having experienced workplace mobbing. Relevant studies (Hoel & Vartia, 2018) have been also carried out in Europe for the European Parliament FEMM Committee, suggesting that at the European level, 5% of all employees have experienced workplace mobbing. In some countries, such as France, workplace mobbing was the case for more than 12% of the employees. Overall, the highest rates of mobbing are reported in the North European countries and the lowest in South of Europe and especially in Bulgaria, Portugal, Hungary, and Greece. Does this lead to the conclusion that the phenomenon is under-represented in these countries? It is most likely that cultural variations and higher tolerance lead to under-reporting. In fact, in Greece, mobbing at work is a rather recently introduced term. The recent law 4088/2021, recognizes the phenomena of workplace mobbing and suggests several prevention and intervention measures to create a safe working environment. However, there is only one NGO, «*No Mobbing at Work*», currently established. A study carried out by this organization, suggests that amongst the young people aged 18-24 years old, who took part in their study, 75% were exposed to workplace mobbing.

Causes and consequences of workplace mobbing and bullying

Most research and theories demonstrate that there are many and different factors related to workplace harassment and/or bullying (Nielsen & Einarsen, 2012).

The first approach developed to interpret the phenomenon is Leymann's model, which argues that mobbing is caused by the leadership style. Leymann (1996) argued that workplace harassment is the responsibility of the company and its management, and it should not be attributed to individual characteristics or personality. Leymann (1996), listed four (4) factors that seem to dominate businesses in which harassment phenomena are observed. These factors include deficiencies in the business plan combined with poor management of the conflicts that arise in the workplace, with an authoritarian and unethical leadership and the victim's socially vulnerable position. The list of morally and emotionally abusive behaviors is long. Leymann (1990; 1996), identified forty-five (45) different behaviors. Amongst these, malicious rumors and baseless accusations, disparaging comments in front of others, about a person's work, morals, motivations and/or behavior, or about a person's background, are included. Some of these behaviors may occur as isolated incidents, due to a work conflict or during a difficult workday. So quite often they cannot be regarded as mobbing or bullying. But in some instances, these behaviors are frequent and regular. Initially, they may appear gradually, through passive aggressive behavior that is not being easily noticed by the person experiencing it, who nevertheless begins to feel unpleasant. They then escalate and have several negative effects with the most negative being job resignation. Besides, Allport (1954), as early as the mid-1950s, had clearly described the process by which an individual is pressured in the workplace to eventually resign. This process includes four stages. The first stage involves underlying comments, the second, stigmatization of the victim, the third overt harassment, insults, and discrimination against the victim and the fourth, forcing the victim to resign. Mobbing in this occasion acquires a systematic and regular character and as it continues for a prolonged period, it limits a person's potential to develop healthy working relationships.

Einarsen (1999), who as early as the mid-1990s investigated the psychosocial dimensions of harassment, developed further Leymann's model, by adding other parameters that need to be considered in the

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

understanding of the causes of mobbing. Einarsen (1999) acknowledged that workplace conflicts are inevitable in the workplace and therefore mobbing may be due to a long-term conflict**,** between two people, which however one of the two parties cannot manage as they are in a vulnerable position at work or socially. Conflicts in the workplace can sometimes be useful as new ideas and solutions emerge from them. However, the victimization of an individual can also be the result of internal conflicts with unpleasant consequences for both, the person, and the organization. This happens when the dispute is prolonged, the two parties have forgotten how it started and from professional, it becomes personal.

Einarsen (1999) argues that mobbing is aggressive in nature when it comes from management. Usually the person who experiences it, cannot find justification for this kind of behavior. Einarsen et. al. (2003) concludes that the phenomenon of mobbing and workplace bullying is a dynamic, multi -factorial process that depends on a network of socio-economic and cultural factors. These factors concern both the workplace itself and the policy it adopts, as well as the individual, his/her personality, and the conditions in which he/she lives.

The organisation can encourage harassment, tolerate it, and even use it for its own benefit. A UK study (Rayner & Keashly, 2005) suggests that harassment occurs in workplaces where there is tolerance towards the abusers and victims are not justified even when they report the phenomenon. The European Organization for Safety and Health at Work since 2002 argues that the phenomenon of mobbing is due to a corporate culture that fails to recognize and prevent it. When the harassment comes from the business site, it is usually associated with inadequate management that is unable to resolve crises. In these cases, leadership is usually unethical, fails to build healthy relationships, and relies primarily on paranoia, passive-aggression, and intimidation. This type of leadership aims to maintain its power by any means and to lead to the withdrawal or resignation those executives from whom leadership feels that challenge or threaten its position. In this work environment the person feels powerless to ask for help, as the risk of being ridiculed for personal inability to manage the situation, is present. The constant negative comments and criticism, inevitably lead the person to isolation and eventually to resignation. Even when the workplace does not encourage harassment, in many cases it can remain apathetic and thus not discourage it. This is the case when the institutional reaction mechanisms are absent or when an organization or a business does not have the necessary procedures to prevent these phenomena. The consequences, however, are negative beyond the individual level, to the organizational level.

Gender and moral harassment

A particular form of harassment is gender discrimination in the workplace. Despite the progress achieved in recent years, the fact remains that women (Zapf et. al., 2020) are mainly those who experience workplace harassment as social and cultural stereotypes persist. In many organizations and businesses, women are still treated with stereotypes and prejudices (Rosander et. al., 2020; Misawa et. al., 2019), regarding their right to work, to be paid equally with men, to participate in decision-making and to claim positions of authority in the work environment. This results in women facing more barriers to advancement in the hierarchy of a company or organization, even though they may be numerically more than male employees. However, even when women rise in the hierarchy, they are criticized for this rise. Often the criticism can come from other women. In these cases, malicious rumors are spread about their potential for work, the quality of the work

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

they produce, but also about their morals and the means they have used to develop professionally. The passive aggressive behavior expressed towards women and the rumors spread are usually about moral and behavioral issues. These tools have been used many times in the past against women to harm them in various areas and with the main goal of total control over them.

Negative stereotypes and prejudices about the role of women in general and in the workplace, lead to questioning of women's knowledge, skills, and abilities, even when they are objectively more qualified than men occupying higher positions. Negative stereotypes also lead women either to a constant effort to prove their worth, or to frustration, resignation, and withdrawal. The glass ceiling phenomenon, i.e., the barriers a person faces due to its own gender to progress in the hierarchy, despite having all the necessary qualifications, is widely known and women are often exposed to it. The recent years the glass cliff phenomenon is also observed (Bechtoldt et al., 2019; Morgenroth et al., 2020), according to which, some companies allow women to occupy high positions in the hierarchy, but this happens when businesses are in crisis or already perform poorly. It also happens when women are offered jobs that are too demanding, in the hope that they won't be able to cope with them and resign. In both cases, women are exposed to criticism and stereotypes and prejudices against women are reinforced. The narrative that women are ultimately incapable of leadership prevails (Mulcahy & Linehan, 2014). In these cases, the fact that the specific companies were already facing serious sustainability problems and were looking for the scapegoat is kept silent.

In cases where women succeed in occupying high positions of power in the hierarchy of a company, they are often criticized for the management model they follow. When they are focused on their goal are seen as distant and they are criticized for adopting the "male model" of management. Therefore, even when women manage to succeed in roles or professions that are considered "masculine", or when their behavior and appearance do not conform to stereotypical notions, they are still more exposed than men (Salin, 2018) to criticisms, comments, and harassment.

When they are accessible, operate with empathy, care, and emphasis on working relationships, they are criticized for adopting the "feminine model" of management and are therefore considered ineffective and inadequate.

The ambiguity that still exists regarding the general position of women in the workplace poses further obstacles to women's professional advancement and reproduces the vicious cycle of stereotyping and the exclusion of women from the labor market and senior management positions. In Greece, gender stereotypes and social prejudices that still dominate the workplace have as a result that women's participation in the workplace is characterized by inequality of opportunities for professional development, with various implications at a social, economic, and professional level. According to a study by the European Organization for Safety and Health at Work, gender discrimination is related to work-based stress. Up to 81% of the women, claim that one of the main causes of stress they experience in the workplace is exposure to unacceptable behaviors such as bullying and harassment. Nielsen & Einarsen (2012), attempted to understand the effects of harassment on stress levels, especially for female workers. They carried out a meta-analysis of various studies on this topic, involving a total of 140,000 workers. The results showed that the

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

effects of workplace moral harassment and bullying, both on the individual's physical and mental health, are particularly important. Victims reported great anxiety**,** especially when they were women, who found it difficult to react believing that the reaction will worsen the situation. Therefore, most of the time, they tried to cope passively with the situation and ignore it. However, passive reactions are not effective.

Therefore, the most serious challenge, according to the European Organization for Safety and Health at Work FACTS 23 report, it is the increased workplace stress and the illnesses that accompany it, as a relevant study in which 16,622 people from 26 countries participated in telephone or face-to-face interviews, revealed.

The implications for the organization or the business are also not negligible. A recent study of 96 organizations in Norway in a sample of 10,627 employees (Nielsen et. al., 2020) highlighted that the phenomenon of mobbing is linked to continuous absences due to illness from the workplace and to issues of mental discomfort. No healthy organization would want to lose its staff after spending time and resources to train them. Human resources are not easily replaced as a significant part of the acquired know-how is lost. Time, financial and human resources need to be invested until new staff can acquire the required expertise that will help the organization or business evolve. At the same time, non-productive work hours are valuable and cannot be replaced. The vicious cycle of human resource loss is counterproductive for both, the organization, and the individual. Therefore, the empowerment of both, the individual and the organisation, will help prevent these phenomena and strengthen the institutional processes.

Workplace mobbing and bullying are not easily managed. In some organizations, the culture may even be such that it encourages harassment and bullying. In these cases, employees find it difficult to react, especially when there is no relative support from the work environment. The difficulty of reacting is due to many factors. Some workers may worry that they will lose their jobs, others, especially new entries, may feel that harassment is part of the company's and thus they should be subjected to it as part of their training, and others may find it difficult to manage these phenomena as they recall past experiences. In these cases, according to the Workplace Bullying Institute, perceptions that there is no harassment or bullying at work, prevail. Therefore, significant concern should be placed on how discrimination and harassment are dealt with in the workplace. Even more so, significant attention should be paid to sexual harassment as well.

Sexual harassment

Sexual harassment in the workplace is a well-hidden problem (Fitzgerald & Cortina, 2018), which has been perpetuated for many years. The *American Equal Employment Opportunity Commission* defines sexual harassment as " *single or repeated unwanted sexual challenges, such as requests for sexual favors, as well as other types of verbal or physical harassment of a sexual nature* " (McLaughlin et.al., 2012). In this context, legislation in the US recognizes two forms of sexual harassment: a) the one based in the principle of exchange, i.e., the belief that when a person wishes to advance professionally, he should give in to the sexual propositions of his superiors and b) the one based in an aggressive work environment and a culture that encourages sexual harassment. In Greece, in 2010, Law 3896/2010 was passed, which was updated by Law 4808/2021, and provides that " *Harassment, sexual harassment, as well as any less favorable treatment due to the tolerance or rejection of this behavior, constitute gender discrimination and are prohibited.*'

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Women are usually the victims of sexual harassment. However, men can also be victims of abuse of power and sexual harassment. Almost, 1/3 of the workforce considers sexual jokes and related comments to be forms of sexual harassment. Men, however, see sexist comments as a simple result of human nature. Conversely, women are more sensitive to this type of behavior, which they consider to be a form of power abuse in the workplace. The fear, which the victim has that he can be blamed for what he is suffering and experience additional stress, possibly also leads to the low rates of complaints.

Sexual harassment reflects relationships and phenomena of power abuse that prevail in specific work environments. Sexual harassment is accompanied by continuous attempts to devalue the work and dignity of the person who is usually in a weaker work position than the abuser. Power relations and abuse involve both moral and sexual harassment in the workplace. In the work environment, the number of people who are faced with abuse of power and sexual harassment, is not small. However, collecting data on the extent of the phenomenon is not easy. The recording of the phenomenon depends on many factors, that include social and cultural, as it often seems that the culture of stigmatization of the victim rather than the perpetrator is more dominant. Apparently only 13% of the victims, report it. Nonetheless, women report incidents of sexual harassment at twice the rate of men. Furthermore, up to 80% of victims report physical or mental health problems because of sexual harassment. Social and cultural stereotypes determine perceptions of what constitutes abuse of power and sexual harassment, so the problem remains well hidden.

The #MeToo movement succeeded in mobilizing several women to reveal their experiences (Raihani, 2017), resulting in moral and legal vindication. However, there are still several cases where women, who dared to disclose incidents of sexual harassment in the workplace, ended up being stigmatized (Solnit, 2018). Stigma is associated with distorted assumptions, which hold that the victim is responsible for what happens to her. That is, the victim's behavior and attitudes are targeted, and the perpetrator's actions are attributed to them. Besides, in the recent past, sexual harassment in the workplace was interpreted as a mere display of admiration or romantic interest. The individual's refusal to succumb to the pressures was also interpreted as a simple reaction, which could be bent over time. This interpretation, if not dangerous, is at least simplistic.

The causes of sexual harassment

The phenomenon of sexual harassment is multifactorial. A few theories, models and approaches have developed to understand its occurrence and effects in the workplace. An important factor is still the inequality of the two sexes, which formally or informally, consciously, or unconsciously, is cultivated in the context of the family, school, and social environment. The issue has thus preoccupied several women theorists since the 1970s.

Margaret Mead (1978), an important anthropologist and feminist, argued that the school and the family still raise boys in an old-fashioned way, even though social and economic conditions have changed. Goodman (1978), accordingly, considered that sexual harassment is a result of sociological history, which leads men to treat women primarily as "*sexual objects*" and secondarily, as workers. Therefore, as Russell (1986) states, the factors that reduce men's inhibitions are cultural (e.g., a woman's place is in the home) and foster acceptance of discrimination against women. In this context, sexual harassment is a consequence of the economically inferior position of the woman and the perpetrators are men who are in a better financial and

more secure job position. Farley (1978) also believed that the main reason for sexual harassment remains the conscious effort to keep the woman in an inferior work position.

The feminist approach considers sexual harassment to be an " *unwanted imposition of sexual demands, within a relational framework of unequal power* ". So, in essence, it links it to phenomena of abuse of power. This approach was particularly developed by the feminist lawyer Catherine MacKinnon (1979). MacKinnon was the first to argue that sexual harassment in the workplace violates the constitutional principle of equal treatment of the two sexes. MacKinnon (1979) was able to influence in favor of the victim, court decisions on issues of sexual harassment in the workplace, as she strongly argued that sexual harassment functions as a mechanism of labor and economic oppression of women, denigrates the female gender and violates the Equality Act. Overall, the feminist approach considers that sexual harassment is directly related to the phenomena of abuse of power, inequality, and sexism, which are observed in the wider social, cultural, and political environment and which affect the culture formed in the workplace. As such, it is based on the ideology of male superiority and dominance, where men are usually rewarded when they show sexual activity, determination and persistence and are socialized based on these values, while on the contrary women are rewarded when they are submissive and passive (Superson, 1993; Samuel, 2003). In this context, the woman, although working, is treated as a "pleasure vessel" and is led to accept her degraded social position and inability to access power. Sexual harassment is directly related to the position women occupy in public life, where men dominate, and women are dominated.

Another model for understanding the phenomenon, is the organizational model (Tangri et. al., 2000), which also argues that sexual harassment is the result of hierarchical relations, professional opportunities, and power relations, cultivated and encouraged by the very structure of a business or an organization. Within this context, Silverman (1981) argued that sexual harassment begins in the recruitment process, where the criteria are not always related to the objective qualifications of the candidates. Berdahl (2007) tried to investigate through his studies, the causes of sexual harassment and concluded that women who experience sexual harassment work in male-dominated environments and adopt the male work model**,** breaking away from what is considered classic female behavior.

Fitzgerald and Cortina (2018) argue that sexual harassment is a purely female issue, although other groups in the population, such as members of the LGBTQ+ community, may experience it. The authors believe that in this case too, sexual harassment occurs because members of the community are perceived as *'feminine'*.

The prevalence of the phenomenon and the profile of victims and perpetrators

The phenomenon of sexual harassment has significant dimensions; however, the incidents are not always recorded with the corresponding frequency with which they occur. A recent study by the European Union Agency for Fundamental Rights (FRA _ Fundamental Rights Agency, Europe) was carried out in 2014 on a sample of 42,000 women from 28 member states. The results showed that 55% of women in Europe have experienced sexual harassment at least once in their lifetime and one in five in the last year before the study. Sexual harassment can be verbal, non-verbal, or even online. Specifically, 29 % of women have experienced unwanted touching, hugging and/or kissing, 24% of women have been exposed to sexist comments or jokes that they found offensive, 11 % of women have received offensive, spam messages or SMS.When the study

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

focused on incidents of repeat victimization, one in five women (19 %) reported unwanted touching, hugging, or kissing at least twice and 6 % of women reported that this has happened more than six times. 37 % of victims have been exposed to two or more types of sexual harassment, 27 % in 4-6 types and 8 % in 7 or more forms of sexual harassment. The risk of exposure to sexual harassment is increased when women are 18 to 29 years old. Also, women at this age are more exposed to sexual harassment through the internet. One in three (38 %) in this age group has been a victim of sexual harassment and 1 in 4 women aged 30 to 39 years have suffered sexual harassment (24 %). Sexual harassment is reported more often by university-educated women and by women in senior management jobs. Fitzgerald and his colleagues (1995), also tried to record the prevalence of the phenomenon, through a questionnaire, known as " *The Questionnaire of Sexual Experiences in the Workplace" (The Sexual Experiences Questionnaire - Workplace - SEQ - W).* The questionnaire explores gender harassment, unwanted sexual attention, and sexual coercion. Leskinen and Cortina (2014) relatively recently expanded the field and constructed the *Gender Experiences Questionnaire.*

In several cases the abuser was someone the woman knew. Specifically, 35 % of cases, the abuser came from the workplace (colleague, supervisor, or customer) and 31st % of cases it was a friend or acquaintance. However, it is interesting that 35 % of women never talked about the event, 28 % talked to a friend, 24th % to a family member and 14th % informed their partner. Only 4 % reported it to the police, 4 % to the employer or supervisor at the workplace and less than 1 % approached a lawyer or some relevant organization or the workers' union. Other studies in Europe also show that 45–55% of women have been victims of sexual harassment. In Finland, Sweden, France and the Netherlands, the percentages recorded are particularly high and range from 71–81 % (Latcheva, 2017). A recent study in the US showed that 40.9% of women working to private field and 15 % of students have been subjected to sexual harassment (McKinsey, 2021). Also, studies by the American Equal Employment Opportunity Commission-E EOC claim that 78.2% of sexual harassment complaints come from women. In fact, 17% of them have suffered repeated violations, 14% repeated slight unwanted touching and 18% have been sexually assaulted, by touching an erogenous area or the area of the genital organs. However, there are still many cases of sexual harassment that are not reported due to fear. In Greece, a recent study by Dianeosis (2022) showed that 87.8 % of Greeks thinks that sexual harassment has reached great proportions.

The working situation of women seems to play an important role in their vulnerability. Rates are higher among women with irregular or precarious employment contracts, in places of dependent work with temporary or fixed-term contracts. However, the fact remains that many women are still reluctant to report incidents of sexual harassment. But in this way, they empower the abuser. This empowerment allows the cycle of abuse and silence to continue and leads to the lack of sufficient empirical data.

Exposure to incidents of sexual harassment is traumatic and has been linked to symptoms of post-traumatic stress and depression, which overall affect a person's ability to make decisions. In fact, recent research claims that if the psychological trauma is not treated, the person is at risk mentally and physically (Thurston et al., 2019). Sensitizing the abusers to stop the harassment seems to have no effect. Most theories hold that abusers lack empathy for their victims. Empathy is particularly important for human communication and a key ingredient for social justice. Therefore, to cultivate it, it is necessary that interventions are not simply based on information campaigns (Romero, 2018). Systematic prevention programs, legal treatment of the

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

phenomenon and intervention from the working environment are required. For this reason, it is worth focusing on the effects of sexual harassment in the workplace as they are not negligible. The first large-scale study in the US of sexual harassment, the Merit study Systems carried out in 1981 in the public services of America with the participation of 20,000 employees, showed that, with modest estimates, the cost to the Federal government, due to incidents of sexual harassment, amounted to 189 million dollars per two years. The high cost is due to lost hours of work and productivity due to the physical and emotional state of the victims. A recent study in Australia in 2019 by Deloitte shows that the cost is extremely high. Sexual harassment is therefore a serious individual, work and social issue that needs to be addressed promptly.

Coping with mobbing, bullying and sexual harassment through Lifelong learning programs

Most victims of mobbing, bullying and sexual harassment try to deal with the situation passively, simply trying to ignore it. This attitude is linked to the phenomenon of internalized oppression, according to which responsibility is transferred from the abuser to the victim. The phenomenon of *internalized oppression* (Tappan, 2006) explains to a significant extent the ways in which the dominant culture reproduces stereotypical perceptions of the role of women in the workplace and prevents them from claiming a hierarchically superior position. It also pressures them to be unable to respond directly to comments that offend their dignity and principles. The result is the cultivation of the culture of silence, a concept introduced by Paulo Freire (Edwards, 2017). The culture of silence reinforces the passive and suppressed self-image of women. The woman turning against herself, feels guilt and shame, fear and anxiety and is unable to defend herself openly. The culture of silence is not a solution. It encourages the abuser to continue the harassment and/or escalate the violence and isolates the victim. Therefore, it is of great importance that the workplace itself takes a primary role in dealing with the phenomenon, with specific actions and policies to strengthen human resources.

Sexual harassment should be dealt with by the workplace itself, as defined by the relevant law 3896/2010 on " *Implementation of the principle of equal opportunities and the equal treatment of men and women in matters of work and employment",* according to which sexual harassment constitutes gender discrimination. The employer can be considered jointly responsible for incidents of harassment, even when they do not come from him but from other employees towards their colleagues (Commission of the European Communities, 1993). He is therefore obliged to take the necessary measures and sexual harassment needs to be addressed within the organization or business, through appropriate interventions and personnel policies. In this area, lifelong learning has a significant role to play These include the establishment of a committee of professional ethics and ethics to study and record the phenomenon in the workplace and to submit proposals to deal with it, to the administration. Employees need to be informed of the procedures they can follow to report an incident through specifically designed lifelong learning programs. However, it is of great importance that the process is not limited only to the possibility of reporting incidents, which may not be resolved. In this case, the risk of perpetuating the problem, especially when the company does not provide solutions, is great. The victim remains exposed and mentally and morally traumatized, but the climate in the business is also pathological. It can also perpetuate the cycle of confrontation between different work groups, culminating in the strengthening of prejudice, stigma, and depersonalization.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Therefore, lifelong learning programs for preventing the phenomena and coping with trauma when necessary are urgently needed.

A risk often encountered in business is that the victim is held responsible for the behavior of the abuser. This phenomenon is based on the psychological principle of the *fundamental attribution error*.

The term, *fundamental attribution error*, was introduced by Ross (1977) and it is referred on how individuals tend to judge a situation, based on a person's characteristics, and ignoring the circumstances under which the event has occurred (McLeod, 2018). For example, some women can easily be accused of causing sexual harassment because of their dress or general behavior. Especially when a group of employees has rallied around the abuser for various reasons (e.g., he is a boss, etc.), they may give their own interpretation of the incident, blaming the victim. In this case, the group sees only their own perspective, is influenced by their emotions, and holds the victim accountable, rather than the perpetrator. The fundamental attribution error explains why we may criticize some people for unethical behavior and at the same time excuse others for the exact same behavior. In this context, sexual harassment, when it comes from a powerful member of a group, is rationalized, and justified, with the result that the victim remains exposed, her complaint is devalued and socially is isolated. The group rallies around the abuser, and the victim remains helpless. Therefore, lifelong training programs on the causes and the etiology of the phenomenon from the different theoretical perspectives are needed to ensure that the risks for the fundamental attribution error are minimized.

Sometimes, the paradoxical phenomenon occurs**,** that the group feels satisfaction for the abuse of the victim, identifies with the abuser and expresses its empathy towards him (Bongiorno et al., 2019). However, when the group rallies around the victim, recognizes, and understands their problems, becomes emotionally attached to them, and the victim feels part of the group, then the issue of sexual harassment becomes the issue of the whole group and not just one individual and can be easier to solve. The group is essentially involved in solving the problem, social and mental stress is reduced, the results are positive and " *Social Therapy* " occurs (Haslam et. al., 2018). In this context lifelong learning training programs introducing empathy, self-help, and mutual help, can be of fundamental value.

Coping with the phenomena of harassment and bullying is also important for the organizations themselves, as labor relations are characterized by mutual interdependence. Their effective and sustainable operation needs to be based on trusting relationships than on harassment and intimidation, as the feelings of anxiety, anger and fear eventually lead the individual to turn against the leadership, spread throughout the business and "contaminate*"* (Klein, 1985) work relations by dominating logic.

For a person to be able to deal with a behavior, they must first be able to recognize it. Many times, the recognition of a negative behavior, especially when it is expressed in underground ways, is not easy. We may often wonder if we are really "on target" or if we are exaggerating our thoughts and reactions. After all, each person perceives experiences differently, has a different degree of tolerance and resistance to stress. In this context, lifelong learning programs can assist in separating what is considered harassment from what is to be considered an innocent flirt or a bad moment in the communication process.

It is interesting to note that, especially in the case of harassment, due to various forms of discrimination, the effects, depending on the personal situation of each person, the resistances, endurances, and identifications

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

they make, are different. One person can react effectively while another experiences sadness, anger and guilt and these feelings gradually lead him to a state where she/he finally internalizes the oppression she/he is under. This phenomenon is *called internalized oppression* (Tappan, 2006) and occurs when, for example, the person who is in a socially vulnerable position or experiences harassment due to her/his different characteristics from the dominant group, gradually begins to believe that the prevailing negative social stereotypes about the group from which she/he originates is correct. Typical is the example of a woman who finds it difficult to claim a higher hierarchical position, ultimately believing that she will not be able to respond to her multiple roles. This has the effect of accepting, turning against herself, the prejudices of the dominant group about the position of women in the workplace, unconsciously considering that she is in an inferior professional position (Griffin, 1997). Lifelong learning programs focusing on transformation theory, critical thinking and critical education are significant for understanding and changing the roots of internalized oppression.

The inability to deal with a dysfunctional situation in a toxic work environment is also associated with feelings of shame that are often felt by people who are the recipients of harassment, but also with the feeling of fear and anxiety. These feelings prevent them from functioning effectively and directly confronting the person who is harassing them. When the person tries to deal with the situation, it is important that she/he manages her/his emotions in principle, so that she/he can openly and without fear confront the people who are harassing her/him. In this context, anger management programs can be useful in preparing for direct confrontation.

In any case, however, it should be noted that in addition to the individual, each company has responsibility for dealing with mobbing, bullying and sexual harassment in the workplace and this responsibility also derives from the relevant legislation. It is therefore no coincidence that many modern companies emphasize the development of human resources departments and the utilization of human resources. Their choice is not random. It is based on the understanding of the need to create a positive work climate that encourages positive communication and bonding between staff members and is linked to increased productivity.

The culture of any business or organization is usually reflected in their structure and management. In toxic cultures, behaviors are toxic and often lead employees to quit. However, this does not mean that the culture cannot be changed. Lifelong training programs can offer pathways to change in the way of management but also in the approach and training of human resources. Adult educators and organizational psychologists who recognize the importance of culture in organizations and businesses can play an important role in this field.

The social support network that develops within a company or organization has a special role. The continuous supervision of the leadership team ensures the development of a positive culture in an organization or business to reduce the phenomena of harassment and workplace mobbing and bullying. In addition, organizations and businesses should include the development of social support networks in interventions that deal with workplace mobbing and bullying (Nielsen et. al., 2020), as is also required by modern legislation. Handling harassment incidents by executives who are unable to address the issues brought by employees, possibly because they do not have the authority to resolve various work-related issues, is ineffective.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Conclusion

Each organization or company needs to assume the responsibility of creating mechanisms to prevent the phenomenon, to protect both the victim and the working environment. However, several times more emphasis is placed on how to protect the organization than the victim. In these cases, there is a risk that the perpetrator will be treated better than the victim, and the case will be covered up so that it does not reach the courts. The situation then gets worse. Therefore, when an organization truly wishes to deal with the phenomenon of mobbing, bullying and sexual harassment in the workplace, it is necessary to take the following measures:

o   Conduct regular surveys to record the phenomenon but also investigate the prevailing culture to identify the risk of discrimination against women and/or other groups.

o   Compile a code of professional ethics and conduct for workplace behavior, of which all staff will be aware from the beginning of their employment.

o   Establish a Professional Ethics and Ethics Committee where victims will be able to report incidents, with respect for confidentiality and privacy of information.

o   Conduct regular information-awareness seminars for staff and leadership on ways to deal with the phenomenon in the workplace.

Training and re-training of staff and leadership on ethical and sexual harassment issues. Tippett (2018) points out that in the design of training programs, it is worth considering various parameters that will allow the dysfunctional assumptions of different participants on the issue of sexual harassment to be explored in depth and presented, beyond theory and legislation and actual incidents of sexual harassment from the workplace.

Investigate reported incidents and resolve issues in collaboration with management and the labor union where possible.

Organizational culture can change for the better. The recent law envisages zero tolerance towards violence and harassment and working with labor unions can go a long way towards this. Nevertheless, the fact remains that until today not enough steps have been taken in the workplace to deal with sexual harassment and the stress that accompanies the people who experience it. There is much room for improvement and change, but the cooperation of all employers, workers and labor unions is required to tackle the problem as a whole and to make organizations and businesses safe working environments, with respect for diversity and with a vision for harnessing new ideas and innovation. Addressing the phenomenon of sexual harassment will help beyond the employees, the organization itself to transform from a pathological system to an organization of learning, development, innovation and change and to ensure its long-term sustainability.

Therefore, companies and organizations that want to deal with the phenomena should follow a series of interventions within Lifelong learning programs, such as employee awareness seminars, systematic group supervision by an external supervisor for issues of harassment and/or other incidents of violence, publication of an information leaflet on tackling discrimination in the workplace and cooperation with labor unions to deal with the phenomenon. Also, labor unions can play a vital role in placing the issues of harassment and workplace mobbing and bullying at the center of collective bargaining. Elected representatives of the workers

who enjoy trust, can be trained to recognize these incidents, and offer immediate support to the workers in case of protest and carry out campaigns to inform the workers about the phenomenon.

References

Allport, GW. (1954). *The nature of prejudice.* Addison-Wesley.

Bechtoldt, MN, Bannier, CE, & Rock, B. (2019). The glass cliff myth? - Evidence from Germany and the UK. *Leadersh, 30*, 273–297. doi: 10.1016/j.leaqua.2018.11.004

Berdahl, J. L. (2007). The sexual harassment of uppity women. *Journal of Applied Psychology, 92* (2), 425–437. https://doi.org/10.1037/0021-9010.92.2.425

Bongiorno, R., Langbroek, C., Bain, PG, Ting, M., & Ryan, MK (2020). Why Women Are Blamed for Being Sexually Harassed: The Effects of Empathy for Female Victims and Male Perpetrators. *Psychology of Women Quarterly, 44*(1), 11–27. https://doi.org/10.1177/0361684319868730

Deloitte Access Economics (2019). *The economic costs of sexual harassment in the workplace: Final Report.* https :// www 2. deloitte . com / content / dam / Deloitte / au / Documents / Economics / deloitte - au - economic - costs - sexual - harassment - workplace -240320. pdf

Dianeosis (2022). What Greeks Believe in 2022, Part B. https://www.dianeosis.org/en/2022/09/what-greeks-believe-%ce%b9n-2022-part-b/

Edwards, R. (2017). A culture of Silence. *The Liberator Magazine.* https://repositories.lib.utexas.edu/bitstream/handle/2152/61646/A%20Culture%20of%20Silence.pdf?sequence=2&isAllowed=y

Einarsen, S., Hoel , H. & Notelaers , G. (2009). Measuring exposure to bullying and harassment at work: Validity, factor structure and psychometric properties of the Negative Acts Questionnaire-Revised. *Work & Stress, 23*(1), 24-44. DOI: 10.1080/02678370902815673

Einarsen, S. (1999). The nature and causes of bullying at work. *International Journal of Manpower, 20,* 1627.

Einarsen, S., Hoel, H., Zapf, D., & Cooper, CL (Eds.). (2003*). Bullying and emotional abuse in the workplace. International perspectives in research and practice.* Taylor & Francis.

European Parliament (2018). Bullying and sexual harassment at the workplace, in public spaces, and in political life in the EU – Study for the FEMM Committee, research paper by the Directorate-General for Internal Policies, Publications Office of the European Union, 2018, p. 30. https://www.europarl.europa.eu/RegData/etudes/STUD/2018/604949/IPOL_STU(2018)   604949 _EN.pdf

European Parliament and Council of the European Union (2006). *DIRECTIVE 2006/54/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 July 2006 on the implementation of the principle of equal opportunities and equal treatment of men and women in matters of work and employment (recast). Official Journal of the European Union, L204/23, 26/7/2006.* https :// eur - lex . Europe . eu / legal - content / EL / TXT / PDF /? uri = CELEX :32006 L 0054& from = BG

European Union (2015). Study on the implementation of the autonomous framework agreement on harassment and violence at work - Final report. Luxembourg: Publications Office of the European Union doi: 10.2767/8998

Farley, L. (1978*). Sexual shakedown: The sexual harassment of women on the job.* Warner.

Fitzgerald, LF, Gelfand, MJ, & Drasgow, F. (1995). Measuring Sexual Harassment: Theoretical and Psychometric Advances. *Basic and Applied Social Psychology, 17*(4), 425-445. https://doi.org/10.1207/s15324834basp1704_2

Fitzgerald, L. F., & Cortina, L. M. (2018). Sexual harassment in work organizations: A view from the 21st century. In C. B Travis, J. W. White, A. Rutherford, W. S. Williams, S. L. Cook, & K. F. Wyche (Eds.), *APA handbook of the psychology of women: Perspectives on women's private and public lives* (pp. 215–234). American Psychological Association. https://doi.org/10.1037/0000060-012

FRA (2014). Violence against women: an EU-wide survey – Main results, Publications Office of the European Union, Luxembourg, 2014. https://fra.europa.eu/sites/default/files/fra_uploads/fra-2014-vaw-survey-main-results-apr14_en.pdf

Griffin, P. (1997). Introductory module for the single-issue courses. In M. Adams, LA Bell, & P. Griffin (Eds.), *Teaching for diversity and social justice: A sourcebook* (pp. 61–81). Routledge.

Goodman, JL. (1978). Sexual demands on the job. *The Civil Liberties Review, 4*(6).

Haslam, C., Jetten, J., Cruwys, T., Dingle, G., & Haslam, SA (2018*). The New Psychology of Health: Unlocking the Social Cure* (1st ed.). Routledge. https://doi.org/10.4324/9781315648569

Hoel, H. & Vartia, M. (2018). Bullying and sexual harassment at the workplace, in public spaces, and in political life in the EU, Directorate General for Internal Policies Policy, Department for Citizen's Rights and Constitutional Affairs, Women's Rights and IME /GSVEE. https //imegsevee . gr / wp - content / uploads /2021/02/ makri . pdf

Klein, M., (1985). Our adult world and its roots in childhood. In Colman, AD and Leymann, H. (1990). *Mobbing and psychological terror at workplaces. Violence and Victims, 5*(2), 119126.

Leymann, H. (1996). The content and development of mobbing at work. *European Journal of Work and Organizational Psychology, 5*, 165184.

Leskinen, EA, & Cortina, LM (2014). Dimensions of Disrespect Mapping and Measuring Gender Harassment in Organizations. *Psychology of Women Quarterly, 38* (1), 107-123.

MacKinnon, C. (1979). *Sexual Harassment of Working Women: A case of sex discrimination.* Yale University Press.

McKinsey (2021). *Women in the workplace 2021*. https://www.mckinsey.com/~/media/mckinsey/featured%20insights/diversity%20and%20inclusion/women%20in%20the%20workplace%202021/women-in-the-workplace-2021.pdf

McLeod, SA (2018). *Fundamental attribution error.* Simply Psychology. www.simplypsychology.org/fundamental-attribution.html

McLaughlin, H., Uggen, C., & Blackstone, A. (2012). Sexual Harassment, Workplace Authority, and the Paradox of Power. *American Sociological Review, 77* (4), 625–647. https://doi.org/10.1177/0003122412451728

Mead, M. (1978). *A proposal: We need taboos on sex at work.* Redbook (April). https://documents.alexanderstreet.com/d/1000678415

Morgenroth, T., Kirby, TA, Ryan, MK, & Sudkämper, A. (2020). The who, when, and why of the glass cliff phenomenon: A meta-analysis of appointments to precarious leadership positions. *Psychological Bulletin, 146* (9), 797–829. https://doi.org/10.1037/bul0000234

Mulcahy, M., and Linehan, C. (2014). Females and precarious board positions: further evidence of the glass cliff. *Bro. J. Manag. 25*, 425–438. doi: 10.1111/1467-8551.12046

Misawa, M., Andrews, J. & Jenkins, K. (2019). Women's experiences of workplace bullying: A content analysis of peer-reviewed journal articles between 2000 and 2017. *New Horizons in Adult Education & Human Resource Development, 31*(4), 36-50.

Nielsen, M. B., Harris, A., Pallesen, S., Einarsen, S. V. (2020). Workplace bullying and sleep – A systematic review and meta-analysis of the research literature. *Sleep Medicine Reviews, 51*, 101289. https://doi.org/10.1016/j.smrv.2020.101289

Nielsen, MB, & Einarsen, S. (2012). Outcomes of Exposure to Workplace Bullying: A Meta-Analytic Review. *Work & Stress, 26*, 309-332. https://doi.org/10.1080/02678373.2012.734709

Raihani, N. (2017). Safety in numbers. *New Scientist*, 236, 24–25. doi:10.1016/S0262-4079(17)32115-2.

Rayner, C., & Keashly, L. (2005). Bullying at work: A perspective from Britain and North America. In S. Fox & PE Spector (Eds.), *Counterproductive behavior. Investigations of factors and targets* (pp. 271-296). American Psychological Association.

Romero, K. (2018). *Empathy and Campus Sexual Assault (CSA) communication: Protecting the well-being and social equity of college women* [Master's alternative plan paper, Minnesota State University, Mankato]. Cornerstone: A Collection of Scholarly and Creative Works for Minnesota State University, Mankato. https :// cornerstone . lib . mnsu . edu / etds /898/

Ross, L. (1977). The Intuitive Psychologist and His Shortcomings: Distortions in the Attribution Process1. *In Advances in experimental social psychology,10,* 173-220. Academic Press.

Rosander, M., Salin, D., Viita, Al. & Bloomberg, S. (2020). Gender Matters: Workplace Bullying, Gender and Mental Health. *Frontiers in Psychology, 11*, Article 560178. doi: 10.3389/fpsyg.2020.560178

Russell, D. (1986). *Sexual exploitation: Rape, child sexual abuse and workplace harassment,* 155. Sage Library of Social Research.

Salin, D. (2018). "Workplace bullying and gender: an overview of empirical findings". In P. D' Cruz, E. Noronha, C. Caponecchia, J. Escartín, D. Salin, and MR Tuckey (eds), *Dignity and Inclusion at Work* (pp. 1–31). Springer.

Samuel, H., (2003). Sexual harassment in the workplace: a feminist analysis of recent developments in the UK. *Women's Studies International Forum, 26*(5), 467-482, https://doi.org/10.1016/j.wsif.2003.08.004 .

Silverman, D. (1981). *Sexual harassment: The working women's dilemma. Building Feminist Theory: Essays from quests*. Longman.

Solnit, R. (2018). *Rebecca Solnit on the #MeToo Backlash: Stop telling us how to confront an epidemic of violence and abuse* [Web log message]. https://lithub.com/rebeccasolnit-on-the-metoo-backlash/

Superson, A. (1993). A feminist definition of sexual harassment. *Journal of Social Policy, 24* (1), 46-64.

Tangri, S., Burt, M. and Johnson, L. (1982). Sexual harassment at work: Three explanatory models. *Journal of Social Issues*, *38*(4), 33–54.

Tappan, M. (2006). Reframing Internalized Oppression and Internalized Domination. *Teachers College Record, 108*(10), 2115–2144.

Thurston, R., Chang, Y., & Matthews, K. (2019*). Association of Sexual Harassment and Sexual Assault With Midlife Women's Mental and Physical Health.* JAMA Intern Med. DOI: 10.1001/jamainternmed.2018.4886

Tippett, E. (2018). Harassment trainings: A content analysis*. Berkeley Journal of Employment & Labor Law,* (forthcoming 2018). https :// papers . ssrn . com / sol 3 / papers . cfm _ abstract _ id =2994571

Zapf, D., Escartìn, J., Scheppa-Lahyani, M., Einarsen, SV, Hoel, H., & Vartia, M. (2020). "Empirical findings on prevalence and risk groups of bullying in the workplace," in *Bullying and Harassment in the Workplace: Theory, Research and Practice,* 3rd Edn, eds SV Einarsen, H. Hoel , D. Zapf, and CL Cooper (Boca Raton, FL: CRC Press), 105–162. Doi: 10.1201/9780429462528-5.

Reflecting on the Educator's self-efficacy through the lens of Transformative Learning
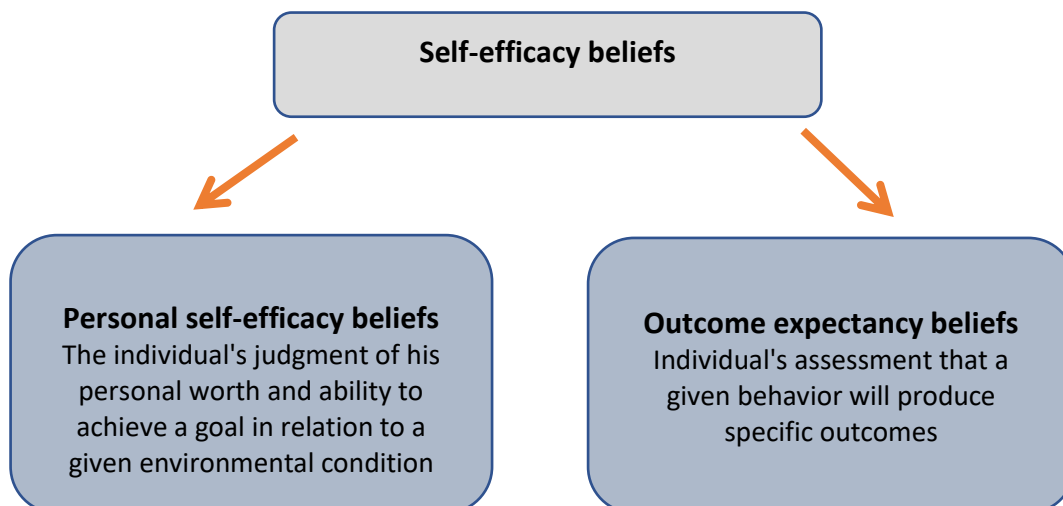
Eirini TZOVLA & Katerina KEDRAKA

Democritus University of Thrace

Introduction

The Social Cognitive Theory of learning interprets behavior as the result of the interaction of personal, behavioral, and environmental factors (Bandura, 1977). One of the basic concepts of this theory is the concept of self-efficacy, which refers to the way a person perceives himself, interprets events, determines his motivations, and expectations, and is a strategic factor in human action and motivation. Self-efficacy affects all aspects of a person's life either directly through the success of an undertaking or indirectly through its influence on goals and is more related to the way the person himself perceives his successes than to the objective concept of success. Bandura (1982) states that in the interaction of people with their environment their estimates of their capabilities are formed, which influence both their thought patterns and their emotional reactions and points out that those who judge themselves to be inadequate relative to the demands of their environment, they maximize potential future difficulties.

In the frame of the concept of self-efficacy, Bandura (1997) includes self-efficacy beliefs, which concern the individual's opinions about his ability and the positive or negative judgment about himself, and analyzes them into personal self-efficacy beliefs and outcome expectancy beliefs, as presented in Figure 1.1.


```
                    ┌─────────────────────────┐
                    │   Self-efficacy beliefs │
                    └─────────────────────────┘
           ┌────────────────┴──────────────────┐
┌──────────────────────────┐      ┌──────────────────────────┐
│ Personal self-efficacy   │      │ Outcome expectancy       │
│ beliefs                  │      │ beliefs                  │
│ The individual's judgment│      │ Individual's assessment  │
│ of his personal worth and│      │ that a given behavior    │
│ ability to achieve a goal│      │ will produce specific    │
│ in relation to a given   │      │ outcomes                 │
│ environmental condition  │      │                          │
└──────────────────────────┘      └──────────────────────────┘
```

Figure 1.1. *Self-efficacy beliefs*

According to Bandura (1977), personal self-efficacy beliefs are influenced by the social environment and concern the individual's judgment about his personal worth and ability to achieve a goal in relation to a certain environmental condition. Outcome expectancy beliefs refer to the belief that one can successfully

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

perform the behavior required to produce outcomes (Bandura, 1977). Personal self-efficacy expectations answer the question "Can I do it?", while outcome expectations answer the question "If I do it, what will happen?". Low personal self-efficacy beliefs make individuals feel that they lack the ability to succeed, while low outcome expectations create feelings of failure and disappointment. Personal self-efficacy beliefs may be related to expected outcomes without this being necessary (Usher & Pajares, 2008).

Conceptual clarifications

A precursor to self-efficacy theory is Rotter's theory of locus of control, which was developed in the context of social learning theory and advocates that the individual can learn through observing and imitating the behavior of other individuals. The concept of locus of control, however, is not identical to the concept of self-efficacy, as it concerns the causal relationship between actions and results, while self-efficacy concerns the individual's belief in his abilities. Self-efficacy is the result of the individual's judgment of what he achieves using his skills, it is related to the adoption of a specific way of thinking and behaving and it depends on the environment and the specific goal at a time.

Bandura (1997) states that self-efficacy in the early years of a person's professional development can change, and Tschannen-Moran and Hoy (2007) note that in later years it is consolidated and advocate that self-efficacy beliefs can become self-fulfilling prophecies with what this implies for one's professional role.

The concept of self-efficacy is often confused with other concepts that have the prefix self as their first constituent. However, these concepts are not synonymous. Specifically, the term self-efficacy differs from the term self-concept, as it refers to the individual's belief in his abilities, to achieve a specific task in specific circumstances, it is related to the comparisons he makes with himself or with others and is the cognitive side of the self, while self-concept is related to the surrounding culture and is the emotional side of the self (Bandura, 2006). Therefore, self-concept refers to one's perceptions of oneself, which are shaped through experiences and interpretations of the environment and are influenced by others' evaluations (Schunk & Pajares, 2009), while self-efficacy refers to goal-oriented abilities. Also, self-efficacy is differentiated from the concept of self-esteem (self-esteem), which according to Schunk and Pajares (2009) is a general self-evaluation and concerns the individual's judgment of his worth. More specifically, self-efficacy refers to the person's "can", while self-esteem refers to "how" the person feels about himself.

Similarly, self-efficacy is also differentiated from the concept of self-confidence, a term which, according to Rice and Roychoudhury, (2003) and Watters and Ginns (2000), is mainly a conversation rather than an educational construct, but has the advantage that it is better known and understood by researchers than the more technical term self-efficacy. Schunk and Pajares (2009) also state that self-confidence is a general ability without specifying its object. Usually, people with high self-efficacy also have high self-efficacy but Bandura (1997) notes that the two concepts are not equivalent, although they are similar in that they both emphasize the strength of beliefs. In conclusion, self-efficacy is a stronger predictor than self-concept and self-esteem.

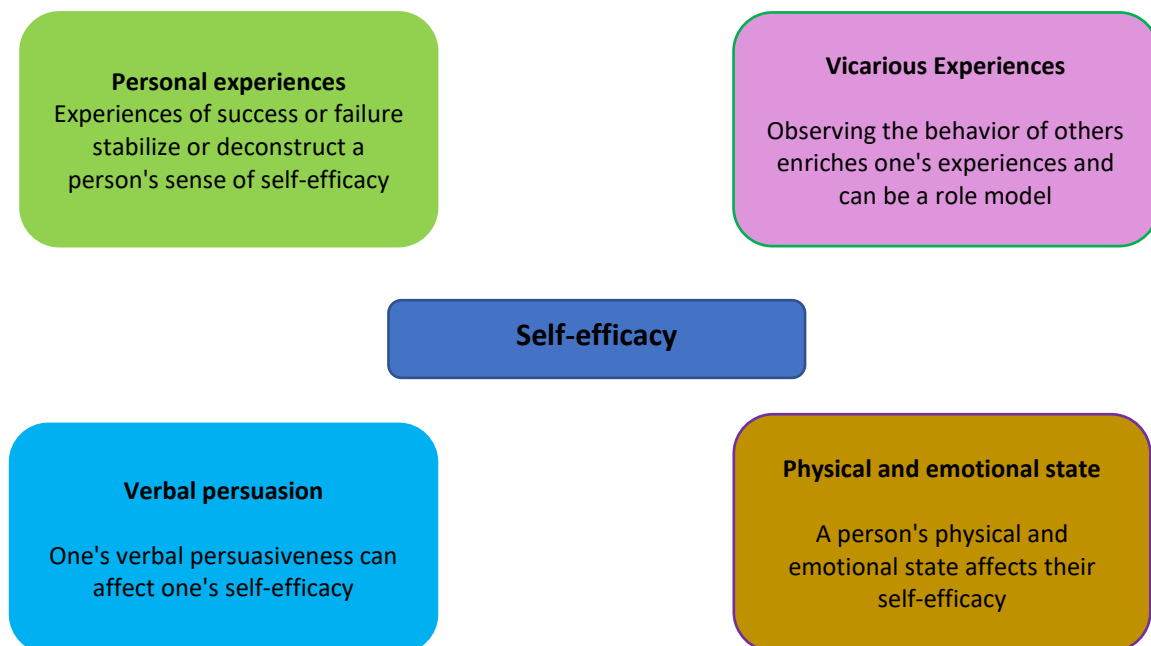**Sources of shaping self-efficacy**

Self-efficacy is not an autonomous and independent concept, but according to Bandura (1997) it is formed in relation to 4 sources, consisting of the following and presented in Figure 2.1:

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Personal experiences (Mastery experiences - performance attainments), which are related to the experiences of the individual and the successes or failures he had in the past. They are a powerful source of information about one's self-efficacy, authentic evidence of whether one can achieve, They directly influence self-efficacy beliefs, and are considered the most important source of shaping one's self-efficacy (Bandura, 1997). People prefer to attempt an action when they have a prior relevant experience of similar action, and their self-efficacy increases when they achieve a difficult task. The interpretation of a person's successes influences their self-efficacy beliefs and is a predictive factor, which further enhances the striving for success. As far as educators, especially young people in the profession, content knowledge of knowledge objects can contribute to improving their self-efficacy and should be part of their personal experiences.

• **Vicarious experiences** are linked to the experiences of other people. The imitation of models is one of the basic premises of social learning. In other words, by observing the successes of others, one seeks to succeed himself and to improve his self-efficacy, while the degree of identification of the observer and observed plays an important role. Exemplary experiences encourage the observer to perceive their personal beliefs about their own competence in similar situations (Gibbs, 2003). Schunk and Pajares (2009) state that observing the success of someone with similar abilities to the observer, strengthens his disposition to try to succeed, while correspondingly observing the failure of the role model discourages the observer from trying. Of course, the choice of the model plays a catalytic role, as observers use the messages they get from the model and subsequently, extend their behavior beyond the observed behavior (Bandura, 1991). An indicative example of this source of formation of self-efficacy for educators can be their participation in discussions about curriculum, with issues of effective teaching and/or when they observe other colleagues and subsequently, coordinate their teaching with the teaching of the model.

Verbal persuasion and related social influences refers to the advice of others. The above source of formation of self-efficacy can contribute to its improvement, as the person can be convinced of his ability from oral discussions with others and overcome some difficulties. Schunk and Pajares (2009) report that individuals who possess persuasiveness skills can strengthen other individuals' self-efficacy beliefs while convincing them that success is possible. The reinforcement and positive feedback that the individual receives from his or social environment can work positively and improve his self-efficacy, while negative feedback can weaken his/her self-efficacy. It should be noted, however, that verbal persuasion should have a realistic basis because otherwise it creates unrealistic beliefs, leads to failure, and has limited power on its own (Gibbs, 2003). At the level of educators, this can take the form of positive feedback from the supervisor or colleagues, positive reinforcement, cooperation, and taking on tasks with a common goal.

Physiological and affective states, affect the emotional reactions of individuals and are influenced by the support system and the reward system that accompanies them. A person's mental and physical well-being affects their potential for future behavior and can affect their later performance and self-efficacy. A person's mood, intensity and sources of emotional arousal, stress, interpretation of physical and emotional states, perceptions, and past experiences affect self-efficacy. Schunk and Pajares (2009) report that negative thoughts and fears about one's abilities reduce one's self-efficacy, create additional stress, and worsen fear management. Therefore, one way to increase one's self-efficacy is to improve one's physical and emotional state and reduce emotional tensions.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Personal experiences
Experiences of success or failure stabilize or deconstruct a person's sense of self-efficacy

Vicarious Experiences

Observing the behavior of others enriches one's experiences and can be a role model

Self-efficacy

Verbal persuasion

One's verbal persuasiveness can affect one's self-efficacy

Physical and emotional state

A person's physical and emotional state affects their self-efficacy

Figure 2.1. *Sources of shaping self-efficacy*

The above are not objective indicators of a person's abilities and their self-efficacy is influenced by their subjective judgment and the way they cognitively process information. Self-efficacy according to Bandura (1997) essentially mediates between knowledge and practice, so that knowledge is transformed into practice and has an effect both on the choice of goals and on the motivation of individuals and their emotions.

Self-efficacy and educators

Effective teaching is directly related to educators' self-efficacy, which refers to the belief in their abilities to teach effectively and influence student achievement (Hoy et al., 2009). Educators' self-efficacy is influenced by their personal perceptions of their ability to help students learn (Tschannen-Moran et al., 1998), it affects the way they feel, think, motivate, and behave (Bandura, 1993) and should be considered in the context of student achievement, classroom management, and time management strategies (Tschannen-Moran & Hoy, 2007). However, it should always be considered that educators operate within a specific social context, by which they are influenced and which they influence and therefore are both products and producers of it (Pajares, 1996). In addition, educators' self-efficacy and insights gained during their professional life are influenced by the training they have received (Brousseau et al., 1988) and many researchers (Fives & Buehl, 2012; Kazempour & Amirshokoohi, 2013) report that educators' sense of self-efficacy affects their orientation towards the educational process and therefore their educational practices, learning outcomes and the student's self-efficacy itself. Regarding self-efficacy beliefs, Dellinger et al. (2008) define them as educators' individual beliefs in their abilities to perform specific teaching tasks at a specific level of quality in a specific situation. These concern the perception that the educator has of himself regarding his teaching and

determine the educational identity of the educators and the teaching practices they adopt (DiBiase & McDonald, 2015).

In a meta-analysis of 88 studies, Ross (1994) reports that personal characteristics of educators and the school subjects are related to educators' personal self-efficacy beliefs and student achievement and points out that educators with high self-efficacy incorporate innovations into their lessons, capitalize on challenges, adopt classroom control techniques that enhance student autonomy and reduce control, promote cognitive and affective goals in their teaching, strengthen weak students, whole class confidence, and foster a collaborative culture. Self-efficacy is a dynamic state that changes under the influence of experiences, acquired knowledge and skills, successes, and failures of the individual. Bandura (1997) states that at the beginning of educators' professional life, self-efficacy beliefs are more malleable, so it is useful to structure them correctly from the beginning. Additionally, Madden and Weibe (2015) point out that educators' self-efficacy beliefs are anchored on their previous teaching experiences, Skaalvik and Skaalvik (2010) advocate that educators' self-efficacy increases with job satisfaction, and Şeker and Alisinoğlu (2015) note that academic knowledge and skills have a positive effect on self-efficacy.

Schunk and Pajares (2009) link self-efficacy to motivation, and Bandura (1982, 1994) states that a high sense of self-efficacy challenges educators to attempt difficult achievements. Chan et al. (2008) state that educators with high self-efficacy develop a stronger commitment to their work, and Brouwers and Tomic (2000) and Egyed and Short (2006) find that they are less absent, have less stress and report by their superiors as competent persons. In addition, these educators are more motivated towards their teaching, giving it a more humanistic orientation (Hoy & Woolfolk, 1990). Also, Azar (2010), reports that a high level of personal self-efficacy leads to high performance and increased motivation prompts educators to exert more effort and influences educational methods and the quality of education, while Caprara et al. (2003) note that these educators take curricular risks, experiment with new teaching methods in order to meet the needs of their students, are supportive of them and encourage them to become autonomous.

In addition, Hoy et al. (2009) report that educators' sense of self-efficacy shapes their behavior in the classroom, Riggs, and Enochs (1990) highlight that educators spend time teaching subjects for which they feel they are effective, while Newberry and Davis (2008) document that high self-efficacy can unleash educators' interest in their students. In the same frame, Pintrich and Schunk, (2002) advocate that when educators have high self-efficacy their personal skills and personal motivation improve, and Emmer and Hickman (1991) note that educators with high self-efficacy tend to adopt positive strategies in their teaching in contrast to educators with low self-efficacy who tend to adopt restrictive strategies.

Similarly, Gibson and Dembo (1984) link educator self-efficacy to the adoption of new pedagogical practices, spending more time on academic learning and strengthening students with difficulties. Schunk (2012) states that educators with increased self-efficacy are more positive toward students' ideas and towards creating a supportive learning climate, and Ashton (1984) records that educators with high self-efficacy are less critical of their students' mistakes. Lumpe et al. (2012) also report that educators with high self-efficacy adopt discovery learning and the student-centered teaching model, while educators with low self-efficacy generally adopt the educator-centered teaching model, give up trying to support students when there are no quick

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

results, they critical of them, focus on extrinsic motivation, and have difficulty setting goals for them (Mojavezi & Tamiz, 2012).

Educator self-efficacy is directly related to learning outcomes. Ashton (1984) points out that no other educator characteristic is as closely related to student achievement, and Zee and Koomen (2016) highlight the positive correlation between high self-efficacy and learning outcomes. Accordingly, Bandura (2006) notes that educators' self-efficacy affects students' self-efficacy Furthermore, it has been found that educators' self-efficacy affects students' attitudes towards the subjects, is related to their behavior in the classroom and the adoption of new ideas, and has an impact on both the choice of activities and the classroom management style that educators choose. (Tschannen-Moran & Hoy, 2001).

Educators' professional development and self-efficacy

At a time when Lifelong Learning in the professional area of Education is a one-way street, as changes in this field are rapid, it is important that their professional development is supported by those adult learning theories, which advocate that the educator's professional development is more the result of a continuous interaction between learning and experience, as experience activate critical reflection (Vergidis, 2022). As far as this experience is concerned, it is acquired either informally through the interactions that take place in the educators' workplace or through institutionalized formal forms of professional development such as short or longer training activities, mentoring in-service training, and postgraduate studies. Both of the above forms of professional development can strengthen the professional identity of the educator, the critical way of professional thinking, his self-efficacy, and ultimately the quality of the services provided by professional educators. In addition, this evolutionary process allows the educator to be the shaper of his professional path, to plan and manage his learning and career effectively, to achieve a greater balance between his personal and professional life (Kedraka, 2022), to think and reflects critically and transforms his educational practices (Guskey, 2002).

The effectiveness of professional development programs has concerned many researchers (Darling-Hammond et al., 2017; Gaible & Burns, 2005), who shape a series of characteristics that are able to contribute to the effective professional development of educators. In this frame, a number of studies document professional development as a key driver of change and improvement in education (Putnam & Borko, 2000), while others (Hanushek, 2008; Ravandpour, 2019), identify the importance of educators' professional development and argue that targeted professional development programs can contribute significantly to increasing their self-efficacy and change of their professional identity, a finding that is close to the concept of transformative learning as defined by Illeris (2017), who links this learning to the change of the latent identity.

Fritz et al. (1995) also concluded that participants in a professional development program had a higher index of self-efficacy, namely, those who utilized the educational materials used in the program, Ross and Bruce (2007) find in their research that the experimental group that participated in a professional development program had higher self-efficacy than the control group, Goddard et al. (2000) and Ross et al. (2001) state that educators' perceptions of teaching influence learning and therefore need to be considered when designing professional development programs and Mulholland et al. (2004) in their own research attribute

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

the improvement of self-efficacy to the utilization of representative and vicarious experiences, which Bandura mentions in his theory.

Additionally, Moseley et al. (2003) point out that long-term professional development programs accompanied by ongoing support increase self-efficacy, which declines when educators return to their teaching duties and cease to be supported. Also, Blank et al. (2008) and Darling-Hammond and Richardson (2009) observe that the duration of these programs, their relevance to the curriculum, the continuous support of educators and the cooperation between them are key success parameters of such a program, while Gibbs (2003) focuses on the adoption of strategies that detect educators' emotional arousal and techniques that help them control their emotions and moods. Well-designed actions that actively involve educators offer them the possibility to increase their personal self-efficacy and the possibility of improving learning outcomes (Aji & Khan, 2019).

The professional development of educators through the prism of Transformative Learning

Focusing on educators as an adult education group we argue that their participation in professional development programs can contribute to the transformation of dysfunctional frames of reference, as the exchange of experiences that takes place within these programs can activate critical reflection and therefore affect their self-efficacy. Given that self-efficacy is a dynamic process, critical reflection on entrenched self-efficacy beliefs contributes to their critical consideration and revision, allowing educators to get rid of distorted assumptions and become "collaborative thinkers" (Mezirow, 2000).

However, educators' professional development programs aimed at enhancing their self-efficacy should be very well structured, implemented in terms of adult education, facilitate the transformation process, and educators should be sufficiently qualified to shape educational environments, which will allow educators to restructure entrenched self-efficacy beliefs (Magnusson et al., 1999). A number of models of educators' professional development speak of a transformation of their perceptions, opinions, and teaching practices, transformations that are related to educators' self-efficacy. Characteristically, Guskey (2002) mentions that the professional development of educators contributes to the change in their teaching practices, a change that can affect learning outcomes, and when this happens then educators transform attitudes and beliefs. An additional model of professional growth that can be related to educator transformation was developed by Clarke and Peter (1993) and later developed by the Educator Professional Growth Consortium (1994). This model is known as the Interconnected Model (Interconnected Model of Educator Professional Growth) and advocates that changes occur when the processes of reflection and action are mediated between 4 domains, concerning the world of educators. The model is not linear and recognizes professional development as a continuous learning process, where changes in one area can bring about changes in others through the mediation of Reflection and Enactment.

Evans (2002, 2012) also developed an ontological model according to which she highlights three dimensions of professional development: a) intellectual development, b) attitudinal development and c) functional development and observes that through professional development educators can improve their cognitive background, their teaching practices (intellectual dimension), transform their attitudes in relation to their

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

pedagogical and professional role for the benefit of themselves and their students (attitude development) and improve performance them (functional dimension).

In addition, Desimone (2009) formulated a conceptual framework regarding the interactions between educators' knowledge and skills, their teaching practices, and learning outcomes. This model according to Wayne et al. (2008) allows an understanding of how the two theories of educator transformation (change in knowledge, skills, and practices) and instructional transformation (the effect of changing practices on learning achievement) can be combined to work effectively in a professional development program for educators.

Mezirow himself was involved in the design and evaluation of programs, as can be traced in his very first works, which refer to transformation optics. However, he does not consider transformative learning as a set of techniques aimed at obtaining qualifications sought by the labor market but is interested in the whole educational process. This particular theory can offer essentials to the professional development of educators, as they often resist change, have personal beliefs of self-efficacy, dysfunctional mental habits, stereotypical perceptions, and fixed practices that are a brake on their professional path. When they themselves are confronted with them by participating in a professional development program and becoming aware of them through a process of critical reflection and thoughtful discussion, they can transform them. This process takes time but, in the end, if it happens, it will work liberatingly for both themselves and the students as well as society.

As educators' self-efficacy beliefs are formed, in relation to their experiences, it is important that educators' professional development programs promote critical reflection and rational dialogue on these experiences, so that the participants in the programs think critically and reflect on how these contributed to the formation of their self-efficacy. In addition, these beliefs are influenced both by the socio-political and economic context of the society in which educators live and work, as well as by the school context. From the above, it is understood that the course of change and transformation is not easy and is not always crowned with success. However, if in the end the educator consciously succeeds in transforming personal fixed positions, practices, beliefs, and assumptions, he can act as a model, as mentioned by Bandura (1997), and influence in this direction other colleagues, parents and students, and by extension society itself.

Impact of the theory of Transformative Learning in the professional development of educators. An example

The Laboratory of Teaching and Professional Development of Bioscientists of the Department of Molecular Biology and Genetics of the Democritus University of Thrace designed and offered an online distance professional development program for educators during the Covid 19 pandemic, which leveraged Digital Educational Content (DEC) and OER in teaching biological concepts. The aim of the program was to investigate, among other things, the contribution of the experience gained within it to the improvement of educators' self-efficacy beliefs in teaching biological concepts in Primary School. This particular effort was of particular importance, as it took place at a time when the coronavirus pandemic had reduced the use of Digital Educational Content (DEC) and Open Educational Resources (OER) in the learning process to a basic option (Tzovla & Kedraka, 2020a; Tzovla & Kedraka 2020b; Tzovla & Kedraka 2020c; Tzovla et al., 2022), as teaching took place online - an unprecedented situation for the educational community - and disoriented

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

educators were questioning their assumptions and looking for pedagogical ways to meet the needs of their students (Eschenbacher & Fleming, 2020).

The program was based on the preliminary investigation of the educational needs of the participants, in order to be shaped according to the specific needs in terms of content, format, and duration and in order to limit dropout (Tzovla & Kedraka, 2022). In addition, basic design principles were the autonomy of study and the ease of use of the platform that hosted the online course, the constant feedback with constructive comments from the trainers, the essential interaction between peers, the cultivation of a culture of cooperation through the sharing of DEC and OER, knowledge and experience in the context of a learning community, the adoption for the participants of the role firstly of the learner and then of the designer of educational interventions, linked to the educational practice, the clear timetable and the clear structure of the units, the educational material of multiple formats and the organization of tasks on a weekly basis (Tzovla et al., 2021a; Tzovla et al., 2021b).

The process was based on the principle that learning is considered both an individual and a collaborative process and aimed at social and cognitive interaction, the substantial involvement of all participants, and the utilization of the colleague as a "critical friend" with the ultimate goal of creating a learning community that utilizes her experience in order to strengthen her self-efficacy beliefs. Through the discussion forum of each module, the educators exchanged ideas and interacted in an asynchronous way, searched for and proposed digital educational resources, planned and implemented activities in their classroom, supported with their ideas the activities of other colleagues, and incorporated the suggestions into their own teaching intervention of peers (Tzovla & Kedraka, 2021). This possibility allowed reflection on the educational material, reflection on the proposed activities, deepening of knowledge, change of teaching practices, and finally, the transformation of their beliefs, as emerged from the posts of the participants in the forum of the 5th week of the program and as presented in the next section.

Research results

Forum posts from week 5 of the program highlighted the importance of the program in improving their self-efficacy. Specifically, a lot of posts focused on the importance of the experience of participating in the program in enhancing self-efficacy beliefs.

The following statements of the participants are indicative:

"Participating in this particular program, I heard, learned, saw, searched, discovered, experienced, redefined, created, enjoyed, but above all, my students enjoyed"

"Upon the completion of the relevant program, I have to say that it was a remarkable experience.... During it, I was lucky because not only as a less experienced educator I was able to receive encouraging comments on my work, but also to receive feedback on it. It is considered very important that experienced colleagues shed light in order to become, - especially at the beginning of one's career, more prepared to face the small society of children in the school classroom".

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

"This particular program was a very beautiful and valuable experience for me, as it worked very supportively in transforming my self-efficacy beliefs about teaching biological concepts, which I was afraid to teach. I think now I will enjoy their teaching."

"The program was an opportunity to engage extensively with important biological concepts and think differently about them. Active participation, interaction, mutual support, sharing experiences, providing feedback, played a decisive role in changing my attitudes towards the teaching of biological concepts and changed my perspective on teaching them."

"It was a very important experience to exchange opinions, ideas, and practices in this training, which helped us think differently about biological concepts and not avoid approaching them in the classroom. The support and help were important, while the encouragement was also evident."

"The colleagues who attended the program submitted a multitude of teaching suggestions that can be used in the future by everyone when teaching Biology, but more important, in my opinion, is the wealth of experience we gained. So, in this way, it is certain that primary school children will better understand biological concepts and will love this subject, which often causes them stress because it causes the same feeling for us as educators."

"This course changed my attitude towards the teaching of biological concepts because they are not familiar enough to me, and I avoided teaching them."

"Active participation and continuous interaction made this program particularly helpful and useful for all of us. The flexibility of the program, the constant encouragement of the educators, and its structure based on the principles of adult education are very strong elements that contributed to its completion. I am very satisfied with this educational experience, as it has helped me to be able to teach biological concepts effectively in the future."

"The seminar met my expectations; I did the activities with pleasure and I keep as a legacy the very valuable teaching suggestions and the valuable experience I gained from it."

"This course was a pleasant experience. The teaching of biological concepts always troubles us as the schoolbook is often insufficient. I personally gained a lot to help students more effectively."

Regarding the value of sharing experiences between participants in strengthening self-efficacy beliefs, the following comments are representative:

"I started this journey in an unknown country for me, that of "Biology in Primary Education". In the end, it turned out that both the journey itself and my destination mattered a lot! And how could it not be so? I entered the ... train/vehicle with a little luggage - my little knowledge of teaching biological concepts in Primary Education. - and thanks to the excellent guidance of the educators and the endless inspiration and testimony of the experience of the colleagues, in the cooperation through the sharing of their own plans and teaching suggestions I managed to arrive safely, full of confidence and assurance in the desired new country! I return from the trip with rich luggage full of inexhaustible material! My expectations were exceeded! My students became direct recipients of my knowledge and experiences and responded positively and happily!"

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

"During this educational journey I confess that I learned a great deal from the experiences of the other members and the suggestions that the latter presented, and I come away from it with an enhanced sense of self-efficacy regarding the teaching of biological concepts... The collaboration between educators is a remarkable undertaking, as through the exchange of materials, experiences, and practices we develop our methods and have to offer children more and more experiences".

"I learned important things and looked carefully at the personal experiences of other experienced members, which were a real source of improvement in my personal self-efficacy."

"Completing the program, I have to testify that my expectations were met. A learning community was created where participants exchanged opinions, experiences, and ideas by interacting with each other. One complemented the other with the common goal of enhancing our self-efficacy and transforming our views on teaching biological concepts in Primary School."

"In general, I believe that the communication between educators and the exchange of their ideas and teaching experiences is valuable for everyone. And, as there are few opportunities every day to hold such educator meetings, such programs are an opportunity to exchange ideas, experiences, and teaching suggestions, to develop our own practices as well."

"Completing the distance learning program, I would like to testify that the exchange of experiences, knowledge, teaching suggestions, mutual support, and interaction between a significant number of participants made me understand the importance of learning communities and how they can function in support of peers, who can be a role model for others."

"What excited me was this interaction and mutual support, the sharing of experience that everyone generously shared and that definitely contributed to the success of the program. This possibility to be able to penetrate into the work of colleagues, to speak our mind, and perhaps to create something new, the result of the inspiration of many worthy colleagues, was unique and made us revise many things about the teaching of Biology in Elementary School."

"Using material, ideas, applications, and creations of very worthy colleagues seeing their passion and methodically, I think I leave richer on all levels both as an educator and as a person."

Conclusion

Finally, one can conclude that an important role in effective teaching is played by the educator, as he mediates between the knowledge objects and the student, sets, and tries to satisfy the learning goals. His sense of self-efficacy essentially mediates between knowledge and practice, so that knowledge is transformed into practice, it has an effect both on the choice of learning goals and on his motivation and emotions (Bandura, 1997) and affects effort, persistence, and performance. Therefore, his sense of self-efficacy and his self-efficacy beliefs influence his teaching style, his choice of teaching practices, his learning outcomes, and his attitude toward different subjects.

A significant role in strengthening the self-efficacy of educators can be played by their targeted professional development programs, which aim to transform established teaching practices, beliefs, and attitudes through the utilization of the experience that educators experience during their monitoring. In conclusion, if

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

transformative learning is the outcome, transformative education is the philosophy and process of facilitating this kind of change.

References

Aji, C. and Khan, M. (2019). A Flight Simulator-Based Active Learning Environment. *Open Journal of Social Sciences, 7*, 192-203. doi: 10.4236/jss.2019.73016

Ashton, P. (1984). Educator Efficacy: A Motivational Paradigm for Effective Educator Education. *Journal of Educator Education, 35*, 287-232. https://doi.org/10.1177/002248718403500507

Azar, A. (2010). In-service and pre-service secondary science educator's self-efficacy beliefs about science teaching. *Educational Research and Reviews*, *5*(4), 172-185. https://doi.org/10.5897/ERR09.243

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American psychologist, 37*(2), 122. https://doi.org/10.1037/0033-295X.84.2.191

Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational behavior and human decision processes*, *50*(2), 248-287. https://doi.org/10.1016/0749-5978(91)90022-L

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational psychologist*, *28*(2), 117-148. https://doi.org/10.1207/s15326985ep2802_3

Bandura, A. (1997). Self-efficacy: *The exercise of control*. W H Freeman/Times Books/ Henry Holt & Co.

Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (Vol. 5, pp. 307-337). Greenwich, CT: Information Age Publishing.

Blank, R.K., de las Alas, N., & Smith, C. (2008). *Does Educator Professional Development Have Effects on Teaching and Learning? : Evaluation Findings from Pro-grams in 14 States.* Washington, DC: Council of Chief State School Officers.

Caprara, G. V., Barbaranelli, C., Borgogni, L., & Steca, P. (2003). Efficacy Beliefs as Determinants of Educators' Job Satisfaction. *Journal of Educational Psychology, 95*(4), 821–832. https://doi.org/10.1037/0022-0663.95.4.821

Chan, W. Y., Lau, S., Nie, Y., Lim, S., & Hogan, D. (2008). Organizational and personal predictors of educator commitment: The mediating role of educator efficacy and identification with school. *American educational research journal*, *45*(3), 597-630. https://doi.org/10.3102/0002831208318259

Clarke, D. J., & Peter, A. (1993). Modelling educator change. In B. Atweh, C. Kanes, M. Carss, & G. Booker (Eds.), Contexts in mathematics education. *Proceedings of the 16th annual conference of the Mathematics Education Research Group of Australasia (MERGA)*. Queensland: Mathematics Education Research Group of Australasia.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Darling-Hammond, L., & Richardson, N. (2009). Educator learning: What matters? *Educational Leadership, 66*(5), 46–53.

Darling-Hammond, L., Hyler, M. E. & Gardner, M. (2017). *Effective Educator Professional Development*. Palo Alto, CA: Learning Policy Institute.

Dellinger, A. B., Bobbett, J. J., Olivier, D. F., & Ellett, C. D. (2008). Measuring educators' self-efficacy beliefs*:* Development and use of the TEBS-Self. *Teaching and educator education, 24*(3), 751-766. https://doi.org/10.1016/j.tate.2007.02.010

Desimone, L. M. (2009). Improving impact studies of educators' professional development: Toward better conceptualizations and measures. *Educational Researcher, 38*(3), 181–199. https://doi.org/10.3102/0013189X08331140

DiBiase, W., & McDonald, J. R. (2015). Science educator attitudes toward inquiry-based teaching and learning. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, *88*(2), 29-38. https://doi.org/10.1080/00098655.2014.987717

Egyed, C. J., & Short, R. J. (2006). Educator Self-Efficacy, Burnout, Experience and Decision to Refer a Disruptive Student. *School Psychology International, 27*(4), 462–474. https://doi.org/10.1177/0143034306070432

Evans, L. (2002). What is educator development? *Oxford Review of Education*, *28*(1), 123–137.DOI: 10.1080/03054980120113670

Evans, R. (2012). Active strategies during inquiry-based science educator education to improve long-term educator self-efficacy. In Daugbjerg, P. S. (Eds.), *Proceedings of Science educators' narratives on motivation and commitment: A story about recruitment and retention.* Paper presented at European Science Education Research Association, Lyon, France

Fives, H., & Buehl, M. M. (2012). *Spring cleaning for the "messy" construct of educators' beliefs: What are they? Which have been examined? What can they tell us?* In K. R. Harris, S. Graham, T. Urdan, S. Graham, J. M. Royer, & M. Zeidner (Eds.), *APA handbooks in psychology®. APA educational psychology handbook, Vol. 2. Individual differences and cultural and contextual factors*, 471–499. American Psychological Association. https://doi.org/10.1037/13274-019

Fritz, J. J., Miller-Heyl, J., Kreutzer, J. C., & MacPhee, D. (1995). Fostering personal teaching efficacy through staff development and classroom activities. *The Journal of Educational Research, 88*(4), 200 – 208. https://doi.org/10.1080/00220671.1995.9941301

Gaible, E., & Burns, M. (2005). Using Technology to Train Educators: Appropriate Uses of ICT for Educator Professional Development in Developing Countries. *Online Submission*. www.infodev.org/en/Publication.13.html

Gibbs, C. (2003). Explaining effective teaching: self-efficacy and thought control of action. *The journal of educational enquiry*, *4*(2).

Gibson, S., & Dembo, M. (1984). Educator efficacy: A construct validation. *Journal of Educational Psychology, 76*(4), 569-582. https://doi.org/10.1037/0022-0663.76.4.569

Goddard, R. D., Hoy, W. K., & Woolfolk Hoy, A. (2000). Collective educator efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal, 37,* 479-508. https://doi.org/10.3102/00028312037002479

Guskey, T.R. (2002). Professional Development and Educator Change. *Educators and Teaching, 8*(3), 381-391. DOI: 10.1080/135406002100000512

Hanushek, E. A. (2008). Incentives for efficiency and equity in the school system. *Perspektiven der Wirtschaftspolitik*, *9*, 5-27. https://doi.org/10.1111/j.1468-2516.2008.00272.x

Hoy, W. K., & Woolfolk, A. E. (1990). Socialization of student educators. *American educational research journal*, *27*(2), 279-300. https://doi.org/10.3102/00028312027002279

Hoy, A. W., Hoy, W. K., & Davis, H. A. (2009). *Educators' self-efficacy beliefs.* In K. R. Wenzel & A. Wigfield (Eds.), *Educational psychology handbook series. Handbook of motivation at school*, 627–653

Illeris, K. (2017). *Learning, Development, and Education. From learning theory to education and practice. The selected works of Knud Illeris*. Routledge.

Kazempour, M., & Amirshokoohi, A. (2013). Exploring Elementary Pre-Service Educators' Experiences and Learning Outcomes in a Revised Inquiry-Based Science Lesson: An Action Research. *Journal of Education and Learning*, *2*(2), 144-154. DOI: 10.5539/jel.v2n2p144

Kedraka, K. (2022). Professional Development. In Th. Karalis & P. Lindzeris (Ed.), *Adult Education Dictionary* (pp. 123-127). Scientific Adult Education Association.[In Greek].

Lumpe, A., Czerniak, C., Haney, J., & Beltyukova, S. (2012). Beliefs about teaching science: The relationship between elementary educators' participation in professional development and student achievement. International *Journal of Science Education, 34*(2), 153-166. DOI: 10.1080/09500693.2010.551222

Madden, L., & Wieb, E., (2015). Multiple perspectives on elementary educators' science identities: A case study. *International Journal of Science Education, 37*(3,) 391-410. https://doi.org/10.1080/09500693.2014.987715

Magnusson, S., Krajcik J., Borko H. (1999). Nature, Sources, and Development of Pedagogical Content Knowledge for Science Teaching. In: Gess-Newsome J., Lederman N.G. (eds) *Examining Pedagogical Content Knowledge. Science & Technology Education Library (*6). Dordrecht: Springer. https://doi.org/10.1007/0-306-47217-1_4

Mezirow, J., & Associates (Ed.). (2000). *Learning as transformation: Critical perspectives on a theory in progress*. Jossey-Bass.

Mojavezi, A., & Tamiz, M. P. (2012). The Impact of Educator Self-efficacy on the Students' Motivation and Achievement. *Theory & Practice in Language Studies*, *2*(3). DOI: 10.4304/tpls.2.3.483-491

Moseley, C., Reinke, K., & Bookout, V. (2003). The effect of teaching outdoor environmental education on elementary preservice educators' self-efficacy. *Journal of Elementary Science Education*, *15*(1), 1-14. https://doi.org/10.1007/BF03174740

Mulholland, J., Dorman, J. P., & Odgers, B. M. (2004). Assessment of science teaching efficacy of preservice educators in an Australian university. *Journal of Science Educator Education*, *15*(4), 313-331. https://doi.org/10.1023/B:JSTE.0000048334.44537.86

Newberry, M., & Davis, H. A. (2008). The role of elementary educators' conceptions of closeness to students on their differential behaviour in the classroom. *Teaching and Educator Education*, *24*(8), 1965-1985. DOI: 10.1016/j.tate.2008.02.015

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of educational research, 66*(4), 543-578. https://doi.org/10.3102/00346543066004543

Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education: Theory, research, and applications*. Prentice Hall.

Ravandpour, A. (2019). The relationship between EFL educators' continuing professional development and their self-efficacy: *A structural equation modeling approach. Cogent Psychology, 6(*1). DOI: 10.1080/23311908.2019.1568068

Rice, D.C., & Roychoudhury, A. (2003). Preparing more confident preservice elementary science educators: One elementary science methods educator's self-study. *Journal of Science Educator Education, 14* (2), 97-126. https://doi.org/10.1023/A:1023658028085

Riggs, I. M., & Enochs, L. G. (1990). Toward the Development of an Elementary Educator's Science Teaching Efficacy Belief Instrument. *Science Education*, *74*(6), 625-637. https://doi.org/10.1002/sce.3730740605

Ross, J. A. (1994). The impact of an in-service to promote cooperative learning on the stability of educator efficacy. *Teaching and Educator Education, 10*(4), 381-394. https://doi.org/10.1016/0742-051X(94)90020-5

Ross, J. A., Hogaboam-Gray, A., & Hannay, L. (2001). Effects of educator efficacy on computer skills and computer cognitions of Canadian students in grades K-3. *The Elementary School Journal*, *102*(2), 141-156. https://doi.org/10.1086/499697

Ross, J., & Bruce, C. (2007). Professional development effects on educator efficacy: Results of randomized field trial. *The journal of educational research*, *101*(1), 50-60. DOI: 10.3200/JOER.101.1.50-60

Schunk, D. H., & Pajares, F. (2009). Self-efficacy theory. *Handbook of motivation at school*, 35-53.

Schunk, D. H. (2012). *Learning theories an educational perspective sixth edition*. Pearson.

Şeker, P. T., & Alisinanoğlu, F. (2015). A Survey Study of the Effects of Preschool Educators' Beliefsand Self-Efficacy towards Mathematics Education and Their Demographic Features on 48 - 60-Month-Old

Preschool Children's Mathematic Skills. *Creative Education, 6*, 405-414. http://dx.doi.org/10.4236/ce.2015.63040

Skaalvik, E. M., & Skaalvik, S. (2010). Educator self-efficacy and educator burnout: A study of relations. *Teaching and educator education*, *26*(4), 1059-1069. DOI: 10.1016/j.tate.2009.11.001

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Educator efficacy: Its meaning and measure. *Review of educational research, 68*(2), 202-248. DOI: 10.12691/jpar-2-1-2

Tschannen-Moran, M., & Hoy, A. W. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced educators. *Teaching and educator Education*, *23*(6), 944-956. https://doi.org/10.1016/j.tate.2006.05.003

Tzovla, E., Kedraka, K., & Lavidas, K. (2022). Investigation of in-service Elementary School educators' self-efficacy in teaching biological concepts. *Hellenic Journal of Phycology, 19*. https://doi.org/10.26262/hjp.v19i3.8766

Tzovla E., & Kedraka, K. (2022). Highlighting educational needs in a educators' professional development program. *European Journal of Alternative Education Studies 7*(2). DOI: 10.46827/ejae.v7i2.4487. ISSN: 2501-5915

Tzovla E., & Kedraka, K. (2021). Exploring Educators' Views on the Impact of an Online Distance Learning Course on Their Self-Efficacy Beliefs. *International Journal of Learning and Development 11*(3). doi:10.5296/ijld.v11i3.18563 ISSN 2164-4063

Tzovla, E., Kedraka, K., Karalis, T., Kougiourouki, M, & Lavidas, K. (2021a). Effectiveness of in-service elementary school educator professional development MOOC: an experimental research. *Contemporary Educational Technology 13*(4) ep324 DOI: https://doi.org/10.30935/cedtech/11144 ISSN: 1309-517X (Online)

Tzovla, E., Kedraka, K., & Kaltsidis, C. (2021b). Investigating In-service Elementary School Educators' Satisfaction with Participating in MOOC for Teaching Biological Concepts. *Eurasia Journal of Mathematics, Science and Technology Education, 17*(3), em1946. https://doi.org/10.29333/ejmste/9729 ISSN:1305-8223 (online)

Tzovla E., & Kedraka, K. (2020a). The Role of the Adults' Educator in Educator Training Programs. *American Journal of Education and Learning, 5*(2), 152-158. DOI: 10.20448/804.5.2.152.158 ISSN: 2518-6647.

Tzovla, E., & Kedraka, K. (2020b). Teaching Biology in Primary Education. *International Journal of Educational Technology and Learning, 8*(2), 91-97. DOI: 10.20448/2003.82.91.97. ISSN: 2523-0581

Tzovla, E., & Kedraka, K. (2020c). Personal biology teaching efficacy beliefs and biology teaching outcome expectancy of in-service elementary educators. *European Journal of Education Studies, 7*(10), 143-159. DOI: 10.46827/ejes.v7i10.3286 ISSN 2501 - 1111.

Usher, E. L., & Pajares, F. (2008). Sources of self-efficacy in school: Critical review of the literature and future directions. *Review of educational research, 78*(4), 751-796. https://doi.org/10.3102/0034654308321456

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Vergidis, D. (2022). Evaluation of educational programs. In Th. Karalis & P. Lindzeris (Ed.), *Adult Education Dictionary* (pp. 24-29). Scientific Adult Education Association. [In Greek].

Watters, J., & Ginns, I. (2000). Developing motivation to teach elementary science: Effect of collaborative and authentic learning practises in preservice education. *Journal of Science Educator Education, 11*(4), 301–321. https://doi.org/10.1023/A:1009429131064

Wayne, A. J., Yoon, K. S., Zhu, P., Cronen, S., & Garet, M. S. (2008). Experimenting with educator professional development: Motives and methods. *Educational researcher*, *37*(8), 469-479. https://doi.org/10.3102/0013189X08327154

Zee, M., & Koomen, H. M. (2016). Educator Self-Efficacy and Its Effects on Classroom Processes, Student Academic Adjustment, and Educator Well-Being: A Synthesis of 40 Years of Research. *Review of Educational Research, 86,* 981-1015. https://doi.org/10.3102/0034654315626801

Education strategies for adults

Action strategies and the evolution of Second Chance Schools

Afroditi VERGIDOU

PhD in Adult Education

Introduction

The action strategies of adult education institutions in Greece can be summarized according to the following typology, based on the main purpose of their activities (Vergidis, 2008). The typology includes the following six action strategies (ibid.):

1. Political-ideological strategy.

2. Strategy of complementary education and training.

3. Strategy of technological, scientific and in service specialization.

4. Strategy for social and occupational integration and combating social exclusion.

5. Strategy of personal and socio-cultural development of the learners.

6. Integrated local development strategy.

The purpose of this paper is to explore the action strategies developed by Second Chance Schools (SCSs). This topic has already been of concern to researchers (Anagnou & Vergidis, 2008). From the analysis of the institutional framework and data from previous surveys conducted between 2004-2007 on the expectations of learners in Second Chance Schools and on the collaboration of Second Chance Schools with local organizations, it was concluded that the activities of Second Chance Schools had developed (ibid.):

(a) the strategy of complementary education and training,

b) the strategy of personal and socio-cultural development.

However, the SCSs are an evolving institution, as their number is increasing and the institutional framework for their organization and function is being modified (Anagnou, 2016).

Therefore, it is of particular interest to examine the strategies of action of the SCSs, as they have evolved after successive changes to their Regulation of Organization and Function.

In the next section, we examine the evolution of the SCSs, based on the institutionalization of their organization, as well as the number of SCSs operating each school year.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

In the third section, we refer to the research methodology. We identify the sample of the SCSs from which our research material was drawn, state our research question and the technique for processing the research material, i.e. the documents we collected.

In the fourth section, we present our data by category and subcategory. The final section includes the discussion and conclusions drawn from the qualitative analysis of the documents.

The evolution of the Second Chance Schools

The SCSs are a European institution, proposed by the European Commission in the "White Paper on education and training, teaching and learning. Towards the learning society" (1995). They are aimed at young people and adults who have not completed compulsory education, and each Member State adapts them to the priorities of its education policy.

In fact, the European Commission also uses the term "Second Chance Education" (pilot-experimental, 2013), which is broader than the term "Second Chance Schools". In the different countries of the European Union, SCSs vary both in terms of the age group they are aimed at and the duration of the course (e.g. from 3 to 18 months in Germany, from 3 to 12 months in Denmark, from 3 to 24 months in Finland, while in Portugal the duration of the course is three years (Kollas, 2015).

In Greece, the establishment of the SCSs was institutionalized in 1997 by Law 2525/1997 (Article 5). The first SCS was established in 2000, while in the following two years 5 SCSs were functioning on an experimental basis (pilot - experimental phase). In 2003, their organization and function were institutionalized by the Ministerial Decree 2373/2003. According to their legal framework, the SCSs are attended by young people and adults over 18 years of age, with the General Secretariat for Lifelong Learning (hereinafter referred to as the General Secretariat), as the body responsible for their establishment and supervision. Attendance at SCSs lasts for two school years, and their curriculum and function are characterized by innovative elements, compared to conventional schools, in particular the Gymnasium (first cycle of secondary education). The innovative elements were institutionalized by the Ministerial Decree 2373/2003 (Vergidou et al., 2018; Vergidou & Ifanti, 2019. Nikolopoulou, 2017). Graduates are awarded a school leaving certificate, equivalent to first cycle of secondary education

Table 1. The SCSs in the different phases of their evolution

Phase	Year	Number of SSAs
1. Legislation of the SCSs in 1997 and pilot/experimental phase of elaboration of the institutional framework leading to the institutionalization of the operation. Elaboration of the curriculum.	1997-2000	-
	2000-2001	1
	2001-2002	5

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

	2002-2003	5
2. Phase of the extension and implementation of the Ministerial Decree 2373/2003 on the organization and operation of the SCSs.	2003-2004	18
	2004-2005	32
	2005-2006	43
	2006-2007	48
	2007-2008	48
3. The phase of modification of the institutional framework and the elimination of some innovative elements of the SCSs, with the Ministerial Decrees 260/2008 and 5953/2014.	2008-2009	57
	2009-2010	57
	2010-2011	58
	2011-2012	58
	2012-2013	58
	2013-2014	58
	2014-2015	63*
Deregulation phase with the shrinking of the educational and material prerequisites for the operation of the SCSs.	2015-2016	63
	2016-2017	67
	2017-2018	68
	2018-2019	74
	2019-2020	76

Sources: Lytsiou, 2007; Anagnou, 2016; Nicolopoulou, 2017. Vergidou &. Ifanti, 2019. Vergidou 2022

* One SCS was suspended during the 2014-2015 school year

In the school year 2002-2003, the number of SCSs was only 5 (see Table 1), while in 2007-2008 it reached 48, i.e. the number of SCSs in five years almost increased tenfold (expansion phase). The institution, as research has proved, retained its innovative features during the expansion phase (Anagnou 2006, 2011). In the years that followed, despite the conservative changes and regulations in the way the SCSs were organized and operated (Ministerial Decrees 260/2008 and 5953/2014) and in this phase (2008/09-2014/15) (see Table 1),

their innovative features and the culture established during the experimental phase were reproduced to a significant extent (Vergidou et al., 2018; Vergidou & Ifantis, 2019).

A study conducted with data about the SCSs during the experimental and expansion phases (Anagnou & Vergidis, 2008) highlights the emphasis on the strategy of complementary education and training, given that their statutory purpose is the completion of compulsory education and training (ibid.). It also highlights the emphasis of the SCSs on the strategy of personal and socio-cultural development given that: a) the personal and social development of learners is one of the main purposes of the SCSs, b) the open curriculum promotes the use of leisure time and the participation of learners in the creation of cultural goods (ibid.).

In the next section, we report on the methodology we used to investigate the action strategies developed in the SCSs during the deregulation phase of their function, during the 2018-19 school year (see Table 1).

As Nikolopoulou (2017) underlines, in this phase the conditions for the innovative function of the SCSs were not met due to the dysfunctions of the General Secretariat and of the Institute of Continuing Adult Education, the tendency to bureaucratize the institution, the lack of training and scientific support for teachers and the increase in the number of SCSs without the adequate and necessary preparation (Vergidou 2022).

Methodology

The sample of the survey includes 13 SCSs, one from each administrative region of the country, out of the total of 62 SCSs operating in the 2018-19 school year, excluding 12 SCSs established in correctional institutions. Based on the above, the sample of 13 SCSs covers 21% of the survey population (62 SCSs). In addition, the sample is selected, so the conclusions are not generalizable to the whole of the SCSs.

The data have been extracted from the three annual reports of the Principals of the SCSs, which are addressed to the Foundation of Youth and Life Long Learning (FYLLL), with notification to the relevant General Secretariat. A total of 39 reports from the 2018-19 school year were used. The research question we worded was: What action strategies are being developed in the SCSs during the school year 2018-2019?

We used qualitative content analysis, with the topic as the unit of analysis (Vamboukas, 2007; Galata, 2017; Green & Thorogood, 2004), predefining the appropriate categories based on our research question (Iosifidis, 2003). The coding/categorization of the documents was done according to their manifest content) (Sarafidou, 2011).

The analysis of the documents has descriptive and interpretative validity, since the interpretation of the functioning of the SCSs was based on the descriptions of the acting individuals (s Cohen et al., 2008; Sarafidou, 2011). The reliability of the research arises from the objectivity of the evidence since it has not been produced for research purposes and is available to other researchers who can interpret it as well (see programs, 2014).

For the coding of documents, we have identified the following categories and subcategories:

1. Collaboration

1.1. with trade unions and social and cultural organizations.

1.2. with educational and scientific institutions.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

1.3. with international institutions and in European educational programmes.

2. Projects

3. Educational and cultural activities in school

4. Educational and cultural activities outside the school

5. School culture

6. Connecting with the world of work

6.1. Working learners

6.2. Unemployed learners

6.3. Information and vocational guidance

The data

In this part we present our research data by category and subcategory.

1. Collaboration

SCSs develop collaborations with a variety of institutions for organized visits to cultural and learning spaces and other synergies, as well as with the invitation of people from the world of art and literature to the school. Excerpts from the reports of two SCSs are quoted as an example.

"... the SCSs took advantage of opportunities to bring learners in contact with knowledge and experience providers, in particular visits outside the school, but also invited notable speakers from the local community to present on topics of their expertise" (SCS 5)

"We all believe that knowledge is not limited to the classroom. The opening of the school to the community, the educational visits (after preparation) to places of creativity and culture, the invitation to the school of people of art, letters and culture have once again enriched the educational process."(SCS 9)

As can be seen from these quotes, the SCSs seek to open up to society by making use of the possibilities they have.

1.1. Trade union, social and cultural organizations

The indicative extracts below highlight the collaboration of the SCSs with various local organizations.

"The Second Chance School has an educational and volunteer work agreement with the NGO 'Sympastastasis' which helps vulnerable groups and refugees. Within the framework of this cooperation, migrant learners come to our school and discussions on anti-racist awareness-raising are organized." (SCS 7)

"... the Soroptimist club of Athens 'Anatolikos' in collaboration with the SCS, organized a talk-discussion on 'Psychological violence against women'" (SCS 9)

Particularly important is the collaboration between the SCSs and the National Confederation of Trade Unions Labour Institute, in the framework of which:

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

"Group counseling workshop for unemployed people on Labour Relations and Rights'. The event took place in the framework of the cooperation between the Network of Information and Counseling Services for Employees and Unemployed of the Labour Institute of the National Confederation of Trade Unions and the Second Chance Schools at a national level" (SCS 2).

1.2. Educational and scientific institutions

Collaboration with university departments and other scientific institutions is also important:

"Particular reference should be made to the project *"Cinema and Education",* as it is a collaboration between the SCS and the Departments of Early Childhood and Primary Education of the University. " (SCS 2)

"... in our school hall, we host several workshops, seminars and training of scientific institutions of the wider region" (SCS 2)

1.3. International institutions and European educational programs indicatively, we quote extracts on the participation of SCSs in European programs:

"The participation of the SCS in the European ERASMUS+ program, adult education partnership on the theme: neuroandragogy against exclusion was discussed. The participation of teachers who will participate in the meeting in Austria in December 2018 was determined." (SCS 4)

"... the European Development Project through the Erasmus+ program titled "Improving management practices and adopting flexibility in adult education" was completed... which provided theoretical knowledge and skills development on systemic and socially constructive leadership." (SCS 5)

2. *Projects*

Some of the extracts about projects are as follows:

"Project for the whole school, friends and relatives of staff and learners, by the Headmistress and learners of classes A2 and B2, on the theme "Papadiamantis" Christmas Bread - Christmas Memories". It was completed in five sessions and then presented. This was triggered by the fact that in both classes [of the SCS] there were constant disagreements and rivalries between the learners" (SCS 3).

"... followed by presentations by the learners of the projects developed this school year. Also, the school choir sang and the dance group presented traditional dances. " (SCS 1)

"Three days of events: presentation of the projects and workshops to the general public, theatrical performance, graduation ceremony with the presentation of live rock music by the teacher A.K. and artistic folk songs by learners. " (SCS 9)

3. *Educational and cultural activities in school*

The following indicative extracts refer to the practical knowledge provided in SCS with additional educational activities:

"... along with the lessons, a team from the Medical Emergency Service came to the school ... they taught a group of learners CPR and first aid in case of ingestion of a foreign body and respiratory failure" (SCS 1)

In some of the SCSs there is a particular emphasis on cultural activities. Indicatively:

"On the occasion of the World Poetry Day, teachers and learners of SCS recited poems, experimented with limericks, haiku, mantinades, calligraphy, and self-poems and filled the poetry wall with personal poetic creations" (SCS 2)

"Screenings of short films, as well as feature films such as: 'A Touch of Spice', 'American History Lessons X', 'The Salt of the Earth, The Boy in the Striped Pajamas, etc." (SCS 12)

As can be seen from the above extracts, interesting educational and cultural activities take place in the SCSs.

4. *Educational and cultural activities outside the school*

As can be seen from the following characteristic excerpts, SCSs exploit the educational potential of the cities in which they are located by visiting cultural sites:

"Visit of the whole school to the Municipal Gallery of our town to see a photo exhibition about the Holocaust in Auschwitz". (SCS 3)

"Visits to libraries, museums, archaeological sites were carried out in order to better acquaint the learners with their local area" (SCS 11)

"On a weekly basis, all learners or some groups of learners (by classes) visit places where cultural-artistic creative activities are developed, participate in social activities or attend programs of educational content outside the school" (SCS 13)

Educational activities are thus not limited to school, but extend to other learning environments: galleries, museums, libraries, and archaeological sites.

5. *Culture of the school*

The culture of the SCSs is illustrated by the extracts below. In some SCSs, the learners themselves seem to be the bearers of this culture. As stated:

"On Thursday, October 4, the reception and meeting of the learners of the first cycle with the learners of the second cycle, the teachers of the school, the Subprincipal, and the Headmistress took place. The introduction included firstly, a presentation of the learners in a plenary session, then getting to know each other in pairs. Then, after forming four groups, everyone's expectations and commitments were noted in order to achieve the best functioning of the school. The meeting ended with a short comment by each individual expressing their feelings during the meeting". (SCS 1)

"... the learners wrote their own script. They prepared a short film on the topic 'SCS. The School of My Heart. They worked in groups and jointly agreed on the film's theme, scenes and content, and filming locations. " (SCS 2)

According to the following extract from the reports of the same SCS, the principal states that he is proud of the SCSs:

"I dare to say and I can strongly argue that Second Chance Schools are a gem of our educational system. An innovative, pioneering school, free of the rigidities and dysfunctions that plague formal schools. A school with a clear orientation and social contribution. " (SCS 2)

The culture of the SCSs is also highlighted by the following extracts:

"We believe that for an open and unconstrained adult school, volunteering by people well established in their field proves useful and essential for the benefit of learners". (SCS 9)

"... It should be noted that the teachers' staff team was concerned about: the extroversion of the school, the openness to the community, the benefit of visits to cultural and artistic venues. " (SCS 9)

SCSs are characterized as innovative, outward-looking, open to society, as opposed to conventional schools, which are plagued by rigidities and dysfunctions.

6. *Connecting with the world of work*

The learners of the SCSs are adults and many of them are either working or looking for work.

6.1 Working learners

"The ultimate aim was to ensure that there would be no need, as in the past, to replace teaching hours by the end of the school year or by means of an extension of the school year, as this is extremely difficult for the majority of our learners working in the tourism sector." (SCS 5)

6.2 Unemployed learners

The SCS "focused, among other things, on the anxiety and the request of unemployed learners to find a job and managed to help several of them to successfully enter the labor market - which is very important for their lives and their self-confidence. Already eight (8) unemployed are now working" (SCS 9).

6.3 Information and vocational guidance

"All classes made visits to businesses and professional organizations for information on jobs and labor issues." (SCS 11)

"In this last period of the school's function, great emphasis was placed on the vocational orientation of learners and for this purpose visits were organized to workplaces and mainly to various high schools (vocational and general high schools), in order to inform learners about the possibilities of continuing their studies" (SCS 13).

It seems that in some SCSs special attention is given to the employment of learners and their connection to the world of work.

Discussion and conclusions

As mentioned above, according to Law 2525/1997 (Article 5) "second-chance schools are established for the enrolment and attendance of young people who have exceeded the age of 18 and have not completed the compulsory nine-year education". The same article provides that special accelerated education programs are to be implemented in SCSs and that graduates of SCSs are to be awarded a diploma equivalent to the first

cycle secondary school certificate. In addition, according to the same article, primary and secondary school teachers will teach in the SCSs.

It is clear that SCSs were legislated as alternative schools to formal education, with accelerated educational programs for the completion of compulsory education for young people and adults who do not have a first cycle of secondary education certificate. Therefore, by law, SCSs are part of the strategy of compulsory education and training. Moreover, in the 2014 Regulation on the Organization and Function of the SCSs, it is underlined that their objective is: "a. The completion of compulsory education for citizens aged 18 and above. b. The reconnection of learners with the education and training systems'' (Ministerial Decree 5953/2014, Article 2). Therefore, the conclusion of Anagnou and Vergidis (2008) applies to this strategy. These objectives were also included verbatim in Article 67 of Law 4763/2020, which refers to the aims of the SCSs. The same Ministerial Decree states that "the purpose of Second Chance Schools (SCSs) is the overall development [and] the strengthening of the self-esteem of learners".

From the data presented above, it can be seen that a variety of activities are developed in the Second Chance Schools that aim at and contribute substantially to the personal and socio-cultural development of the learners. Some reports emphasize the school's openness to the community, visits upon preparation to creative and cultural spaces, and the invitation of people from the world of art, literature, and culture to the school. They also mention the collaboration of the SCSs with the Labour Institute of the General Confederation of Trade Unions for the organization of a counseling workshop on "Labour relations and rights", as well as the collaboration with anti-racist awareness-raising bodies and the highlighting of the problem of exclusion and violence against women.

Particularly important are the activities of the SCSs for the cultural development of the learners. Some SCSs have a choir, and a dance group and organize theater performances and musical evenings. In other SCSs, a poetry day was organized, or a screening of quality films.

Outside the school, visits were made to libraries, museums, and archaeological sites. In summary, in the context of the culture of SCSs (Vergidou, 2016), special emphasis is placed on the expression of learners' aspirations, on collectivity and collaboration, on social contribution, on the extroversion of the school and on opening up to society, with no rigidities, for the benefit of the learners.

As can be seen, therefore, the strategy of personal and socio-cultural development of learners continues to be developed to a significant extent in SCSs (Anagnou and Vergidis, 2008). However, in addition to these strategies, it seems that the strategy of contributing to integrated, local development, mainly cultural and social and in some cases economic, is also developed in SCSs. Some SCSs function as Open Democratic Schools - Cultural Centers (Vergidis, 2021, 2022). The openness to society, and the occasional cooperation of SCSs with various agents of action - individual and collective - shows that the social and cultural development of the learners is an important part of the work of SCSs. The other part of their contribution is the creation of relatively stable structures of cooperation and intervention in the local community, making them cultural centers.

This strategy is mainly developed through the design, organization, and implementation of projects, which are institutionally provided for in the 2014 Regulation on the Organization and Function of SCSs (Ministerial

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Decree 5953/2014, Article 4). The weekly timetable of the SCSs includes 3 hours for projects. It seems that some projects involve not only teachers, counselors, and learners, but also their friends and relatives. Groups of learners are also involved in social actions, and the social contribution of the SCSs is highlighted.

Also, in some SCSs, a connection with the world of work is developed, with visits to businesses and professional organizations in their area. We should also note that each SCS has a career counselor, who is responsible for linking or reconnecting learners with the world of work and for preparing information material on their educational and professional opportunities and prospects. As underlined by the Committee for Monitoring and Support of the Teachers of the SCSs "The role [of the career counselor] also includes networking of the SCS with education, training, employment, and labor market-related organizations" (2013). The strategy of contributing to integrated local development seems to be rather prominent only in some SCSs, operating as Open Democratic Schools - Cultural Centers, yet this is an aspect of the operation of SCSs that should be further analyzed and enhanced.

References

Anagnou, E. (2006). *Second Chance Schools: empirical research based on the views of their principals*. Master's thesis, University of Patras, Patras.

Anagnou, E., (2011). *Educational Policy in Adult Education. Empirical research.* Phd thesis, University of Patras, Patras.

Anagnou, E., (2016). Tracing educational policy for an adult education institution: the creation and evolution of the network of Second Chance Schools in Greece (1997-present). *Themes in the History of Education, 13-14*, 129-156.

Anagnou B.A. & Vergidis D.K. (2008). The action strategies of Second Chance Schools. The institutional framework and the contribution of principals. *Adult Education,13*, 11-18.

Cohen, L., Manion, L. & Morrison, K. (2008). *Educational research methodology*. Athens: Metaihmio.

Committee for Monitoring and Support of the Educational Work in Second Chance Schools (2013). *Second Chance Schools Teacher's Guide.* General Secretariat for Lifelong Learning.

European Commission (1995). *White Paper on education and training, teaching and learning. Towards the learning society.* European Communities.

European Commission (2013) *Preventing Early School Leaving in Europe-Lessons Learned from Second Chance Education*, European Union: Publications Office of the European Union.

Galata, B-P. (Ed.) (2017). *Conducting research in adult education. Methodology manual.* School of Humanities, Hellenic Open University.

Green, J., & Theorogood, N. (2004). *Qualitative Methods for Health Research*. Sage.

Iosifidis, I (2003). *Qualitative data analysis in the social sciences.* Kritiki Publications.

Kollas, S. (2015). *Scientific literacy in second chance schools: Training teachers in curriculum design*. Phd thesis, National and Kapodistrian University of Athens.

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

Lytsiou, L. (2007). Second Chance Schools Historical Review. In K. Koutroumba, V. Nikolopoulou, P. Chatzitheocharous, (Eds.), *Second Chance Schools: An Alternative Approach to Knowledge in the Context of the Greek Educational Reality.* Proceedings of the Second Chance Schools Second Phase Conference, 23-24 June 2006 (pp. 15-19). Ministry of Education.

Nikolopoulou, V. (2017). *Second Chance Schools: An innovative institution of adult education in Greece. How theory became practice and innovation became experience.* PhD thesis, Department of Philosophy and Pedagogy, Aristotle University of Thessaloniki.

Sarafidou, G-O. (2011). *Reconciling quantitative and qualitative approaches. The empirical approach.* Gutenberg.

Tsiolis, G. (2014). *Methods and techniques of analysis in qualitative social research*. Kritiki Publications.

Vamboukas, I. (2007). *Introduction to psychopedagogical research and methodology.* Grigoris Publications.

Vergidis D. (2008). *The evolution of adult education in Greece and its socio-economic function.* Introduction to adult education, vol. B. Patras: Hellenic Open University.

Vergidis, D. (2021). A new project for education: learning cities and open schools - cultural centers. In G. Bagakis (Ed.). *The context of a learning city today. The start of Corinth,* pp. 29 - 35). Grigoris Publications.

Vergidis, D. (2022). Skills development in school: assumptions and educational policies. In E. Kostara, (Ed.). *"Skills Development in Adult Education and School Education" Conference Proceedings, (pp.* 92-94). Hellenic Adult Education Association.

Vergidou, A. (2016). *The principals of Second Chance Schools: Their contribution to the effectiveness and culture of their school.* Master's thesis. University of Patras. URI http://hdl.handle.net/10889/10721

Vergidou, A. (2022). *Leadership, school culture and learning communities in second chance schools: the role of teachers*. PhD thesis. University of Patras, Greece. DOI 10.12681/eadd/51014

Vergidou, A., Vergidis, D. & Ifanti, A.A. (2018). Second Chance Schools: Educational innovations and school culture. Reproduction or adaptation? *Education Sciences*, *2,* 169-186.

Vergidou, A. & Ifanti, A.A. (2019). Second Chance Schools in Greece: The reproduction of their culture and their innovative elements. *Pedagogical Review*, *36* (67), 26-43.

Laws

Law 2327/1995 (Government Gazette 156/A/31-7-1995): *"National Council of Education, regulation of issues, research, education and further education of teachers and other provisions".* Article 4: "Institute of Continuous Adult Education".

Law 2525/1997 (Government Gazette 188/A/23-9-1997): *"Unified Lyceum, access of its graduates to Higher Education, evaluation of educational work and other provisions".* Article 5: "Second Chance Schools".

Law 4763/2020. (OFFICIAL GAZETTE 254/A/21-12-2020): *"National System of Vocational Education, Training and Lifelong Learning, incorporation into Greek legislation of Directive (EU) 2018/958 of the European Parliament and of the Council of 28 June 2018 on the proportionality check prior to the adoption of new legislation on professions (OJ L 173), ratification of the Agreement between the Government of the Hellenic Republic and the Government of the Federal Republic of Germany on the Hellenic-German Youth Foundation and other provisions".* Articles 67,68,69,70,71,72: 'Second Chance Schools (SCS)'.

Ministerial Decrees

Ministerial Decree 2373/2003 (Government Gazette 1003/B/22-7-2003): *"Organization and function of Second Chance Schools".*

Ministerial Decree 260/2008 (Government Gazette 34/B/16-01-2008): "Organization and Function of Second Chance Schools".

Ministerial Decree 5953/2014 (Government Gazette 1861/B/8-07-2014): *"Regulation on the Organization and Function of Second Chance Schools (SCS)".*

ΓΗΡΑΣΚΩ ΑΕΙ ΔΙΔΑΣΚΟΜΕΝΟΣ. LEARNING THROUGH THE LIFE SPAN.

Trends, dimensions, practices and reflections

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace

ΓΗΡΑΣΚΩ ΑΕΙ ΔΙΔΑΣΚΟΜΕΝΟΣ. LEARNING THROUGH THE LIFE SPAN.

Trends, dimensions, practices and reflections

Laboratory of Teaching and Professional Development of Bioscientists
Department of Molecular Biology and Genetics, Democritus University of Thrace