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FOREWORD

Dear Readers!

The first issue in year 2023 opens the thirteenth volume of Acta Education Generalis. This issue is dedicated to the issues of education on all levels and schools and lifelong learning. The international studies are by authors from the USA, Turkey, Hungary, and Slovakia and so, the American, Asian, and European continents are covered. As we can learn from the articles, the educational issues are similar worldwide. We have selected the following studies:

The first study by Silvia Matúšová and Vojtech Kollár is entitled 'Labour and Education Markets in Industry 4.0'. The authors focused on the direction of the world economy, which is increasingly determined by social change. The specific aim of the study is to analyse human resources from the aspects of new demands of Industry 4.0, denoted as Education 4.0. Education 4.0 is characterized by education independent of time and space, personalized teaching, learning flexibility, project-based learning, the ability to interpret data, curricula created with the participation of students, directed learning, decentralization of work teams and the creation of virtual and digital forms of collaboration and learning. In conclusions, the challenges are formulated relating to changes in the educational structure and new qualifications applicable in the Slovak economy by 2030, especially qualifications in the field of education and information technology. The support and significant changes in the educational system should be related to high-quality physical and communication infrastructure. The ongoing system is based on faulty assumptions, which is accentuated by the authors.

Juana M. Lang and Joshua Valk – experts from the USA – present their study 'Exploring Middle School Teachers' Job Demands and Job Resources during COVID-19'. In the study, they aimed to explore teachers' general working conditions, job demands and resources, and teachers' general well-being in four middle schools in the Southeastern U.S during COVID-19. The study's results revealed seven themes that emerged from the data: changes in working conditions; teachers' well-being and working conditions; perceived teachers' new job demands and additional workload; emotionally draining job demands; perceived available job resources; perceived need for job resources; and strategies teachers used to cope with stress. The shift in job demands and job resources during the pandemic placed teachers at risk of emotional exhaustion and burnout.

'The Relationship between Lifelong Learning and Attitudes towards the Teaching Profession of Pre-service Teachers' is examined by Kula Selen Sultan. The purpose of the presented study was to examine the relationship between lifelong learning (LL) and attitudes towards the teaching profession (ATTP) in pre-service teachers. LL and ATTP of pre-service teachers were compared in terms of gender, perceived success level and reading frequency variables. It was revealed that the LL level of pre-service teachers was high and the ATTP level was very high. Being female affects LL and ATTP levels of pre-service teachers positively. Another result of this study is that the more successful pre-service teachers perceive themselves to be, the more lifelong learning tendencies they have. The more frequently pre-service teachers read books in daily life, the more their lifelong learning tendencies and attitudes towards the teaching profession increase. The results of this study revealed that there was a moderate, positive and statistically significant correlation between LL and ATTP.

The issues of lifelong learning are in the focus of the study by Turkish authors Oğuzhan Nacaroglu and Fatma Mutlu entitled 'Investigating Lifelong Learning Tendencies and Scientific Creativity Levels of Prospective Science Teachers'. The purpose of the study was to determine lifelong learning tendencies and scientific creativity levels of prospective science teachers and examine the correlation between these variables. As recommended by the authors, for prospective teachers, it is important to do practices, which will improve their lifelong learning skills during their undergraduate education, in terms of scientific creativities. This is because scientific creativity and lifelong learning skills should be included in the science course in order for students to acquire sense of task, scientific perspective, and skills for controlling and regulating their learning.

Adult education is the topic of the next article by a Hungarian author Szilvia Simándi – 'Non-formal Learning Activities - Adult Learning Initiatives'. The purpose of the paper is to contribute to the international history of community culture and culture-based adult learning through showing the initiatives of a Post-Socialist country through introducing some initiatives from 1950, without claim for completeness. The changing of the regime brought reform in the discussed area, too, it basically changed the profession and training as well - the community culture builds on local initiatives and active participation, includes training, creating artistic, informational activities of the citizens, based on their self-activities.

Learning as perceived by students is dealt with by Gökçe Dişlen Dağgöl in the study 'Online Self-Regulated Learning and Cognitive Flexibility through the

Eyes of English-Major Students'. Assuming responsibility of learning and showing flexibility in case of changes and problems in learning could make this process more conscious and fruitful, as pointed out by the author. This is significant, particularly at a time when traditional universities are increasingly moving into online education. To address the gaps in previous self-regulated learning and cognitive flexibility research, the presented study examined the students' perceived online self-regulated learning and cognitive flexibility, and looked into the probable relationship between them. Transition into online education at tertiary level brings both advantages and disadvantages; hence, it becomes a must to promote positive aspects and to minimize negative sides. The author concludes that since online education necessitates more learner autonomy, students should be trained on how to use self-regulatory strategies in language learning.

The topic of the application of the revised Bloom's taxonomy in the context of reading is focused on by Dinçay Köksal, Ömer Gökhan Ulum and Nurcihan Yürük – the authors of the study 'Revised Bloom's Taxonomy in Reading Texts in EFL/ESL Settings'. The findings of the presented study show that the revised Bloom's taxonomy provides helpful and productive stages for EFL students to be creative while reading materials. Creatively approaching a text and its questions requires assembling, creating, designing, articulating, and writing. Evaluation, which involves assessing, debating, defending, judging, choosing, supporting, valuing, and evaluating, is a further step that must be examined. This trend highlights the need for teachers to supplement reading material with activities that promote higher-order thinking, such as open-ended questions, research assignments, and group discussions.

The requirements for mathematical literacy resonate in the paper by Semahat Incikabi, Musa Sadak and Lutfi Incikabi in the study 'Identifying Mathematical Literacy Demands in Turkish, Singaporean and Australian Textbooks'. Textbook tasks are considered tools for implementing, endorsing mathematical thinking and thereby creating chances for learning mathematics as it is accentuated by the authors. One of the contributions the study can make is that Singaporean and Australian textbook creators include more sufficient practices of the whole mathematical literacy processes (MPL) cycle in their problems to make sure students acquire the principal latent components of the problems, because failure to provide the necessary opportunities to solve problems of a range of different types in textbooks may cause students not to solve particular types of problems.

The issues of students' experiencing of happiness in schools after the COVID-19 pandemic are dealt with in the final study 'Rethinking Happiness at School after COVID-19 and Some Implications for Future Research' by Fatma Kesik, Aslı Yurttaş and Murat Taşdan. As a result of the study, the main determinans of children's hapinness were found as the relationships which they established with their friends and teachers and their academic achievement. Also, it was revealed that students made references to creating more time for courses such as physical education, music, art, etc., and more free time at school and renewal of school fixtures in order to contribute to their happinness. Nevertheless, future research should aim to determine what makes children happy in a process which the students are deprived of all facilities which the schools provided.

Dear Readers, the presented studies fill the pages of our Journal. All of them are topical and deal with the issues of education from various aspects, but also from the point of view of experts from different continents, which - we believe - makes it richer in content for readers. The theoretical background for the discussed topics is confirmed by research findings and recommendations for practice are listed.

We believe that you will read papers which you will find appealing and will motivate you for further research activities and submitting interesting studies to Acta Educationis Generalis.

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Labour and Education Markets in Industry 4.0

Silvia Matúšová - Vojtech Kollár*

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Abstract:

Introduction: The current development of the world economy defined as the Fourth industrial revolution (Industry 4.0) is rather determined by a larger social change caused by the interconnection of the physical, virtual, and social worlds. It affects the market of products, production factors, sectors, services, education, research, social systems, the labour market, the education, and specialization, including the legal framework, and the use of digital technologies for production and education purposes.

Purpose: The aim of the literature review will be the description and analysis of Industry 4.0, which are digitization and the application of digital technologies, associated with new emerging jobs in the circular economy, artificial intelligence, cloud computing, development, sales of products and services and the focus on human resources, as Industry 4.0 requires new standards regarding Education 4.0.

Methods: The study, analysis, evaluation and comparison of selected scientific papers and research reviews of international organizations (European Union, OECD, etc.) related to Industry 4.0 and Education 4.0 resulted in the need for a significant transformation of education and labour markets, because of newly emerging professions demanding new profiles of graduates.

Conclusions: Calls for changes in the educational structure and new qualifications will be formulated regarding the Slovak economy by 2030. A successful transition to Industry 4.0 paradigm requires the linkage between industrial policy and educational, scientific, technical and innovation policies.

Key words: Economy 4.0, Education 4.0, labour market requirements, Teacher 4.0.

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Introduction

The world is changing rapidly due to technological, social, economic, and societal changes. This process, referred to as the Fourth industrial revolution (Industry 4.0), optimizes procedures and applies new technologies to the production system. It is a transition to the industry based on digital technologies with an expected increase in productivity, production efficiency, reduction of energy and raw material intensity of production, optimization of logistics systems, building of intelligent infrastructure and reduction of production and final consumption in connection with the use of new technologies. Industry 4.0 represents a technology revolution, growing exponentially. It brings in a principal change in knowledge-based economy.

Humanity is facing the biggest challenge of its existence. The strategy "Industry 4.0" is where the physical world merges with the virtual. Information technology, telecommunications and manufacturing are united when the means of production are becoming more independent.

Industry 4.0 can be described as a cyber-physical-social revolution (Mařík, 2016) which concerns industrial production, science and research, education system, legal framework, social system, and labour market. Industry 4.0 is a program for the reindustrialisation of Europe. At the same time, it caused a new approach to education and labour market.

We live in the era of the digital economy and society, in which the adaption of people and the human workforce requires new approaches to education, training and retraining, acquiring new skills and knowledge. If the demand for digital and other skills continues to grow as fast as it currently does, employees and students will have to adapt their skills and abilities to market demands both at the start and throughout their working life.

Education will become a firm component of life, not just the studies at a young age. This will greatly affect the education and training systems, as well as the adaptability of students and the development of lifelong learning systems. The requirements of companies and enterprises on their employees are constantly growing, which is why lifelong learning - including on-the-job training (Barnová, Duda, Matulčíková, Gabrhelová, & Hrivíková, 2022) - is becoming a necessity. Therefore, it will not be possible to limit the age category of university students. Forms, methods and means of education at universities and lifelong learning institutions must also be subordinated to this. The transformation of economy due to Industry 4.0 paradigm is associated with the concept Education 4.0 which is mainly associated with the use of digital technologies in online education as a standard. Online education is considered as part of digitization of education at universities.

Leading positions are occupied by technological changes related to digitization, communication forms, analysis of large data sets, robotization, and artificial

intelligence. Man should be properly equipped through education to operate in above areas. Therefore, the most significant task of society at large is to develop human resources and increase the value of education.

Industry 4.0 requires the creation of a fast and accessible infrastructure for data transfer and the adaptation of the human workforce to the changes that the paradigm Industry 4.0 brings in. In this context, the educational system requires the comprehensive reflection of changes and challenges, starting with new educational policy objective, the application of innovative approaches to curricula and the ways of teaching and learning, to ensure the implementation of the new paradigm (Portál Industry4.0.sk).

1 Industry 4.0 and the labour market

Slovakia is situated at the beginning of Industry 4.0, which can transform the future requirements of industry related to the workforce. Thus, it is essential to focus on the main challenges and problems that could hold back Slovak businesses and slow down the use of the potential arising from Industry 4.0.

The lack of qualified labour force is a significant barrier to economic development and competitiveness of each country, including Slovakia, but can be considered a serious issue from the aspect of individual business entities competitiveness as well, since human capital represents a strategic tool for them (Rozvadský-Gugová & Barnová, 2020). This deficiency can deepen the success of the implementation of Industry 4.0 concept, especially in connection with the expected changes in the structure of industries, the methods of production, procurement, and sale of products.

The World Economic Forum (WEF, 2020) reports that while 71% of the world's work is currently still done by humans, this will change by 2025, and it is predicted that machines worldwide will do more work than humans. Around 70 million jobs will disappear, but on the other hand, new ones will be created, while the creation of 133 million new jobs is expected. New job positions will require new knowledge and skills that school graduates should have.

Jobs will be threatened due to Industry 4.0. The leading industry in Slovakia is the automotive industry, with a rapid growth of robotization and automation. Slovakia ranked 16th in the global ranking in terms of the number of industrial robots per 10,000 employees, achieving 165 industrial robots per 10,000 employees (European Commission, 2020).

The OECD study assumes that approximately 40% of traditional occupations will disappear in Slovakia because of greater automation (OECD, 2018). The replacement of the average employee by artificial intelligence reaches up to 62% in Slovakia, which is the worst perspective of the OECD countries, while the most threatened groups are young and unskilled workers (OECD, 2020).

The application of Industry 4.0 resulting in the changes in the labour market has become an object of several research studies and surveys in Slovakia and worldwide focused on future needs and demands for work force. The World Economic Forum (2020) predicts the growth of demand for jobs in the green economy, artificial intelligence, cloud computing, product development and sales, marketing and the areas related to mutual interaction by 2025.

As Hall et al. (2019) assume, the essential skills expected by Industry 4.0 from graduates at the international level by 2025 should include critical and analytical thinking; problem solving ability; self-management and active learning; learning strategies; creativity, originality, and innovative thinking; the ability to cooperate with each other; use, monitoring and control of technologies; communication skills; resilience, stress tolerance and flexibility.

The European Union points to potential benefits and risks resulting from Industry 4.0 by means of the SWOT analysis, identifying principal strengths and weaknesses, opportunities and threats associated with the implementation of Industry 4.0.

The main strengths of Industry 4.0 include:

- a) increased productivity, more efficient use of resources, strengthening of companies' incomes and their competitiveness.
- b) increasing the number of highly qualified and well-paid jobs.
- c) increased customer satisfaction, access to new markets (increased possibility of product customization and greater variability of offered products).
- d) higher flexibility of processes and control.

The main weaknesses were identified as follows:

- a) high dependence on highly resilient technologies and networks, where small disruptions can have significant impacts,
- b) high interdependence on numerous factors, including standards, single frameworks, supply of labour force with sufficient skills, reasonable scope of investments in economics, funding for research and development,
- c) the cost of the development and implementation of digital technologies,
- d) potential loss of control over the enterprise,
- e) higher unemployment rate of semi-skilled workers.

According to the analysis of the European Union, digitization brings in the following opportunities:

- a) strengthening the position of the European Union as a world leader in industrial production and other sectors,
- b) development of new markets for products and services,
- c) compensation of the negative demographic curve in the countries of the European Union,

d) reducing barriers to the entry of small and medium-sized enterprises into new markets and connecting to new supply chains.

The analysis of the European Union identifies the following threats and risks:

- a) cyber security, protection of intellectual property and personal data,
- b) employees, small and medium-sized enterprises, industries, and actors within the national economy often are not sufficiently aware of digitization and do possess the resources necessary to adapt to Industry 4.0, which could result into a comparative disadvantage of those companies and sector of economy,
- c) a position of vulnerability to global supply chains, and a low degree of stability,
- d) the rapid adaptation of foreign competitors to Industry 4.0 can neutralize the benefits of Industry 4.0 in the countries of the European Union.

Digitalization is defined as a technological trend that is reshaping all sectors of industry and society today. It is considered a major driving force of innovation and disruption that challenges private and public organizations equally. With all economic and societal sectors being affected, digital economy is very dynamic and increasingly competitive (Lang, 2021).

Based on estimates of the impacts of Industry 4.0, it can be assumed that the impact on the gross domestic product (GDP) will be smaller at the start of digitization and will reach its peak in the period 2025 to 2030. A shift in the employment structure can be expected in the horizon of the next 10 to 15 years. A decrease of jobs can be expected especially in manufacturing professions, while a more significant increase is expected in service-driven professions.

Digital technologies represent the most important aspects of life in the 21st century. They can create new value offers. The digital transformation will strongly impact labour markets. The companies will not pay human workforce if it can be replaced by robots and other digital solutions, thus gaining a competitive advantage over the competitors, while being able to produce the product better, faster, and cheaper. Competition is one of the driving forces of the market economy, and forces economic actors to innovate. Currently, innovation is mostly synonymous with the introduction of digital solutions, so economic and social stakeholders which do not benefit of digitization will fall behind and even lose their position on the market.

The European Commission applies the Digital Economy and Society Index (DESI) to rate the digital economy and society in EU countries. The DESI is a composite index published every year by the European Commission since 2014, measuring the progress of EU countries towards a digital economy and society. It brings a set of relevant indicators on Europe's current digital policy mix, and virtual reality, robotics, and big data (Vidová, 2020, p. 498). Table 1 demonstrates the composition of the DESI index, applied from 2014 till 2020.

Table 1

The composition of DESI index of five principal policy areas

<u>Policy areas</u>	<u>Description</u>
1. Connectivity	Fixed broadband, mobile broadband, fast and ultrafast broadband, and prices
2. Human capital	Internet user skills and advanced skills
3. Use of internet	Citizens' use of internet services and online transactions
4. Integration of digital technology	Business digitisation and e-commerce
5. Digital public services	e-Government and e-health

Source: European Commission (https://ec.europa.eu/commission/presscorner/detail/en/MEMO_19_2933)

In 2021, the Commission has adjusted DESI to align it with the four cardinal points set out in the Commission proposal for a decision 'Path to the Digital Decade Policy Programme'. The DESI Index in 2022 focused on human capital, connectivity, integration of digital technology in businesses and digital public services. The proposal sets targets at EU level to be reached by 2030 to deliver a comprehensive and sustainable digital transformation across all sectors of the economy.



Figure 1. Digital Economy and Society Index (DESI) in EU countries in 2021 (<https://digital-strategy.ec.europa.eu/en/library/digital-economy-and-society-index-desi-2021>).

The EU DESI 2021 shows that, although Slovakia is making progress in Industry 4.0, compared to other EU countries, the country has been lagging for the last 3 years, and the lagging has even worsened.

In 2021, according to the DESI index, Slovakia ranked 22nd among the 27 EU member states. Slovakia has remained in the same position as in 2020. Regarding the human capital indicator, it ranked just below or around the EU average. Although as many as 54% of Slovaks have at least basic digital skills and 27% have above-average digital skills, this is less compared to the EU average of 56% and 31%, respectively.

In 2022, Slovakia ranked 23rd among the 27 EU member states. Figure 1 demonstrates that Slovakia fell by one position. Concerning the Visegrad 4 countries (Czech Republic, Poland, Hungary, and Slovakia) as indicated in the Figure 2, Slovakia was preceded by the Czech Republic and Hungary. It means that the two-thirds of the EU member states progress in DESI Index, however, Slovakia remains at the same position as in 2020, ranking among the seven least progressing EU member states.

Concerning the human capital, 55% of Slovaks have basic digital skills, which is slightly above the EU average of 54%. The proportion of ICT specialists in total employment is 4.2%, slightly below the EU average (4.3%). 16% of ICT specialists are women compared with the EU average of 19%. Slovakia's e-commerce scores have fallen: 13% of SMEs sell online compared with 17% in 2020. 16% of Slovak enterprises used e-invoices in 2020 compared with 32% in the EU. Slovakia is below the EU average across the indicators for digital public services. The proportion of e-government users among internet users has decreased to 62% and is below the EU average of 64% (Digital Economy and Society Index (DESI) 2022 Slovakia, 2022, p. 3). Simply, Slovakia needs to improve and expand digital public services (Digital Economy and Society Index (DESI) 2022 Slovakia, 2022, p. 4).

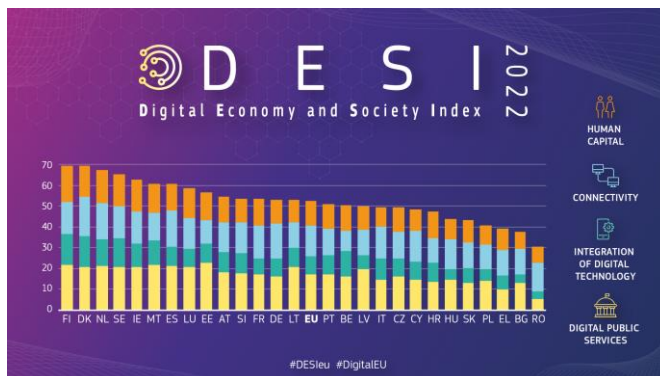


Figure 2. Digital Economy and Society Index (DESI) in EU countries in 2022 (<https://digital-strategy.ec.europa.eu/en/library/digital-economy-and-society-index-desi-2022>).

The above results of DESI 2022 confirmed that Slovakia needs to focus on digital competence and skill development in pupils, students, and adults in the preparation of Industry 4.0. The insufficient digital transformation of society may affect the implementation of Industry 4.0 mainly from the aspect of digitally skilled workers and employees, practically in all sectors of national economy.

In Slovakia, the impact of Industry 4.0 within the next fifteen years will be dominant especially in the Industrial Production sector, where a decrease of over 95,000 jobs is expected by 2030. The main share of the decrease is expected by 2025. The positive effect should occur in the Construction Professions, where the impact of initial investments should persist.

On the other hand, there are sectors that should be relatively strengthened in coming years. The biggest job growth is still expected in IT, scientific research, legal and business consulting, media, and arts professions. An increase of 2,400 new jobs in IT and communication technology is expected. The sector of education is expected to prosper, thanks to the increasing investments of companies related to lifelong learning of employees. By 2030, the number of jobs in the sector of education should increase by at least 7,000.

Slovakia must therefore prepare for changes in the educational structure and new qualifications which must be applied in the Slovak economy by 2030. It will be inevitable to focus on the development of qualifications in sectors of education and information technology. This implies the necessity of supporting and reforming the educational system and ensuring high-quality physical and communication infrastructure.

Slovakia needs to focus primarily on the following areas:

- a) support of educational policy,
- b) support of physical and IT infrastructure,
- c) protection of intellectual property,
- d) change in labour law policy (working hours, working conditions, health, and safety protection at workplace, self-employed persons),
- e) support of the legal system (data protection, legal liability, trade restrictions).

Firstly, Slovakia must improve is in the education system at all levels and should undergo its reform. The approach to education that persists in Slovakia is based on the experience of the 19th and 20th centuries and is not suitable for the development of talents in the new developing environ of the digital and circular economy. The ongoing education system is based on faulty assumptions. It creates an artificial barrier between the teaching of humanities and sciences, placing more emphasis on the social prestige resulting from acquisition of formal higher education and less emphasis on the actual content of education and knowledge acquired through practice.

Secondly, the support of the physical and IT structure in companies and educational institutions, the interconnection of theory and practice, especially by cooperation between universities and companies (e.g., through pilot schemes aimed at increasing the quality of graduates). Students would have the opportunity to confront theoretical knowledge with the requirements of practice and employers.

Thirdly, the concept of summer schools should be promoted, as they bring place for the development of additional knowledge beyond the curriculum, allow the creation of homogeneous groups of students linked by a common interest in industrial practice, the field of production and services.

2 Requirements of Industry 4.0 for Education 4.0

The Education 4.0 represents an inevitable trend in the new glance at education. Education is becoming a capital for an individual as well as for employers. The corner stone of professional success of individuals consists in flexibility and readiness for change (Krajňáková & Horváthová, 2020, p. 247). Competitiveness will increase in production and products, as well as in educational systems developing the talents in learners as educated employees will contribute to develop modern innovation systems.

Education 4.0 is defined as the use of technology in the context of teaching and learning (Dunwill, 2016, as cited by Krajňáková & Horváthová, 2020, p. 247; Pesti, Tamášová et al., 2021, p. 41). The concept Education 4.0 was designed to respond to the needs of Industry 4.0. New vision of education was aimed at the betterment of digital competences which could be applicable in all sectors of economy and production. Therefore, the traditional paradigm of education, teaching and learning must be re-assessed and transformed. Learners must be prepared for future radical changes in industries that will occur during their lives. Digital coalition states that teachers should especially master the more advanced approach to education, reduce the curriculum to the essentials and avoid excessive memorization, support natural curiosity in children, not mortify children's creativity, critical thinking, interest in adventure, curiosity, desire after new knowledge (Združenie podnikateľov Slovenska, 2020).

The Association of Entrepreneurs of Slovakia also agrees with the above premise, adding that Slovakia wants to handle the challenges ahead, cooperation between companies and schools and school authorities is essential, and it should not be limited to dual education only. Policy makers also expect from companies the qualified answers related to the profile and qualities of graduates and the demands of employers, thus obtaining the comprehensive requirements related to the school education (Združenie podnikateľov Slovenska, 2020). Companies are quite good at defining which graduates they need today, however, it should be emphasized that the education cycle is much longer. If there is a talk about

today's freshmen, then with a high probability they will perform jobs that we even do not know, and still they need to be prepared for them. It is generally agreed upon, that the school should teach pupils knowledge of mathematics, sciences, and technology, develop soft skills and character in them. The ways of teaching and learning should promote a positive attitude towards education and learning among students and do not kill their curiosity and joy in learning new things.

Changes in the labour market are noticeable already at present. The increase in offers in the IT sector has been visible. In 2018, the IT sector and IT jobs were the fifth most demanded on the Profesia.sk, in 2019 it was the fourth most in demand, and in 2020 it was the third most in demand. The demand for IT workers increased by the corona pandemic crisis and the increasing automation that is gaining ground in the national economy (Profesia.sk, 2020).

The characteristics of Education 4.0 include education independent of time and space, personalized teaching, learning flexibility, project-based learning, the ability to analyse and interpret data, curricula development with the participation of students, guided learning, decentralization of work teams, and the setup of virtual and digital forms of collaboration and learning.

The key requirements of Industry 4.0 in relation to Education 4.0 can be formulated as follows:

- 1) Individualized education, focused more on the education of the individual, not on the education of the class as a whole group. Industry 4.0 will probably increase the number of employees contracted as freelancers, i.e., involved in specific projects. The expected transition of a large share of workers to other professions (e.g., via freelancing) requires an individualized approach to students on the part of educators.
- 2) The teacher training must be priority. Towards the future, it will not be sufficient for a teacher to study the teaching profession. It will be principally necessary for teachers to be continuously trained and able to work with the most up-to-date technologies. Teaching through new technologies should gradually cover the traditional subjects (e.g., biology, chemistry, and physics).
- 3) Increased flexibility in the teaching process is promoted. According to the traditional concept, the school seems to be outdated compared with the challenges of the future. Strict regulation of the educational process, e.g., the extent of the lesson, the exact schedule of lessons and breaks, can suppress a creative approach to teaching and learning.
- 4) Change should be carried out in the assessment of learners. The current assessment system is based on the same criteria for all learners. Considering the future professions, however, it can be expected that the assessment at workplace will be done in relation to the fulfilment of a

different task. The concept of Education 4.0 also operates with testing, while some online tests allow the learner to pass the test easier or "harder" according to learner's abilities. The primary goal of testing is to provide feedback on knowledge and skills, not a grade.

- 5) The teacher is a mentor and coach. Education 4.0 assumes that the classic concept of the teacher as an "explainer of syllabi" or a "speaker dictating notes" will be shifted towards a mentor (especially concerning the development of soft skills). A Teacher 4.0 should be able to create video and audio content, visually engage content, use social networks in teaching, use blogs for participatory content, and create digital portfolios (Bolgarová, 2021).

Due to the requirements of the labour market for the future of jobs, education must be fundamentally changed.

Based on the future development and transformation of education resulting from Industry 4.0, several studies attempted to predict the new skills mostly valued in Industry 4.0.

According to a study by the American Society of Mechanical Engineers (ASME, 2022), companies should focus on three skill sets:

- those that companies **MUST** have (highest priority),
- those that companies **SHOULD** have (medium priority),
- those that companies **COULD** have (low priority).

The table 2 presents the breakdown of technical and personnel skills according to priorities.

Table 2

The breakdown of technical and personnel skills according to priorities

<u>Technical skills</u>	<u>Personal skills</u>
Highest priority: What companies must have?	Highest priority: What companies must have?
a) IT knowledge and skills	a) Time and personal management
b) Data and information processing and analysis	b) Adaptability to changes
c) Knowledge of statistics	c) Ability to collaborate in teams
d) Organizational and process knowledge	d) Social skills and communication skills
e) Ability to communicate with up-to-date interface (man-technology, man- robot)	
Medium priority: What companies should have?	Medium priority: What companies should have?
a) Knowledge management	a) Trust in new technologies
b) Interdisciplinary/general knowledge of technologies and organisations	b) Implementation of concept of continuing betterment and life-long

-
- | | |
|--|----------|
| c) Specific knowledge of production activities and processes | learning |
| d) IT security awareness and personal data protection | |
- Low priority – What companies could have?
- | | |
|---------------------------------------|--|
| a) Ability of programming and coding | |
| b) Specific knowledge on technologies | |
| c) Knowledge of ergonomics | |
| d) Knowledge of legal framework | |
-

Source: own processing according to ASME

The era of digitization and changes at the global level require a different approach to teaching and learning and new relations within the educational system and external relationships.

The detection and identification of the required knowledge and skills in the Education 4.0 relates to the theoretical definition of skills, sometimes referred to as competences, and the identification of the most important skills from the aspect of Industry 4.0.

Competencies for the 21st century have been the subject of several studies and analyses. Several types of competences were defined - key or transferable, cross-disciplinary, global, competences for the 21st century and transversal competences. Currently, four basic types of broadly conceived transversal competences have been formulated, which go beyond the boundaries of the traditional teaching and learning system. They include digital information and media literacy, collaborative problem solving, awareness of sustainability and diversity, and the competence to know to learn and to learn in long-life learning (Hanesová & Theodoulides, 2022, p. 10).

Currently, it is emphasized that these competencies must clearly relate to critical thinking and reflection. Understanding this competence-thought framework is the basis for the formation of foundational knowledge and the formation of the potential of teachers.

Individuals, workforce, organizations, and businesses are currently exposed to unprecedented changes and challenges, such as rapid and radical developments and advances in technology, transformations and changes on a global scale, environmental sustainability, demographic change, and migration, as well as global political uncertainty. These changes can be characterized as a radical change in the paradigm of social and economic development, which confront humanity with positive and negative consequences in the world of work as well.

The report of the World Economic Forum (2016) stated that due to unprecedented changes in technological systems and intelligent systems, up to 65% of pupils entering school today will work in professions that do not yet exist and will use about a third of competencies that are not currently emphasized.

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In 2016, the Future Jobs Report (The WEF, 2016, p. 3) stated that majority of current, most in-demand professions in many countries and industries did not even exist 10 or 5 years ago, and the rate of change will accelerate.

Professions that significantly affect people, will be expanding, including such newly emerging professions as specialists in human resource development, training and personnel development, organizational development, HR consultants and specialists, organizational culture personnel, service personnel and designers, problem solving consultants, e-commerce and social media specialists, experts in innovation development and innovation management. All newly emerging jobs are associated by the ability to present data, negotiate, and persuade, the ability to explain and lead others (Hanesová & Theodoulides, 2022, p. 14).

Even jobs described as stable (researchers, educators) will not remain untouched, but will undergo change and be based on the ability of cooperation between man and technology.

For this reason, it is necessary to look at competences and skills in a new way, from the aspect of the new needs and demands of life and practice.

The WEF report states that "the core of most jobs will be the transversal skills". Therefore, individuals, employers and educational institutions should focus attention on the formation and development of these competencies in ongoing, continuous education. If all actors adopt these new fundamental skills, it will be necessary to radically change the educational system and to resolve at universities what should be the content of formal academic knowledge, including transversal competences, which will be the educational outcomes, applicable in the personal, social, and professional life of the graduate.

A new vision concerning the content of education was brought by the WEF in 2016 (p. 32), when it introduced three new terms linked to education - competencies, foundational literacies, and character qualities, which are considered essential for education in the 21st century (Table 3).

Table 3

New vision for education

<u>Foundational Literacies</u>	<u>Competences</u>	<u>Character Qualities</u>
Literacy	Critical thinking/Problem Solving	Curiosity
Numeracy	Creativity	Initiative
Scientific Literacy	Communication	Persistence/Grit
ICT Literacy	Collaboration	Adaptability
Financial Literacy		Leadership
Cultural and		Social and
Civic Literacy		cultural awareness

Source: World Economic Forum, 2016.

3 Requirements of Industry 4.0 for higher education

Digitization also affects the field of education, although we are not at the end of this process, and therefore it is difficult to say exactly what role digital solutions will play in education in a horizon of few decades. In the education sector, it can already be observed currently, especially during the COVID-19 pandemic, that digitization replaces some elements of the traditional education and opens new possibilities that can educate students more effectively.

Progress in the digital economy can only be achieved by the quality improvement of education and the development of the skills of students and workers who can respond to new challenges of the labour market and accept technological innovations that will emerge at an ever-faster pace. Education is expected to prepare specialized human resources characterized by new knowledge, attitudes, work ethics, social and moral values, and skills to maintain and improve the development of society.

The management of universities and higher educational institutions must apply a new approach to the recruitment of future learners. The presentation of the universities must appeal to a wide range of potential learners, who most often decide on the quality of the offer, the new trends applied in education and the prestige of the university.

Universities should give students the confidence that they select the best offer by which their educational needs will be met. Through educational content and a wide range of study programs, the universities must be able to offer learners a powerful tool for learning and talent development.

Therefore, education must effectively adapt its "curriculum" to the needs of a changing society. It should be dynamic so that it can contribute to national development goals and bring about desirable social changes, preserve the positive aspects of the existing culture.

In accordance with the Strategy of the Digital Transformation of Slovakia 2030, "at all levels of the education system, there must be overall personality development, the development of a culture of relationships, and the development of the ability to learn, to be able to abstract problems and acquire knowledge in a targeted manner, as well as to orientate in the extensive data of the digital world" (Ministerstvo školstva, vedy, výskumu a športu SR, 2020, p. 29).

Higher education, research and innovation play a key role in supporting economic growth and global competitiveness, as they are part of economic, social, and cultural development. The mission of universities in the European education and research area is "to develop a harmonious personality, knowledge, wisdom, goodness and creativity in a person and to contribute to the development of education, science, culture and health for the well-being of the whole society. Fulfilment of this mission is the main activity of universities." (Ministerstvo školstva, vedy, výskumu a športu SR, 2020, p. 30)

In this context, higher education staff comes into focus, meaning all persons in institutions or programs of higher education who are engaged in teaching and/or scholarship and/or research and/or providing educational services to students or the community at large (UNESCO, 2020).

Development in higher education and research depends to a large extent on infrastructure and resources - both human and material, on the qualifications and expertise of teaching staff at universities, as well as on their human, pedagogical and technical qualities.

Digital transformation and information and communication technologies have taken over the world and are also present in education. During rapid growth, it is therefore necessary to provide education which increases the qualification of technological knowledge and skills of teaching staff of universities, educational and extracurricular facilities.

Acquisition of digital competence and skills is essential as every education and job in the future will require a certain level of digital competence and skills. Constant technological development and digitization require lifelong development of competences and skills from all learners, for Europe to remain economically competitive.

The European Union (European Commission, 2020) supports the development of a high-performing European digital education ecosystem and strives to improve the competences and skills of citizens for the digital transformation. It also supports equality during the digital transformation of education and society because it is essential. The European Commission also solves these problems through its main political initiative in this area - the Digital Education Action Plan (2021-2027).

Digital transformation is changing society and the economy with an ever-increasing impact on everyday life. During the coronavirus pandemic, the need for a higher level of digital capacity in education has been demonstrated, several challenges for education systems in the digital capacity of educational institutions and teacher training and the overall level of digital skills and abilities have been revealed.

Concerning this, the results of several studies are alarming. According to the OECD 2018 study, less than 40% of educators felt ready to use digital technologies in their teaching, with large differences between EU member states.

4 Digital transformation of education at universities

The term digital transformation refers to the transformation of the school, which also includes the appearance of digital devices, teaching procedures and methods, digital competences of teachers and students.

With the development of technologies, in addition to traditional competences (text understanding, logical, social, emotional skills), the development of digital

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competence also became important. It denotes the knowledge that people possess how to use ICT tools, and that with the help of the digital tools they can interpret information and data, communicate, collaborate, take care of their personal safety and data protection, create digital content, and solve problems.

Digitization in education also brings fundamental changes in the areas of administration, monitoring and assessment. Digital tools and methods in assessment are not influenced by the environment, emotions and other factors that distort the result. Digital tools perform much better than humans in a crucial part of the assessment process: they can collect and analyse data at lightning speed. By connecting digital devices, immediate and highly accurate feedback is possible.

The use of information technologies at universities is one of the basic conditions for successful development. Colleges and universities have drawn up a strategic development plan, which also includes an IT development plan. Since the introduction, operation and the management of technologies and integrated information systems is very complex, the university management must provide them the constant support.

The digital technology equipment of universities includes:

1. High-speed infrastructure (telecommunications connection to the Internet and computer network).
2. University information system (basic, professional software as the basis of the university's integrated information system, licensed programs, database systems, presentation programs, video conference systems, communication programs - platforms for online communication (e.g., Cisco Webex, Microsoft Teams, educational platform Moodle, Slido), multimedia programs, electronic academic libraries).
3. Digital technologies (licenses, server, WIFI connection, LAN and WAN connection, notebook, SMART devices such as tablets, mobile phones, multifunction printers, projector, interactive whiteboard) staffed by experts (administrator, network administrator).
4. The management system of the educational institution as an open management system, quality education as the basic pillar of successful achievement of educational goals, the quality improvement of teaching and professional staff, etc.
5. The digital competences of the teaching and non-teaching staff must be upgraded through digital competence upgrade/upskilling courses, including the improvement of the command of software, hardware, work with information and services (information literacy) and the ability of electronic communication. The courses should be designed as lifelong learning and professional development training programs.

6. Digital technologies are an effective means of digital literacy improvement. Several countries, including Slovakia, have not approved a set of specific skills neither a digital skill development, assessment strategy referring to teachers as part of professional development.
7. Security in cyberspace - global security threats the Internet of Things - network protection, digital infrastructure safety against viruses and hacking - data leaks, personal data protection.
8. ICT development and management (regular maintenance, management, and development of digital technologies).

Technical infrastructure is a prerequisite for the success of online education, which takes place in a virtual environment. Online education "is the process of the teacher acting on students in the virtual space, while explaining the subject matter, giving instructions, discussions, providing feedback, while educational activities are carried out exclusively through the transmission of data via the Internet. Students participate in education in real time (synchronous learning) or from recorded materials in shifted time (asynchronous learning). It is a form of distance education." (Strenáčiková, 2020, p. 3)

However, online education brings specific challenges that students and teachers must cope with. Online teaching copes with such challenges that the classic face-to-face teaching does not have. The most important feature of education must remain the quality of teaching, regardless of the environment in which it takes place. L. Nelson (Nelson & Goodson, 2021) points out that quality and effective teaching is efficient teaching - and conversely, ineffective teaching is inefficient teaching - whether in a classroom, online or hybrid environment.

L. Nelson (2021) cites several sources and examples that confirm that:

- what matters most in learning of learners is good teaching, not technology,
- online learning improves when pedagogy drives technology, not the other way around,
- ineffective online teaching reduces students' chances of completing school or a given course, therefore improving online courses can support students' academic success,
- opportunities for cooperation among students, self-reflection and self-monitoring are among the most efficient educational practices in various environments.

When online learning follows best teaching practices, students may learn a bit more than in a comparable face-to-face class. Educators need more preparation time for online teaching. Online education also brings in challenges that full-time education does not present, e.g., social, and pedagogical challenges.

Learners in full-time education and learners in online education are challenged to persevere and succeed. They expect support and motivation from the teacher to persevere and succeed. Many students need more from online education than just

convenient online learning and a collection of reading materials, assignments, and assessments. The educator's social presence, personal contact, clear instructions and expectations, relevant documents, and absorbing tasks help learners learn and complete their studies.

Universities and educational institutions face several challenges in online education:

- a) Quality assurance and overcoming doubts of educators about the quality of lecturing in the online environment and the content of presentations, endangering the academic success of students, while at the same time they perceive the increased external pressure on universities to develop new online courses as quickly as possible, educators do not have enough time to develop the best use of online technologies, which further feeds these doubts.
- b) Technological tools are the matter of administrators, and not educators, but ultimately educators are supposed to have the command to apply them. Although technology administrators provide training to explain how to use technology tools, educators must learn how to use them in the context of teaching and research. As teaching professions currently face rapidly changing requirements, educators require a new and broader set of competencies, especially due to the ubiquity of digital devices and applications.
- c) Incorporation of teaching procedures into online teaching is the task of the educator. When creating online materials and solving technical problems, educators tend to pay more attention to the correct use of technology than to correct teaching, even though they overlook the strategies they have acquired in their traditional teaching practice.
- d) Technologies can fit well into teaching methods. The combination of technological elements, pedagogy and design of online teaching must be best recognized and applied by the educator.
- e) Without interlinkage of pedagogy (pedagogical procedures) with the tools for quality improvement of university teachers in research and teaching, instructional design and online learning, it cannot be surprising that technology prevails over pedagogy and that many teachers have reservations about online teaching.

According to L. Nelson (2021), an effective transition to online education requires two key types of support: the value increase of online education through a better understanding of the pedagogical value of technology on the part of the educational institution, and competence upgrade in online education, including knowledge of specific technology-based skills (Nelson & Goodson, 2021).

The European Framework for Educators' Digital Competence (Punie, Y. et al, 2017) is a scientifically based framework that defines what digital competence

for educators. It provides a general reference framework to support the development of digital competences specific to educators in Europe. DigCompEdu's emphasis is not on technical skills, but rather on detailed information on how digital technologies can be used to improve and innovate education and training. Special attention should be paid to the role of a modern teacher who at the same time fulfils the role of a lecturer, tutor, digital advisor, content manager, digital learning practitioner, educational environment designer, blended learning designer, educational technology designer, mentor, and analyst (Teslenko & Khudyakova, 2020, p. 472). Modern teacher roles and competencies are presented in Table 4.

Table 4

Modern teacher roles and competencies

<u>Modern teacher roles</u>	<u>Modern teacher competencies</u>
Lecturer	Lecturing
Tutor	Development and maintenance of information educational technologies
Digital advisor	Training in the effective and safe use of the digital educational environment
Content manager	Use of digital technologies in the educational process
Digital learning practitioner, instructional designer of educational environment, blended learning designer	Construction of educational environment by disciplines based on the integration of educative tasks and the results of analysis of capabilities of services and platforms
Instructional designer of educational technologies	Student development research
Mentor	Mentoring
Analyst	The ability to create own development trajectory

The most significant competencies of teachers today include the following characteristics: readiness for continuous development and learning, information literacy and the ability to apply digital technologies in the educational process (Teslenko & Khudyakova, 2020, p. 472). The analyses of the teacher's digital competencies allow to distinguish several levels of their development (Table 5).

Table 5

Levels of digital competencies development in teachers

<u>Levels of digital competencies development</u>	<u>Characteristics of the level</u>
Basic level	Knowledge and ability to apply a particular tool in e-learning and distance education
Practice level	Logical combination of full-time and distance (online) learning (allowing to use a mixed/hybrid approach in the educational process)
Advanced level	Ability to teach other teachers to make full use of digital technologies in the educational process

Source: Teslenko & Khudyakova, 2020, p. 473

Online education is a popular alternative to traditional, face-to-face education at universities. In 2019, Research and Markets predicted that the online education market would reach \$230 billion value by 2025 – and with the major impact of COVID-19 on education, it is likely that online education programs will see even more growth.

In fact, the COVID-19 pandemic has shown what a practical and sustainable model online education is. It allows access to education even during a public health crisis, natural disaster, or other circumstances when students and teachers cannot travel and participate in full-time education. The pandemic has undoubtedly disrupted the entire education sector and forced academic staff and students to change their working, educational and even living conditions.

As many as 194 countries and regions temporarily closed their educational institutions in 2020 due to the pandemic, which affected more than 1.5 billion students worldwide. However, this process has not been easy due to a range of issues including IT, internet access and lack of knowledge about digital teaching and learning resources.

The OECD study (2022) highlighted how educators faced a steep learning curve in adapting to new teaching technologies at the start of the pandemic. Suddenly, they had to record lectures, create learning resources, organize online classes, online meetings, and consultations. It was easy for some, but not for others; they only learned to educate online because they were actively doing so due to circumstances.

New digital skills and technologies have played a key role in the transformation of traditional lessons into online education and hybrid learning. However, it

should be noted that such mixed teaching methods increased the working load and stress level of the teaching staff.

In the area of innovation and digitization, there is huge potential for using technology to deepen and support learning. The pandemic forced a definition of what teacher and student engagement really means in the classroom and showed that students could be more creative. Inside Higher Ed's annual report found that half of educators surveyed agree that online education is an "effective method of teaching", even though they also cited more stress and work pressure, more workload beyond working hours and too much engagement in front of a PC screen.

Regardless of where the education takes place – face-to-face, online, or through hybrid teaching and learning– effective engagement of students and acquisition of learning experiences from online learning should remain key priorities for higher education institutions.

According to the Online College Students 2022 report (Aslanian & Fischer, 2022) as many as 87% of college students and graduates agreed with the statement that online education is an appropriate way to educate and learn. In 2020, most likely due to COVID-19, up to 73% of students described themselves as studying online or partially online, compared to only 33% in 2017.

The pandemic affected the educational sphere at all types and levels of schools. It gave the opportunity to see the strengths and the shortcomings of educational systems. The adaptation to the online learning model can be a big challenge, however it brings in many advantages.

Today's workforce is gradually moving to the online environment. As many as 46% of foreign organizations surveyed by the Society for Human Resource Management (SHRM) said they use work from home and create virtual teams. As a result, the number of professionals who regularly work from home has increased by 159% over the past decade, with more than 4.7 million employees working at least half the time "online". Regarding the education, online education helps to prepare students for this change and shift towards online work (telework, home office).

The education informatization program until 2030 also defines solutions for the above-mentioned areas and proposes the following measures (Ministerstvo školstva, vedy, výskumu a športu SR, 2020, p. 29-30):

- a) To put in place a system of education for university staff according to the specific training needs of individual categories (university teachers, researchers, artists, administrative staff and others).
- b) Each study program should include the development of transferable and specific digital competencies in accordance with European standards and the needs of practice (the standard of digital skills will be part of the accreditation of the study program).

- c) In teacher education and training, a precise distinction between the digital skills development (at all levels and in all subjects) and preparation for teaching informatics must be done, in primary education for all future teachers, at higher levels in the corresponding study programs. Every graduate of teacher education must meet the standard of digital skills associated with the study program (the standard of digital skills will be part of the accreditation of the study program). The development of future teachers' digital skills must be linked to the practical part of their studies (the same standard must also apply to Supplementary Pedagogical Study).

With reference to global trends in the digital transformation of education, in 2021 the Ministry of Education, Science, Research and Sport of the Slovak Republic approved the Program for Informatization of Education until 2030 which represents a long-term strategy for the development of education from the aspect of informatization, with the aim to achieve a significant shift in the use of digital technologies and get closer to a European standard. The program defines the requirements for the transformation of traditional education into digital education, the parameters, and the paths to it.

Conclusion

The world around is changing rapidly due to technological, economic, and societal changes. We live in the era of the digital economy and society, in which adapting people and the workforce to changes often requires adequate education, retraining and continuous acquisition of new knowledge and skills.

The requirements of companies on workers are constantly growing and lifelong learning is becoming a necessity. Therefore, it is not possible to limit the age category of university students. Today, an educational institution must be much more flexible than it used to be, and in addition to provision of basic educational functions, it must flexibly respond to the changing demands of the education market and those interested in education of different age categories, job positions and length of employment, who are united in their high demands for the quality education.

In terms of technology changes, all those related to digitization, communication, analysis of large sets of data, robotization and artificial intelligence lead. Advances in technology are primarily promoted through education. The best means of development in these areas are people and their educational level. Therefore, investments in the development of human resources and the increase of the education value in society become a necessary task for policy makers and decision-making authorities. Access to knowledge has changed. This fundamentally changed the relationship to knowledge, since in many cases not objective knowledge represents the value, but the acquisition of methods and ways (know-how) how to arrive at knowledge.

Slovakia needs to create conditions for the digital transformation of all sectors of the economy. This primarily includes the transformation of the current industry into Industry 4.0, by which we have access to technologies, as well as incentives and initiatives to solve specific problems, which will be used, for example, by digital innovation hubs. Innovative approaches and achievements of Industry 4.0 can significantly help Slovakia to function in a sustainable, ecological, and efficient way.

Since the COVID-19 pandemic, time has passed, full of challenges that have affected almost all areas of our lives. The world has changed, especially after the severe covid crisis and the shifting of geopolitical layers. New values were created, and old and proven over decades were blurred. People's thinking also changed. Our planet is facing challenges that have accumulated over the past decades and which we can only solve with united efforts. Science and the Art, the synergy between them, give us the eternal power to change our world and work for a sustainable future - the world of our generations. Humanity is facing the biggest challenge of its existence. The strategy "Industry 4.0" is where the physical world merges with the virtual. Information technology, telecommunications and manufacturing are united when the means of production are becoming more independent.

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Exploring Middle School Teachers' Job Demands and Job Resources during COVID-19

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Abstract:

Introduction: The study aimed to explore teachers' general working conditions, job demands and resources, and teachers' general well-being in four middle schools in the Southeastern U.S during COVID-19.

Methods: The methodology for this study was qualitative. The sampling strategy was purposeful and comprised 15 educators. The data were collected utilizing two semi-structured interviews and documentation. The data analysis consisted of thematic analysis.

Results: The study's results revealed seven themes that emerged from the data: a) Changes in working conditions; b) teachers' well-being and working conditions; c) perceived teachers' new job demands and additional workload; d) emotionally draining job demands; e) perceived available job resources; f) perceived need for job resources; and g) strategies teachers used to cope with stress.

Discussion: The lessons learned during the pandemic in these four organizations may assist leaders in designing new policies and avoid further deterioration of teachers' well-being.

Limitations: Access to the organization's documentation and the sample size were limitations.

Conclusions: The shift in job demands and job resources during the pandemic placed teachers at risk of emotional exhaustion and burnout.

Key words: job demands, job resources, personal resources, emotional exhaustion, burnout syndrome.

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Introduction

The public health hazards posed by the COVID-19 pandemic forced schools to close their doors across the United States in March 2020. As a result, educational organizations underwent rapid changes in job demands requiring fast adaptation (Pressley, 2021). During the first wave of the virus, teachers and students were pushed to online instruction with no preparation time and inadequate resources to grapple with the new challenging working conditions (Sokal et al., 2020). Problems arose when some schools reopened with substantially different safety and instructional mandates during 2020-2021 (Marshall et al., 2022). Changes in working conditions, such as job demands and job resources, negatively impacted teachers' well-being (Falco et al., 2021; Pressley, 2021). The new job demands and limited resources opened the door to new threats to educational organizations (Kraft et al., 2021).

Before the COVID-19 pandemic, middle school teachers were one of the occupational groups presenting the highest stress levels in the workplace (García-Carmona et al., 2019). Additionally, 46% of teachers in middle schools nationwide expressed working under the pressure of high demands (e.g., dealing with students' emotional issues) with no resources or support from leaders (Bottiani et al., 2019). In the wake of the pandemic, middle school educators have encountered abrupt changes in job characteristics exposing these educators to physical and psychological strain (Čopková, 2021). Although some studies have explored teachers' working conditions: job demands, and job resources during the pandemic (Collie, 2021; Sokal et al., 2020), there is a lack of research in the middle school setting.

1 Literature review

1.1 The Job Demands-Job Resources model of organizational well-being

The Job Demand-Job Resources model is salient in the literature addressing the optimization of the well-being of human organizational capital (Lesener et al., 2019; Schaufeli, 2017; Taris et al., 2017). The model originated in the work of Demerouti et al. (2001), and since the first appearance of JD-R in the literature, the model has undergone revisions (Demerouti et al., 2019; Schaufeli, 2017; Xanthopoulou et al., 2007). One of the most important additions to the model was the conceptualization of personal resources as an extension of the JD-R (Bakker & de Vries, 2021; Xanthopoulou et al., 2007).

The JD-R model tenets support employees' well-being may be a consequence of the equilibrium or lack thereof between job demands and job resources as elements of the working conditions of the workplace (Mudrak et al., 2018). Further, the intrinsic attributes of job characteristics could impact individuals' health and impair well-being (Bakker & Demerouti, 2007; Han et al., 2020).

Demerouti et al. (2001) explained that the essence of the Job Demands-Job Resources model is defined by integrating two psychological processes. A stress process sparked by excessive job demands and a motivational process triggered by the presence of job resources (Schaufeli, 2017). In the work of Bakker et al. (2003), it was demonstrated that job demands were a vital determinant factor of absence duration due to health issues. On the other hand, absence frequency was predicted by job resources as an indication of motivational factors. The JD-R model is nourished by the strength of three theories: The Effort Recovery, the Conservation of Resources, and the Self-Determination theory (Schaufeli & Taris, 2014).

1.2 Job demands

Job demands are physical, social, and psychological characteristics of a job requiring sustained physical or physiological effort (Demerouti et al., 2001; Schaufeli & Bakker, 2004). When job demands become stressors, they may cause burnout, depression, and other physical and mental problems among employees (Schaufeli & Bakker, 2004). In the same vein, job demands may become an overwhelming cognitive, physical, and psychological expense if job resources are insufficient, thus hindering motivation and engagement (Kwon & Kim, 2020). Examples of Job demands include role ambiguity, unsupportive administrators, conflict with colleagues, work pressure, and job autonomy. (Bakker & Demerouti, 2007).

1.3 Job resources

Job resources are physical, psychological, and social aspects of jobs that are important in achieving goals at work, ameliorating the effects of the job demands, and motivating employees' learning (Bakker & Demerouti, 2007). Similarly, job resources are associated with diminishing the psychological costs caused by experiencing high job demands (Bakker & Demerouti, 2007). Examples of job resources constitute support from leaders and others, job control (autonomy), and feedback from supervisors (Schaufeli, 2017).

1.4 Personal resources

Xanthopoulou et al. (2007) contributed to the JD-R model by adding the concept of personal resources. Like self-efficacy and self-esteem, personal resources predict work motivation, engagement, well-being, and emotional exhaustion (Bakker & Albrecht, 2018; Xanthopoulou et al., 2007). According to Schaufeli and Taris (2014), and Moloney et al. (2018), personal resources, similarly to job resources, are crucial in completing work goals as they promote employees' personal growth. In addition, personal resources are positive self-evaluations that refer to an individual's ability to control the effect of stress (Xanthopoulou et al.,

2009). Examples of personal resources are optimism, self-efficacy, and organizational-based self-esteem.

1.5 The Effort Recovery theory

Work requires energy and effort to accomplish tasks (Meijman & Mulder, 1998). In their seminal work, Meijman and Mulder explained that a work environment with high job demands is conducive to fatigue and exhaustion. Working conditions and job demands may deplete individuals' psychological and physical resources (Bennett et al., 2018). Sonnentag and Fritz (2015) stated that psychological detachment from work is a powerful recovery experience allowing individuals to cope better with new job demands. In addition, when recovery efforts are insufficient, individuals may suffer from health problems (Kinnunen et al., 2011). Based on the tenets of the Effort Recovery theory, Schaufeli and Taris (2014) also asserted that a work environment offering a diversity of job resources to employees fosters an individual's desire to exert efforts on the job to attain goals. Therefore, job resources are initiators of willingness to spend compensatory effort, mediating the negative effects of job demands (Schaufeli & Taris, 2014). Similarly, personal resources or individuals' ability to cope with stress are protected by recovery experiences as the recovery effort mediates stress outcomes at work (Kinnunen et al., 2011).

1.6 The Conservation of Resources theory

The Conservation of Resources theory (COR) is considered a motivational theory (Hobfoll et al., 2018). In addition, COR is derived from the stress literature and may be used to explain how individuals experience burnout and exhaustion in the workplace (Bakker et al., 2022). Hobfoll (1989) explained that people are incentivized to acquire, maintain, and safeguard the resources they value. According to van den Heuvel et al. (2020), the theory is based on the following principles: a) those who possess more resources are less vulnerable to losses, b) those with fewer resources are vulnerable to resource loss, and c) those with more resources are more capable of resource gains (Hobfoll et al., 2018). Research studies based on the JD-R model using the postulates of the COR theory determined that there is a direct correlation between the availability of job resources in organizations, motivation, and well-being (Skaalvik & Skaalvik, 2018). Consequently, organizations need to provide resources to alleviate stress, attract, and retain competent employees.

1.7 The Self-Determination theory

The Self-Determination theory is an approach to human motivation (Ryan & Deci, 2000). The postulates of SDT empirically examined the processes fostering self-motivation (Deci & Ryan, 2012) and determined three basic needs mediating

individuals' motivational processes: The need for autonomy, relatedness, and competence. The theory has also been used to examine environmental factors influencing motivation at work (Deci et al., 2017).

The Job Demands-Job Resources model posits that a work environment sparks motivational processes when job resources are abundant (Schaufeli & Taris, 2014). Hence, the presence of job resources fosters employees' willingness to put effort into daily tasks (Schaufeli & Taris, 2014). As a result, work environments promoting autonomy, relatedness, and employee competence positively impact motivation (Bakker & Demerouti, 2018).

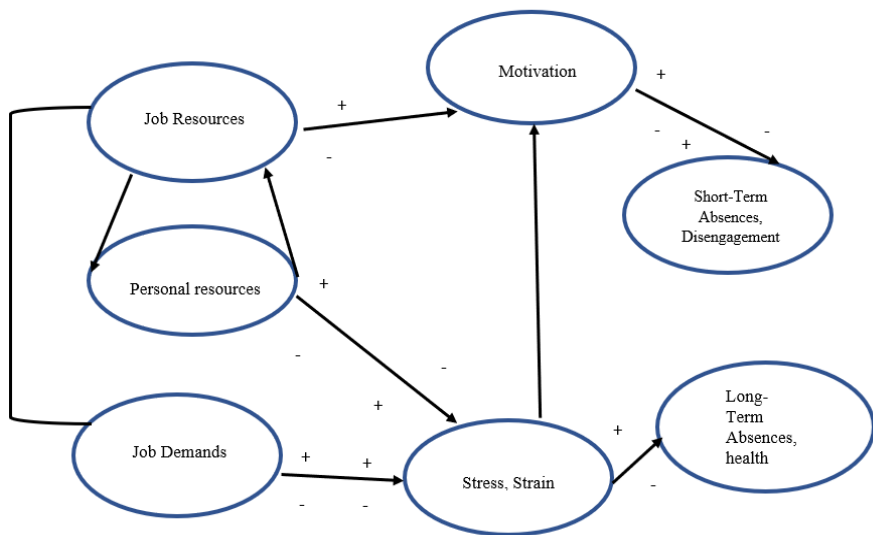


Figure 1. Conceptualization of the Interaction of the Elements of the Job-Demands Resources Model (Adapted from the work of Bakker and Demerouti, 2018)

2 Methods

2.1 Research design

The study was designed as an exploratory case study. A case study is an intensive description and analysis of a phenomenon inherent to individuals or organizations (Merriam, 2002). A case study design selection requires careful consideration of the research questions, the control the researcher has over the

events, and whether the study is focused on historical or contemporary issues (Yin, 2015). The study methodology was a case study, and the case study type was exploratory because the goal was to explore an unknown phenomenon bounded to four middle school organizations.

2.2 Participants

The population for the study consisted of six middle school administrators and nine teachers for a total sample of 15 participants. Educators' experience ranged from four to 30 years. Participants' age was between 30 to 55 years old. The sample comprised 10 (66%) females and five (33%) males. In the present study, purposeful sampling was selected. Qualitative researchers recognize that some participants possess richer information (Marshall, 1996); therefore, subjects were selected based on their ability to provide insight into the research problem, purpose, and research questions.

2.3 Data collection tools

The data collection process occurred after earning IRB approval and after the organization's gatekeepers conferred the necessary permissions to conduct the study. Data were collected using three data collection instruments. One semi-structured interview set was designed to interview teachers, while a second set was used to interview administrators. The third data collection instrument consisted of documentation.

2.3.1 Teachers' and administrators' semi-structured interviews

Two sets of semi-structured interviews were conducted using the Zoom platform. One set was used to interview teachers, a second to interview administrators. Interviews were audio-recorded, but no video was captured. A note-taking process occurred as participants provided verbal data during the interviews. Likewise, participants were given sufficient time to process the information and respond to each question. Questions were clarified at the participant's request. A script of the interview was shared as interviews occurred. Recordings were transcribed using a Microsoft Word document. Participants, as external validators, reviewed the transcripts as part of a member-checking protocol. Each participant was assigned an alphanumeric code during the interviews to maintain confidentiality. Teachers were assigned the letter (T), while administrators were assigned the letter (A).

2.3.2 Documentation

The school principals provided the documentation required for the study. Other documents were retrieved from the school district's public website. The documentation used to collect data included school announcements, newsletters,

schools' and districts' internal and public communications, memoranda, and policies. Only documents relevant to the study's problem, purpose, and research questions were collected.

2.4 Data analysis

The data analysis was characterized by an inductive process stemming from the study methodology and design, and it was an iterative reflexive protocol encompassing theme-generating techniques. The following phases characterized the data analysis: memoing, reflexivity, coding, constant comparison analysis, category formation, and theme generation.

2.4.1 Data analysis of semi-structured interviews

After each interview was conducted, audio recordings were manually transcribed. Each transcript was reviewed at least two times before member checking occurred. After member checking concluded, an initial analysis of each transcript was performed. The objective of this first analysis was to deepen the understanding of the nuance of details provided in the data.

2.4.2 Memos

Memos were written after examining each transcript. The content of the memos was representative of observations made during the interviews and contained a summary of participants' accounts. The purpose of the memos was to help the researcher gain familiarity with the data and to reflect on the information collected. Reflexivity allowed for pondering about bias and preconceived ideas affecting the credibility of the results. Following the memoing technique, codes were assigned to the data.

2.4.3 Coding the data

The coding phase started after finishing each memo. Pieces of data were coded to identify consistent, meaningful phrases and words repeated across the data sets. An open code strategy was applied to all transcripts. The open code approach allowed flexibility in finding pieces of data relevant to the research questions (Merriam & Tisdell, 2015). Words and phrases not providing insight into the research questions were eliminated. After codes were applied, a constant comparison analysis phase started.

2.4.4 Constant comparison analysis

First, codes from teachers' interviews were compared to one another, followed by a comparison of codes in administrators' interviews. The last step involved comparing codes from teachers' and administrators' data. Table 1 presents a summary of codes resulting from the comparative analysis phase.

Table 1

Comparative analysis: Examples of codes in teachers' and administrators' interviews

<u>Teachers' Interviews Open Codes</u>	<u>Administrator's Interviews Open Codes</u>
Working	Working hours
Face-to-face	In-person, face-to-face
Online,	Online
Stress, anxiety	Frustration, stress
Sick	Infected, sick
Confused	Uncertain
eCampus	Virtual platforms
Safety	Safety
Teaching face-to-face and online	Synchronous teaching
Technology	Technology
Discipline	Discipline, behavior
Training	Professional development
Materials	Curriculum materials
Team members	Colleagues
Venting, unloading	Family, friends

2.4.5 Category construction

Similar codes were color-coded and transferred to an Excel sheet for category formation. The category construction process allowed for clustering data into similar group sets.

2.4.6 Documentation analysis

Documentation data analysis occurred simultaneously with the analysis of the interviews and followed the same process. After getting familiar with each document, memos were written to summarize the message contained in the documents. Secondly, documents were read line by line to find key phrases or words providing insight into the research questions. An open coding process was applied to each document; then, codes were compared to teachers' and administrators' interviews using a constant comparative analysis approach (see Table 2).

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Table 2

Comparison analysis: Examples of open codes in semi-structured interviews and documents

<u>Teachers' Interviews Open</u>	<u>Administrator's Interviews</u>	<u>Open Codes in Documents</u>
<u>Codes</u>	<u>Open Codes</u>	
Working	Working hours	Work late
Teaching	Teaching	Teaching, instruction
Face-to-face	In-person, face-to-face	Face-to-face, in-person
online,	online	Virtual, online
Stress, anxiety	Frustration, stress	Mental health
Sick	Infected, sick	Quarantined, infections
Confused	uncertain	Uncertain times
eCampus	Virtual platforms	Virtual platforms
safety	safety	safety
Teaching face-to-face and online	Synchronous teaching	Synchronous
Technology	Technology	Technology
Discipline	Discipline, behavior	Discipline protocols, improve behavior
Training	Professional development	Professional development
materials	Curriculum materials	District materials/curriculum
Team members	Colleagues	Peers
Venting with family	Support from family, friends	

The codes emerging from the data were reduced into categories. Categories were then compared to those found in the interviews. Categories in misalignment with the research questions were eliminated.

All categories identified in teachers' and administrators' interviews were confirmed in the documentation analysis process. However, some categories in the interviews were worded differently in the documents. For example, the emotional health category did not describe specific cases of anxiety, mental illness, or stress among teachers in the documentation collected. Nevertheless, school and district documentation showed awareness of mental health needs due to the stress caused by the working conditions during the pandemic and recommended mental health services when necessary. Similarly, other internal communications (e.g., schools' newsletters) provided tips to ameliorate the effects of stress. No specific data points, such as student referral, confirmed that student behavior was a draining job demand. However, documentation addressed concerns about student behavior by supplying tips to build student-teacher relationships and improve behavior. Internal school documents also depicted

discipline protocols. Even though the social support category and lack of technology were identified in the interviews, the documentation did not show evidence of these categories. It is important to note that the categories not supported by evidence in the collected documentation were strongly supported in teachers' and administrators' interviews by frequency of codes and percentage of participants. Hence, they are considered relevant. Table 3 represents categories that emanated from the instruments.

Table 3

<i>Categories identified in the data collection instruments</i>			
<u>Categories</u>	<u>Teachers'</u> <u>Interviews</u>	<u>Administrators'</u> <u>Interviews</u>	<u>Documentation</u>
Working hours	✓	✓	✓
Teaching modalities	✓	✓	✓
Role ambiguity	✓	✓	✓
Physical health	✓	✓	✓
Emotional health	✓	✓	✓
Use of virtual platforms	✓	✓	✓
Synchronous teaching	✓	✓	✓
Enforcing safety	✓	✓	✓
Use of technology	✓	✓	✓
Student engagement	✓	✓	✓
Student behavior	✓	✓	✓
Colleague support	✓	✓	✓
District-created materials	✓	✓	✓
Technology needs	✓	✓	NA
Technology training	✓	✓	✓
Social support	✓	✓	NA

2.4.7 Data saturation

Data saturation was achieved after interviewing the 12th participant. However, all 15 interviews were conducted to ensure saturation had been effectively attained.

3 Findings

Qualitative research uses a naturalistic approach to understand real-life phenomena (Golafshani, 2003).

The inductive nature of this qualitative study followed a qualitative protocol, turning narrative data into themes (Merriam, 2002). Using non-numerical data (i.e., semi-structured interviews and documentation) and focusing on a single

community, the study addressed participants' familiarity with the study problem to learn about teachers' experiences under the unique working conditions of the COVID-19 pandemic holistically. As a result of the thematic analysis and triangulation of the data, seven main themes were revealed in the data: a) changes in working conditions, b) teachers' well-being and working conditions, c) teachers' new job demands and additional workload, d) emotionally draining job demands, e) perceived available job resources, d) perceived need for job resources, and e) strategies teachers used to cope with stress. Table 4 shows research questions in alignment with the resulting themes from data triangulation.

Table 4

Resulting themes in alignment with the research questions

<u>Research Question</u>	<u>Theme</u>
R1- What can be learned about the working conditions of teachers and teachers' well-being in four middle schools in the Southeastern United States during the pandemic?	1- Changes in Working Conditions 2- Teachers' Well-being and Working Conditions
R2-What can be learned about teachers' job demands in four middle schools in the Southeastern United States during the pandemic?	3- Teachers' NewJob Demands and Additional Workload 4- Emotionally Draining Job Demands
R3-What can be learned about the presence or absence of specific job resources in four middle schools in the Southeastern United States during the pandemic?	5- Perceived Available Job Resources 6- Perceived Need for Job Resources
R4-What can be learned about personal resources and strategies teachers may have used to manage the effects of job demands during the pandemic?	7- Personal Resources Used to Cope with Stress

3.1 Theme 1: Changes in working conditions

Based on participants' responses, working conditions dramatically changed as work characteristics morphed during the closing of the schools in March 2020 and reopening for the school year 2020-2021. Salient shifts in organizations' working conditions manifested in modifications of teaching modalities, changes in working hours, and role ambiguity.

3.1.1 Changes in teaching modalities

Teaching modality changes appeared relevant in the data in all three data collection instruments. In addition, 100% of the participants' responses identified changes in teaching modalities immediately after schools closed in March 2020. Participant T1 stated, "It was all online for all those nine weeks of school." In addition, participant A1 described the shifts in teaching modalities as "abruptly switching from face-to-face instruction to an entirely online platform." Participant T5 also remembered August 2020, when schools reopened for the 2020-2021 school year: "I had to teach kids face-to-face and those at home; I was teaching two classes simultaneously. It was very stressful."

Evidence of teaching modalities changes appeared ten times in the documents supplied by principals and the school district website. At the beginning of school closures in March 2020, a school principal emailed teachers stating, "I want to wish you all the very best as we start distance learning tomorrow." Similarly, a document retrieved from the district's website described teaching modalities at the beginning of the school year 2020-2021 in the following manner: "Parents will have the choice to select from three different teaching modalities: Online, face-to-face, and hybrid."

3.1.2 Changes in working hours

The study results revealed that teachers' working conditions also translated into changes in working hours during the pandemic. 66% of participants experienced increased work time and difficulty disengaging from work activities. Participant T9, referring to the nine-week closures in March 2020, stated, "I was working at home all the time." Similarly, A3 posited, "When schools reopened in August 2020, many teachers stayed late to be able to prepare for the next day. These teachers were double planning because they had to teach face-to-face and online." T7 also recalled experiences vividly as she explained, "Parents and students had to take turns using the computers, so, I had to do later calls or present the lesson after school hours because that was the only time that...that the student had a computer in from of them."

The documentation reviewed supported the changes in working hours during the pandemic during school closures in March 2020 and reopening in August for the school year 2020-2021. In one document, the author mentioned how a teacher spent most of her "free time" calling the parents and working with students after hours. The document reads, "... she spends much of her free time calling parents and working with students remotely to make sure they understand how to access her class." A second document showed an algebra teacher who took time from her summer to assist with algebra during the pandemic.

3.1.3 Role ambiguity

Signs of role ambiguity were apparent in the interviews and were supported by 100% of the responses. Participant T8 explained, “Everything was new, and I did not know what to do with instruction.” T5 compared the working conditions during the closing of schools in March of 2020 “To being in the middle of a game, and you don’t know where to run and pass. We didn’t know what to do.” T5 added, “It was confusing.” Expressions of uncertainty and confusion about teachers’ roles were common answers as teachers and administrators narrated the experiences of teachers. Teachers expressed sorrow for families and students as educators felt they did not know the guidelines to follow to be effective in their teaching roles.

Evidence of role ambiguity was found in different internal communication documentation. For example, in an email sent to teachers, a school principal stated, “We had some questions regarding attendance; please follow the guidelines sent to you by the district.” The document showed new guidelines for taking attendance online. Another record submitted by a school principal attempted to clarify questions teachers had about their roles during the pandemic.

3.2 Theme 2: Teachers’ well-being and working conditions

100% of respondents acknowledged a perceived physical and emotional health decline during the school closures and reopening for the 2020-2021 school year. T1 described her physical well-being by stating, “My physical lifestyle changed; the lack of mobility was hurting me physically.” Another participant stated, “After school reopening, wearing the mask all day caused a strain on my vocal cords.” In addition, school administrators reported a lack of staffing after returning to work in August 2020, as teachers were constantly quarantined with COVID.

Data collected from the interviews revealed that 100% of the participants alluded to teachers’ emotional well-being as “being compromised” in the working conditions during the pandemic. Participant T7 described feelings of concern for family members facing the possibility of infection. T9 also asserted, “... by the end of the year, I was depressed because I felt I had failed my students.” Other participants described their emotional well-being as a state of “mentally exhausted.” In addition, a participant disclosed taking anti-anxiety medication for the first time during the study’s interview.

Different documents provided insights into internal communication about COVID-19 infections. Cases of COVID-19 among students and teachers factored into feelings of fear about the virus. A district document described a given week during the pandemic as “one of our busiest weeks of COVID yet.” In another published document, graphs and tables presented the number of teachers and students infected by the virus in 2020-2021. In the document, the district

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reported that 53 middle school staff members and 287 students were infected with the COVID-19 virus that same year.

Although no direct evidence was found in the schools' or district's documentation about individual teachers' struggles with mental health, a district reopening plan document offered mental health resources through the Wellness department. Resources such as self-care, mindfulness, and the Employee Assistance program were available. The need for self-care was acknowledged and encouraged in a school newsletter.

3.3 Theme 3: Perceived teachers' new job demands and additional workload

When participants were asked about job responsibilities during the pandemic, teachers maintained they continued to have the same pre-pandemic duties; however, 100% of subjects asserted that teachers faced new additional demands. The data showed that participants identified using virtual instructional platforms, the synchronous teaching modality, and enforcing safety protocols as new job demands and additional job responsibilities.

3.3.1 Teaching on online platforms

All participants perceived teaching on online platforms as a new responsibility never experienced before. Participant A1 referred to using instructional platforms, stating, "Teachers were stuck with making sure that their eCampus courses were up-to-date and current." In addition, participant A2 also stated, "Prior to the pandemic, teachers had to have readily available an eCampus page for online learning, but during the pandemic, the number of specific details that had to go into building eCampus pages and content was much more significant." T7 also explained that learning about virtual platforms was new and described it as "a struggle." Other participants used phrases such as, "cumbersome," and "I have never done that before" when referring to teaching online as a new job responsibility.

District public documents and internal schools' communications supported evidence-based data on instructional platforms and a daily responsibility or new demand. For example, a district document reported, "...for the 2020-2021 school year, X district utilizes CANVAS for secondary schools." Instructional virtual platforms were addressed in a district document as "creating a system to develop a foundation in digital literacy within the schools." Internal school documents provided reminders to teachers to update the eCampus pages.

3.3.2 Synchronous teaching

73% of teachers and administrators also recognized the synchronous teaching modality as a new job demand and an additional responsibility during the COVID-19 pandemic. The dual teaching modality was implemented during

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2020-2021 when schools reopened in August. According to T3, he opted to teach face-to-face classes and stated, "...but a lot of my coworkers were teaching both online and face-to-face students at the same time."

A district document delineated the instructional models for 2020-2021 and informed that "...4th quarter distance learning opened many learning possibilities for improved synchronous and asynchronous teaching and learning, in both face-to-face and remote learning models." Another record from the school district provided guidance on the instructional models and explained, "Connect is an innovative learning environment that is a teacher-driven structured form of at-home learning...." The document expanded, "...students follow a school day schedule using technology and other instructional resources to learn from their teachers presenting live in classrooms."

3.3.3 Enforcing safety

Enforcing safety was supported by 80% of the participants as a new and added job demand. Enforcing safety was a protocol followed in the school environment to protect students and staff from the COVID-19 virus. According to participant A2, "Maintaining seating charts for contact tracing, which was a time-consuming task to keep track of COVID cases, was a new demand and a daily responsibility expected of teachers." Participant A4 also stated, "The first thing that was noticeable and enforced by teachers and administrators after schools reopened in August 2020 was masks." Participant T2 referred to safety as a new job demand never experienced in her 25 years of teaching.

The search for documentation to support participants' claim of safety as a new job demand produced significant findings in school and district records. The following is a statement retrieved from a district document:

"Secondary students (Grades 6-12) are required to wear face-covering when they are not able to be 6 feet from others, are in the hallway transitions/class changes, in large common areas, are riding the bus transportation, and are in line in the dining room area."

In other documentation, an internal school communication also revealed the following about enforcing safety:

"This is a reminder that I need every teacher teaching face-to-face classes to print out seating charts for each class period. I need it to be dated so I can shred older ones as you adjust your seating charts for contact tracing."

3.4 Theme 4: Emotionally draining job demands

80% of participants identified student engagement, student behavior, and technology use as draining job demands. A participant, A5, referred to student engagement as "a constant challenge" and described teachers' efforts to re-

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engage students as “hard work.” In addition, participants T5 and T1 expressed frustration about the lack of student engagement. Another participant, T3, stated, “I was disappointed and sad because all I did all day was teaching kids who were checked out.”

3.4.1 Student behavior

Patterns emerging from the semi-structured interviews found that student behavior was also perceived as a draining job demand. Administrators and teachers (80%) expressed concern about changes in student behavior during the pandemic. One participant, A5, described kids’ attitudes as “ornery.” Participant A2 also stated, “Some students created both big learning curves and behavioral concerns.”

3.4.2 Use of technology

Another perceived draining demand was the use of technology. 100% of the participants agreed that technology was “stressful and strenuous.” One participant perceived technology as “complicated and exhausting.” A school administrator lamented how “technology was difficult for teachers.”

3.4.3 Student engagement

Student engagement was evident in both district and school documentation. For example, one document emphasized the need for students to have their cameras on during online instruction and participate using the chat feature. Documentation about student behavior does not depict specific discipline incidents or referrals. However, some schools’ newsletters and internal memos provided guidance on discipline protocols and handling student disruptive behaviors. Similarly, a document provided by a school principal showed how teachers struggled with technology and commended a teacher who “is willing to help other teachers with eCampus and technology.”

3.5 Theme 5: Perceived available job resources

Interview question seven aimed to collect information about job resources teachers had available to assist with daily job demands during the pandemic. The resultant findings revealed that 100% of participants identified colleague support as resourceful and helpful during the pandemic. In addition, data showed that 100% of subjects acknowledged district-created materials as assisting teachers at the beginning of the pandemic when schools closed and teachers moved to an online platform.

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3.5.1 Colleague support

When asked about available resources, administrators agreed that teachers relied on one another to complete their daily tasks. For example, A2 referred to teacher-to-teacher collaboration and support as “more than they did ever before.” Another participant, T4, stated, “Thank God for my team member who knew what he was doing.”

3.5.2 District-created materials

Another resource participants alluded to during the interviews was a series of district-created materials provided to teachers by the school district. According to T1, examples of resources were a series of online math books ready to use on virtual platforms. Other participants, in similar comments, also explained that the district provided tutorials, pre-written curricula, and different online resources to facilitate instruction and support teachers during the pandemic.

While assistance from team members was a pattern identified in the data from the interviews, there was only one document provided by a school principal showing evidence of colleague support. However, the category was strongly supported by 100% of participants during the interviews.

The district’s instructional continuity plan document provided evidence about the district-supplied materials emerging in the semi-structured interviews. In one of its paragraphs, the document reads, “Resources teachers can use flexibly in face-to-face and online environments have been added to the frameworks.”

3.6 Theme 6: Perceived need for job resources

The results from the data analysis of interview question eight indicated that teachers lacked technology and technology training. While schools provided some technology (e.g., teacher laptops), 66% of participants claimed more technology would have helped teachers’ daily job demands. In addition, 73% of teachers and administrators perceived the need for more in-depth technology training.

3.6.1 Technology needs

Participants explained that they had to buy their technology or use their laptops as the schools’ computers were “broken.”

3.6.2 Technology training

While 73% of the participants also suggested that technology training was “quick” and “insufficient,” 66% expressed concerns about the lack of “good quality technology.” Participant T5 expressed the following referring to technology and technology training, “I wasn’t aware I was going to be teaching

face-to-face and online. More technology and more technology training would have been nice.”

The examined documentation did not provide a direct account describing a need for technology training. However, a school’s internal communication document showed leaders’ efforts to fill the technology gap experienced by teachers. As a result, a series of tips were suggested. One recommendation found in the documentation was directing teachers to watch different tutorial videos to manage virtual platforms and online classes. In addition, one of the school principals providing documents for the study published a newsletter using a “Coaching Corner” section to address teachers’ concerns regarding technology use.

3.7 Theme 7: Strategies teachers used to cope with stress

The results of interview question nine showed that 80% of participants perceived social support as a strategy to cope with stress from job demands. Participant A1 explained, “I think that some of our teachers relied on talking to their teammates.” In another interview, a participant asserted leaning “heavily on other teachers.” T9 described social support as “...having morning coffee with my husband and talking through my frustrations....” T2 sought social support when she explained, “All I had to do was to team up with the right people, you know, that made my day go better.”

Social support as a personal resource for coping with stress is not documented in the district or school records received from the principals. The documents collected did not show evidence of teachers seeking social support to cope with their daily job demands during the pandemic. Hence, the responses provided by the participants were not verified in written documentation.

4 Discussion

Toropova et al. (2021) referred to working conditions as work characteristics attached to the general attributes of an organization. Working conditions can also be categorized into job demands and job resources (Bakker & Demerouti, 2007). In the present study, different job characteristics, such as changes in teaching modalities, changes in working hours, and role ambiguity, were perceived as the primary shifts in teachers’ working conditions during the closing of the schools in March 2020 and reopening in the school year 2020-2021. Drastically different job characteristics caused by the advent of the COVID-19 pandemic impacted organizations’ working conditions (Carnevale & Hatak, 2020). For example, the changes in teaching modalities are recognized in the literature as ubiquitous during the pandemic (Pressley et al., 2021). Other studies conducted during the COVID-19 pandemic also reported these changes as variations in teaching methods (Kaden, 2020; Kraft et al., 2021). The sense of urgency and fast

transition from face-to-face instruction left many teachers unprepared to incorporate digital pedagogies into their daily practices (Cataudella et al., 2021). Hence, teachers reported a decline in their sense of success as teaching modalities changed (Kraft et al., 2021; Lizana & Vega-Fernandez, 2021).

Changes in teachers' working hours were also caused by the shifts in working conditions during the pandemic. According to Schaufeli (2017), and Schaufeli and Taris (2014), extending working hours is categorized as a job demand in the JD-R model of organizational well-being. The literature shows that rapid changes in working hours compel employees to work longer (Vieten et al., 2022; Wendsche et al., 2021). While high job demands call for recovery, the same demands impede employees from disconnecting from work (Sonnentag, 2018). The cycle is known as the recovery paradox (Sonnentag, 2018). Gicheva (2022) conducted a recent study on teachers' working hours during the pandemic and confirmed that the workday became longer for educators during the 202-2021 school year. However, Gicheva (2022) also showed that teachers' working hours diminished during school closures in March 2020. The findings of Gicheva's research are in stark contrast with the participants' experiences with working hours in the present study, as subjects perceived having to extend their workday to meet the new job demands during school closures in March 2020 and the reopening of the school year 2020-2021.

As shown in the study's findings, role ambiguity was also identified as a job demand as part of the working conditions of these four middle schools during the pandemic. Participants expressed uncertainty and confusion about their roles when schools closed. Similarly, school administrators sustained that teachers were baffled. Several respondents used the word "uncertain" to describe their roles. Role ambiguity is described in the literature as feelings of uncertainty stemming from concerns regarding completing one's job demands (Urien et al., 2017). Teachers' roles were reorganized during the pandemic to adapt to the new working conditions (Starrett, 2022). The literature on role ambiguity during COVID-19 is not abundant. However, Pressley et al. (2021) asserted that unprecedented changes in teachers' daily tasks during the pandemic may have created a lack of clarity in teachers' responsibilities, confirming the present study's findings.

Participants experienced a barrage of physical and emotional symptoms as their working conditions abruptly changed during the pandemic. The extant literature shows a connection between working conditions and well-being (Bakker & Demerouti, 2018; Skaalvik & Skaalvik, 2018). For example, working more hours is linked to one of the theories supporting the study: The Effort Recovery theory. The tenets of the theory explain that spending too much time at work may adversely affect well-being when recovery opportunities are scarce (van Hooff et al., 2007). Research has clearly shown that inadequate recovery from work

causes employees to be exhausted (Oerlemans & Bakker, 2014). Even though more studies are needed, teachers' and administrators' assertions about working hours showed that teachers might be at risk of stress-related diseases. In addition, role ambiguity or lack of clear roles (Bakker & Demerouti, 2014; Lee & Ashforth, 1996) may also result in burnout.

One of the study's objectives was to explore teachers' job demands stemming from the working conditions of the COVID-19 pandemic. As a result, teachers and administrators contended that using online platforms, a synchronous teaching modality, and enforcing safety protocols were new and added job demands. Employees' workload is akin to job demands in the JD-R model (Skaalvik & Skaalvik, 2018). When administrators discussed these new responsibilities, it was mentioned that a few staff members decided to retire early or leave the profession as they could not manage the increasing workload. Furthermore, the literature has shown that an unmanageable workload is one reason teachers leave the profession (Doherty, 2020). Zamarro et al. (2021) conducted a study to determine teachers' intentions to leave education during the COVID-19 pandemic and determined that 42% of teachers expressed a desire to leave as the workload increased. Employee retention issues may indicate excessive job demands (Bakker & Demerouti, 2007).

The study findings revealed that student motivation, engagement, and technology implementation were emotionally draining job demands. Past studies have identified student discipline as a source of teacher burnout and exhaustion (García-Carmona et al., 2019). Furthermore, previous studies utilizing the Job Demands- Job Resources model also identified student behavior as a source of strain and stress (Bakker & Demerouti, 2007; Dicke et al., 2018). Research has also shown that teachers' perceptions of student engagement correlate with teachers' self-efficacy (Pressley et al., 2021). Consequently, when teachers face complex challenges, they reassess their ability to fulfill the job, thus affecting perceptions of effectiveness and their sense of self-accomplishment (Lauermann & Berger, 2021). In the same vein, the inability to implement and execute online learning may have affected teachers' sense of self-efficacy if they perceived they lacked the skills to utilize technology.

Colleague support was identified as a resource in all four organizations. Seeking and obtaining support from coworkers is a job resource responsible for buffering the negative impact of workload (Bakker & Demerouti, 2008). Duarte et al. (2020) explained that employees adapt to high demands by adjusting the work environment. Secondly, positive relationships with coworkers and organizational connectedness are job resources inspiring creativity and motivation (Bakker & Demerouti, 2007; Mazzetti et al., 2021). Deci and Ryan (1985) used the self-determination theory to explain why individuals engage in constructing relationships for the needs of competence and relatedness. Another perceived

available job resource was district-created materials. Similar to social resources, physical job resources are essential for teachers as they assist employees in completing their daily tasks (Schaufeli & Taris, 2014; Sokal et al., 2020).

The interviews and document analysis showed that technology and technology training was lacking. According to Bakker et al. (2004), a lack of job resources produces failure and, thus, frustration as individuals cannot attain their goals. In a changing environment, employees must acquire relevant job resources such as different competencies to manage their job demands successfully (Akkermans et al., 2013).

Job resources are linked to the Conservation of Resources theory (COR) (Schaufeli & Taris, 2014). Hobfoll (2002) asserted that people seek to obtain and protect resources. In addition, the theory suggests that loss of resources at work will have more impact on organizational well-being than resource gain (Bakker et al., 2005). Based on these tenets, providing employees with functional technology and technology training was essential to mitigate the effects of the new and draining job demands such as technology implementation.

An interesting perspective in the literature is that while the logical action is to provide resources to buffer the impact of job demands, teachers who were exhausted by the changes in workload during the pandemic may have perceived the allocation of additional resources as another job demand (Eblie Trudel et al., 2021). According to Demerouti et al. (2001), a correlation exists between a lack of job resources and depersonalization, the second phase of burnout.

The study's findings also showed that teachers resorted to social support to cope with stress at work. Present and past studies have identified social support as a mitigating factor of stress (Ye et al., 2020), thus corroborating the study's results. In addition, social support is categorized as a personal resource in the Job Demands-Job Resources model (Bakker & Demerouti, 2017; Xanthopoulou et al., 2007). According to Cohen and Wills (1985), the stress hypotheses revealed the role of social support in shielding employees from physical and psychological costs in job-related high-demand experiences.

5 Limitations

The study was bounded to only four middle school organizations, and the findings may not be representative of all middle schools in the state or the country as the perception of these middle school teachers on the phenomenon of the study may differ from other middle school educators. The data collection process for the study was initiated at the end of the 2021-2022 school year; some teachers expressed feeling tired after a long academic year, and therefore, they may have provided distorted answers. Another limitation of the study may stem from the documentation collected. Free access to the organizations' records was not available as only school principals were the only individuals authorized to

provide documentation. Hence, selectivity may have occurred. Some documents were retrieved from the district's website; however, the selection of documents was limited to what the school district posted.

Conclusions and recommendations

In conclusion, the results of the current study found that teachers working conditions, job demands, job resources, and well-being dramatically changed during the COVID-19 pandemic, placing teachers at risk of mental and physical harm. Based on the study's results, it is recommended that leaders continue to refine emergency plans for periods of crisis. For example, school districts should innovate and create protocols to practice digital learning days. Digital learning days should encompass using online platforms only. The context of education during the pandemic extended beyond the classroom setting (Code et al., 2020). Hence, creating the conditions to include learning days from home in a school calendar year is recommended.

In the same way schools practice fire and tornado drills, organizations should practice for situations where face-to-face learning is impossible. An important consideration is policy redesign and development around the needs of a very different educational environment from the conventional campus-based setting (Naidu, 2021). The effects of the COVID-19 pandemic on education established the obsolete nature of current educational policies. Educational institutions armed with a solid digital infrastructure coped better during the pandemic (Naidu, 2021).

Recovery from work is a job resource that must be encouraged as it is part of a health-promoting practice. Working conditions filled with demanding tasks may deplete employees' psychological resources (Bennett et al., 2018; Meijman & Mulder, 1998). Teachers were repeatedly exposed to high job demands during the pandemic; therefore, engagement in recovery efforts outside work hours is required. Partnering with psychologists and counselors to use a research-based instrument to measure emotional fatigue and burnout is crucial. Interventions to recover from exhaustion should focus on the individual and organizational levels (Bakker, 2017). A multi-approach to intervention targeting departments, teams, and individuals has shown efficacy in alleviating organizational burnout and stress (West et al., 2016).

An important recommendation is to conduct action research within these organizations to resolve student engagement and behavior issues. It is essential to use research-based practices to provide solutions to these problems.

In conclusion, the COVID-19 pandemic changed the educational landscape forever. Since the Job Demands-Job Resources model has not been utilized in these educational organizations, this study contributes to the existing literature

and provides a foundation for future research. Lessons learned through the pandemic can inform positive policy development in educational institutions.

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The Relationship between Lifelong Learning and Attitudes towards the Teaching Profession of Pre-service Teachers

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Abstract:

Introduction: The purpose of this study was to examine the relationship between lifelong learning (LL) and attitudes towards the teaching profession (ATTP) of pre-service teachers. LL and ATTP of pre-service teachers were compared in terms of gender, perceived success level and reading frequency variables.

Methods: This correlational study was conducted with 515 pre-service teachers from a faculty of education located in Turkey's Central Anatolia Region. "Lifelong learning tendency scale" and "Attitude toward the teaching profession scale" were used as data collection tools.

Results: The results of the study showed that there was a positive and statistically significant correlation between pre-service teachers' LL and ATTP. Gender, perceived success level and reading frequency are variables that affect LL and ATTP of pre-service teachers.

Discussion: Pre-service teachers' LL and ATTP provide important tools for improving teacher quality and learning quality of students, making it an indispensable integral part of the teaching profession in developed countries.

Limitations: This study focused on pre-service teachers. A similar study can be designed with teachers and instructors. The quantitative research method was used in this study. A detailed examination with qualitative data was not carried out, which can be considered a limitation.

Conclusions: It was revealed that the LL level of pre-service teachers was high and the ATTP level was very high. Being female affects LL and ATTP levels of pre-service teachers positively. Another result of this study is that the more successful pre-service teachers perceive themselves to be, the more lifelong learning tendencies they have. The more frequently pre-service teachers read books in daily life, the more their lifelong learning tendencies and attitudes towards the teaching profession increase. The results of this study revealed that there was a moderate, positive and statistically significant correlation between LL and ATTP.

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Key words: lifelong learning; motivation; perseverance; curiosity; self-regulation; teaching profession.

Introduction

In order for countries to continue their development and change into 21st century societies, all individuals should be given the characteristics of learners based on a lifelong learning culture. In a learning society, individuals should have the ability to access information, use and produce information and technology. From this perspective, there is a need for individuals who can research, question, think critically, solve problems and think creatively; that is, have higher-order thinking skills. The most fundamental responsibility in raising individuals with these desired qualities is the education system because learning is at the centre of a sustainable and developing modern economy (Adams, 2007). Lifelong learning (LL), one of the current concepts frequently used in education in recent years, is an important part of the process of raising qualified people. In the 21st century, the knowledge gained in university education is out-of-date before graduation and the individual has to continue learning in business life for professional development. University students must be lifelong learners if they want to be a part of the learning society and contribute to society (Candy et al., 1994). While LL is not a new concept in Turkey, work for the establishment of the lifelong learning system has gained momentum since the 2000s. In this context, the 2009-2013 Lifelong Learning Strategy Document was prepared and implemented (Ministry of National Education [MoNE], 2014). LL is not limited to formal learning, but also includes informal and non-formal learning (Illeris, 2006). LL refers to the wide range of learning processes in which an individual is involved throughout his life to develop knowledge, skills and competencies for personal and professional development (Quinn & Sinclair, 2016).

Lifelong learners are autonomous learners who enjoy learning, have self-control, strong internal motivation, curiosity and perseverance. Today, the needs of the global economy, rapidly changing technological needs and the increasing need for manpower trained in different areas of the business world require individuals to learn how to learn (Demirel, 2009). Individuals with lifelong learning habits are information literate individuals (Akkoyunlu, 2008). Nine standards provide a conceptual framework for defining information literate individuals (American Library Association & Association for Educational Communications and Technology, 1998). These standards include the individual's effective access to information, the efficient, critical, creative and competent use of information, and the effort to produce knowledge. The information literate individual follows their personal interests as an independent learner. Information literate individuals value creative expressions of other knowledge, such as literature. The

information literate individual acknowledges the importance of knowledge for a democratic society and strives for a learning society. They exhibit ethical behaviour regarding information and information technology (American Library Association & Association for Educational Communications and Technology, 1998).

Lifelong learning is needed in adult education in order to facilitate the adaptation of adults to the changing conditions of business life and to improve their professional competencies as well as personal development (Dong, 2004; Friessen & Anderson, 2004). The relationship between lifelong learning and attitudes towards the profession is the main problem in this study. As an important part of community development, teachers who are lifelong learners can make important contributions to society as well as to students (Laal, 2011; Lasser & Fite, 2011; Matheson & Matheson, 1996).

When you ask parents and community members about their most important demands for their children, they usually agree that they want the best teacher possible in every classroom. Research shows that the most effective strategy to educate successful and qualified students is to achieve the professional development of teachers (Mizell, 2010). Achieving professional development of teachers is only possible if they are lifelong learners (Acar & Uçuş, 2017; Fenwick, 2001). In order to raise lifelong learners in society, pre-service and in-service teacher education programs should undergo radical changes (Cornford, 1999). Learning to learn, which is the core of LL, is the most valuable quality for the professional development of individuals from all professions. A prerequisite for training teachers who are successful in their profession and accelerate society is to ensure that pre-service teachers have positive attitudes towards their profession. In this context, it is thought that determining the relationship of LL, which can be associated with every profession, with ATTP will make a significant contribution to the literature.

Pre-service teachers' lifelong learning and their attitudes towards the teaching profession

LL teachers learn from many different sources such as students, parents, their peers and digital or non-digital sources in formal and informal environments (Knapper & Cropley, 2000). LL pre-service teachers can be defined as individuals who are highly motivated to learn, who do not give up easily in the face of difficulties, who persistent to achieve their aims, who can organise their own learning, have self-development, higher-order thinking skills and are interested in learning (Demirel, Sadi, & Dagyar, 2016; Diker Coşkun & Demirel, 2012, Kula, 2022a).

Attitude can be defined as an individual's positive or negative emotion/behavioural tendencies towards a situation, event or phenomenon

(Kenrick, Neuberg, & Cialdini, 2005). The ATTP of pre-service teachers will form the basis of their future professional understanding. Pre-service teachers' ATTP affects their future professional development (Kwakman, 2003), performance (Üstüner, 2006), self-efficacy (Demirtaş, Cömert, & Özer, 2011; Kula, 2022b; Yakar & Yelpaze, 2019) and satisfaction (Recepoglu, 2013). It is thought that there may be many commonalities between the characteristics of LL individuals listed above and the characteristics of individuals who have a positive attitude towards the teaching profession. It is necessary to determine the relationship between LL and ATTP of pre-service teachers and the variables with which these properties differ, in order to understand and develop the qualifications of pre-service teachers because teachers play a key role in creating successful changes in education and therefore in society (Van der Heijden, Geldens, Beijgaard, & Popeijus, 2015). The purpose of this study was to examine the relationship between LL and ATTP of pre-service teachers. For this purpose, the answers were sought to these questions:

1. What are the levels of LL and ATTP among pre-service teachers?
2. Do pre-service teachers' LL and ATTP differ significantly according to gender, perceived success level and reading frequency variables?
3. Is there a significant relationship between LL and ATTP of pre-service teachers?

1 Method

This study, which examined the relationship between lifelong learning and the attitudes towards the teaching profession, was designed with the correlational survey model which aims to describe the relationship between two or more variables and make predictions.

1.1 Participants

Ethical and research permissions required to conduct the research were obtained from Kirsehir Ahi Evran University Social and Humanities Scientific Research and Publication Ethics Committee with the number 2020/5. The target population of this research consisted of pre-service teachers from Kirsehir Ahi Evran University, Faculty of Education. The study used the convenient sampling method and 515 pre-service teachers were randomly selected to participate voluntarily in the research. The data were collected from participants who volunteered to participate in the study in the fall semester of 2020-2021. At this stage, the scope and purpose of the research was explained to the participants. The demographic characteristics of the participants are given in Table 1.

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Table 1

Participant demographic information

<u>Gender</u>	<u>n</u>	<u>%</u>
Female	397	77.1
Male	118	22.9
<u>Age</u>	<u>n</u>	<u>%</u>
17-20	304	59
21-25	184	35.7
26-30	14	2.7
31-35	8	1.6
36+	5	1
Age <i>M(SD)</i>		20.94 (.72)
<u>Department</u>	<u>n</u>	<u>%</u>
Social Studies Education	182	35.3
Classroom Education	121	23.5
Guidance and Psychological Counselling	95	18.4
Preschool Education	72	14
Mathematics Education	23	4.5
Turkish Education	17	3.3
Science Education	4	.8
Computer and Instructional Technology Education	1	.2
<u>Grade</u>	<u>n</u>	<u>%</u>
1st Year	224	43.5
2nd Year	94	18.3
3rd Year	173	33.6
4th Year	24	4.7
<u>Perceived Success Level</u>	<u>n</u>	<u>%</u>
Low	37	7.2
Moderate	433	84.1
High	45	8.7
Perceived Success Level <i>M(SD)</i>		2.01 (.40)
<u>Reading Frequency</u>	<u>n</u>	<u>%</u>
Every day	123	23.9
A few days a week	189	36.7
Occasionally	165	32
Rarely	34	6.6
Never	4	.8
Reading Frequency <i>M(SD)</i>		3.76 (.92)
<i>Total</i>	<i>515</i>	<i>100</i>

1.2 Data collection tools

Lifelong Learning Tendency Scale (LLTS): The LL of participants was determined with LLTS (Diker Coşkun & Demirel, 2010) a four-dimensional, 6-point Likert scale with the extreme points labelled as "strongly disagree" (1) and "strongly agree" (6). The dimensions of the scale were specified as motivation (6 items), perseverance (6 items), lack of regulating learning (6 items) and lack of curiosity (9 items). On the scale, items under the dimensions of "lack of regulating learning" and "lack of curiosity" were reverse scored. The Cronbach's alpha reliability coefficient for the total scale was .893. The interval coefficient of the scale was calculated as 0.83 by using the formula (Number of Intervals/Likert Type) in order to determine the LL levels of pre-service teachers.

Attitude Towards the Teaching Profession Scale (ATTPS): In the study, participants' attitudes towards the teaching profession were determined with ATTPS, a 35-item, 3-dimensional (affection, moral, accordance) scale developed by Çetin (2006). The extreme points of the 5-point Likert scale were labelled as "strongly disagree" (1) and "strongly agree" (5). The Cronbach's alpha reliability coefficient for the total scale was .946. The interval coefficient of the scale was calculated as 0.80 by using the formula (Number of Intervals / Likert Type) in order to determine the ATTP levels of pre-service teachers.

Table 2

Scale levels and intervals

<u>Scale Type</u>	<u>Evaluation Criteria</u>	<u>Evaluation Intervals</u>
5-point Likert	Very Low	1.00 – 1.79
	Low	1.80 – 2.59
	Moderate	2.60 – 3.39
	High	3.40 – 4.19
	Very High	4.20 – 5.00
6-point Likert	Very Low	1.00 – 1.83
	Low	1.84 – 2.67
	Slightly Low	2.67 – 3.50
	Slightly High	3.50 – 4.33
	High	4.34 – 5.17
	Very High	5.17 – 6.00

Personal Information Form (PIF): The PIF was developed by the researcher in order to determine the age, gender, department, perceived success level and reading frequency of the participants. In the development process of the PIF, lifelong learning and professional attitude literatures were examined. In line with the literature, the variables to be included in the form were decided. The form

was finalized by obtaining expert opinion regarding the PIF from a researcher in the field of educational sciences.

1.3 Data analysis

SPSS 22.0 software package was used to calculate statistics. Skewness and kurtosis values were examined to test the normality of the data. It was observed that LLTS skewness varied between -1.078 and .108 with kurtosis between 1.195 and .215; ATTPS skewness was between -1.159 and .108 with kurtosis between .518 and .215. When kurtosis and skewness values are between -1.5 and +1.5, the data are considered to be normally distributed (Tabachnick & Fidell, 2013). For this reason, parametric tests were used for the analysis of the data. The independent samples t test was used to compare the means between two sample groups, and one-way analysis of variance was used to compare more than two means. Pearson correlation coefficient was used to determine the relationship between variables, and regression analysis was used to determine the effects.

2 Findings

Descriptive statistics such as minimum, maximum, mean score, standard deviation and level for the scales are given in Table 3.

Table 3

Descriptive statistics for the scales

<i>Scales and Sub-dimensions</i>	<i>Min</i>	<i>Max</i>	<i>\bar{x}</i>	<i>SD</i>	<i>Level</i>
<i>LLTS</i>	2.22	6.00	4.96	.65	High
LLTS-Motivation	1.00	6.00	5.22	.73	Very high
LLTS-perseverance	1.83	6.00	4.82	.79	High
LLTS-regulating learning	1.83	6.00	5.13	.84	High
LLTS-curiosity	1.44	6.00	4.77	.91	High
<i>ATTPS</i>	2.43	5.00	4.35	.59	Very high
ATTPS-affection	1.68	5.00	4.22	.74	Very high
ATTPS-moral	2.88	5.00	4.76	.34	Very high
ATTPS-accordance	1.40	5.00	4.28	.80	Very high

LLTS: Lifelong Learning Tendency Scale

ATTPS: Attitude towards the Teaching Profession Scale

Pre-service teachers had high LL level and very high ATTP level. When the standard deviation values of the total scores and sub-dimensions of the scales were examined, the most homogeneous distribution in ATTPS is for the moral sub-dimension (SD = .34).

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The LL and ATTP of pre-service teachers were examined according to gender, perceived success level and reading frequency variables. Table 4 shows the results of the t-test regarding pre-service teachers' LL and ATTP by gender.

Table 4

Comparison of scores of pre-service teachers based on LLTS and ATTPS according to gender

<u>Variable</u>	<u>Gender</u>	<u>N</u>	<u>\bar{x}</u>	<u>SD</u>	<u>T</u>	<u>p</u>
LLTS	Female	397	5.06	.57	6.38	.000**
	Male	118	4.64	.78		
ATTPS	Female	397	4.44	.53	6.37	.000**
	Male	118	4.06	.68		

**p<0.01

LLTS: Lifelong learning tendency scale

ATTPS: Attitude Towards the Teaching Profession Scale

LL and ATTP of pre-service teachers showed a significant difference in favour of females according to the gender variable (LLTS- $\bar{x}_{(female)}$ =5.06; $\bar{x}_{(male)}$ =4.64, T= 6.38, p<0.01; ATTPS- $\bar{x}_{(female)}$ =4.44; $\bar{x}_{(male)}$ =4.06, T=6.37, p<0.01). In addition, it was calculated that there was a significant difference in favour of females for all sub-dimensions of both scales (LLTS-Motivation $\bar{x}_{(female)}$ = 5.30; $\bar{x}_{(male)}$ =4.92, T=5.08, p<0.01; LLTS - Perseverance $\bar{x}_{(female)}$ =4.87; $\bar{x}_{(male)}$ = 4.62, T=3.06, p<0.01; LLTS- Regulating learning $\bar{x}_{(female)}$ =5.23; $\bar{x}_{(male)}$ = 4.81, T=4.97, p<0.01; LLTS - Curiosity $\bar{x}_{(female)}$ =4.89; $\bar{x}_{(male)}$ =4.35, T=5.93, p<0.01; ATTPS-affection $\bar{x}_{(female)}$ =4.32; $\bar{x}_{(male)}$ =3.91, T=5.41, p<0.01; ATTPS-moral $\bar{x}_{(female)}$ =4.82; $\bar{x}_{(male)}$ =4.56, T=7.47, p<0.01; ATTPS-accordance $\bar{x}_{(female)}$ = 4.39; $\bar{x}_{(male)}$ =3.93, T=5.60, p<0.01).

Table 5

Comparison of scores for pre-service teachers based on LLTS and ATTPS according to perceived success level

<u>Variables</u>	<u>Perceived success level</u>	<u>N</u>	<u>\bar{x}</u>	<u>SD</u>	<u>F</u>	<u>p</u>	<u>Post-Hoc</u>
LLTS	1. Low	37	4.63	.87	9.52	.000	2>1
	2. Moderate	433	4.96	.63			3>1
	3. High	45	5.25	.46			3>2
ATTPS	1. Low	37	4.15	.60	2.32	.100	
	2. Moderate	433	4.37	.58			
	3. High	45	4.39	.64			

LLTS: Lifelong learning tendency scale

ATTPS: Attitude towards the Teaching Profession Scale

It was concluded that pre-service teachers' LLTS scores differed significantly according to their perceived success level ($p < 0.01$). The ATTPS scores of pre-service teachers did not differ according to the perceived success level. According to the Tukey test results, pre-service teachers with high perception of success had higher LL than their peers with low and moderate perception of success. In other words, the more successful pre-service teachers perceive themselves, the more lifelong learning tendencies increase.

Table 6

Comparison of scores for pre-service teachers based on LLTS and ATTPS according to reading frequency

<u>Variables</u>	<u>Reading frequency</u>	<u>N</u>	<u>\bar{x}</u>	<u>SD</u>	<u>F</u>	<u>p</u>	<u>Post-Hoc</u>
LLTS	1. Every day	123	5.25	.46	36.00	.000	1>3
	2. A few days a week	189	5.14	.51			1>4
	3. Occasionally	165	4.70	.69			1>5
	4. Rarely	34	4.38	.61			2>3
	5. Never	4	3.46	.89			2>4
ATTPS	1. Every day	123	4.46	.63	6.50	.000	2>5
	2. A few days a week	189	4.43	.53			3>5
	3. Occasionally	165	4.26	.60			4>5
	4. Rarely	34	4.03	.58			1>3
	5. Never	4	3.80	.71			1>4

LLTS: Lifelong learning tendency scale

ATTPS: Attitude Towards the Teaching Profession Scale

It was concluded that LLTS and ATTPS scores of pre-service teachers showed significant differences according to their reading frequency ($p < 0.01$). According to the Tukey test results, pre-service teachers with high reading frequency had higher LL and ATTP than those with low reading frequency. The more pre-service teachers read, the more their LL propensity and ATTP increased.

Table 7

Pearson correlation coefficient between LL and ATTP

<u>Variables</u>	<u>r</u>	<u>p</u>	<u>N</u>
LL-ATTP	.480**	.000	515

** $p < 0.01$

LL: lifelong learning

ATTP: Attitude towards the Teaching Profession Scale

The results of correlation analysis revealed that there was a moderate (Cohen, 1988), positive and statistically significant correlation between LL and ATTP. As the LL tendency increases, ATTP of pre-service teachers also increased. The relationships between the sub-dimensions of the scales are as follows:

Table 8

Pearson correlation coefficients between sub-dimensions

<i>Variables</i>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
1. Motivation	1						
2. Perseverance	.655**	1					
3. Regulating learning	.356**	.255**	1				
4. Curiosity	.471**	.481**	.564**	1			
5. Affection	.345**	.279**	.280**	.387**	1		
6. Moral	.389**	.256**	.365**	.317**	.419**	1	
7. Accordance	.394**	.262**	.334**	.439**	.719**	.350**	1

**p<0.01

LLTS: Lifelong learning tendency scale

ATTPS: Attitude towards the Teaching Profession Scale

It was concluded that there was a positive and statistically significant correlation between all sub-dimensions of LLTS and ATTPS of pre-service teachers. The effect size for the correlation coefficients (r) are interpreted as: weak from .10 to .29; moderate from .30 to .49; strong from .50 to .69; and very strong .70 and higher (Davis, 1971). There was a positive moderate relationship between motivation and affection (r=.345, p<0.01), motivation and moral (r=.389, p<0.01), motivation and accordance (r=.394, p<0.01), regulating learning and moral (r=.365, p<0.01), curiosity and affection (r=.387, p<0.01), curiosity and moral (r=.317, p<0.01), curiosity and accordance (r=.439, p<0.01), and regulating learning and accordance (r=.334, p<0.01). There was a weak positive relationship between perseverance and affection (r=.279, p<0.01), perseverance and moral (r=.256, p<0.01), perseverance and accordance (r=.262, p<0.01), and regulating learning and affection (r=.280, p<0.01).

The effect of LL tendency on teaching attitude is given in Table 9.

Table 9

Results for regression analysis to determine the effect of lifelong learning on attitude towards the teaching profession

<i>Variable</i>	<i>B</i>	<i>Std. Error</i>	<i>β</i>	<i>t</i>	<i>p</i>
(Constant)	2.175	.177		12.266	.000
Lifelong learning	.439	.035	.480	12.393	.000

$R = .480$, $R^2 = .230$, $F = 153.596$; $p < 0.01$;
Dependent variable: attitude towards teaching profession

Cohen (1988) interpreted the effect sizes for the regression coefficient (R^2) as: low .02, moderate .13, and strong .26. The results of regression analysis revealed that the LL of pre-service teachers has a positive strong effect on their ATTP ($F = 153.596$, $p < 0.01$). In total, 23% of the change in ATTP of the participants could be explained by their LL tendency ($R^2 = .230$, $p < 0.01$). LL has a positive effect on ATTP ($\beta = 0.48$; $p < 0.01$).

3 Discussion

This research aimed to determine pre-service teachers' LL and ATTP levels and the relationship between them. It was revealed that the LL level of pre-service teachers was high and ATTP level was very high. The fact that the study was conducted with young pre-service teachers may affect these results because research shows that as the age of an individual increases, lifelong learning decreases (Yıldız Durak, Seferoğlu, & Sen, 2020; Yıldız Durak & Tekin, 2020). High LL and ATTP is consistent with previous research results (Acar & Ucus, 2017; Akyol, 2016; Ayra & Kösterelioğlu, 2015; Bulaç & Kurt, 2019; Demirel & Akkoyunlu, 2010; Els, 2009; Erdoğan & Eker, 2020; Ergün & Cömert Özata, 2016; Evin Gencel, 2013; Karakuş, 2013; Şahin, Akbaşlı, & Yanpar Yelken, 2010; Şahin, Sarıtaş, & Çatalbaş, 2020; Ünal & Akay, 2017; Yaman & Yazar, 2015). It is thought that pre-service teachers who have a positive attitude towards their profession and are lifelong learners, will perform their profession lovingly and willingly in the future, will not avoid any sacrifice for the multi-faceted development of their students, and as a result, they will guide their students better (Brčić & Perin, 2014; Orgoványi-Gajdos & Kovács, 2020). LL and ATTP of pre-service teachers provides an important tool for improving teacher quality and students' learning quality, making it an indispensable, integral part of the teaching profession in developed countries (Day & Sachs, 2004).

Being female affects pre-service teachers' LL and ATTP levels positively. LL and ATTP scores of female pre-service teachers are significantly higher than male pre-service teachers. Gender stands out as an important variable for LL and ATTP. In all sub-dimensions of LLTS and ATTPS (motivation, perseverance,

regulating learning, curiosity, affection, moral and accordance), the average scores for female pre-service teachers were significantly higher than male ones. In line with this result of the study, female pre-service teachers are more eager to learn new knowledge and skills than males, they are more open to innovation, they do not give up in the face of failures and make efforts to improve, their motivation is higher in the learning process and they have a more positive attitude towards the teaching profession. Although there are studies in the literature suggesting that the gender factor does not have an effect on LL (Dindar & Bayrakçı, 2015; Şahin & Arcagök, 2014; Yaman & Yazar, 2015), there are also research results that reveal gender as an important factor for LL (Arsal, 2011; Bulaç & Kurt, 2019; Demirel & Akkoyunlu, 2010; Diker Coşkun & Demirel, 2012; Duymuş & Sulak, 2018; Erdoğan & Eker, 2020; Evin Gencel, 2013; Gökyer & Türkoğlu, 2018; Özgür, 2016; Şahin, Akbaşlı, & Yanpar Yelken, 2010; Şahin, Sarıtaş, & Çatalbaş, 2020). Gender is seen as one of the important factors in an individual's learning process (Gouthro, 2009; Tondeur, 2010; Uzunboylu & Hursen, 2013) and motivation (Hargittai & Shafer, 2006), as well as its social meanings.

Another result of this study is that the more successful pre-service teachers perceive themselves, the more lifelong learning tendencies they have. Therefore, it comes to mind that the self-efficacy perceptions of pre-service teachers may be an important variable affecting lifelong learning. As a matter of fact, there are research results showing a significant positive relationship between self-efficacy and LL tendency (Ayra & Kösterelioğlu, 2015; Karaduman & Tarhan, 2017; Özçiftçi & Çakır, 2015; Sıvacı & Çöplü, 2020; Yalın Uçar & Uysal, 2019). It was stated that academic motivation also increases academic self-efficacy and is a mediating variable for LL tendency (Sıvacı & Çöplü, 2020). Therefore, it is emphasized that in order to increase the effect of academic self-efficacy of university students on lifelong learning tendencies, it is necessary to take their academic motivation into account and increase it. Studies show the importance of increasing pre-service teachers' motivation to learn and, in this way, to perceive themselves as successful teachers (Kula, 2022b). The lifelong learning tendencies of pre-service teachers who perceive themselves as successful also increase and they are encouraged to develop positive attitudes towards their profession. As a result, it is necessary to include academic activities such as seminars, conferences, workshops and different practical projects that can be applied in the teaching process, which enable pre-service teachers to perceive themselves as successful and increase their motivation.

In this study, it was revealed that the more frequently pre-service teachers read books in daily life, the more their lifelong learning tendencies and attitudes towards the teaching profession increase. One of the ways to obtain individuals who love their profession, who have positive attitudes towards their profession

and have lifelong learning tendencies was revealed to be encouraging individuals to like reading and developing their reading habits (Ren & Li, 2017). This result of the research can be considered to be a very important result for teacher training programs. The result of this research, which reveals the relation between reading frequency and LL, is consistent with the learning definitions in the literature. There is a strong correlation between learning and intellectual, cultural and emotional components. According to Crick, Broadfoot and Claxton (2004) "Learning is also influenced by variables that are present in the socio-historical environment of the learner such as significant relationships, cultural tools, worldviews and traditions". Reading strengthens these variables that enable the individual to learn. Studies reveal a positive relationship between information literacy and LL tendencies (Demirel & Akkoyunlu, 2017; Garipagaoglu, 2013; Mbagwu, Chukwuedo, & Ogbuanya, 2020; Oguz & Atasven, 2016; Sadioglu et al. 2009; Solmaz 2017). The prerequisite for providing information literacy is to increase the reading frequency of individuals and to develop effective reading and comprehension skills (Zimmerer, Skidmore, Chuppa-Cornell, Sindel-Arrington, & Beilman, 2018). As a result, it is important for pre-service teachers to be individuals who read, love to read and comprehend what they read in order to train teachers with lifelong learning habits.

The results of this study revealed that there was a moderate, positive and statistically significant correlation between LL and ATTP. The LL of pre-service teachers had a positive strong effect on their ATTP. In the literature, results of similar studies confirm this correlation (Çam & Üstün, 2016; Ünal & Akay, 2017). In this way, it is considered necessary to train pre-service teachers as lifelong learners in order to have a positive professional attitude and to raise successful students. It is known that teachers' individual characteristics affect their professional development and their students' success (Hattie, 2012; Kwakman, 2003). It is also known that there is a positive relationship between pre-service teachers' self-efficacy perceptions and LL (Akyol, 2016; Ayra & Kösterelioglu, 2015). When interpreted with the current research results, it can be stated that pre-service teachers with improved lifelong learning skills both perceive themselves to be professionally competent and develop a positive attitude towards their profession. When different research results are examined, when teachers' lifelong learning motivation and persistence increase, their professional values of creativity, mental stimulation, sacrifice and diversity (including various tasks, doing different jobs) also increase (Tanatar & Alpaydin, 2019). Therefore, it is predicted that improving the LL of teachers, pre-service teachers and actually each member of society will support the multi-directional development of individuals both personally and professionally. Lifelong learning teachers are known to experience less burnout (Yildiz Durak, Seferoglu, & Sen,

2020). Occupational burnout is an emotion that negatively affects professional performance and causes poor work performance (Maslach et al., 2001). The research results of Kazu and Demiralp (2016) suggest that academics think that teacher training programs are not suitable for gaining lifelong learning competence that programs are insufficient to improve pre-service teachers' personal development, and that gaining lifelong learning competence is left in the background in programs implemented in education faculties. There should be awareness in teacher training institutions that the pre-service teachers being lifelong learners is an important factor affecting their professional attitudes. In addition, developing teacher training programs in this way is an important point in raising highly qualified teachers who love the profession in Turkey. As a matter of fact, Els (2009) suggests that higher education institutes should know that they play an important role in shaping young minds and update their curriculum accordingly.

Conclusion

LL is a concept that should be turned into a philosophy of life for teachers and pre-service teachers. It has become a necessity in today's living conditions for teachers to teach LL to each student they train. The problem in this study focused on pre-service teachers. A similar study can be designed with teachers and instructors. The quantitative research method was used in this study. A detailed examination with qualitative data was not carried out, which can be considered a limitation. The result showing that LL skills and attitudes of female pre-service teachers towards the teaching profession are higher than male pre-service teachers can be examined in a sociological context in future studies. The reasons that push females to be more competitive in professional and social life in Turkey and the effects of gender roles on female teachers may be subjects for future educational research.

It is striking that the more frequently the pre-service teachers read in daily life, the higher their LL and ATTP increase. In future studies, the types of books that affect pre-service teachers' LL and ATTP can be investigated. In this way, practices such as projects, assignments and reading clubs that will encourage pre-service teachers to read can be disseminated in courses given in faculties of education.

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Investigating Lifelong Learning Tendencies and Scientific Creativity Levels of Prospective Science Teachers

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Abstract:

Introduction: Prospective science teachers must themselves first generate rather than simply using knowledge and they must be science literate must be science literate and abreast of the changes in industry if we want future generations to be and do the same. Therefore, the purpose of this study is to determine lifelong learning tendencies and scientific creativity levels of prospective science teachers and examine the correlation between these variables.

Methods: In the study, correlational survey, one of the quantitative research methods, was used. The sample of the study was composed of 201 prospective science teachers studying at the 1st, 2nd, 3rd, and 4th years in a public university in Eastern Anatolia Region within the academic year 2019/2020. “Lifelong Learning Scale” and “Scientific Creativity Test” were used as data collection tools in the study. Independent samples t-test was used to compare the scale scores of the participants in terms of gender and age and ANOVA was used to compare them in terms of class level. In addition, Pearson’s Product-Moment Correlation Coefficient (r) analysis technique was used in order to examine whether or not there was a significant correlation between lifelong learning tendencies and scientific creativity levels of prospective science teachers.

Results: The results of the study indicated that the prospective science teachers had high lifelong learning tendencies. No statistically significant difference was found between the Lifelong Learning Scale (LLS) total scores of female and male prospective science teachers. However, a statistically significant difference was found between the Scientific Creativity Test (SCT) total scores of male and female prospective science teachers and this difference was observed in favor of male teachers. Additionally, there was a positive and moderate correlation between the lifelong learning tendencies and scientific creative levels of the participants.

Discussion: As a result of the study, it was observed that there was a moderate and positive correlation between lifelong learning tendencies and scientific

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creativity levels of the participants. High levels of lifelong learning were correlated with high levels of scientific creativity. Lifelong learning requires individuals to have some atypical knowledge, skills and competencies to cope with current life problems. In addition, it is recommended in the literature that individuals should have some competencies, such as searching information, accessing information and knowing the ways of reaching information in order to have lifelong learning skills. Therefore, it can be interpreted that scientific creativity skills of individuals, who integrate learning processes throughout their lives and have the mentioned competences, will also improve.

Limitations: The limitations of the study are that the study included 201 prospective science teachers studying in a public university located in Eastern Anatolia Region and the number of male participants was less than the number of female participants.

Conclusions: It is important for prospective teachers to do practices, which will improve their lifelong learning skills during their undergraduate education, in terms of scientific creativities. This is because scientific creativity and lifelong learning skills should be included in the science course in order for students to acquire sense of task, scientific perspective, and skills for controlling and regulating their learning.

Key words: lifelong learning, scientific creativity, science education, prospective science teachers, correlational survey.

Introduction

Societies experience many changes in science, industrial, and technological fields as a result of their increased knowledge level. These changes have led to Industry 4.0, the last industrial revolution, in which machine power has replaced with manpower and is different from the other industrial revolutions in terms of speed, digitalization, and system (Banger, 2016). Societies need to have qualified labor that adopts technology, in order to adapt to this industrial revolution. In this context, it is important for individuals to have 21st century skills such as information and technology literacy, critical and creative thinking, and lifelong learning (Demir, 2018; Qina, Liua, & Grosvenor, 2016).

Although there is no general definition for 21st century skills, these skills are also referred to as survival skills (Trilling & Fadel, 2009) as well as the characteristics individuals need to possess in order to adapt to the new industrial revolution (Ledward & Hirata, 2011). 21st century skills involve basic and critical thinking, such as language skills, science literacy, and mathematical literacy, as well as practical skills such as creative thinking and problem solving (Lai & Viering, 2012; Casner-Lotto & Barrington, 2006). Transferring these skills to future generations is necessary for the survival of societies and Industry 4.0 and the presence of these skills has led to the emergence of a new education

system, such as Education 4.0 based on innovation and production (Saxena & Bhat, 2017). Education 4.0 aims to train individuals who produce and transfer information, have higher-order thinking and innovation skills, and can respond to the needs of the technological world (Demir, 2018; Gurjanov et al., 2020). In addition, it is crucial in this education system to educate individuals in such a way to constantly produce and use what they have produced. This is because in Education 4.0 approach learning processes, which regulate understanding, trigger research, and are based on producing results, will be used by preventing Bloom's taxonomy (Chea & Huan, 2019; Gomaratat, 2015) and lifelong learning is the basic mission of educational institutions by attaching importance to sense of education (Doğan & Baloglu, 2020; Öztemel, 2018).

The concept of lifelong learning, used by Grundtvig in 1800s for the first time is defined by European Commission as "all activities aiming to improve individuals' knowledge, skills, and competences individually, socially or professionally throughout their life". Besides, while Dinevski and Dinevski (2004) describe lifelong learning as the lifelong education process without any restriction, White (1982) stated lifelong learning as the process in which the individuals improve their potentials throughout their lives in order to manage their life. Lifelong learning includes individual developments which strengthen qualifications individuals have and are able to adapt them to the changing environment throughout their lives as well as all formal and informal educations acquired throughout their lives (Kulich, 1982; Cross, 2014). Lifelong learning, which attaches importance to improvement of professional and personal competence of individuals, is also referred to as the responsibility given to the knowledge in social and economic fields (Hursen, 2014). Shuman, Besterfield-Sacre and McGourty (2005) describe lifelong learning skills as being aware of what needs to be learnt, learning by using different ways, following a learning plan in learning processes using technology, critical reading, and research. Individuals with these skills are curious, are interested in new developments, are information and technology literate; analyze the problems deeply by evaluating their learning, and make intellectual struggles to solve these problems (Mitkovska & Hristovska, 2011).

Individuals, at early ages, should acquire lifelong learning skills aiming to ensure economic growth by increasing production and efficiency and to increase social solidarity by providing equal opportunities and ensuring them to receive education based on their interests and abilities (Çiftcibaşı, Korkmaz, & Karamustafaoğlu, 2020). Teachers and prospective teachers should have lifelong learning skills (Rausch, 2003) and for this reason, lifelong learning should be included in the education of prospective teachers in order for the lifelong learning referred to as continuity in education to be part of education and for individuals to acquire lifelong learning competence and skills. Continuous self-

improvement of teachers is associated with lifelong learning. In other words, teachers should learn lifelong due to their profession, follow developments related to their professional fields, adopt these novelties, and apply them in classroom activities. In this regard, it is attached importance that teachers and prospective teachers should be trained in such a way to contribute to the improvement of their lifelong learning skills by determining their lifelong learning tendencies. In their study, Demirel and Akkoyunlu (2017) stated that teachers should acquire lifelong learning skills for the development of a society composed of lifelong learning individuals, who are information literate, and then the teacher training programs in universities should be arranged to support lifelong learning for achieving this. Therefore, it is important to have lifelong learning skills as well as scientific creativity skills in processes of producing, spreading, using and structuring information on the basis of being a strong individual and society (Wang & Yu, 2011; Zulkarnaen, Supardi & Jatmiko, 2018).

Although scientific creativity is an important concept in the internalization of knowledge by students and especially in science, it has no common definition (Demirhan, Önder, & Beşoluk, 2018). In this context, Sak and Ayas (2013) define scientific creativity as producing different and original ideas and products in the field of science and Hu and Adey (2002) describes it as finding and imagining novel techniques for a solution after exploring a problem. The characteristic distinguishing scientific creativity from general creativity is that information related to the study field is taken into consideration during creative thinking (Amabile, 1996). Scientific creative thinking has a theoretical and practical systematic and aims to solve a scientific problem. Therefore, scientific creativity should be examined separately from general creativity (Hu et al., 2013). Besides, students should acquire scientific creative thinking skills as a requirement of the new education system (Kiras & Bezir-Akçay, 2016; Siew, Chin, & Sombuling, 2017).

Today, it is important that individuals have 21st century skills and lifelong learning and scientific creative thinking skills within the scope of Education 4.0 education system. This situation has been involved also in the new curricula. the Science Education Curriculum states that students should acquire 21st century skills, such as creative and innovative thinking, lifelong learning skills, problem solving, critical thinking, collaboration, communication, media and technology literacy, leadership, and entrepreneurship (MEB, 2018). For this purpose, first of all, teachers should have lifelong learning and scientific creative thinking skills which is an important gain in Education 4.0 education system and they should be the teachers of 21st century as a requirement of this understanding (Brun & Hinostroza, 2014). This is because all these changes in education have led to changes in tasks and responsibilities of teachers along with learning processes

(Yenice & Alpak-Tunç, 2019). In this context, it is thought that science teachers have more duties and responsibilities in acquiring these skills to their students (Yenice & Yavaşoğlu, 2018).

Scientific creativity and lifelong learning skills should be involved in the science courses in order for students to acquire skills related to sense of task, scientific perspective, and regulating and controlling their learning (Pise & Jadhav, 2016; Shanahan & Nieswandt, 2009). The studies have showed that there is a positive correlation between science and scientific creativity (Yang et al., 2016). For this purpose, it is important to investigate lifelong learning tendencies and scientific creativity levels of prospective science teachers in particular. In the literature, there are studies investigating separately the scientific creativity levels (Demir, 2015; Demirhan, Önder, & Beşoluk, 2018; Polat & Konaş, 2018) and lifelong learning tendencies (Bulaç, 2019; Demirel, Sadi, & Dağyar, 2016; Hanewald, 2012; Mitkovska & Hristovska, 2011) of prospective science teachers, however, no study has been found investigating both lifelong learning tendencies and scientific creativity levels of prospective science teachers. Therefore, the study is believed to contribute to the literature. Prospective science teachers must themselves first generate rather than simply using knowledge and they must be science literate must be science literate and abreast of the changes in industry if we want future generations to be and do the same. Therefore, the purpose of this study is to determine lifelong learning tendencies and scientific creativity levels of prospective science teachers and examine the correlation between these variables. In accordance with the specified objective, answers to the following sub-problems were sought:

1. What are the lifelong learning tendencies of prospective science teachers?
2. Do lifelong learning tendencies and scientific creativities of prospective science teachers differ significantly in terms of gender, age and class level variables?
3. Is there any significant correlation between lifelong learning tendencies and scientific creativity levels of prospective science teachers?

1 Methodology

1.1 Research design

In this study, correlational survey, one of the quantitative research methods, was used. Correlational survey is used to examine the correlation between two or more variables and determine the correlation level between variables if any (Fraenkel & Wallen, 2006). Since the correlation between lifelong learning tendencies and scientific creativity levels of the prospective science teachers was investigated in this study, correlational survey was used.

1.2 Sample group

While the population of the study was composed of the prospective science teachers continuing to receive education in a public university located in Eastern Anatolia Region within the 2019-2020 academic year, the sample of the study consisted of 201 prospective science teachers studying in the 1st, 2nd, 3rd, and 4th years of the same university. Appropriate sampling method was preferred for sample selection. In order to reach the sample required for the study with the appropriate sampling method, the most easily accessible samples are preferred. Besides, the generalization was made to the “accessible population” and the whole accessible population was reached during the data collection process. In this context, Table 1 shows the demographic information of the participants in the sample.

Table 1

Demographic characteristics of the participants

<i>Class level</i>	<i>f</i>	<i>%</i>
1st Year	47	23.4
2nd Year	43	21.4
3rd Year	60	29.9
4th Year	51	25.3
Gender		
Female	152	75.6
Male	49	24.4
Age		
16-20 years	98	48.7
21-25 years	103	51.3

When Table 1 was examined, it was determined that 47 (23.4%) of the participants were the 1st-year students, 43 (21.4%) were the 2nd-year students, 60 (29.9%) were the 3rd-year students and 51 (25.3%) were the 4th-year students. In addition, 75.6% of the participants (152 participants) were female and 24.4% were male.

1.3 Data collection tools

Lifelong Learning Scale (LLS), which was developed by Wielkiewicz and Meuwissen (2014) to examine lifelong learning tendencies of prospective science teachers and was adapted to Turkish by Boztepe and Demirtaş (2016), was used in the present study. The one-dimension scale with 13 items was prepared as 5-point Likert type. In this context, the minimum and maximum scores of the scale are 13(13x1) and 65 (13x5), respectively. In their study Boztepe and Demirtaş (2016) calculated the Cronbach's alpha reliability

coefficient of the lifelong learning scale as .78; whereas, as a result of the repeated reliability analysis, the Cronbach's alpha reliability coefficient of the scale was calculated as .83 in this study.

Scientific Creativity Test (SCT), which was developed by Hu and Adey (2002) and adapted to Turkish by Deniz-Çeliker and Balım (2012), was used in the study to investigate scientific creativity levels of prospective science teachers. The test is composed of seven open-ended questions and includes all sub-dimensions of the scientific creativity model (Baysal, Kaya, & Üçüncü, 2013). The answers given to the questions are rated and scored in terms of fluency, flexibility and originality. The subjects related to each question are presented in Table 2.

Table 2

SCT questions and contents

<u>Question number</u>	<u>Related subject (Content)</u>	<u>Evaluation criteria</u>
1	Unusual situations	Fluency, flexibility and originality
2	Exploring the problem	
3	Developing product	
4	Scientific imagination	
5	Problem solution	Flexibility and originality
6	Science experiment	
7	Product design	

As seen in Table 2, while the questions 1, 2, 3 and 4 are evaluated in terms of fluency, flexibility and originality, questions 5, 6 and 7 are evaluated in terms of flexibility and originality. For example, 1 point for each answer (fluency), 1 point for each different answer (flexibility) and 2 points for each answer found in less than 5% of people, 1 point between 5% - 10% (originality) criteria are taken into account in the evaluation of the answers given by the participants to the 1st question; (Kılıç, 2011). While the reliability coefficient of the original version of the test was calculated by Hu and Adey (2002) as .89; Deniz-Çeliker and Balım (2012) who adapted the test into Turkish calculated it as .86. In the present study, the reliability coefficient of the test was found as .72.

1.4 Data analysis

Firstly, normality test was performed in the study. Table 3 shows the normality test results for each variable.

Table 3

Results of normality test

<u>Scale</u>	<u>Variables</u>	<u>Statistic</u>	<u>Kolmogorov-Smirnov</u>	
			<u>DF</u>	<u>Sig.</u>
SCT	Male	.070	49	.200
	Female	.092	152	.003
LLS	Male	.114	49	.149
	Female	.070	152	.068
SCT	1st-Year	.154	47	.007
	2nd-Year	.132	43	.059
	3rd-Year	.100	60	.200
	4th-Year	.117	51	.078
LLS	1st-Year	.116	47	.130
	2nd-Year	.080	43	.200
	3rd-Year	.086	60	.200
	4th-Year	.134	51	.024
SCT	16-20 years	.094	98	.032
	21-25 years	.091	103	.036
LLS	16-20 years	.074	98	.200
	21-25 years	.061	103	.200

Based on Table 3, the SCT scores of students who were female, first-year, and from different age groups were not distributed normally. Since kurtosis and skewness values of SCT scores do not exceed the range of +/- 1, it is accepted that the scores obtained from this scale are normally distributed (George & Mallery, 2001). As a result of these explanations, independent samples t-test was used to compare the scale scores of the participants in terms of gender and age and ANOVA was used to compare them in terms of class level. In addition, Pearson's Product-Moment Correlation Coefficient (r) analysis technique was employed in order to examine whether or not there was a significant correlation between lifelong learning tendencies and scientific creativity levels of the prospective science teachers.

2 Findings

2.1 Lifelong learning tendencies of the prospective science teachers

Within the scope of the study, the answer of the question "what are the lifelong learning tendencies of prospective science teachers?" was sought. In this context, Table 4 shows mean (\bar{x}) and standard deviation (SD) of LLS scores of the participants.

Table 4

Descriptive statistics for LLS

	<u>LLS</u>	<u>N</u>	<u>\bar{X}</u>	<u>SD</u>
1	I enjoy intellectual challenges.	201	3.91	0.93
2	I share things I've just learned with others.	201	4.15	0.85
3	I like to analyze issues and problems in depth.	201	3.64	0.92
4	Reading is an activity I do regularly.	201	3.50	1.07
5	I'm a self-motivated person.	201	3.61	1.07
6	I search libraries and bookstores for interesting books, magazines.	201	3.35	1.10
7	I make interesting contributions to discussions around me or in school.	201	3.14	0.98
8	Critical thinking is one of the activities I do.	201	3.64	0.98
9	I read something for fun or entertainment.	201	3.82	0.98
10	I'm interested in many different areas.	201	3.70	0.98
11	I follow different interest areas.	201	3.64	1.02
12	I like to learn new things.	201	4.41	0.75
13	I read a lot of books, magazines etc. that are not related to school or courses.	201	3.31	1.16
	General		3.67	

When Table 4 was examined, LLS total mean score of the participants was calculated as 3.67. Therefore, the prospective science teachers said “Often” with agreement level of 3.67 to the overall LLS. While the participants agreed mostly the item “I like to learn new things.” (\bar{x} =4.41), they agreed the item “I make interesting contributions to discussions around me or in school.” the least (\bar{x} =3.14). Also, while they said sometimes to the item “I make interesting contributions to discussions around me or in school.” as “sometimes” and responded to the item “I like to learn new things.” as “always”, their mean value for the other items was in the range of “Often”.

2.2 *Investigating the lifelong learning tendencies and scientific creativities of the prospective science teachers in terms of gender*

Within the scope of the study, answer of the question “Do lifelong learning tendencies and scientific creativities of prospective science teachers differ significantly in terms of gender?” was sought. In this context, independent samples t-test was carried out to examine if the participants’ LLS and SCT scores differed in terms of gender variable or not. Table 5 shows t-test results for the scores of the female and male participants included in the study.

Table 5

Results of t test for the scale scores of male and female participants

	<i>Gender</i>	<i>N</i>	<i>\bar{X}</i>	<i>SD</i>	<i>DF</i>	<i>t</i>	<i>P</i>
LLS	Male	49	47.38	8.11	199	-.550	.58
	Female	152	48.08	7.39			
SCT	Male	49	47.44	14.04	199	1.800	.04
	Female	152	42.72	16.52			

When Table 5 was examined, no statistically significant difference was found between the LLS total scores of male and female prospective teachers (Female participants = 48.08, Male participants = 47.38) ($p > .05$, $t = -0.550$). Besides, a statistically significant difference was found between SCT total scores of female and male prospective science teachers ($p = .043 < .05$, $t = 1.800$). This difference was in favor of male participants (Female participant = 42.72, Male participant = 47.44).

2.3 Investigation of lifelong learning tendencies and scientific creativities of the prospective science teachers in terms of age variable

In the study, the answer of the question “Do lifelong learning tendencies and scientific creativities of prospective science teachers differ significantly in terms of age variable?” was sought. In this context, independent samples t-test was carried out to examine whether or not the participants’ LLS and SCT scores differed in terms of age variable. Table 6 shows t-test results for the scale scores of the participants from different age groups.

Table 6

Results of t test for the scale scores of the participants from different age groups

	<i>Age</i>	<i>N</i>	<i>\bar{X}</i>	<i>SD</i>	<i>DF</i>	<i>t</i>	<i>p</i>
LLS	16-20 years	98	47.80	7.75	199	-.181	.856
	21-25 years	103	48.00	7.41			
SCT	16-20 years	98	39.59	14.73	199	-	.000
	21-25 years	103	47.95	16.29			

When Table 6 was examined, no statistically significant difference was found between the LLS total scores of the prospective science teachers from different age groups (16-20 age = 47.80, 21-25 age = 48.00) ($p > .05$, $t = -0.181$). Besides, a statistically significant difference was found between SCT total scores of the prospective science teachers ($p = .000 < .05$, $t = -3.809$). When the mean scores were examined, it was observed that the difference was in favor of the participants in the age group of 21-25 years (16-20 age = 39.59, 21-25 age = 47.95).

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2.4 Investigation of lifelong learning tendencies and scientific creativities of the prospective science teachers in terms of class level variable

In the study, the answer of the question “Do lifelong learning tendencies and scientific creativities of prospective science teachers differ significantly in terms of class level variable?” was sought. One-way analysis of variance (ANOVA) from parametric tests was carried out to answer this sub-problem. While Table 7 shows the group statistics obtained from LLS as a result of the analysis, Table 8 shows ANOVA results.

Table 7

<i>Group statistics</i>				
<u>Class level</u>	<u>N</u>	<u>\bar{X}</u>	<u>SD</u>	<u>Standard error</u>
1 st Year	47	46.17	7.92	1.15
2 nd Year	43	49.27	7.95	1.21
3 rd Year	60	49.23	7.66	.99
4 th Year	51	46.78	6.36	.89
Total	201	47.90	7.56	.53

Table 8

<i>Results of ANOVA statistics</i>						
<u>Scale</u>	<u>Source of Variance</u>	<u>Sum of squares</u>	<u>DF</u>	<u>Mean squares</u>	<u>F</u>	<u>P</u>
LLS	Between-group	392.554	3	130.851	2.333	.045
	Within-group	11048.650	197	56.085		
	Total	11441.204	200			

A significant difference was found between the LLS total scores in terms of class level [$F(3-197)=2.333$; $p=.045<.05$]. LSD (Least Significant Difference) from multiple comparison tests was preferred to determine the cause of the difference since variances were homogeneously distributed. Table 9 shows the results obtained in this context.

Table 9

<i>Distribution showing LSD test comparison in terms of class level</i>					
<u>Class</u>	<u>Class</u>	<u>Difference of Means</u>	<u>Standard error</u>	<u>P</u>	
1 st Year	2 nd Year	-3.10886	1.58	.051	
	3 rd Year	-3.06312	1.45	.037	
	4 th Year	-.61410	1.51	.686	
2 nd Year	1 st Year	-3.10886	1.58	.051	

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	3 rd Year	.04574	1.49	.976
	4 th Year	2.49476	1.55	.109
	1 st Year	-3.06312	1.45	.037
3 rd Year	2 nd Year	.04574	1.49	.976
	4 th Year	2.44902	1.42	.048
	1 st Year	-.61410	1.51	.686
4 th Year	2 nd Year	2.49476	1.55	.109
	3 rd Year	2.44902	1.42	.048

The results of LSD carried out to determine the cause of difference between class levels indicated that the difference was between the 3rd -year students and 1st -year and 4th -year students and in favor of 3rd -year students. The group statistics obtained from SCT as a result of the analysis are present in Table 10 and the ANOVA results are present in Table 11.

Table 10

Descriptive statistics results of class level

<u>Class level</u>	<u>N</u>	<u>\bar{X}</u>	<u>SD</u>	<u>Standard error</u>
1 st -Year	47	35.29	14.43	2.10
2 nd -Year	43	41.06	13.79	2.10
3 rd -Year	60	49.33	15.77	2.03
4 th -Year	51	47.72	16.15	2.26
Total	201	43.87	16.06	1.13

Table 11

Results of ANOVA statistics

<u>Scale</u>	<u>Variance Source</u>	<u>Sum of squares</u>	<u>DF</u>	<u>Mean squares</u>	<u>F</u>	<u>P</u>
	Between-group	6339.780	3	2113.260		
SCT	Within-group	45304.111	197	229.970	9.189	.000
	Total	51643.891	200			

A significant difference was found between the SCT total scores and class level [$F(3-197) = 9.189$; $p = .000 < .05$]. The cause of the resulting difference was found by LSD test. Table 12 shows the findings obtained in this context.

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Table 12

Distribution showing LSD test comparison in terms of class level

<u>Class</u>	<u>Class</u>	<u>Means Difference</u>	<u>Standard error</u>	<u>p</u>
1 st -Year	2 nd -Year	-5.77190	3.20	.073
	3 rd -Year	-14.03546	2.95	.000
	4 th -Year	-12.42762	3.06	.000
2 nd -Year	1 st -Year	-5.77190	3.20	.073
	3 rd -Year	-8.26357	3.03	.007
	4 th -Year	6.65572	3.13	.035
3 rd -Year	1 st -Year	-14.03546	2.95	.000
	2 nd -Year	-8.26357	3.03	.007
	4 th -Year	-1.60784	2.88	.578
4 th -Year	1 st -Year	-12.42762	3.06	.000
	2 nd -Year	6.65572	3.13	.035
	3 rd -Year	-1.60784	2.88	.578

LSD test results revealed between class levels showed that the difference was between the 3rd year students and 1st year and 2nd year students and in favor of 3rd year students. In addition, it was found that there was a significant difference between the scale scores of 4th year students and the scale scores of 1st and 2nd year students and this difference was in favor of 4th year students.

2.5 Investigation of the correlation between lifelong learning tendencies and scientific creativity levels of the prospective science teachers

In the study, the answer of the question “Is there a significant correlation between lifelong learning tendencies and scientific creativity levels of prospective science teachers?” was sought. The correlation between the lifelong learning tendencies and scientific creativity levels of the participants was investigated using the Pearson’s Product-Moment Correlation Coefficient. Preliminary analysis indicated that there was a moderate and positive correlation between two variables ($r=.304$, $n=201$, $p=.000<.01$) (Table 13).

Table 13

Pearson’s product-moment correlation results

<u>Scales</u>	<u>R</u>	<u>p</u>
LLS	.304	.000*
SCT		

* $p<.01$

3 Discussion

This study was conducted to investigate the lifelong learning tendencies and scientific creativity levels of the prospective science teachers and the correlation between these variables. Their LLS total mean score was found to be 3.67. Accordingly, it can be asserted that the prospective teachers had high lifelong learning tendencies. In other words, they were willing to learn new things continuously and develop themselves in numerous areas. The studies conducted by Kurt, Cevher and Arslan (2019) with prospective Turkish teachers; by Altın (2018), Ayaz (2016) and Ayra (2015) with teachers; by Kuzu, Demir, and Canpolat (2015) with prospective teachers, and by Karaduman (2015) with university students reported that lifelong learning tendencies of the participants were high, which supports the result of the prospective studies.

The lifelong learning tendency levels were in moderate level for Turkish teaching students in the study by Ürün-Karahan (2017) and for university students in the study by Yasa (2018). While Donnison (2009) stated that prospective teachers always considered themselves as lifelong learning individuals, Bulaç (2019) determined that the scores obtained by the prospective teachers from lifelong learning tendencies scale were above the moderate level and recommended that lifelong learning related courses should be involved in the education of prospective teachers. On the other hand, the participants had low levels of lifelong learning tendency in the studies conducted by Diker-Coşkun and Demirel (2012) and Gökyer and Türkoğlu (2018) with university students and by Tunca, Şahin and Aydın (2015) with prospective teachers and this result is not compatible with the present study. Tunca, Şahin and Aydın (2015) suggested that this may be associated with the fact that the lifelong learning skills are not fully involved into the teacher training programs.

In the literature, an inconsistency is seen in lifelong learning tendency levels of prospective teachers. Therefore, the underlying causes of this situation should be revealed. Likewise, it is important to take necessary steps for teachers, who are social architects of societies, to acquire lifelong learning skills including formal and informal all-purpose activities (Green, 2002). It was also determined in the present study that the participants agreed mostly with the item "I like to learn new things." and with the item "I make interesting contributions to discussions around me or in school." the least (Table 4). As a component of lifelong learning strengthening individuals' knowledge and skills, providing them an unlimited learning environment and giving them the opportunity to use these skills in real life, the prospective teachers stated that they were pleased with learning new things. This was an expected result in terms of the current study (Rausch, 2003; Wetzel, 2010). However, the prospective teachers stated that they were reluctant to contribute to the discussions in general. This is a subject requiring to be emphasized and solved. This is because individuals should acquire lifelong

learning skills from early ages and teachers have important duties in this process (Fenwick, 2001). It is also important for teachers, who undertake major tasks to influence societies, to acquire the desire of solving current problems and providing necessary contributions to discussions and to prepare appropriate learning environments in which teacher candidates can make discussions on scientific and social issues during their undergraduate education.

No statistically significant difference was found between the LLS total scores of female and male prospective science teachers (Table 5). This result was an expected situation in terms of gender equality and is similar to some studies in the literature (Şahin & Arcagök, 2014; Yaman & Yazar, 2015). Besides, Kurt, Cevher and Arslan (2019) and Kahraman (2019) found that lifelong learning skills of female prospective teachers were higher than male prospective teachers in motivation, curiosity, and lack of regulation of learning dimensions. Woonsun (2013), on the other hand, stated that lifelong learning tendencies of prospective teachers were partly dependent on gender. These studies have revealed that there is a need for further studies to investigate the effect of gender variable on lifelong learning tendencies. In addition, no statistically significant difference was found between the LLS total scores of the prospective science teachers in different age groups (Table 6). This result is not compatible with the results of some studies (Horuz & Şahan, 2016; Yasa, 2018). For example, Yasa (2018) stated that younger teacher candidates could make more efforts to have lifelong learning skills and importance should be attached on elective courses that will improve lifelong learning skills of prospective teachers from different age groups. Bulaç (2019) emphasized that prospective teachers should acquire lifelong learning skills during undergraduate education, which supports this recommendation. From this point of view, preparing suitable learning environments for prospective teachers from any age group to have lifelong learning skills, making appropriate course selections and encouraging them to receive graduate education are seen to be important.

A significant difference was found between the LLS total scores of the prospective science teachers in terms of class level (Table 8). The results of LSD test performed to determine the cause of the difference indicated a difference between the 3rd-year students and the 1st- and 4th-year students and it was in favor of 3rd-year students (Table 9). This result is compatible with results of some studies conducted with prospective teachers (Kurt, Cevher, & Arslan, 2019; Tunca, Şahin, & Aydın, 2015; Yasa, 2018). However, Bahadır (2019) stated that class level variable and the education given in universities had no effect on lifelong learning tendencies of university students. All these results indicated that lifelong learning tendencies of teacher candidates should increase with increasing class level but there were inconsistencies at this point. Therefore, it seems important to investigate profoundly the lifelong learning tendencies of

prospective teachers studying in different classes with the supports of qualitative studies.

A statistically significant difference was found between the SCT total scores of male and female prospective science teachers and this difference was in favor of male participants (Table 5). This result is different from results of some studies (Karaçelik, 2009; Öztekin, 2013; Ulusoy-Yılmaz & Yıldız, 2019). Polat and Konaş (2018) stated that gender variable had no significant effect on the creativity of teachers and higher education programs should be updated in this direction in order for teachers to have higher-order thinking skills. Likewise, Şahin (2010) investigated the scientific creativity levels of teachers and stated that gender had no effect on scientific creativity level. Although these results have revealed that gender variable does not have any effect on scientific creativity, it is important to conduct further related studies. Besides, a statistically significant difference was found between the SCT total scores of prospective science teachers in different age groups and this difference was in favor of the participants from the age group of 21-25 years (Table 6). It is expected that scientific creativity levels increase with increasing age. This result is supported by the finding reporting that as the class levels of the prospective teachers increased, their scientific creativity levels increased (Table 10). A significant difference was found between the SCT total scores in terms of class level (Table 11) and this difference was observed between the 3rd-year students and 1st- and 2nd-year students and it was in favor of the 3rd -year students (Table 12). However, no significant difference was found between scientific creativity scores of 3rd- and 4th-year prospective teachers. The results showed that the SCT scores of the prospective teachers increased until 3rd-year but the scores of 4th-year prospective teachers decreased. This may be associated with the effect of the exam that prospective teachers studying in the last year have to take in order to work as teachers in educational institutions after graduation. Therefore, it can be concluded that focusing on exam-oriented studies rather than conducting studies to develop higher-order thinking skills for 4th -year teacher candidates led to a decrease in their scientific creativity scores.

As a result of the analysis, it was seen that there was a moderate and positive correlation between lifelong learning tendencies and scientific creativity levels of the participants (Table 13). These results indicated that high levels of lifelong learning were correlated with high levels of scientific creativity. Lifelong learning requires individuals to have some atypical knowledge, skills and competencies to cope with current life problems (Cross, 2014). In addition, it is recommended in the literature that individuals should have competencies such as searching information, accessing information, and knowing the ways of reaching information in order to have lifelong learning skills (Knapper & Cropley, 2000; Shuman, Besterfield-Sacre, & McGourty, 2005). Therefore, it can be asserted

that scientific creativity skills of individuals who integrate learning processes to all their lives and have the mentioned competences will also improve. Similarly, Kozikoğlu and Altunova (2018) expressed that lifelong learning tendencies of prospective teachers will increase with increasing self-efficacy perceptions for 21st century skills and an individual should improve and use his/her own creativity in lifelong learning.

Conclusion

The limitations of the study are that the study included 201 prospective science teachers studying in a public university located in Eastern Anatolia Region and the number of male participants was less than the number of female participants. As a result of all these explanations, it is important for prospective teachers to do practices, which will improve their lifelong learning skills during their undergraduate education, in terms of scientific creativities. This is because scientific creativity and lifelong learning skills should be included in the science course in order for students to acquire sense of task, scientific perspective, and skills for controlling and regulating their learnings. Besides, unlike this study conducted with prospective science teachers studying at faculty of education, the correlation between lifelong learning tendencies and scientific creativity levels of teachers in different branches can be revealed.

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Non-Formal Learning Activities – Adult Learning Initiatives

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Abstract:

Introduction: The purpose of this paper is to contribute to the international history of community culture and culture-based adult learning through showing the initiatives of a Post-Socialist country through introducing some initiatives from 1950, without claim for completeness. Additions to the History of Community Culture and Culture-based Adult Education and Learning in Hungary.

Purpose: Our questions include how the political and legal environment, and the spread of the mass media influenced the cultural activities and the community culture, and what culture-based adult learning initiatives and activities can be identified in the area of culture.

Methods: To its realization we chose horizontal and vertical analysing viewpoints. The horizontal viewpoint of our investigation is the linearity of timeline, while the vertical analysing viewpoint is the characteristics of political and legal environment having influence on culture-based adult education (cf. non-formal and informal cultural learning) and showing the work of some significant personalities, through synthesizing archive sources and literature background.

Conclusions: The changing of the regime brought reform on this area, too, it basically changed the profession and the training as well: the community culture builds on local initiatives and active participation, includes the training, creating artistic, informational activity of the citizens, based on their self-activities.

Key words: adult learning, community culture, initiatives, non-formal learning.

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Introduction

The paper is going to start from the definition of community culture as given by Mátyás Durkó (1999), which says that it means the lifelong permanent personality development (learning), together with the connected environmental, social system of conditions promoting its formation. Accordingly, community culture is the acquisition of cultural goods, values and products connected to people's current activities, with different aims. Due to the community culture, the personality is being formed and it is enriching, developing in ideal circumstances. In every cultural learning process we also learn and every learning process contributes to our knowledge.

Non-formal and informal learning are interpreted on the basis of "Recognition, Validation and Accreditation of Non-formal and Informal Learning in UNESCO Member States" (Yang, 2010, p. 9) in this writing: "Formal learning occurs as a result of experiences in an education or training institution, with structured learning objectives, learning time and support, leading to certification. Formal learning is intentional from the learner's perspective. Non-formal learning is not provided by an education or training institution and typically does not lead to certification. It is, however, structured (in terms of learning objectives, learning time or learning support). Non-formal learning is intentional from the learner's perspective. Informal learning results from daily life activities related to work, family or leisure. It is not structured (in terms of learning objectives, learning time or learning support) and typically does not lead to certification. Informal learning may be intentional but in most cases it is non-intentional (or "incidental"/random)."

After the stormy 1950s the Kádár-consolidation era evolved in the 1960s, and a politically less constrained era came where more and more money was spent on culture, professionalism was stronger, the training of culture mediators and experts on non-formal adult education started, as well (Erdei, 2012). The consolidating Kádár-system delimited itself from the approach of the 1950s, which meant for the profession that it did not have to provide the propagandist tasks. (Note: independently of the 1956 political events, but at that time started the university training of adult education experts, first in Debrecen for the initiative of Mátyás Durkó (1926-2005), whom we can consider the founder of expert training, then in Budapest with the leadership of Andor Maróti). The service of the "social progress", the enforcement of the Marxist ideology suited to the expectations of the era continued to be of course requirements, but the authority admitted that it can do more with the particular means of culture, with the development of literacy than with direct propaganda. With the transformation of this approach the task of the adult educator also changed. On the one hand the circle of cultural goods to be popularized widened, while on the other hand the aim was transferred from political persuasion to forming of literacy. Although

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the adjective “Socialist” got in front of the literacy and this showed that the education policy did not disclaim its world orientation, but it was also proven that this needs a wider, overall literacy (T. Molnár, 2016).

In the seventies one of the most important documents was the decree of the Central Committee of the Hungarian Socialist Labour Party on the situation and further tasks of community education in 1974. Among others, it aimed that the whole system of non-formal and informal adult education, the party- and public organizations, movements, the council and managing units should consider the permanent increase of the political knowledge of the public as their primary task, to form the Marxist-Leninist world view. The Act V of 1976 on the basis of the community education decree of 1974 defined the contribution in the development of Socialist democracy as the principle of culture-based adult education, coming from the tasks to build a well-developed Socialist society.

In that period a professional change of view began; the earlier view was a hierarchical, education-oriented view, culture-based adult education increasingly placed informal and non-formal learning with the devices of culture into the focus. The concept of community culture also included that cultural learning does not only mean a simple acceptance and passive knowledge, but it is also a creative and acting participation. From the 1970s a new role perception started to be outlined inside the profession, namely, the role of the developer, who, starting from the needs and the tensions coming from these roles, tries to transmit values in cooperation with the community (T. Molnár, 2016).

Act V. of 1976: some initiatives tried to realize the practice suitable for the modern interpretation of culture-based adult education. Also the bottom-up cultural initiatives gained grounds (for example club movement, educational associations). In elaborating the community culture concept of the era, the representatives of different cultural professions took an active part. The “social” mechanisms built into the system of adult education spread-eagled the political limits and socialized adult education. In our work we are selecting from the initiatives starting from the 1970s.

These were mostly connected to the culture of lifestyle, and the part from the act that everybody has some knowledge and/or experience of his own that is worth handing over to the public was applied in a way that a public opinion poll was organized in particular villages. Local residents were asked about who would learn and what, and what kind of knowledge they would share with others. What is the thing they know the best and what they would teach to others with pleasure? What would they learn from others with pleasure? Do they approve of their names and addresses to be included in the local Yellow Pages? The aim was to encourage people to organize themselves. The editing of names of people familiar with and interested in the same topics next to each other made it clear for many people that they do not have to wait for a group or club leader, they can

find one another. Thus with the raising awareness of local sources the community self-activity could be established. As an example, we can talk about the so-called “Szeged Academic Catalogue” created by Tibor Pintér and his colleagues in 1981, the Hajdúság study circle movement from 1981, or the “Would teach-would learn” columns of the Bakony calendars from 1984 (Varga & Vercseg, 1998).

As a result of the act on culture-based adult education, as well as the new education plans, the cultural activity of schools also changed significantly. The number of regular readers increased; the rate of participants in art groups and study groups grew, they took part successfully on cultural competitions /e.g. Fine Hungarian speaking. Our dear mother tongue. Trivia on the Soviet Union/; more people went to theatres, exhibitions, classical concerts. For example, the article of Adult Education and Training Lexicon defines study groups as voluntarily formed free time community of people with the same interest to get a deeper, more thorough knowledge about the practical- and public service activity of a topic from an artistic or scientific section. Individual and common aims are realized through creating self-expression. Their functioning is indefinite in time and is continuous, their members can change. Their leader is an expert on the topic who directly leads the voluntary community. The study group activity mainly goes on in cultural centres and associations (Benedek et al., 2002). An important part of the definition above is that the members of the study groups can change and mostly an expert leads these groups. The study groups are mainly organized around a hobby, for example artistic, literary, photo, astronomical groups etc. Although not many associations were created, but they proved to be lasting. And what is even more important: their members studied the literature of the topic so they became the experts of their interests. But they did not become as important as the study circles in Sweden and the other northern-European countries (Maróti, 2010).

1 Literature review

The vertical analysing viewpoint is the characteristics of political and legal environment having influence on culture-based adult education (non-formal and informal cultural learning) and showing the work of some significant personalities, through synthesizing archive sources and literature background.

Out of the self-educating adult learning examples from the seventies, we find the voluntary movement “University students for cultural learning” worth mentioning. It can be connected to the name of Tamás Varga A. In the movement students of the University of Technology could choose from self-educating offers of more than a hundred topics. If at least 5 students gathered to study a topic together, then the students could compile their programme with professional help, if necessary, because the cultural secretariat of the university

provided experts, special materials and room, if needed. 80 study circles were formed. Varga imagined the getting of a wider view and education in an active way; he urged his students to this and also helped the circles to survive (Varga & Vercseg, 1998).

The non-formal and informal-cultural learning are also being helped by the spreading of mass media: through the Hungarian Radio, Hungarian Television, and the Hungarian National Film-making Company. The national and professional organizations, institutions and many technical journals were helped/backed by the Ministry of Education. In the first half of 1977 some cultural centres, county methodological consultants received a new task. They had to create and develop a new institutional department with the direction of the Ministry of Culture: Studios for Education Adults. The studios supported the processes of the out-of-school trainings of adult education with modern educational technology devices, as well as the educational processes of the small communities.

The Studios for Education Adults tried to adapt study circles in County Hajdú-Bihar between 1981 and 1983, these aimed mainly at the adult who wanted to learn and educate and the youth who were left out of school studies. Its basis was that one of the professors of the University of Debrecen (Ilona Keresztesné Várhelyi) prepared a working paper about the experience and methods of study circles during her study tour for using them under Hungarian circumstances and by translating the methodological guide of study circles (see Keresztesné, 1981, as cited in Francz & Koczokné, 1983; Litauszki, 1983; Francz, 1986; Francz, 1989; Francz, 2009; Maróti, 2010).

The experiments on adapting happened in two ways: there were study circles which were organized privately and others that were established as divisions of the “Reality of Our Age” (Korunk valósága) industrial county cultural movement (Francz, 2009).

The underpinning of technical information was promoted with forms connected to training, retraining and vocational training at the workplace. It should primarily support acquiring practical knowledge connected to everyday culture (gardening, home decorating etc.) and other services should be attached to this. The “Reality of Our Age” cultural movement had three divisions (general, advanced level and self-improvement division). The aim of the movement was to promote the continuous learning of industrial brigades with the help of non-formal and informal adult education means and the brigades could choose the division in which they wanted to widen their knowledge. However, there were also compulsory subjects (politics, technical information) on the general and advanced level divisions, beside these participants could choose from the following topics: literature, social politics, TV film, sport, music, folk art etc. (Francz, 2009; Maróti, 2010, as cited in Kaduchová, 2017).

At the self-improvement division no political topic was compulsory. Each circle had to choose a topic and process it. The topic chosen for learning was connected either to one of the sciences, or public knowledge, or one branch of arts and their partial areas. Their topic has to be defined not in general but it has to be concrete and specific. It suggest studying the topics of political life, history of our country, mother tongue, workplace, history of the profession, sociology, technical knowledge, lifestyle, parts of our landscape, literature etc. Those applying for the self-improvement division make their annual activities independently. For their preparation they can ask continuous help from the cultural centre, if they need it (e.g. consultancy etc.). Between September and November the participants present their annual work in their own environments. From December we show the best programmes in front of a large audience, on request in Debrecen and in other places in the counties (Korunk valósága, 1984). Many study circles were inclined by the absence of the topic from the school schedule, others by the lack of information inside the family, a few others by the need in social life, but also the lack of attention or support at the workplace e.g. chemists, pharmacists, economists, office workers etc. The forming of hobby circles, free time interests were also motivations to form a study circle. Many publications preserve the didactic features, sociographic, pedagogical, androgological depictions of the work in the study circles (see Francz & Keresztesné, 1981).

The „self-improving circles” were free to choose topics. If there was a need for it, the Ferenc Kölcsey Cultural Centre provided trained facilitators. The facilitators, as supporters of the learning process, gave advice concerning planning, collecting and organizing information, as well as processing and helping with technical literature to the study circles. The study circles finished with showing their products, in the forms of performances, studies, thematic exhibitions, voiced filmstrip series, tradition revealing collections, creative products (wood carving, painting, ceramics). Organizing the utilization of these products was also helped by the cultural centre: in schools, youth clubs, and cultural homes or at workplaces etc. (Francz, 2009; Maróti, 2010).

At first a lot of people were interested in the privately organized initiative, owing to the fact that the possibility to learn in a study circle was remitted to the local residents in many ways: flyers were put into mailboxes, information leaflets were sent to schools, institutions, different organizations and the means of local publicity were also used. The interest was, however, wobbled when it turned out that the circles would not have an assigned leader, the participants would not get ready-made material and they cannot expect a certificate. Still, a total of 89 circles - 10 private and 79 connected to a workplace - indicated their wish to be created with 727 participants altogether. Among the chosen topics were for example the fauna of Hortobágy, folk art of the county, history of

Hajdúszoboszló, but students could also learn how to make pottery or enamelling. Three-quarter of the participants came from the age group between 20 and 40, two-thirds of them were women, and mostly women participated in the privately organized study circles. As for the school qualification, participants had at least a secondary or higher education qualification, only one percent of the participants had only a primary school qualification (Maróti, 2010). The examples shown strengthen that school qualification had an important role in connection with self-training.

The Association of Hungarian Adult (Folk) Educators was formed in 1979, the members of which were the colleagues of non-formal and informal adult education institutions and leaders of self-training communities. The association organized performance-series, discussions, helped and coordinated the work of the experts (Juhász, 2016).

The real democratic changes could only start from the 1990s. Following the change of the regime the progress of the lifestyle, as well as the appearance of the new information technologies together resulted in the change of cultural habits (Arapovics, 2013). An initiative from the 1990s: to the initiative of Elemér Hankiss and his colleagues there were experiments on acclimating a variety of the self-study movement, the so-called “Dialogue Circle” method. The methodological booklet published by them shows the desirable model of social participation with contrasting discussion and dialogue, the consensus to be born during the dialogue by the citizens and their organizations. In this approach a self-study group is a democratic small group dialogue in which everyone takes part as equal and in an active way. The leader does not have power; his role is to provide the dialogue of the exchange of views and its enjoyable atmosphere. The dialogue has no expected results of any kind. The participants decide together in everything. The aim is to examine each other’s points of view (Vercseg, 1995). At the bottom of each dialogue circle material the following can be read: Translated into Hungarian with the permission of the Study Circles Resource Centre by Pál Kandó Pál, Mihály Kandó and Judit Stefány.

More and more conscious attention was directed to get to know the methodology of the Swedish study circles more carefully. „Study circles are often thought only to exist in the Scandinavian countries, but they actually also exist in other countries” (Larsson & Nordwall 2010, p. 8.). Study circles are interpreted on the basis of “Study Circles in Sweden. An Overview with a Bibliography of International Literature” (Larsson & Nordwall, 2010) in this writing: participation is voluntary; the persons of different ages are mixed in the circles. The number of persons in a circle is normally somewhere between 5 - 10 persons. The circle can be led by a leader, who does not have to be an expert – in fact it may be one of the participants. Participants should have an equal share of

the conversation. The atmosphere is informal and study circles can be linked to various political, religious and social interests and perspectives (Byström, 1996). To familiarize with the Swedish practice and methods a meeting was organized at the beginning of the 1990s. Some Swedish adult education experts came to Hungary (colleagues of the Arbetarnas Bildningsförbund), to introduce the widely spread study circle movement. Their report was given to county and town secretaries of the Society for Dissemination of Scientific Knowledge (Maróti, 2010). In 2008 the work of Wennberg & Hane (2001, 2008) was published in Hungarian (translated by Annus, Ildikó). In 2010 the work of Kindström, Carina (2000, 2010) Larsson, Staffan and Nordvall, Henrik (2010) was published in Hungarian (translated by Bozsó Péter), titled “Methodological introduction of study circles – Study circles in Sweden”. It was published by the Association of Folk High School in Budapest Area.

There was a change in the act in the 1990s. The Act CXL of 1997 repealed the Act of 1976. The new act basically clears the relationship between the state and popular education. It sets the targets and talks about the importance of the civil sphere and its engagement.

From the 1990s the professional reformation is shown by the fact that after the changing of the regime the cultural manager expert, the andragogue, the cultural service provider etc. appeared, being a competence-based, practice-oriented expert training, in which the earlier experience can be utilized, too (T. Molnár, 2016).

Nowadays we also find the activity of the Open Learning Centre worth mentioning in our study, in the framework of which a piloting programme began (first in 7 settlements, small towns and villages) where the aim was to learn languages and IT programmes in the form of study circles. To realize this, facilitators were trained in the settlements. Another example is the “Common Knowledge” project in which the initiative led by the Borsod County Cultural Education Institute was realized in which topics connected to gastronomy, embroidery, preserving of traditions and IT were processed. “The knowledge was added locally, there was a case when people of the same settlement formed a circle, in other cases participants came from 7-9 settlements. It has been mentioned since then because the good experience inherited into other circles, too”, says Klára Tünde Ureczky (Mészáros et al., 2013). A good example for study circle initiative strengthening local identity is the study circle of Kunbábony, called Társalgó (Parlor). In this circle participants tried to search for the history and past of Kunbábony in a way that they visit every family, talk to them and collect the existing knowledge. An exhibition was also made up from the collected objects in the Civil College (Mészáros et al., 2013).

Due to the spread of technological devices, as well as the Internet services, the areas and possibilities of lifelong learning and education have been widened

recently. Community applications make the common activities available for creating knowledge and trialogical learning, where the third participant is the content itself, which is established together by the participants themselves. The appearance forms of the web 2.0 are really various, the community sites also belong to this.

In brief, we are going to show an initiative the starting point of which is that today there is a possibility to inspire study circles in an online learning environment with the involvement of community sites. Its basis can be served by a common topic of interest and we analyse this as a learning place of those who want to learn in their free time but cannot meet personally. In the lack of personal presence self-directing gets an even more important role and it is related to the individual responsibility and the self-regulating ability of the individual, while the individual can meet challenges in the online learning environment different from those he got used to in a traditional learning environment (Simándi, 2017).

Conclusion

With this paper the author tries to contribute to the international history of Hungarian community culture and adult learning in the area of culture, the examination of the drafted problem is based on the synthetizing of the related literature and the archive sources. The 1970s were the period of the so-called “soft dictatorship”, when, in a limited way, there was a possibility for professional discussions and searching for new ways, which meant a kind of modernization from the party’s side (T. Molnár, 2016). The changing of the regime brought reform on this area, too. It basically changed the profession and the training as well: the community culture builds on local initiatives and active participation, includes the training, creating artistic, informational activity of the citizens, based on their self-activities. Its determinative element is the active participation of the individuals in planning the educational processes, in drafting and realization of their goals. The participants are not only passive recipients, but also active creators of education, and the training of experts is a competence-based, practice-oriented training. Today the community culture initiatives support encouraging active citizenship and lifelong learning, among others, and incorporate the process of mainly such topics that can be used in everyday life, for example which provide practical knowledge for management, household duties or questions a wider society deals with: healthy lifestyle, environmental protection, different forms of culture etc. (Farkas, 2013; Németh, 2015). In 2017 the act CXL of 1997 was modified by the act LXVII of 2017. Among others, the basic non-formal and informal adult education services include 18 § (3): promoting the creation of educating communities, supporting their functioning, helping their development, providing place for adult education activities and

educating communities, developing community and social participation, providing conditions for lifelong learning, insuring the inheritance of traditional community cultural values.

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Online Self-Regulated Learning and Cognitive Flexibility through the Eyes of English-Major Students

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Abstract:

Introduction: Assuming responsibility of learning and showing flexibility in case of changes and problems in learning could make this process more conscious and fruitful. This is significant, particularly at a time when traditional universities are increasingly moving into online education. To address the gaps in previous self-regulated learning and cognitive flexibility research, the current study examined the students' perceived online self-regulated learning and cognitive flexibility, and looked into the probable relationship between them.

Methods: The present study used mixed-research design. The data were gathered from 115 English-major students both quantitatively and qualitatively. The quantitative data were collected through two different scales as Online Self-regulated Learning Questionnaire (OSLQ) and the Cognitive Flexibility Scale. Two open-ended questions probing into both online self-regulation and coping skills of the students constituted the qualitative data.

Results: The results revealed that online self-regulated learning and cognitive flexibility correlated positively although the relationship was found to be quite slight, and the students had online self-regulated learning and cognitive flexibility at relatively high level. Students also provided examples of online self-regulated learning strategies they used, and they presented probable solutions to their problems they experienced in improving their level of English.

Discussion: Online self-regulated learning and cognitive flexibility, which were positively correlated, are likely to feed the language learning and improving processes since both variables could enable students to take decisions multi-dimensionally, without confining them to only one type of study skill. Higher level of cognitive flexibility which is associated with adapting to new situations and problem solving could help students to better manage their online learning. However, it should be noted that both self-regulation and flexibility require time and effort, and they are not products, but processes, in the journey of learning; therefore, they could be achieved through raising awareness, providing

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opportunities for students to self-direct their own learning and to cope with their problems, and undoubtedly instructors' role-modelling. Higher self-regulation and cognitive flexibility could turn students into autonomous and lifelong learners.

Limitations: The study was conducted among undergraduate students in Turkish context. The participants were English majoring students. It could also be carried out among non-English major students because self-regulation and coping skills should be supported in every department at tertiary level. The number of participants could be increased, and students in different departments or in different years of education could be compared. Different variables such as age, gender and language proficiency levels could be included into the study to measure the influences of various elements.

Conclusions: Transition into online education at tertiary level brings both advantages and disadvantages; hence, it becomes a must to promote positive aspects and to minimize negative sides. Since online education necessitates more learner autonomy, students should be trained on how to use self-regulatory strategies in language learning. Likewise, such a change in learning setting could require students to be more cognitively flexible to be able to cope with probable difficulties and to expand their thinking skills. Thus, cognitive flexibility should be instilled into the curriculum. The last but not the least, the importance of taking responsibility of learning and seeking for alternatives in the face of problems should be reminded frequently. The study aimed to provide insights and implications for all stakeholders to consider self-regulation and cognitive flexibility in designing online courses.

Key words: online self-regulated learning, cognitive flexibility, English-major students.

Introduction

As a lifetime act, learning presents itself in various forms in different settings, and each form adds a variety of dimensions to the learning process, which in turn renders learning more sophisticated. One of these forms is undoubtedly self-regulated learning. Self-regulation, rather than being a mental ability or academic performance skill, constitutes a self-directive process through which academic skills are shaped by the learners' mental abilities, and the component skills include goal setting, adopting strategies, monitoring performance, restructuring physical and social context, managing time, self-evaluating, attributing causation to results and adapting future methods (Zimmerman, 2002), and self-regulated learning occurs from the students' self-generated actions that show a systematic orientation towards the fulfilment of their goals (Schunk, 1989). In other words, self-regulation constitutes the students' control over their cognition, behaviour, emotion and motivation through the use of personal strategies to attain their pre-set goals (Panadero & Alonso-Tapia, 2014).

Therefore, self-regulated learning embodies cognitive, metacognitive, behavioural, motivational and affective sides of learning, and it includes a number of variables such as self-efficacy and volition (Panadero, 2017). Considering all these aspects, it can be said that self-regulated learning is associated with social cognitive theory of Albert Bandura (1997), and this theory gives importance to the self-system that allows individuals to exercise control over their opinions, emotions and actions (Schunk & Pajares, 2010). Bandura (1991) suggests that basic self-regulative mechanisms are activated through self-monitoring, self-judgement and affective self-reaction. In addition, reciprocal determinism, which is a central notion in this theory, highlights the continual interplay between personal factors and environmental factors (Little, 2018). Accordingly, based on the social cognitive theory, self-regulated learning could be attained in various ways such as self-monitoring, goal-setting, feedback, self-reward, self-instruction and social support (Laranjo, 2016). Apparently, self-systems and environment both take a role in self-regulated learning. Studies on self-regulated learning has focused of knowledge, motivation and volition in relation to various academic subjects, tasks and learning environments, and accordingly, a number of schematic models of self-regulated learning have been put forth, including relationships among task environments and learners' behavioural, cognitive, metacognitive and affective strategies (Martin, 2004). One of these models is Zimmerman's (1989) social cognitive view of academic self-regulated learning, and this model proposes three self-regulatory processes as self-observation, self-judgement and self-reaction, and focuses on triadic influences of person, behaviour and environment. Zimmerman's Cyclical Phases Model, which is another model put forward by Zimmerman (2000), presents itself in three phases as forethought, performance or volitional control and self-reflection. Forethought phase includes task analysis, goal-setting, planning and motivation while in performance phase students actually execute the task while self-observing their progress, and finally self-reflection phase paves the way for students' assessing their own performance and making attributions about success and failure (Panadero, 2017). Sarı and Akinoğlu (2009) provide sub-categories for each phase; to illustrate, task-analysis and self-motivation for forethought phase, self-control and self-observation for performance phase, self-judgement and self-reaction for self-reflection phase are presented as possible processes. Another model inspired by the same background, that is social cognitive theory, is the one proposed by Pintrich. Puustinen and Pulkkinen (2010) found the models by Zimmerman and Pintrich resembled most, considering the four criteria as background theories, definitions of self-regulated learning, components included in the models and empirical work, and theoretical background constituted a significant distinctive feature in this identification. According to Pintrich (2000), self-regulated

learning is an active, constructive process and learners are not the passive recipients of information in this process because they set goals for their own learning and then endeavour to have a control over their cognition, motivation and behaviour influenced by the contextual factors in the environment; therefore, these self-regulatory acts can take the role of a mediator between the learner and the environment. Based on Pintrich model (2000), self-regulated learning appears to be composed of four phases: 1) Forethought, planning and activation; 2) Monitoring; 3) Control; and 4) Reaction and reflection, in addition, each phase embodies different areas for regulation: 1) cognition, 2) motivation/affect, 3) behaviour and 4) context. These four phases represent a general sequence although they are not linearly or hierarchically arranged, and they can show simultaneous and dynamic occurrence (Torrano Montalvo & González Torres, 2004). Accordingly, given the assumptions of Pintrich model, self-regulated learners go beyond the passive consumption of information, they can track and influence their own learning behaviours, then they can evaluate sufficiency of their learning, and they can mediate external and personal factors to boost their achievement (Ozan, Gundogdu, Bay, & Celkan, 2012). The extent to which students are able to demonstrate such self-regulatory behaviours considerably promotes their learning outcomes (Beishuizen & Steffes, 2011). Different studies identified a positive effect of self-regulation on academic performance, as well. (Agustiani, Cahyad, & Musa, 2016; Kitsantas, Winsler, & Huie, 2008; Nota, Soresi, & Zimmerman, 2004; Schunk & Zimmerman, 1998; Young, 2005). In addition to higher academic achievement, self-regulated learners are likely to have higher self-satisfaction, awareness and control on their actions (Peng, 2012), and they are able to construct sound attributions for poor performance (Lapan, Kardash, & Turner, 2002). The critical role of such self-regulatory behaviours in success presents itself not only in traditional but also online learning settings. Self-regulation is more needed in online learning environments where students are required to be autonomous learners (Artino & Stephens, 2009; Barnard, Lan, To, Paton, & Lai, 2009; Dabbagh & Kitsantas, 2004). Removal of traditional classrooms, and thus, lack of direct instructor interaction in e-learning settings requires students to use their personal skills to control and manage their own learning (Sharma, Dick, Chin, & Land, 2007).

Despite the steady increase in undergraduate student enrolment in online courses, online learning is undoubtedly not free of challenges (Wandler & Imbriale, 2017), and dropout rates could be higher in online learning settings than traditional classrooms (Levy, 2007). Student factors, course factors and environmental factors could influence students' decision to dropout (Lee & Choi, 2011). Hence, cognitive flexibility which refers to humans' ability to show flexible adaptation to the changing environments (Cools, 2015; Önen & Koçak, 2015) could be a contributing factor to increase persistence in online learning.

Awareness of different alternatives in any given context, willingness to adapt to the situations and self-efficacy in being flexible constitute the basic components of cognitive flexibility (Martin & Rubin, 1995). Therefore, cognitive flexibility relates to utilizing knowledge selectively to adaptively fulfil the requirements of understanding and decision-making within a particular context (Spiro, Feltovich, Coulson, & Anderson, 1988). Martin and Anderson (1998) state that one component of the cognitive flexibility is willingness to adapt to the situation; thus, cognitively flexible individuals are more likely to accept possible behavioural changes depending on the social factors in order to meet the contextual needs. Higher education institutions in different countries including Turkey have faced a sudden transition to distance education due to Covid-19 Pandemic, and this abrupt transition has posed students a new learning context to which they need to show adaptation. Distance learning could be challenging and demanding itself on both students and instructors (Rurato, 2011), which might require adoption of cognitive flexibility to cope with the different requirements than traditional classrooms. Cognitive flexibility enables individuals to find adaptable solutions to the changing demands (Ionescu, 2012), and they become eager to handle unfamiliar situations and try new ways of communication (Demirtaş, 2020). In addition, some students are more likely to be willing to cope with the problems faced in learning process whereas some incline to show avoidance (Akbaba, 2006), which, according to Bertiz and Karoğlu (2020) could be related to different cognitive flexibility levels of the students. Considering the cognitive flexibility as a fundamental dimension of problem solving and coping skills (Altunkol, 2011), it could have a dramatic role in adapting to the emergent transition into the online learning due to the Covid-19 Pandemic. Accordingly, Chokri (2012) suggests the adoption of cognitive flexibility in the design of e-learning process to solve the students' probable problems. Furthermore, cognitive flexibility requires flexible learning environments (Bertiz & Karoğlu, 2020), and given the flexible nature of distance education (Odabaş, 2003; Ali, Joyes, & Ellison, 2013), these learning settings could be appropriate platforms to promote cognitive flexibility.

Self-regulation in online learning setting and cognitive flexibility levels of the undergraduate students were the main components of the present study. As a conceptual framework, this study used Zimmerman's (1998) model of self-regulated learning through conceptualization of six constructs to gauge online self-regulated learning. Therefore, six constructs which included environment structuring, goal setting, time management, help seeking, task strategies and self-evaluation (Lan, Bremer, Stevens, & Mullen, 2004) constituted the focus of the study within the scope of online self-regulated learning. As for the coping skills and flexibility, the study was grounded on the Cognitive Flexibility Theory. Covid-19 Pandemic has led to emergency distance education in Turkey, and

within the framework of this e-learning setting, the study aimed at addressing the following questions with a view to making a contribution to the relevant literature:

1. What are the online self-regulated learning tendencies of English-major students?
2. What are the cognitive flexibility levels of English-major students?
3. How do English-major students cope with the difficulties in improving their level of English?
4. Is there a statistically significant relationship between online self-regulated learning and cognitive flexibility?

1 Methodology

1.1 Research design and participants

This descriptive study used mixed research design. It bore both quantitative and qualitative features. A state university in Turkey constituted the context of the present study. 115 undergraduate students enrolled in Translation and Interpreting Department participated in the study. Purposive sampling method was utilized in identification phase of the groups to be included in the study. Since the objective of the study was to measure online self-regulation and cognitive flexibility in EFL setting, only the students majoring in an English language department were selected. Although they were in different grades at university ranging from prep class to the 4th year, the study did not take the probable differences among the groups.

1.2 Data collection instruments

Three different data collection instruments were administrated to the participants. Both quantitative and qualitative tools were used in the study to ensure triangulation and to gather data from different perspectives. A Turkish version of Online Self-regulated Learning Questionnaire (OSLQ) developed by Lan, Bremer, Stevens and Mullen (2004) was given to the students. The questionnaire was adapted into Turkish by Kilis and Yıldırım (2018), with Cronbach Alpha coefficient as 0.95. Given the context-specific nature of self-regulated learning and the differences in online and traditional learning, an instrument that is valid in traditional learning environment could be invalid in online setting (Barnard et al., 2009). Therefore, the questionnaire used in this study especially focused on self-regulation in online learning environment. It consisted of 24 items with a 5-point Likert response format with a 5-point Likert-type response format having values ranging from strongly agree (5) to strongly disagree (1). Higher average scores indicated better self-regulation by students. Another quantitative tool was Cognitive Flexibility Scale (Martin & Rubin,

1995) to determine the cognitive flexibility levels of the students. However, the participants were administered the Turkish version of the scale adapted by Altunkol (2011) with Cronbach Alpha coefficient as 0.81. This Likert type scale involved six points ranging from strongly agree (6) to strongly disagree (1). The scale was composed of 12 items, and the scores were calculated by averaging the individual item scores. That is, the lowest score of the scale was 12 whereas the highest one was 72; therefore, higher scores indicated high level of cognitive flexibility while lower ones referred to low level of cognitive flexibility. In addition, the students were asked two open-ended questions to gain further insight into their tendencies for online self-regulation and coping skill within the frame of cognitive flexibility. The first open-ended question focused on whether the students could manage their own learning in online classes. The second-question dwelled upon the students' probable problems in improving their English and their probable solutions. The questions were: 1) Can you manage your own learning in online classes? Can you give an example? (goal-setting, strategy-identification, self-motivation, self-observation and making effort, and self-evaluation); 2) What kind of problems do you experience in improving your English as required by your department? How do you cope with these problems? The word "improve" instead of "learn" was intentionally chosen for the second question since they were English-major students. Both questions aimed at reflecting students' own perceptions concerning the issue.

1.3 Data analysis

Both the Online Self-Regulated Learning Questionnaire (OSLQ) and the Cognitive Flexibility Scale were analysed quantitatively using Statistical Packages for Social Sciences (SPSS 21.0 version for Windows). The data were presented descriptively. Students' levels of online self-regulated learning and cognitive flexibility were presented with their percentages and frequencies. Then, the relationship between online self-regulated learning and cognitive flexibility was detected using correlation analysis. To support the related data, the open-ended questions were analysed qualitatively. The qualitative data were subjected to content analysis, and codes and themes were identified for online self-regulation and coping skill. Directed content analysis, which starts with a theory or relevant research findings as guidance for initial codes (Hsieh & Shannon, 2005) was applied for the first question relating to online self-regulation. Directed content analysis was conducted in four steps as in Barak, Hussein-Farraj and Dori (2016). First, students' responses were gathered, read and re-read, organizing them in two lists. Second, the things students did to manage their online learning were divided into short segments. Third, based on the Online Self-regulated Learning Questionnaire (OSLQ), each segment was categorized under the sub-scales of the QSLQ. Finally, responses were coded,

assigned with nominal numbers and frequencies were calculated. The second question on cognitive flexibility was analysed through conventional content analysis. All the responses to the each open-ended question were put into analysis without limiting the number of the participants. That is, answers of 115 participants were analysed qualitatively, as well.

2 Findings

Quantitative and qualitative findings of the data were presented respectively in different sections.

2.1 Findings of the Online Self-Regulated Learning Questionnaire

Online Self-regulated Learning Questionnaire was composed of 6 subscales as Environment structuring (ES), Goal setting (GS), Task strategies (TS), Time management (TM), Help seeking (HS) and Self-evaluation (SE).

Table 1

Online Self-Regulated Learning Questionnaire (OSLQ) (Barnard et al., 2008, as cited in Handoko, 2017)

<u>Subscale</u>	<u>Definition</u>
Goal setting (5 items)	The statements that indicate student-initiated efforts of setting educational goals or sub-goals and planning for sequencing, timing, and completing of activities related to those goals, e.g., <i>"I set standards for my assignments in online courses."</i>
Environment structuring (4 items)	The statements that indicate student-initiated efforts to select or arrange the physical setting to make learning easier, e.g., <i>"I choose the location where I study to avoid too much distraction."</i>
Task strategies (4 items)	The statements that indicate student-initiated efforts of using various learning strategies to achieve the learning goals, e.g., <i>"I try to take more thorough notes for my online courses because notes are even more important for learning online than in a regular classroom."</i>
Time management (3 items)	The statements that indicate student-initiated efforts to schedule, plan, and manage study time to achieve the learning goals, e.g., <i>"I allocate extra studying time for my online courses because I know it is time-demanding."</i>
Help seeking (4 items)	The statements that indicate student-initiated efforts to solicit help from classmates or instructors, e.g., <i>"I find someone who is knowledgeable in course content so that I can consult with him or her when I need help."</i>
Self-evaluation (4 items)	The statements that indicate student-initiated evaluations of the quality or progress of their work, e.g., <i>"I summarize my learning in online courses to examine my understanding of what I have learned."</i>

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While all the items were analysed statistically, Table 2 below shows the means scores and standard deviations of each subscale.

Table 2

Mean scores of subscales

<u>Sub-Scales</u>	<u>\bar{x}</u>	<u><i>Sd</i></u>
Goal Setting (1-5 items)	18.0	3.75
Environment Structuring (6-9 items)	15.6	3.09
Task Strategies (10-13 items)	13.7	2.73
Time Management (14-16 items)	13.1	3.41
Help Seeking (17-20 items)	11.8	3.24
Self-Evaluation (21-24 items)	9.6	2.83

Goal-setting was found to have the highest mean score while self-evaluation appeared to have the least mean score among all the subscales. Goal setting was followed by environment structuring with 15.6 mean score while task strategies and time management had quite similar scores. Given the total score obtained from the scale, which was 82.1, students seemed to have high tendency to online self-regulated learning. In addition to the average scores of each subscale, Table 3 below showed the scores related to the each item in QSLQ.

Table 3

Mean scores of the items in QSLQ

<u>ITEMS</u>	<u>Min.</u>	<u>Max.</u>	<u>\bar{x}</u>	<u><i>Sd</i></u>
SLQ7 (ES)	1	5	3.99	1.004
SLQ8 (ES)	1	5	3.95	.935
SLQ6 (ES)	1	5	3.89	.971
SLQ9 (ES)	1	5	3.81	1.016
SLQ18 (HS)	1	5	3.77	1.079
SLQ1 (GS)	1	5	3.69	.862
SLQ2 (GS)	1	5	3.66	1.050
SLQ3 (GS)	1	5	3.61	.980
SLQ17 (HS)	1	5	3.60	1.033
SLQ4 (GS)	1	5	3.60	.972
SLQ21 (SE)	1	5	3.57	1.060
SLQ5 (GS)	1	5	3.50	1.209
SLQ16 (TM)	1	5	3.45	1.164
SLQ20 (HS)	1	5	3.43	1.117
SLQ14 (TM)	1	5	3.41	1.146
SLQ22 (SE)	1	5	3.37	1.047
SLQ10 (TS)	1	5	3.33	1.197

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SLQ24 (SE)	1	5	3.20	1.186
SLQ13 (TS)	1	5	3.13	1.096
SLQ23 (SE)	1	5	3.03	1.224
SLQ19 (HS)	1	5	2.95	1.107
SLQ12 (TS)	1	5	2.81	1.075
SLQ15 (TM)	1	5	2.79	1.158
SLQ11 (TS)	1	5	2.59	1.050

Considering the findings of the QSLQ, roughly 70% of the students were seen to set standards for their assignments in online courses. More than half of the students (58.2%) were found to set short-term (daily or weekly) as well as long-term (monthly or for the semester) goals. Likewise, slightly more than 60% of them thought that they did not compromise the quality of their work because of its being online.

When it comes to environment structuring, nearly 80% of the students were found to avoid too much distraction and prefer a comfortable place to study. Similarly, more than half of the students (75.7%) seemed to know where they could study most efficiently for online courses.

As to the task strategies, more than half of the students tried to take notes for online courses since they thought notes as more important for online courses than regular classes. However, less than one third of the students (31.3%) had a tendency to prepare questions before joining in the chat room or discussions. Working extra problems in addition to assigned ones in online courses seemed to interest only less than half of the students (42.6%).

In terms of time management, more than half of the students claimed to allocate extra time for online courses (55.7%) and distribute their studying time evenly across days (59.2%) as in setting short term goals. However, scheduling the same time everyday or every week to study for online courses was not found to have a high frequency with only mean score of 2.79.

Within the frame of help seeking, students seemed to have higher frequencies in finding someone who was knowledgeable in course content to consult (61.8%), share their problems with classmates to find solutions (70.4%) and get help from the instructor through e-mail (52.2%). Nevertheless, meeting the friends face-to-face was found to have the lowest mean score in this subscale.

To perform self-evaluation, great majority of the students (62.6%) also claimed to summarize their learning in online courses to check their own understanding and half of the students to ask themselves a lot of questions while studying for an online course. Communicating with classmates to evaluate their own learning was preferred by only less than half of the students.

2.2 Findings of the Cognitive Flexibility Scale

The Cognitive Flexibility Scale consisted of 12 items. Although the scale was thought to have three subscales as awareness, willingness and self-efficacy, the present study conducted analyses as a whole without separating the subscales as in other studies (Altunkol, 2011; Demirtaş, 2020; Kuyumcu & Kirazcı, 2020). The percentages of the students' responses were presented in Table 4 below.

Table 4

Percentages of the students' responses in CFS

	CFQ1	CFQ2	CFQ3	CFQ4	CFQ5	CFQ6	CFQ7	CFQ8	CFQ9	CFQ10	CFQ11	CFQ12
Strongly disagree	.9	1.7	10.4	2.6	.9	0.0	0.0	1.7	2.6	.9	0.0	1.7
Disagree	2.6	7.8	10.4	7.8	9.6	5.2	1.7	2.6	9.6	7.0	2.6	12.2
Slightly disagree	2.6	25.2	33.0	38.3	17.4	2.6	2.6	3.5	1.7	20.9	.9	1.7
Slightly agree	35.7	12.2	10.4	39.1	13.0	22.6	15.7	28.7	36.5	13.0	13.0	23.5
Agree	40.9	33.9	21.7	12.2	40.9	44.3	48.7	39.1	34.8	35.7	46.1	35.7
Strongly agree	17.4	19.1	13.9	2.6	18.3	25.2	31.3	24.3	14.8	22.6	37.4	25.2

Students' responses revealed that more than 80% of the students believed they could communicate an idea in different ways and they could have possible choices and options when deciding how to behave in any situation. Great majority of the students stated that their behaviour was the result of their conscious decisions. When it comes to coping with their problems, majority of the students claimed to be willing to work at creative solutions to problems (70%) and to consider alternatives for handling a problem (84%). More than half of the students did not seem to avoid new and unusual situations, as well. However, in case of seemingly unsolvable problems, only about 40% of them slightly agreed with finding workable solutions. Likewise, more students (nearly 60%) claimed to have difficulty in using their knowledge in real life situations. Among all the items, the seventh one (In any given situation, I am able to act appropriately) had the highest mean score while the third item (I feel like I never get to make decisions) had the lowest mean score as shown in the following figure:

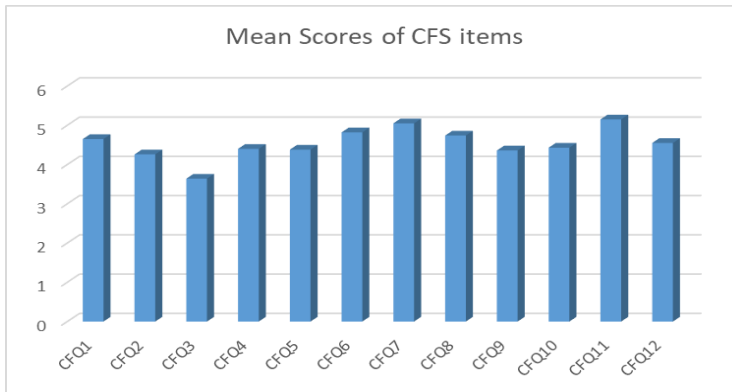


Figure 1. Mean scores of cognitive flexibility scale items.

Considering the mean scores of the items ranging from 3.64 to 5.05, students could be viewed to have seemingly high level of cognitive flexibility, which was also supported by the total score they got from the scale (54.4).

Analyses of both Online Self-regulated Learning Questionnaire and Cognitive Flexibility Scale revealed that the students showed relatively high tendencies to have self-regulated learning in online courses and cognitive flexibility. Nonetheless, high correlation was not found between these variables.

Table 5

Correlation between online self-regulated learning and cognitive flexibility

<i>Variables</i>	<i>N</i>	<i>r</i>	<i>p</i>
Online self-regulated learning	115	.176	.061
Cognitive flexibility			

Although there was a positive relationship between online self-regulated learning and cognitive flexibility, the correlation was found to be quite low, and the relationship was not found to be statistically significant.

2.3 Findings of the qualitative data

The qualitative data were obtained through two open-ended questions, and they were related to their online self-regulated learning and coping skills within the frame of cognitive flexibility respectively. Responses of the all participants were analysed qualitatively for each question. Only 15 responses for each question were not included in the analyses since those participants gave no or irrelevant answers. The findings of the first question were shown in the following table.

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Table 6

Students' perceived online self-regulated learning

<i>Can you manage your own learning in online classes?</i>			
<u>YES (71)</u>		<u>NO (36)</u>	
Goal Setting	<i>f</i>	Goal Setting	<i>f</i>
making short or long term plans	8	no goal or strategy setting	1
		inability to realize the goals	1
Environment Structuring		Self-Motivation	
avoiding the distractors	1	lack of motivation	10
getting prepared as if in classroom	1	exam anxiety	2
Task Strategies		Nature of Online Learning	
note taking	13	decrease in concentration	4
studying before class	6	decrease in self-regulation	3
studying extra resources after class	5	difficulty in adaptation	3
making effort	5	difficulty in understanding	2
re-watching the records	5	lots of distractors	1
making revision	4		
listening to the teacher attentively	1		
searching for solutions to the problems	1		
searching for ways to learn easily	1		
self-questioning			
Time Management		Help Seeking	
attending classes regularly	10	inability to study without instructor	1
submitting the assignments regularly	6		
studying regularly	2		
Help Seeking		Other	
following the teacher's feedback	2	technical problems	1
consulting the teacher	1	no time for this	1
		no need for self-regulation	1
		inflexible assignments	1
Self-Evaluation			
self-evaluation before and after class	3		
needs analysis	1		
Self-Motivation			
self-motivation	8		
watching the records	2		
love of studying	2		
love of the department	1		
benefit from the content of the course	1		
anxiety for future	1		

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future goals	1
learning with fun	1
self-talk	

The first open-ended question focused on the students' perceived online self-regulated learning skills. Most of the students were found to think that they could manage their own learning in virtual classes. When asked to give examples for the things they did for self-regulation, they appeared to make daily, weekly or monthly plans. Although avoiding distractors and getting prepared physically as if they were in classroom were cited once, the students did not provide different examples for environment structuring. When it comes to task strategies, note-taking ($f=13$) had the highest frequency, and it was followed by studying before class ($f=6$) and studying extra resources after class ($f=5$). Some students posed making effort ($f=5$) as a general task strategy. Additionally, watching the records of the class ($f=5$) since the classes were online and making revision ($f=4$) were given as examples for their perceived self-regulatory leaning skills. Students also seemed to manage their time in online setting through attending classes regularly ($f=10$), submitting assignments regularly ($f=6$) and studying regularly ($f=2$). In terms of help seeking, they were found to prefer their instructors ($f=3$). Apart from all these, some students noted that they performed self-evaluation before/after classes ($f=3$) and needs analysis ($f=1$). In addition to the six categories structured according to the OSLQ, one more category emerged out of qualitative analyses as self-motivation. Within this category, the mostly cited example belonged to the students' motivating themselves ($f=8$). They also voiced watching the records again ($f=2$), love for studying ($f=2$), future ($f=2$) and self-talk ($f=1$) as sources of their motivation. In contrast, lack of motivation ($f=10$) was mostly cited reason by the students who stated they could not manage their own learning in online setting. They did not also appear to be pleased with the nature of online learning since, for them, it decreased concentration ($f=4$) and self-regulation ($f=3$), it caused difficulty in adaptation ($f=3$) and comprehension ($f=2$). Lack of goal setting, dependence on instructor and technical problems were also the examples for the absence of self-regulation in online learning. The second open-ended question dwelled upon coping skills, as an aspect of cognitive flexibility. Table 6 below firstly presented the problems experienced while improving their English.

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Table 7

Problems the students experience while improving their English

<u>Themes</u>	<u>Codes</u>	<u>f</u>
Linguistic	Speaking	31
	Vocabulary	12
	Listening	8
	Grammar	6
	Writing	3
	Pronunciation	2
Translational	Finding correct equivalence	3
	Terminology	2
	Cultural differences	2
	Lack of culture knowledge	1
	Translating long sentences	1
	Translating different text types	1
	Speed in interpreting	1
	Lack of practice in interpreting	1
	Searching in translation field	1
	Online classes	4
Instructional	Too much assignment	2
	Lack of instructors in specific courses	1
	Lack of contact with a supervisor	1
	Too much grammar	1
	Lack of self-confidence	8
Personal	Lack of retention	3
	Anxiety	1
	Laziness	1
	Difficulty in learning	1
	Lack of time	1
	Recession in times of not studying	1
	Lack of computer	2
Other	Technical problems	2
	Difficulty in finding appropriate sources	1

As a result of qualitative analyses, five categories emerged regarding the students' problems in improving their English, a requirement of their major. Speaking (f=31), especially lack of practice in speaking was the mostly cited problem among the students. It was followed by vocabulary (f=12), listening (f=8), grammar (f=6), writing (f=3) and pronunciation (f=2). Translational

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problems included equivalence (f=3), culture (f=3), terminology (f=2) and interpreting (f=2). Long sentences and different text types were also viewed as problems. Within the frame of instruction, online classes (f=4) were considered to be problems themselves. Abundance of assignments (f=2) were also difficulties on their path to improve their English. Additionally, lack of self-confidence (f=8) and lack of retention (f=2) were the problems attributed to the self. Lack of required technical tools in general (f=4) were counted as problems, as well. However, students also listed their probable solutions to the problems as shown in Table 8 below.

Table 8

<i>Coping Skills for the Problems in Improving English</i>		
<u>Themes</u>	<u>Codes</u>	<u>f</u>
Study skills	More practice in translation/interpreting	6
	Searching	6
	Making more practice in listening	5
	Making more practice in writing (keeping diary/writing story)	1
	Making revision	1
	<i>Improving speaking through</i>	
	Making more practice in speaking	6
	Making practice with foreigners	5
	Making sentence in mind before speaking	1
	<i>Improving vocabulary through</i>	
	Studying vocabulary	5
	Reading different types of texts	2
	Making my own sentence	1
	Making up stories/associations	1
	Benefitting from context	1
	Watching videos on different fields	1
	Using song and serials	1
Materials	Using extra resources	8
	Making practice with audiovisual materials	7
	Looking up in dictionary	4
	Using Google translate to self-check	1
Personal tendencies	Consulting others	6
	Self-talk to calm down	2
	Making plan	1
	Taking a break	1
	Detecting and studying the problematic points	1

The most frequently cited solution was found to be more practice in different skills such as translation, listening, speaking and writing. More specifically, the students highlighted ways of improving speaking skill and vocabulary. Making

search (f=6) was another frequent citation as a coping skills. Furthermore, use of extra sources (f=8), audiovisual materials (f=7), dictionary (f=4) and machine translation (f=1) were listed as material-related solutions. As in self-regulated learning strategies, consulting others (f=6), self-talk (f=2) and making plan (f=1) were among their probable coping skills for the problems in improving their English.

3 Discussion

Given that Covid-19 Pandemic caused higher education institutions in Turkey to transform into emergency remote learning, online classes require more self-regulation, and cognitive flexibility concerns the adaptation to changing situations and coping skills, the present study aimed to reveal a probable relationship between online self-regulated learning and cognitive flexibility in Turkish context. The participants were comprised of English-major students, and the data were gathered both quantitatively and qualitatively.

Students with high cognitive flexibility can employ self-regulation (Denis & Vander Wal, 2009). The present study found a positive relationship between online self-regulated learning and cognitive flexibility; however, the correlation between them was quite low and it was not statistically significant. In another study by Malkoç and Sünbül (2020), cognitive flexibility correlated positively with self-efficacy, as well.

The students were found to have online self-regulated learning at relatively high level. They had the highest score in terms of goal-setting. Both quantitative and qualitative findings indicated that students made short or long term plans to manage their learning in online setting. Goal setting could ensure greater achievement (Moeller, Theiler, & Wo, 2012), enhance self-efficacy and motivation (Mikami, 2020; Munoz & Jojoa, 2014) in addition to increased attentiveness, awareness, language learner autonomy and self-regulation (Miller, 2018). Making plans was also among the students' coping skills for the problems experienced while improving English.

Despite various advantages, online learning embodies different drawbacks, one of which is undoubtedly the possible distractors in the environment. According to Cigognini, Paoletti, Fattorini and Boscarol (2015), it is a must for distant learner to resist to both external (phone calls, noise...) and internal (own thoughts, mind wandering...) distractions. The students in the present study preferred avoiding the distractors and pretending to attend classes as if they were in traditional classroom.

Both quantitative and qualitative findings showed that students benefitted from note-taking as a self-regulated learning strategy. In another study conducted in Web-based setting by Kauffman (2004), note-taking, as a cognitive component, was found to have the strongest influence on information-gathering and

achievement. Studying before class and studying on extra sources after class were found to be other self-regulation indicators. Likewise, making revision constituted both online self-regulated learning strategy and coping skill that students consulted. This way, students could both monitor their progress and detect any probable difficulties they might encounter. Reviewing of one's own learning and revising the approach could be an indicator of self-monitoring and personal commitment to performance (Paris & Paris, 2001). Watching class records again, which is an advantageous aspect of online learning, presented itself as another task strategy. Especially, when video recordings are used as a complementary instrument, they could constitute a valuable supplementary for students (Williams, Birch, & Hancock, 2011). However, as Islam, Kim and Kwon assert (2020), lack of clear deadlines to watch video lectures could end in accumulation of workload, which could be hard to handle before exams. Even watching records may require effective time management.

Although online learners are not restricted to manage their own schedules (Araka, Maina, Gitonga, & Oboko, 2020), the students appeared to manage their time through allocating extra time for online classes and distributing time evenly for each class. Additionally, regular attendance and regular submission of the assignments were identified to be their time management strategies. Loyalty to deadlines and regular work could apparently hint at the students' sense of self-regulation. As Hodge noted (2005), most of the time students will need to depend on their personal abilities to manage their own learning and direct their assignments and deadlines to be successful in distance education.

As for help seeking, students had tendency to consult someone who was knowledgeable in course content, friends and instructors. This could enhance their sense of collaboration, as well. Students with higher self-regulation in online learning seem to have a better perception of online communication and collaboration (Barnard, Paton, & Lan, 2008). Instructor's feedback was also found to be important among the students. Apart from interaction with others, students also performed self-evaluation as another online self-regulated learning strategy. Summarizing, self-questioning and needs analysis allowed them to evaluate themselves. As a matter of fact, self-evaluation occurs at each self-regulated learning phase with different patterns (Yan, 2020), and guiding the learning process, it makes students more self-regulated (Kırmızı, 2015).

Qualitative analyses revealed another strategy as self-motivation. Students tried to motivate themselves to manage their online learning. In addition to intrinsic motivation such as love of studying and love for department, students' extrinsic motivation such as future goals shaped their self-motivation process. As Bandura (1988) put forth, the capability for self-motivation and purposive action is cognitively based, and perceived future events are turned into current motivators and regulators of action. Motivation enables persistence, sustainability and

effort. Actually, motivation as a pre-requisite of student engagement (Saeed & Zyngier, 2012) occupies a significant place in all modes of learning. However, with the recent need to move into online learning due to Covid-19 Pandemic, it has become even more challenging to keep students engaged (Schmidt, 2020). Therefore, students should try different ways to boost their motivation without depending on an instructor to increase their willingness to learn. Those claimed not to self-regulate their online learning complained about lack of self-motivation.

As to the cognitive flexibility, students were found to have relatively high level of flexibility, as well. They believed they were able to communicate an idea in different ways. They seemed to have possible choices and options in their decision-making process, which meant they do not confine themselves to one-sided solutions and they are open to alternatives. They also based their behaviour on their conscious decisions, which also implied autonomy and self-regulation. They were also found to benefit from alternatives in coping with their problems. However, use of knowledge in real life situations was identified to be difficult for the students. In fact, students described as high cognitive flexibility are able to integrate their own experiences and training to use appropriately in a relevant situation (Algharaibeh, 2020).

When it comes to problems experienced in improving English, skills especially speaking and vocabulary were found to have the highest citations respectively. Since they were translation and interpreting department students, they found it difficult to choose appropriate equivalence, cope with terminology and culture-related problems. Similarly, the study conducted among English-major students by Soualmia (2010) found out that the students had difficulty in translating terminology, and another study by Badawi (2008) investigated English-major students' ability to translate the culture-bound items and revealed that most of the students were unable to translate the items. Additionally, lack of self-confidence and lack of retention presented themselves as self-related problems. However, for some students, online learning itself constituted an obstacle against improving English. Likewise, those who failed to self-regulate their learning stated that online classes led to concentration, adaptation and comprehension problems. As a context-specific construct, self-regulatory processes in online education could be different from those in traditional classroom settings (Barnard, Lan, To, Paton, & Lai, 2009), and online learning exposes students to many a complex demand such as need to be self-direct and regulate their own learning (Bol & Garner, 2011); therefore, online learning setting could be more challenging for some students.

Given that cognitive flexibility enables individuals to produce multiple solutions to difficult situations (Denis & Vander Wal, 2010) the present study showed that students posed different, alternative solutions to their problems. Practice in

different skills such as translation, speaking, listening and writing was their most frequently cited solution. They seemed to believe the critical role of practice in learning and improving a language. They also favoured benefitting from audiovisual materials, which was an expected result considering the digitalized world. Likewise, the study done by Kausar (2013) showed that students having problems in learning English at tertiary level found it difficult to learn the language without audiovisual aids. Use of extra sources was a parallel finding with their online-self regulated learning and cognitive flexibility. Since cognitively flexible students are expected to solve the problems more constructively and persistently (Esen-Aygun, 2018) all these efforts to find solutions to their language improving difficulties could also imply students' tendency to benefit from cognitive flexibility.

All in all, online self-regulated learning and cognitive flexibility, which were positively correlated, are likely to feed the language learning and improving processes since both variables could enable students to take decisions multi-dimensionally, without confining them to only one type of study skill. Higher level of cognitive flexibility which is associated with adapting to new situations and problem solving could help students to better manage their online learning. However, it should be noted that both self-regulation and flexibility require time and effort, and they are not products, but processes, in the journey of learning; therefore, they could be achieved through raising awareness, providing opportunities for students to self-direct their own learning and to cope with their problems, and undoubtedly instructors' role-modelling. Higher self-regulation and cognitive flexibility could turn students into autonomous and lifelong learners.

Conclusion

The study was conducted among undergraduate students in Turkish context. The participants were English majoring students. It could also be carried out among non-English major students because self-regulation and coping skills should be supported in every department at tertiary level. The number of participants could be increased, and students in different departments or in different years of education could be compared. Different variables such as age, gender and language proficiency levels could be included into the study to measure the influences of various elements.

Transition into online education at tertiary level brings both advantages and disadvantages; hence, it becomes a must to promote positive aspects and to minimize negative sides. Though some universities had used distant education as an additional method prior to Covid-19 Pandemic, most of them were not ready for a full online experience; hence, optimization of online learning process is essential to maintain proper education (Coman, Țiru, Meseșan-Schmitz, Stanciu,

& Bularca, 2020). Since online education necessitates more learner autonomy, students should be trained on how to use self-regulatory strategies in language learning. Likewise, such a change in learning setting could require students to be more cognitively flexible to be able to cope with probable difficulties and to expand their thinking skills. Technology-based education setting centred on Cognitive Flexibility Theory could promote students' higher order thinking skills (Tavoulari, Paraskeva, & Choustoulakis, 2011). Thus, cognitive flexibility should be instilled into the curriculum. The last but not the least, the importance of taking responsibility of learning and seeking for alternatives in the face of problems should be reminded frequently.

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Revised Bloom's Taxonomy in Reading Texts in EFL/ESL Settings

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Abstract:

Introduction: Among its contemporaries, the updated Bloom's taxonomy is perhaps the most widely used cognitive process model. It is a categorization paradigm that emphasizes the cognitive levels beginning with remembering the information and progressing to more complicated levels such as producing the knowledge. Education psychologists want to assist instructors, policymakers, and curriculum creators in designing education that enables students to effectively retain, retrieve, and apply the selected content. Classifying information in a precise sequence that is durable in a person's memory can aid learners in effectively storing, retrieving, and using facts; otherwise, the whole learning process may be impeded. Thus, it is imperative that students acquire the fundamental knowledge prior to attempting to interpret current information to develop meaningful knowledge (Darwazeh, 2017). The purpose of this research was to determine the degree to which the updated Bloom's taxonomy is included into the reading sections of EFL textbooks developed for Turkish high school students. According to the results of the research, the evaluated textbooks lacked the higher level cognitive abilities outlined in the updated Bloom's taxonomy. Consequently, based on the results, certain hypotheses have been formulated to indicate how reading sections of textbooks now being written or to be published might reference the updated Bloom's taxonomy.

Methods: The objective of this research is to determine the degree to which EFL textbooks incorporate higher and lower level questions based on the updated Bloom's taxonomy. In the study, the overall reading sections of the EFL textbooks were examined. In other words, the cognitive level of the reading passages was determined using the updated Bloom's taxonomy. Consequently, the approach used in this study is descriptive content analysis in qualitative research. The updated cognitive levels of Bloom's Taxonomy were referenced in the classification of reading questions in EFL textbooks.

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Results: The data indicate that the reading text questions did not target higher cognitive levels. Given that remembering is associated with working memory and short-term memory, it is doubtful that it can assess long-term memory. To reinforce knowledge in the long-term memory, it is necessary to engage higher cognitive processes. It is rare that learners of a foreign language would reinforce lexical, syntactical, and contextual knowledge unless they analyze or assess the corresponding information in the texts. Measuring mainly lower levels of cognition gives them with little data. Additionally, it is crucial to apply integrated activities while reading texts. Reading and writing, or speaking and listening, are examples of integrated tasks. Thus, reading text queries were unable to assist students in producing meaningful texts. Pure and concrete inquiries have just a superficial relationship to understanding.

Discussion: The revised Bloom's taxonomy is a useful and successful tool for reading classes. Therefore, EFL and ESL instructors, researchers, and textbook authors must use Bloom's higher cognitive aspects so that EFL students can reinforce texts at the lexical, syntactic, and contextual levels. Taking into account lower cognitive abilities, the most often utilized inquiry type concerned remembering, which includes definition, listing, memorization, recalling, and expressing the pertinent language and material. However, there are significant limits to memorizing dimension for language learners. This constraint may be overcome by including more cognitive elements. It is glaringly obvious that English instructors and textbook authors should include extra questions into reading texts so that foreign and second language English learners may build more productive abilities via reading text questions in line with the updated Bloom's taxonomy. Due to the relationship between Bloom's taxonomy and critical syllabus, it is possible to design a critical syllabus to obtain these competencies (Ordem, 2021).

Limitations: This research is confined to the free EFL textbooks issued by the Turkish Ministry of National Education. In other words, only locally authored EFL textbooks are included in the research, as opposed to both locally and internationally published EFL textbooks. Consequently, future research should concentrate on a larger scope. Such an approach should consider the impact of locally authored textbooks and their comparison to textbooks published by international organizations, such as the British Council or Cambridge University Press. This is an important point to consider, as international publishers are likely to bring different perspectives on language learning, which may differ from that found in locally authored textbooks. Further, the research is exclusively confined to the Revised Bloom's Taxonomy. Therefore, alternative cognitive categorization models should also be applied to assess course contents. This would provide a more comprehensive picture of the students' learning outcomes, and enable the researchers to evaluate course effectiveness from multiple perspectives. Moreover, the utilization of other cognitive categorization models, such as Anderson and Krathwohl's Taxonomy of Educational Objectives and SOLO Taxonomy, would help to provide a broader context of comparison to effectively evaluate the effectiveness of course.

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Conclusions: Revised Bloom's taxonomy provides helpful and productive stages for EFL students to be creative while reading materials. Creatively approaching a text and its questions requires assembling, creating, designing, articulating, and writing. Evaluation, which involves assessing, debating, defending, judging, choosing, supporting, valuing, and evaluating, is a further step that must be examined. Analyzing is another aspect that requires discriminating between various portions of the text, evaluating, comparing, contrasting, critiquing, differentiating, scrutinizing, and asking. These higher cognitive characteristics were not detected in the assessed reading text questions from textbooks. This lack of higher-order thinking skills presented in the text questions of the assessed textbooks suggests that students are not being adequately prepared to engage in thoughtful dialogue or comprehensive analysis when responding to texts. This is an alarming discovery as these skills are essential for students to demonstrate competency in language arts, develop effective reading strategies, and build critical thinking. This trend highlights the need for teachers to supplement reading material with activities that promote higher-order thinking, such as open-ended questions, research assignments, and group discussions. By incorporating these activities into the classroom, teachers will be able to ensure that students are exposed to the kinds of higher-order thinking that can help them to become engaged, competent readers and critical thinkers.

Key words: revised Bloom's taxonomy, reading skills, reading comprehension questions.

Introduction

Due to their restricted time and excessive workloads, teachers are unable to produce educational materials for their classes. Therefore, they mostly use course books in their classrooms and refer to these course books as the primary instructional tools (Ulum, 2016). In the late 1930s, information processing emerged as an important aspect of cognitive study. Recent learning and teaching methods, research investigations, and disciplines such as psychology indicate that the mind utilizes a variety of cognitive processes for manipulating, describing, storing, and retrieving information (Darwazeh, 2017). These cognitive processes include memory, understanding, discrimination, and analysis, among others. Moreover, the degree of difficulty of these cognitive processes varies, since they may be of low, medium, or high complexity. Thus, the degree of difficulty may be seen as a component of any cognitive-based classification system. Consequently, a number of scholars in the relevant field of study have applied cognitive science ideas to the subject of education (West, Farmer, & Wolff, 1991). Education psychologists want to assist instructors, policymakers, and curriculum creators in designing education that enables

students to effectively retain, retrieve, and apply the selected content. Classifying information in a precise sequence that is durable in a person's memory can aid learners in effectively storing, retrieving, and using facts; otherwise, the whole learning process may be impeded. Thus, it is imperative that students acquire the fundamental knowledge prior to attempting to interpret current information to develop meaningful knowledge (Darwazeh, 2017). The initial Taxonomy provided peculiar definitions for the six main cognitive domain dimensions, namely knowledge, comprehension, application, analysis, synthesis, and evaluation, whereas the revised Taxonomy included the levels of remember, understand, apply, analyze, evaluate, and create respectively (Armstrong, 2010). Wilson (2016) created the following diagram to illustrate the difference between the original and amended taxonomies.

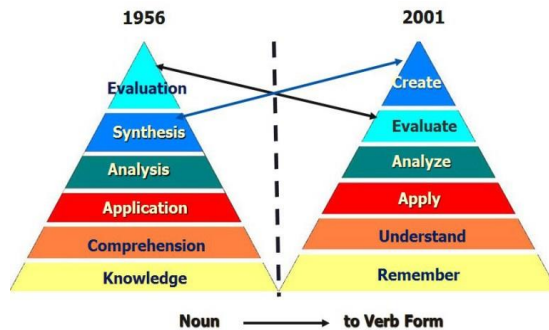


Figure 1. Bloom's Taxonomy Revised (Wilson, 2016).

The stages are arranged from easy to difficult, basic to complicated, and tangible to abstract to illustrate a hierarchical structure. Thus, the competence at a lower level is a requirement for competence at a higher one (Krathwohl, 2002). Bloom et al. (1956) developed a categorization model based on critical thought and cognitive processes. In addition, the Revised Bloom's Taxonomy proposed by Anderson et al. (2001) included student prototypes into the original taxonomy in an effort to improve student understanding. The cognitive process is comprised of six aspects that undergo major alterations. Primarily, the noun forms of Bloom's six dimensions were changed to verb forms to emphasize the significance of student activity. In addition, the old taxonomy's knowledge level was renamed remembering in the new version. In addition, the comprehension level of the original taxonomy was changed to understanding, while the application/applying, analysis/applying, and evaluation/evaluating levels remained the same. Last but not least, the synthesis level was renamed creating,

and the order of synthesis/creating and evaluation/evaluating was reversed in the new taxonomy. In contrast to the original taxonomy, the new taxonomy (Anderson et al., 2001) allows the levels to intertwine (Krathwohl, 2002). In the 1960s, Bloom's original taxonomy was described as a hierarchical framework of the cognitive domain (Bloom et al. 1956). In the year 2001, Anderson and his colleagues changed the model. As a result, significant changes were made to the structure and vocabulary of the model. Original (Bloom et al. 1956) or amended (Anderson et al. 2001) taxonomy refer to a categorization model that hints to cognitive stages ranging from simple remembering to more complex actions such as producing (Ulum, 2016). Bloom's taxonomy of educational objectives plays an important role in developing learning tasks, assessment tools, and course materials with respect to higher and lower level cognitive skills because it is necessary to assess how well learners comprehend and apply information for meaningful learning (Köksal & Ulum, 2018).

1 The research problem

Teachers in both public and private schools lack the time and opportunity to create instructional materials for their courses. Thus, they rely heavily on textbooks as the primary course materials and employ them extensively in their classes. The EFL textbooks chosen for examination in this study work are those used in high schools across Turkey. The objective of this research is to determine the degree to which EFL textbooks incorporate higher and lower level questions based on the updated Bloom's taxonomy. In the study, the overall reading sections of the EFL textbooks were examined. In other words, the cognitive level of the reading passages was determined using the updated Bloom's taxonomy. This content analysis will determine whether or not the reading questions in EFL textbooks include the higher-level thinking abilities outlined in the updated Bloom's taxonomy.

1.1 Purpose of the study

This research paper is to assess the cognitive levels of the reading questions in the EFL textbooks developed locally for students in Turkey's ninth, tenth, eleventh, and twelfth grades. With reference to the new Bloom's taxonomy, this research tries to determine if there is a lack of low or high order cognitive levels in the reading questions. Thus, the following study question was posed: How much do the reading parts of the ninth, tenth, eleventh, and twelfth grade EFL textbooks include the lower and higher order cognitive levels outlined in the updated Bloom's taxonomy?

1.2 Significance of the study

This research paper investigates the reading questions in EFL textbooks written for Turkish students in order to determine the proportion of lower and higher cognitive levels outlined in the updated Bloom's taxonomy and to recommend techniques to aid textbook writers in the creation of reading questions. In addition, the conclusions of this study article will greatly assist teachers in crafting reading problems depending on the appropriate cognitive levels. This study paper's findings will also assist relevant authorities in selecting the necessary textbooks. This research will increase awareness of the needed cognitive levels that must also be included in textbooks. In addition, the outcomes of this research will be of considerable value for both global and local stakeholders in order to achieve the curricular goals.

1.3 Limitations of the study

Textbooks should provide a variety of reading questions based on both low and high order cognitive abilities so that students are equipped to answer to questions at any cognitive level (Assaly & Smadi, 2015). Only the updated Bloom's taxonomy was used to ask the reading comprehension questions in this article. In addition, this study work is confined to locally created EFL textbooks for the ninth, tenth, eleventh, and twelfth grades. Other local EFL textbooks from the elementary and secondary levels, as well as internationally authored EFL textbooks from various grade levels, were not included in the study's findings. Lastly, this research article solely investigates reading questions; consequently, the study's findings are confined to the examination of reading questions.

2 Methodology

This qualitative study use descriptive content analysis as its methodology. The updated cognitive levels of Bloom's Taxonomy were referenced in the classification of reading questions in EFL textbooks. Initially, two study questions pertaining to lower and higher order cognitive levels, respectively, were formulated. The former refers to tangible phases of cognition, whereas the later is concerned with abstract states of cognition.

1. To what extent do the reading sections of the 9th, 10th, 11th, and 12th class EFL textbooks involve the lower higher order cognition levels specified in the revised Bloom's taxonomy?
2. To what extent do the reading sections of the 9th, 10th, 11th, and 12th class EFL textbooks involve higher order cognition levels specified in the revised Bloom's taxonomy?

Key words and verbs exemplifying the taxonomy stages, example question stems, and prospective activities concentrating on each level were used to indicate which levels of thinking order were noticed in the total assessed

reading passages. In addition, the key terms and verbs illustrative of the taxonomy's phases, example question stems, and prospective actions were derived from Tarlinton (2003) and Pohl (2005, 2000). As the obtained data are evaluated and analyzed, this study is based on qualitative research. In addition, frequencies and percentages are provided in the study as a quantitative research design, whilst the relevant samples from the reading comprehension questions reflect the qualitative investigation. The following EFL textbooks are included in the study:

- High School Relearn Student's Book Grade 9 designed and delivered by the Ministry of Turkish National Education, 2019
- Count me in Student's Book Grade 10 designed and delivered by the Ministry of Turkish National Education, 2019
- Sunshine English Student's Book Grade 11 designed and delivered by the Ministry of Turkish National Education, 2019
- Count me in Student's Book Grade 12 designed and delivered by the Ministry of Turkish National Education, 2019.

Reading passages of the studied textbooks were evaluated in light of the cognitive levels of the updated Bloom's taxonomy. For this purpose, descriptive content analysis was used to the reading sections of each unit of EFL textbooks. Low order cognitive skills: remembering, comprehending, and applying; and high order cognitive skills: analyzing, assessing, and inventing. The frequencies and proportions of each level of thinking were then computed. Several models, such as Piagetian and Vygotskian, are used to evaluate assessment tasks and questions (Anderson & Krathwohl, 2001), but the revised Bloom's taxonomy can be viewed as a cornerstone for investigating assessment tools based on the cognitive domains of remembering, understanding, applying, analyzing, evaluating, and creating (as cited in Zareian et al., 2015). In order to provide a clearer illustration of the data in the current research, the percentages and frequencies of each cognitive level have been provided in tables. Briefly, the updated Bloom's taxonomy served as the conceptual underpinning for this investigation. Accordingly, the results were tallied, and relevant examples were presented to illustrate each cognitive level of the new Bloom's taxonomy.

3 Data analysis and results

The scope of the updated Bloom's taxonomy incorporated in the reading sections of the 9th, 10th, 11th, and 12th grade EFL textbooks published locally constitutes the study's conclusions. In addition, the total number of such instances in the EFL textbooks included in the research is shown below. Under each table, sample passages for each category are shown.

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Table 1

The extent of the revised Bloom's taxonomy in the reading parts of the locally written 9th class EFL textbook

<u>Level</u>	<u>f</u>	<u>%</u>
Remembering	74	81.32
Understanding	17	18.68
Applying	–	–
Analyzing	–	–
Evaluating	–	–
Creating	–	–
Total	91	100.00

Table 1 clearly demonstrates that 81.32 percent of the questions in the reading sections of the 9th grade EFL textbooks created locally are of the remembering level. In addition, a minor fraction of occurrences were found at the level of comprehension (18.68%). However, no occurrences were noted at the levels of applying, analyzing, assessing, and generating. The following examples illustrate the specified levels:

- Read the text on the next page and answer: Is there traffic on the Castle Street? (Remembering level, p. 24)
- Why did more than 30000 people become homeless? (Understanding level, p. 54)

Table 2

The extent of the revised Bloom's taxonomy in the reading parts of the locally written 10th class EFL textbook

<u>Level</u>	<u>f</u>	<u>%</u>
Remembering	118	71.52
Understanding	43	26.06
Applying	–	–
Analyzing	–	–
Evaluating	–	–
Creating	4	2.42
Total	165	100.00

As it is plainly evident in Table 2, remembering level (71.52%) is significantly dominating in the reading sections of the locally authored 10th class EFL textbook. Additionally, several instances were found at the level of comprehension (26.06%). In addition, a bare emergence was noticed at the level of creation (2.42%). In contrast, no change was detected at the levels of application, analysis, or evaluation. Below are examples of data samples:

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- Read the text on icebreaker activities and answer the questions.
 1. Why do teachers use ice-breakers? (Understanding level, p. 13)
 2. What are some ice-breaker activities? (Remembering level, p. 13)
 3. Why are ice-breakers important? (Understanding level, p. 13)
- Below is the template of a digital collaborative story. Its first sentence has been given for you. Each time before a group, pair or student adds a sentence, discuss it and make changes if necessary to create a collaborative story which shows the advantages of technology. Then, arrange it online (Creating level, p. 105).
- Now, write a 'cause and effect paragraph' on the importance of netiquette (Creating level, p. 102).

Table 3

The extent of the revised Bloom's taxonomy in the reading parts of the locally written 11th class EFL textbook

<u>Level</u>	<u>f</u>	<u>%</u>
Remembering	123	56.16
Understanding	82	37.45
Applying	–	–
Analyzing	–	–
Evaluating	–	–
Creating	14	6.39
Total	219	100.00

The most prevalent level noticed in the reading sections of the locally authored EFL textbook for 11th graders is the remembering level (56.16%) as shown in Table 3. In addition, the degree of comprehension was encountered at a modest rate (37.45%). Moreover, a minor fraction of occurrences (6.39%) were also observed at the level of creation. There was no incident throughout the application, analysis, and evaluation phases. The following are excerpts from the research:

- Read the speech bubbles about the professions below and write similar sentences (Remembering level, p. 10).
- Work in pairs. Look at the CV below and make predictions about the future career of this person. Use the prompts (Understanding level, p. 15).
- Work in groups of four. Write some texts about your teachers or friends and prepare your own class magazine. Then, share it with the class (Creating level, p. 119).

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Table 4

The extent of the revised Bloom's taxonomy in the reading parts of the locally written 12th class EFL textbook

<u>Level</u>	<u>f</u>	<u>%</u>
Remembering	112	65.37
Understanding	56	32.17
Applying	2	1.15
Analyzing	–	–
Evaluating	–	–
Creating	4	2.30
Total	174	100.00

As is evident from Table 4, the degree of memory retention (65.12%) happened with the greatest frequency. The degree of comprehension (32.56%) has been seen to follow the level of recalling. In addition, a rare incidence was seen at both the creating (2.32%) and applying (1.15%) levels, however neither the analyzing nor the evaluating levels presented any instances. Examples of samples illustrating the aforementioned levels are shown below:

- Read the dialogue and find out what impacts Alex and Luke's choices in music (Remembering level, p. 13).
- Read the passage and discuss the predictions and plans (Understanding level, p. 46).
- The length of the lines in the below diagram shows the progress human beings made. How would you interpret the speed of change according to the diagram? (Applying level, p. 46)
- Write a letter of complaint about an environmental problem to a local or national authority and suggest solutions in your letter (Creating level, p. 81).

Table 5

The extent of the revised Bloom's taxonomy in the reading parts of the overall EFL textbooks included in the study

<u>Level</u>	<u>f</u>	<u>%</u>
Remembering	427	65.79
Understanding	198	30.51
Applying	2	0.31
Analyzing	–	–
Evaluating	–	–
Creating	22	3.39
Total	649	100.00

Table 5 demonstrates that the remembering level (65.79%) occurs most often in the reading sections of the EFL textbooks (9th, 10th, 11th, and 12th grade textbooks) included in the research. In addition, a percentage of 30.51 was found for the degree of comprehension. While just a few occurrences were seen at the level of creation (3.39%), a single event was found at the level of application (0.31%).

4 Discussion and conclusion

This research aims to evaluate the lower and higher cognitive levels of reading questions in Turkish EFL textbooks. Overall, the reading questions evaluated lower levels of cognitive ability at a higher level. However, the advanced level of intellect was hardly addressed. Memory, comprehension, and application, which are tangible stages of cognition, were stored in the reading texts, however analyzing, evaluating, and producing, which are higher and more abstract stages of cognition, were not adequately examined. The data indicate that the reading text questions did not target higher cognitive levels. Given that remembering is associated with working memory and short-term memory, it is doubtful that it can assess long-term memory. To reinforce knowledge in the long-term memory, it is necessary to engage higher cognitive processes. It is rare that learners of a foreign language would reinforce lexical, syntactical, and contextual knowledge unless they analyze or assess the corresponding information in the texts. Measuring mainly lower levels of cognition gives them with little data. Additionally, it is crucial to apply integrated activities while reading texts. Reading and writing, or speaking and listening, are examples of integrated tasks. Thus, reading text queries were unable to assist students in producing meaningful texts. Pure and concrete inquiries have just a superficial relationship to understanding.

It is essential for EFL textbook authors and researchers to incorporate the updated Bloom's taxonomy in order to teach learners who can effectively analyze, evaluate, and produce texts. The revised Bloom's taxonomy provides useful and productive stages for EFL students to be creative while reading texts. Creatively approaching a text and its questions requires assembling, creating, designing, articulating, and writing. Evaluation, which involves assessing, debating, defending, judging, choosing, supporting, valuing, and evaluating, is a further step that must be examined. Analyzing is another aspect that requires discriminating between various portions of the text, evaluating, comparing, contrasting, critiquing, differentiating, scrutinizing, and asking. These higher cognitive characteristics were not detected in the assessed reading text questions from textbooks. The revised Bloom's taxonomy is a useful and successful tool for reading classes. Therefore, EFL and ESL instructors, researchers, and textbook authors must use Bloom's higher cognitive aspects so that EFL students

can reinforce texts at the lexical, syntactic, and contextual levels. Taking into account lower cognitive abilities, the most often utilized inquiry type concerned remembering, which includes definition, listing, memorization, recalling, and expressing the pertinent language and material. However, there are significant limits to memorizing dimension for language learners. This constraint may be overcome by including more cognitive elements. It is glaringly obvious that English instructors and textbook authors should include extra questions into reading texts so that foreign and second language English learners may build more productive abilities via reading text questions in line with the updated Bloom's taxonomy. Due to the relationship between Bloom's taxonomy and critical syllabus, it is possible to design a critical syllabus to obtain these competencies (Ordem, 2021).

Future research should include the new Bloom's taxonomy. The reading text questions in textbooks should be updated to accommodate and embrace higher cognitive capabilities. In addition, the Ministry of Education, English language teaching departments, and textbook authors must work to reformulate reading text problems so that second and foreign language learners may gain more abstract and productive abilities. Teachers of the English as a Foreign Language (EFL) are able to question themselves about EFL texts (Ordem, 2017c). Adding integrated assignments to reading materials continues to be a significant concern for EFL textbook authors. In addition, foreign textbooks may be evaluated to generate reading text questions. Remember that taxonomy thinking adds to the adaptability of learners. Limiting students to lower cognitive levels offers significant challenges for language instruction and learning. Therefore, reading text queries restricted to lower cognitive levels and dimensions should be increased in order to strengthen higher cognition levels. In addition, task-based language teaching can be incorporated into EFL classroom activities so that foreign language learners can complete differentiated tasks. This is possible because task-based language teaching prioritizes the revised Bloom's taxonomy, the communicative approach, and the content-based language teaching method. Consequently, the updated Bloom's taxonomy may be related with the integration of several methodologies and approaches in language instruction. This advanced taxonomic thinking presents considerable chances for language learners, since EFL students may be endowed with higher cognitive levels when reading and examining an English book if they engage in it. Reading questions are an excellent indicator of what EFL students should consider while they read and skim a material. In addition, by incorporating higher levels of cognition, critical thinking abilities may be enhanced (Ordem, 2017a). Ordem (2017b) further highlights that motivation may be increased if students believe they can acquire certain abilities.

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It is strongly suggested that authors of EFL textbooks and academics use the updated Bloom's taxonomy into reading comprehension questions. Consequently, the reading text questions must be altered to align with the taxonomically classed higher cognitive levels. Thus, learners of foreign and second languages may study and evaluate texts by generating a new point of view product. Language learners must continue to be asked reading comprehension tasks that go beyond lower cognitive levels and promote higher cognitive levels. This hopeful outlook may be reached via partnership with departments of English language instruction, English instructors, and textbook authors.

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Identifying Mathematical Literacy Demands in Turkish, Singaporean and Australian Textbooks

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Abstract:

Introduction: Textbook tasks are considered as tools for implementing, endorsing mathematical thinking and thereby creating chances for mathematics learning. Therefore, textbook tasks can potentially influence and structure the way students think and can serve to limit or to broaden their views of the subject matter with which they are engaged. Among the essential sources of textbook tasks include worked examples and exercises. Because these worked examples and exercises in the textbooks are mostly used by students either in the classroom or at home, they definitely affect students' conceptual understanding of mathematics and may inspire students to work individually or collaboratively with their peers. Thus, given the importance of mathematical literacy for learning and understanding of math, one should investigate the chances students can have through it. This study aims to reveal the inclusion of the mathematical literacy demands in the fifth-grade mathematics textbooks from Turkey, Singapore, and Australia.

Methods: Being qualitative in nature, the current study employed a document analysis method to examine the textbooks. The cycle of mathematical literacy processes, defined in PISA framework, was used as a framework during the analysis to investigate mathematical literacy demands.

Results: Findings of the analysis of mathematical literacy demand in real life problems indicated that textbooks from all three countries had provided more opportunities for the competencies of two mathematical literacy processes, formulating and employing, while a small portion of these problems requires higher level cognitive skills to interpret/evaluate their mathematical solutions and make decisions for real life, which is the third process in the cycle; therefore, most of the real-life problems in the textbooks could not provide the chances for

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completing the whole mathematical literacy cycle. Moreover, textbooks from all three countries provided more chances for experiencing mathematical literacy processes in to-be-solved questions rather than worked examples.

Discussion: In general, textbooks from all three countries have included a small portion of the problems relating real life. Related literature also proves evidence for lack of real-life opportunities in the mathematics textbook tasks. Moreover, textbooks from all countries had provided more opportunities for the competencies of formulating and employing while a small portion of these problems requires higher level cognitive skills to interpret/evaluate their mathematical solutions and make decisions for real life. These results are not in accordance with the mathematics education calls voiced in national and international standards of mathematics education: Raising individuals with both mathematical thinking and reasoning skills and a useful foundation of mathematical knowledge and skills needed in all areas of life. Most of the real-life questions in the textbooks could not provide the chances for completing the whole mathematical literacy cycle. Textbooks' weaknesses in their inclusion of MLP may also cause impediments in the development of students' skills of handling the problems that they confronted in daily life.

Limitations: The present study only included one textbook from each country while these textbooks were representing the authenticity of the other textbooks in these countries. Moreover, this study examined the opportunities of mathematical literacy only provided in the textbooks while the actual implications of these opportunities may differ across classrooms in these countries.

Conclusions: Students' inappropriate practices with the real-life problems may cause them to not successfully solving these kinds of problems. Instead, employing more real-life problems in the classroom activities may result in higher student understanding. Moreover, examples and tasks from daily life are helpful to provide students with meaningful contexts and enable students to relate to their familiar experiences. The absence of providing necessary problem-solving opportunities in a range of different types in the textbooks may cause students to not solve specific types of problems. Moreover, textbooks should also include these problem-solving opportunities to construct students' conceptual appreciations of problem structures. Thus, one implication this study can make is that Singaporean and Australian textbook creators should include more sufficient practices of the whole MLP cycle in their problems to make sure students acquire the principal latent components of the problems.

Key words: mathematical literacy competencies, mathematics textbooks, comparative education.

Introduction

Over the past 50 years, there has been an increase in researchers' interest in students' mathematics performances in the international large-scale assessments such as the Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) (e.g., Andrews, Ryve, Hemmi, & Sayers, 2014; Kjærnsli & Lie, 2004). The results of these assessments are also carefully followed by countries around the world and have had an impact on their education systems (e.g., Breakspear, 2012; Hopkins, Pennock, Ritzen, Ahtaridou, & Zimmer, 2008). Having higher performances on PISA appeared to emphasize existing policies and thus there was no motivation for extensive change (Dobbins, 2010) while decreases in performance forced countries to take actions for change in their educational policies, assessments, curriculum standards and performance goals (e.g., Martens, Nagel, Windzio, & Weymann, 2010; Takayama, 2008). Upon PISA's influence on thought and action in mathematics education, Stacey et al. (2015) indicated that PISA results have reinforced to take actions and inspired projects that propose enhancing achievement. These projects have also aimed at improving content and design of the textbooks due to the general acceptance that enhancement in textbooks can stimulate the way mathematics is taught and learned (e.g., Ball & Cohen, 1996; Hirsch, 2007; Weiss, Knapp, Hollweg, & Burrill, 2002).

Textbooks, considered a 'de-facto national curriculum' (Mayer, Sims, & Tajika, 1995), constitute the major structures of teaching programs and regarded as artifacts that evolves educational policy into the teaching practices; therefore, carries intended curriculum toward implemented curriculum (Valverde, Bianchi, Wolfe, Schmidt, & Houang, 2002). As a result, research on textbook offers a broader reflection on curriculum standards and teaching practices in the classroom environment (Mayer et al., 1995). In order to stand out in international competition, to evaluate the performance of their students and to direct education policies, countries have given increasing importance to the skills evaluated in international large-scale assessments, such as PISA; and this has affected the design of the textbooks, including the competencies to be targeted (Hopkins et al., 2008). When we analysed the key competencies of the PISA, Mathematical Literacy Processes (MLP) is encountered as a central concept (de Lange, 2003). PISA, through MLP cycle, examines how student are well prepared for their future lives in terms of their learning of mathematics (OECD, 2007). MLP cycle starts with a problem situated in the real-life context, continues with formulating the problem in mathematical terms, employing the mathematical computations and finalized with interpretation and evaluation of mathematical solution to check for its adequacy in answering the original question. If it is not adequate, the cycle should start from the formulating again to enhance the model. Considered at the heart of PISA mathematical assessment, MLP adaptation of

the textbooks also be a significant concern when giving importance of textbooks that are the primary resource for mathematics learning as they provide students with the tasks delivering fundamental bases for fostering meaningful learning of the concept, practicing basic mathematical skills, and engaging students in doing “important” mathematics (Valverde et al., 2002; Van Zanten & Van den Heuvel-Panhuizen, 2018).

Textbook tasks are considered as tools for implementing activities (Mason & Johnston-Wilder, 2004), endorsing mathematical thinking (Lithner, 2003), and thereby creating chances for mathematics learning (Sullivan, Clarke, & Clarke, 2012). Therefore, textbook tasks “can potentially influence and structure the way students think and can serve to limit or to broaden their views of the subject matter with which they are engaged” (Henningsen & Stein 1997, p. 525). The most essential sources of textbook tasks include worked examples and exercises (Sullivan et al., 2012). Because these worked examples and exercises in the textbooks are mostly used by students either in the classroom or at home, they definitely affect students’ conceptual understanding of mathematics and may inspire students to work individually or collaboratively with their peers (Hopf, 1980; Sullivan et al., 2012). Thus, given the importance of mathematical literacy for learning and understanding of math, one should investigate the chances students can have through it. Since mathematics educators involves MLP through international assessments, specifically PISA, it necessitates to investigate the extent to which these mathematical literacy demands exist in the textbook tasks. Thus, this study proposes a reflection on how MLP exist in the textbook tasks while mathematical literacy demands may also exist in the textbook explanations, illustrations, as well as in-class activities, etc. The relevancy of the possible existence of mathematical literacy demands beyond the textbook tasks cannot be ignored but is not considered in the current study. This study aims to reveal the inclusion of the MLP (as defined in PISA study) in the fifth-grade mathematics textbooks from Turkey, Singapore, and Australia. The specific research question was: To what extent do mathematical literacy demands take place in the sets of questions in the Australian, Turkish and Singaporean textbooks?

Selection of countries

In the selection of the countries from which we chose mathematics textbooks, we examined mathematics mean score of all countries in PISA 2018 and decided to select three countries with an average mathematics test score in PISA 2018, which was a) statistically below the OECD average, b) statistically above the OECD average, and c) had statistically the same average as the OECD average, respectively (see Table 1). The reasoning behind our selection was to track the

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similarities/differences of the MLP characteristics of mathematics textbooks from the countries at a different achievement rate.

Table 1

PISA 2018 average test score

<i>Country</i>	<i>Rank</i>	<i>Score</i>
Turkey	43	454
Singapore	2	569
Australia	29	491

Note: Rank represents the arrangement of each country among 79 countries held PISA 2018. The highest score in the 2018 PISA Math Test was 591 and the lowest score was 325 while the OECD average score was 489.

The results of international assessments, such as PISA, affect education systems around the world (e.g., Breakspear, 2012; Hopkins et al., 2008). High performance on PISA has been shown to strengthen the presence of systems (Dobbins, 2010); on the other hand, declines in performance urge countries to take steps to change their education practices and policies (e.g., Martens et al., 2010; Takayama, 2008). Following the publication of the PISA 2015 results, Turkey has taken important decisions concerning the education practices including mathematics teaching, which also continued after PISA 2018 results. These decisions include the revision of mathematics education programs at all levels and the concept of “mathematics literacy” for the first time, which is included in the basic principles of mathematics education program (MoNE, 2017). The Ministry of National Education has organized workshops for school principals and teachers to adopt the MLP theory and apply it in the classroom. The content of the transition to high school exam also changed significantly and included MLP questions. In the last step, secondary school textbooks are gradually being changed starting from the fifth grade in 2018. For this reason, this study aimed to compare the first sample of the redesigned Turkish textbooks with their counterparts in Australia and Singapore.

Mathematical literacy processes

PISA 2018 Assessment and Analytical Framework (OECD, 2019) defines mathematical literacy as

“...an individual's capacity to formulate, employ, and interpret mathematics in a variety of contexts. It includes reasoning mathematically and using mathematical concepts, procedures, facts and tools to describe, explain and predict phenomena. It assists individuals to recognize the role that mathematics plays in the world and to make the well-founded

judgments and decisions needed by constructive, engaged and reflective citizens.” (p. 75)

Mathematical Literacy Processes (MLP) refer to an individual's capacity to formulate, employ, and interpret mathematics. MLP describe how students carry the mathematical context of the problem into the interpretation, application and evaluation of the mathematical outcomes through formulating the problem mathematically and employing necessary mathematical concepts and procedures (OECD, 2019). According to PISA 2018 analytical mathematics framework, the formulating process is defined as “how effectively students are able to recognise and identify opportunities to use mathematics in problem situations and then provide the necessary mathematical structure needed to formulate that contextualised problem into a mathematical form” while the employing process is defined “how well students can perform computations and manipulations and apply the concepts and facts that they know to arrive at a mathematical solution to a problem formulated mathematically”. Finally, the interpreting/evaluating process is defined “how effectively students can reflect upon mathematical solutions or conclusions, interpret them in the context of a real-world problem, and determine whether the results or conclusions are reasonable” (OECD, 2019, p.77). Students’ ability to solve mathematics questions is dependent upon their abilities in these three processes. Either educational policy or classroom level discussions can also be informed by students’ performances in these processes (OECD, 2019).

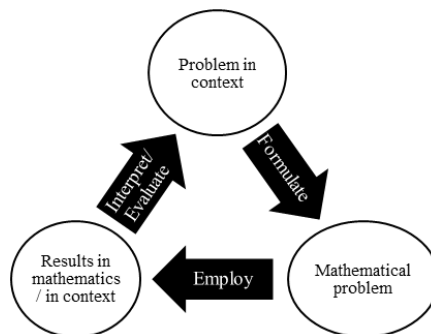


Figure 1. A model of mathematical literacy processes (MLP) in practice (adapted from OECD, 2019, p. 77).

There is a demand in the world to prepare students with the mathematical knowledge applicable to the real-life situations. Wu (2009) indicated that some countries make necessary efforts to ensure their students are prepared well toward real-life situations by aligning their curriculum and assessment practices accordingly. She also highlighted that mathematical literacy should be embodied

in the curriculum and textbooks if the main goal is to acquire it as an educational outcome, which explains our effort to work on the textbooks. MLP takes students into consideration as problem solvers in PISA; however, in an assessment context, it is not usually expected them to involve in all three processes as a cycle (Niss, Blum, & Galbraith, 2007). Students, as problem solvers, usually complete a partial cycle or completed the whole processes couple of times to revise their prior decisions. In our case, the demand for mathematics literacy cycle in textbooks is handled in two dimensions. First, an investigation was made for the inclusion of each process of the MLP in the textbook tasks. Then, the progress in the entire MLP cycle in textbook tasks was examined.

Studies of textbooks

It has been popular to compare textbooks and their problem specifications especially after the first results of the TIMSS study was issued. Several studies were conducted to compare textbooks of diverse educational systems to reveal indigenous objectives and practices (Gatabi et al., 2012). Specifically, textbook tasks (including to-be-solved problems and worked examples) have been receiving admired attention among studies focusing on textbook analysis as the most prevalent non-mathematical topic (e.g., Fan, 1998; Fan & Zhu, 2000; Li, 2000; Sun, 2011). Analysis of the textbook tasks generally consists of answer types, concepts, and complexities (e.g., Huntley & Terrell, 2014; Zhu & Fan, 2006). While some studies were conducted on specific mathematical topics (e.g., Vincent & Stacey, 2008), some others focused on the entire textbook of a specific grade level (e.g., Brändström, 2005; Dole & Shield, 2008).

This summary only refers to a few studies that focused on the analysis of textbook tasks in terms of the competencies included in the international assessments. Bao (2004) worked on the old and new mathematics textbooks used in China to investigate the difficulty level of the items of the international assessments. As a result of his study, he expressed how important the alliance between the problems used in the textbooks and the anticipated student learning. Gatabi et al. (2012) compared Australian and Iranian mathematics textbooks in terms of the inclusion of mathematical literacy in the mathematical tasks as indicated in the relevant literature, and concluded that Australian mathematics textbooks contain different types of mathematical tasks ranging between simple formulation to the real-life contextualization. On the other hand, Iranian textbook provides less diversity in the types of mathematical tasks providing students very minimal chance in the real-life contextualization, which is the main process of the mathematical literacy. Vincent and Stacey (2008) investigated different textbooks used in Australia at the eighth-grade level to reveal how competent the problems in the textbooks with the classification of the TIMSS video study. As a

result of their study, the problems included in the textbooks were well aligned with the ones used in TIMSS video study.

To sum up, the studies mentioned above illustrated that analysis of the problems included in the textbooks can provide opportunities to understand student learning; however, the analysis should be based upon a framework that may reveal the usefulness of the textbooks in terms of the curricular objectives. On the other hand, these studies did not incorporate an essential element of the textbook tasks: Their concern with using real-life context utilizing mathematical literacy framework. Considering the value of mathematical literacy in learning mathematics, mathematical literacy demands are also worth including in the analysis of textbook tasks.

1 Methodology

Being qualitative in nature, the current study employed a document analysis method to examine Mathematical Literacy Processes (MLP) in mathematics textbooks. Document analysis includes recording the existing records and documents related to the subject to be investigated and then coding these documents according to a certain norm or system (Cohen, Manion, & Morrison, 1994).

1.1 Selection of textbooks

In this study, the textbooks were selected based on purposive sampling strategy. Table 2 gives information about the selected textbooks. Turkey and Singapore utilize standardized textbooks in their classrooms while mainstream teaching materials are used in Australia. In Turkey, textbooks are compulsory in primary and secondary education. The adoption of a textbook for instruction depends on the approval of the Ministry of National Education (MoNE). Turkish textbooks are evaluated based on four basic dimensions: 1) the conformity to the instructions of MoNE, 2) scientific competence, 3) the level of achievement of instructional objectives, and 4) quality of visual and content design. Similarly, Singaporean textbooks need to be approved by Singapore's MoNE before they can be adopted. As a representative of mathematics textbooks in Singapore, the textbook series, New Syllabus D Mathematics, was selected for the study. In Australia, different curriculum standards are developed in the different states. These standards can be employed by authors who would like to write a textbook to be used in the curriculum.

Table 2

List of textbooks used in the study

<u>Country</u>	<u>Textbook Series</u>	<u>Publisher</u>
Turkey	Middle School Mathematics Course Book 5	MEB Publishing
Singapore	New Syllabus Primary Mathematics 5A	Shinglee
Australia	Mathematics for Australia 5	Haese Mathematics

1.2 Units of analysis

This study employed the model of Mathematical Literacy Processes (MLP), given in Figure 1, as the unit of data analysis. PISA 2018 Assessment and Analytical Framework defines mathematical literacy in three processes: formulating situations mathematically, employing mathematical concepts, facts, procedures and reasoning, and interpreting and evaluating mathematical outcomes (see Table 3 for a detailed explanation of mathematical literacy processes) (OECD, 2019). The current study utilized these processes and utilized the following criteria to better describe textbooks' attempts to apply mathematical processes.

Mathematical Literacy Framework also acknowledges that mathematical literacy helps individuals to recognize the role that mathematics plays in the world; hence a central aim is to provide situations encountered in daily life (OECD, 2019). Therefore, we only focused on the questions relating to real-life or taken directly from a real-life phenomenon. Moreover, textbooks tasks, in general, have two basic opportunities for students to foster their understandings of the concepts. They include exercises for students to practice their math learning (we named them “to-be-solved questions – TBSQ”) and the questions with an answer that aims to extend or to example a concept or definition for robust students’ understanding (we named them “worked examples – WE”). If a TBSQ/WE includes mathematical literacy processes, we evaluated TBSQ and WE separately in terms of mathematical literacy inclusion. Within this regard, Table 4 shows the distribution f) of the contents to be analyzed in textbooks. According to Table 4, a total of 948 content items were investigated to determine the MLP’s inclusion in the textbooks. Australian textbooks provided more real-life content than Turkish textbooks while Singaporean textbooks had the least amount of content regarding the real-life context to be examined in the current study.

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Table 3

Mathematical literacy processes and the underlying mathematical capabilities (OECD, 2019)

<u>Competency</u>	<u>It refers to</u>	<u>List of activities</u>
Formulate	Individuals being able to recognize and identify opportunities to use mathematics and then provide mathematical structure to a problem presented in some contextualized form.	<ul style="list-style-type: none"> - identifying the mathematical aspects of a problem situated in a real-world context and identifying the significant variables - recognizing mathematical structure in problems or situations - simplifying a situation or problem to make it amenable to mathematical analysis - identifying constraints and assumptions behind any mathematical modeling and simplifications gleaned from the context - representing a situation mathematically, using appropriate variables, symbols, diagrams, and standard models - representing a problem differently, including organizing it according to mathematical concepts and making appropriate assumptions - understanding and explaining the relationships between the context-specific language of a problem and the symbolic and formal language needed to represent it mathematically - translating a problem into mathematical language or a representation - recognizing aspects of a problem that correspond with known problems or mathematical concepts, facts, or procedures. - using technology to portray a mathematical relationship inherent in a contextualized problem. - selecting an appropriate model from a list.
Employ	Individuals being able to apply mathematical concepts, facts, procedures, and reasoning to solve mathematically formulated problems to obtain	<ul style="list-style-type: none"> - devising and implementing strategies for finding mathematical solutions - using mathematical tools, including technology, to help find exact or approximate solutions - applying mathematical facts, rules, algorithms, and structures when finding solutions - manipulating numbers, graphical and statistical data and information, algebraic expressions and equations, and geometric representations - making mathematical diagrams, graphs, and constructions and extracting mathematical information from them

Interpreting /evaluating	mathematical conclusions.	<ul style="list-style-type: none"> - using and switching between different representations in the process of finding solutions - making generalizations based on the results of applying mathematical procedures to find solutions - reflecting on mathematical arguments and explaining and justifying mathematical results. - performing a simple calculation - drawing a simple conclusion - selecting an appropriate strategy from a list - interpreting a mathematical result back into the real-world context - evaluating the reasonableness of a mathematical solution in the context of a real-world problem
	reflect upon mathematical solutions results or conclusions and interpret them in the context of real- life problems.	<ul style="list-style-type: none"> - understanding how the real-world impacts the outcomes and calculations of a mathematical procedure or model in - order to make contextual judgments about how the results should be adjusted or applied - explaining why a mathematical result or conclusion does, or does not, make sense given the context of a problem - understanding the extent and limits of mathematical concepts and mathematical solutions - critiquing and identifying the limits of the model used to solve a problem - evaluating a mathematical outcome in terms of the context

1.3 Coding procedures

To respond to the research question, the questions relating to the real-life were analyzed in terms of their alignment with the MLP. To check inter-rater reliability, three coders who are proficient in both English and Turkish languages and had experiences with textbooks participated in the coding process of the textbooks. Due to the multiplicity of data to be encoded, in the beginning, 215 content items in the Singaporean textbook were independently coded by three coders. According to the Fleiss' Kappa formula, the inter-rater reliability of the first codes was calculated to be 81.5%. Then, coders met and discussed the items that caused disagreement until agreement upon each disputed item is reached. After coders, an expert in the field of mathematics education also coded the same content. According to the Cohen's Kappa formula, the interrater agreement rate was found to be 88.7% between the coders and the expert. Discussions on the causes of disagreement resulted in a consensus. Then, the remaining content items were shared among coders, and coders worked independently. Finally,

coded data were examined both qualitatively and quantitatively to identify the similarities and differences among the mathematics textbooks of three countries in terms of their adaptation of MLP. In the presentation of the findings, the percentages of each of the MLP in the textbook questions were determined. Afterward, progress in the MLP cycle was analyzed to reveal how much of the daily life questions in the textbooks have gone through the entire MLP. The findings were also descriptively compared in terms of the distribution of TBSQ and WE.

Table 4

Distribution of the contents to be analyzed (f)

	<u>TBSQs</u>	<u>WE</u>	<u>Total Real-Life Questions</u>	<u>Total Questions</u>
Turkey	160	86	246	643
Singapore	138	77	215	537
Australia	472	15	487	1091
Overall	770	178	948	2271

1.4 Sample codes

To provide a clear understanding of the coding procedure, the below is provided some samples of codes regarding the units of analysis. Figure 2 presents a TBSQ from Australia fifth grade textbook. The question is about the cost of a trip to a local wildlife park and includes the prices of possible preferences. The very first step MLP cycle is having a problem in the context and this question has a real-life context of planning a trip. Then we choose it for evaluation and start checking its inclusion of MLP. Parts a, b, and c of the question requires students to formulate the situation and employ the value based on their formula. For example, part a of the question requires students to come up with a formula by writing a mathematical sentence of the problem (12×5.30) and then computing the total savings in dollars. Building upon the solutions of prior parts of the question, part d requires evaluating the results in the context (interpret/evaluate) whether Noah can effort everything in his list. This problem covered all processes in MLP; thus, completed the whole MLP cycle.

Opening problem

Noah is planning a trip to the local wildlife park. He has saved \$5.30 each week for the past twelve weeks.

Noah has researched all of his costs, including things he would like to buy:

Admission	\$21.50
Return bus ticket	\$2.80
Lunch pack	\$8.95
Toy koala	\$15.85
Drinks	\$3.50
Animal food	\$3.75
Guide book	\$8.50

Things to think about:

- How much has Noah saved?
- What is the total cost of the bus ticket and admission?
- After paying for his bus ticket and admission, how much money does Noah have left?
- Can Noah afford everything on his list?

Figure 2. TBSQ from Australian textbook. Processes: Formulate, Employ, Interpret/Evaluate; Progress in MLP cycle: Whole process.

On the other hand, some of the real-life problems in the textbooks were not found to be compatible with some mathematical literacy competencies and could not complete the MLP cycle. The following WE from the Singapore textbook is a sample for this situation (see Figure 3). When the solution process is examined, firstly, the expression in daily life was translated into a mathematical sentence (formulate) and then calculations were made based on the mathematical expression written (employ). Hence, this WE is coded having formulation and employ competencies, and stopped at the employing step of the MLP cycle.

Mrs Tan bought a large pizza. She kept $\frac{1}{2}$ of the large pizza and ate $\frac{1}{4}$ of the pizza she kept. What fraction of the large pizza did she eat?

LET'S LEARN

1. Mrs Tan ate $\frac{1}{4}$ of $\frac{1}{2}$ of the large pizza.



$\frac{1}{4}$ of $\frac{1}{2} = \frac{1}{4} \times \frac{1}{2}$
 $= \frac{1 \times 1}{4 \times 2}$
 $= \frac{1}{8}$

$\frac{1}{2}$ of the pizza is divided into 4 equal parts.




Figure 3. WE from Singaporean textbook. Processes: Formulate, Employ; Progress in MLP: Formulate & Employ.

2 Findings

The Mathematical Literacy Processes (MLP) cycle begins with a problem from the real-life context. Figure 4 shows the distribution of real-life problems and their compatibility with the MLP defined in the framework of PISA mathematical literacy. The bottom line of the figure shows the proportion of real-life questions in textbooks across countries. It seems Australian textbook offer students more opportunities to deal with real-life problems than the others, but textbooks have close distributions in the range of 38% to 45%. When we consider analyzing each MLP in all textbooks, we can also track similar distributions. Across the textbooks from all countries, real-life problems most of the time requires students to formulate a given situation and/or to employ their formula. However, a small portion of these problems (especially in Singaporean (5.6%) and Australian (5.5%) textbooks) require students to interpret/evaluate their mathematical solutions and make decisions in the context. Moreover, Turkish fifth-grade textbooks provide more opportunities for their students to practice each MLP in their real-life problems.

As a result of the investigation illustrated in Figure 4, Figure 5 is created to present the progress of textbook problems in the MLP cycle, as described in the PISA framework (Figure 1). Almost all real-life problems (96.7%) in Turkish textbooks require students to formulate the situation given in the context. Then more than two-third of these problems also requires employing the formula to have a solution in the world of mathematics. At the next stage, there is a dramatic drop at the percentage coverage of the real-life problems that require interpreting mathematical results and evaluating these results in the real-life context.

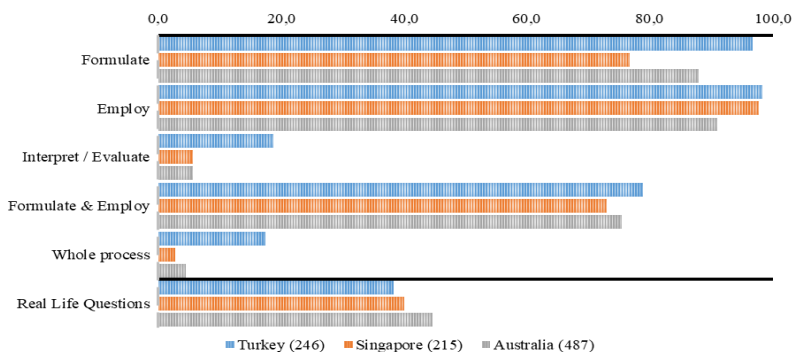


Figure 4. MLP Distributions across Real-life problems from textbooks (%).
Note: The total number of real-life problems is provided within parenthesis.

Similar results are also evident in textbooks from other countries. Let's talk about the points where Turkish textbooks differ from other textbooks in terms of adaptation to the mathematics literacy cycle. First of all, more daily life problems enter the cycle of mathematical literacy from the first stage (formulation) of the process. Even though there is a decrease in the percentage distribution, more problems in the employing phase progress in the MLP cycle. Despite significant declines in the proportion of textbook problems completing the final stage of the MLP, completion rate of the whole MLP cycle in Turkish textbooks are higher by several times than others.

As a result of the investigation illustrated in Figure 4, Figure 5 is created to present the progress of textbook problems in the MLP cycle, as described in the PISA framework (Figure 1). Almost all real-life problems (96.7%) in Turkish textbooks require students to formulate the situation given in the context. Then more than two-third of these problems also requires employing the formula to have a solution in the world of mathematics. At the next stage, there is a dramatic drop at the percentage coverage of the real-life problems that require interpreting mathematical results and evaluating these results in the real-life context. Similar results are also evident in textbooks from other countries. Let's talk about the points where Turkish textbooks differ from other textbooks in terms of adaptation to the mathematics literacy cycle. First of all, more daily life problems enter the cycle of mathematical literacy from the first stage (formulation) of the process. Even though there is a decrease in the percentage distribution, more problems in the employing phase progress in the MLP cycle. Despite significant declines in the proportion of textbook problems completing the final stage of the MLP, completion rate of the whole MLP cycle in Turkish textbooks are higher by several times than others.

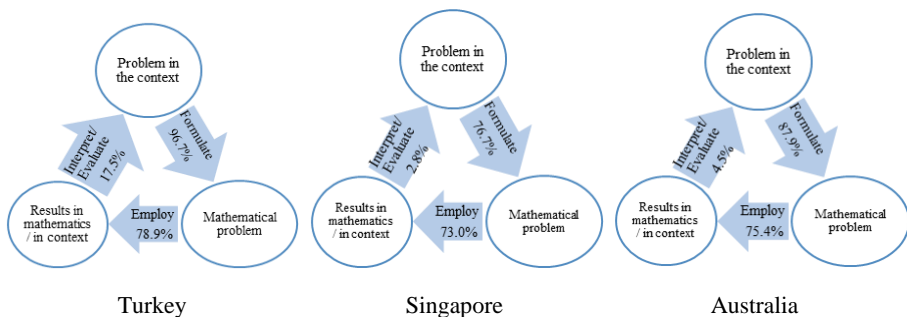


Figure 1. The alignment of textbooks with MLP (OECD, 2019).

2.1 Analysis of the situation in TBSQ and WE

We were also concerned about textbooks' providing children similar learning opportunities in conducting MLP. To this end, Figure 6 has shown the distribution of MLP in terms of to-be-solved questions (TBSQ) and worked examples (WE). Generally speaking, textbooks from all countries have all provided more chances for experiencing MLP in TBSQ. Textbooks from Singapore and Australia included no WE going through the entire MLP cycle, while the Turkish fifth-grade mathematics textbook provides some cases for exemplifying uses of MLP in WE. When we analyze the situations in the MLP, the Australia textbook has provided a few chances for the students to engage in MLP in WE (4.50%). Singaporean textbook has provided equal opportunities for enacting formulating and employing processes in WE (34%) while none of WE completed the whole cycle, which means did not include the process of evaluating and interpreting results. The case of Turkish fifth-grade math textbooks also favored TBSQ for MLP while they have provided students with the chance for getting acquainted with each MLP in the WE.

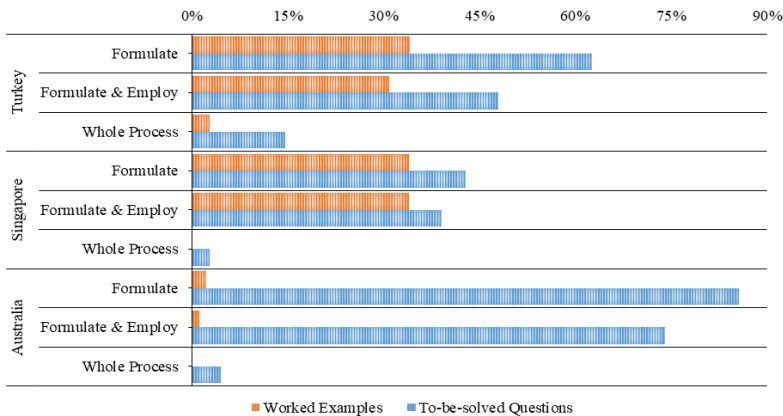


Figure 6. Opportunities for mastering MLP.

3 Discussion and conclusions

The current study aimed to reveal the inclusion of the PISA mathematical literacy process in the fifth-grade mathematics textbooks from Turkey, Singapore and Australia. Garner (1992, p. 53) points out that “textbooks serve as critical vehicles for knowledge acquisition in school” and may “replace teacher talk as the primary source of information”. In general, textbooks from all three countries have included a small portion of the problems relating real life. Related

literature also prove evidence for lack of real-life opportunities in the mathematics textbook tasks (e.g., Pepin & Haggarty, 2007; Wijaya, van den Heuvel-Panhuizen, & Doorman, 2015). Students' inappropriate practices with the real-life problems may cause them to not successfully solving these kind of problems (Wijaya et al., 2015). Instead, employing more real-life problems in the classroom activities may result in higher student understanding (Gu et al., 2004). Moreover, examples and tasks from daily life are helpful to provide students with meaningful contexts and enable students to relate to their familiar experiences (Pepin & Haggarty, 2007). Within this regard, pure mathematically contextualized problems should not be included in the textbooks rather than the problems underlining real-life contexts (Alajmi, 2012).

An analysis of mathematical literacy demands in real life problems indicated that textbooks from all countries had provided more opportunities for the competencies of formulating and employing while a small portion of these problems requires higher level cognitive skills to interpret/evaluate their mathematical solutions and make decisions for real life. Therefore, cognitively lower anticipations expressed in the present study overlapped with the findings of the previous researches (e.g., Huntley & Terrel, 2014; O'Keeffe & O'Donoghue, 2015; Zhu & Fan, 2006). On the other hand, these results are not in accordance with the mathematics education calls voiced in national and international standards of mathematics education: Raising individuals with both mathematical thinking and reasoning skills and a useful foundation of mathematical knowledge and skills needed in all areas of life (MoNE, 2017; NCTM, 2000).

Most of the real-life questions in the textbooks could not provide the chances for completing the whole mathematical literacy cycle. Among school subjects, mathematics has a long history of being driven by textbooks and curriculum materials that teachers use to teach mathematics topics (Remillard, 2005). Today, the mathematics textbook remains a major classroom resource for teaching and learning mathematics (Nicol & Crespo, 2006). Furthermore, students spend considerable time using mathematics textbooks at school or at home to do the assigned homework, and teachers from primary to make use of mathematics textbooks to understand the curriculum objectives and to shape their pedagogical practices from primary to tertiary level (Zakka, Oluyemi, & Twaki, 2015). Thus, mathematics textbooks play a significant role in conveying mathematical knowledge and competencies including mathematical literacy (Tall, Smith, & Piez, 2008). Hence, textbooks weaknesses in their inclusion of MLP may also cause impediments in the development of students' skills of handling the problems that they confronted in daily life.

Textbooks from all countries have all provided more chances for experiencing MLP in TBSQs. Particularly, Singaporean and Australian fifth-grade math

textbooks are provided no worked examples progressing whole MLP. Worked examples help to understand the nature of mathematics with their effective use in demonstrating different methods in complex tasks, developing concepts, and showing relationships in explanation and proof (Liz et al., 2006). From this point of view, the contributions of worked examples to mathematical understanding cannot be denied. It is stated that well-structured examples support students' problem-solving skills by providing meaningful, visually rich solution steps that will enable students to achieve this goal with a specific goal to be achieved (Atkinson, Derry, Renkl, & Wortham, 2000; Shen & Tsai, 2009; Van Loon-Hillen, Van Gog, & Brand-Gruwel, 2012).

Turkish fifth-grade textbooks provide more opportunities for their students to engage in each MLP in their real-life problems. Turkish textbooks also have more problems demanding to go through of MLP cycle. However, the PISA test score indicates Turkish students' comparatively low performance in mathematical literacy items than those from Australia and Singapore. In a study comparing contents and problem-solving requirements in American and Korean textbooks, Hong and Choi (2014) indicated that neither Korean nor American students' performances on the international assessments might be caused by the textbook itself. An explanation for this outcome can be the "teacher effect." Love and Pimm (1996, p. 398) suggest that "the teacher normally acts as a mediator between the student and the text" whose interpretations are "based not only on her constructions of the intention of the author but on her accumulated experience of teaching". Previous studies pointed out that higher student learning occurs when mathematical tasks requiring higher level cognitive demands are presented on a regular basis (Stigler & Hiebert, 2004; Tarr et al., 2008). The key element to enhance student achievement in the international assessments may be to use textbooks that include more problems with higher level cognitive demands along with appropriate implementation of the problems in the classroom environment by teachers (Hong & Choi, 2014). Thus, it would be suggested to investigate the appropriate practices of the mathematical literacy by focusing on teachers' implementations, which is again a key role in implementing the intended curriculum. Are teachers including Turkish able to incorporate whole MLP cycle? In-depth analysis focusing on the implementation of MLP practices in the classroom environment will give us better insights toward international assessment results.

The absence of providing necessary problem-solving opportunities in a range of different types in the textbooks may cause students to not solve specific types of problems (Riley, Greeno, & Heller, 1983). Moreover, Sweller, Chandler, Tierney and Cooper (1990) also indicated that mathematics curriculum, such as textbooks, should also include these problem-solving opportunities to construct students' conceptual appreciations of problem structures. American National

Council of Teachers of Mathematics (NCTM, 2000) also highlighted the necessity of students' exposure with diverse mathematical problems in the mathematics learning environment. Thus, one implication this study can make is that Singaporean and Australian textbook creators should include more sufficient practices of the whole MLP cycle in their mathematical problems to make sure students acquire the principal latent components of the problems.

3.1 Limitations

There existed some limitations in this study. First, the present study only included one textbook from each country while these textbooks were representing the authenticity of the other textbooks in these countries. Second, this study examined the opportunities of mathematical literacy only provided in the textbooks while the actual implications of these opportunities may differ across classrooms in these countries.

3.2 Implications

For future studies, we suggest that not only problems but also the content of the textbooks should be included in the analysis of the textbooks to provide a wider view of the mathematics literacy demands in them. Although Turkish textbooks provide more opportunities for improving mathematics literacy competencies, students from Turkey lack behind of the students from Australia and Singapore according to the international assessment results, such as TIMSS and PISA (Mullis, Martin, Foy, & Hooper, 2016; OECD, 2019). Studies utilizing different methodologies to investigate teachers' utilization of textbooks in mathematics teaching would contribute on validating the results obtained in the current study.

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Rethinking Happiness at School after COVID-19 and Some Implications for Future Research

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Abstract:

Introduction: This research aims to determine what makes children feel happy and unhappy at school, the determinants of their subjective well-being, and by using this information it attempts to develop recommendations for the ongoing process which is characterized by uncertainty and stress and for education due to the crisis created by COVID-19 and some implications for future research.

Methods: This is a qualitative study using a phenomenological approach. The study group of the research consists of 34 primary school students in the 3rd and 4th grades (between the ages of 8-11) during the first term of 2019-2020 school year. A semi-structured interview form including three open-ended questions was used as data collection instrument. The data were analysed with descriptive analysis technique.

Results: As a result of the study, the main determinants of children's happiness were found as the relationships which they established with their friends and teachers and their academic achievement. Also, it was revealed that students made references to creating more time for courses such as physical education, music, art, etc. and more free time at school and renewal of school fixtures in order to contribute to their happiness.

Discussion: Considering the students' opinions about what makes them happy/unhappy at school and the factors that can contribute to their happiness, it can be argued that what is important for children's happiness at school is their relationships with their friends and teachers. This finding of the research has itself an utmost importance in the current process which the children experience either limited or no relationship with their peers and teachers due to the COVID-19 crisis. Accordingly, this research discusses the children's happiness within the framework of the researches that prompt us to rethink about students' happiness in an atmosphere of stress and uncertainty.

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Limitations: Although the qualitative method used in this study provided a profound picture of the views of students about what makes them happy/unhappy at the school, its limited sample constitutes an impediment to generalize it to all students in Turkey and the whole participants of the research.

Conclusions: Considering what makes students happy and unhappy in schools in that research, we can argue that even the existence of schools alone, as the main grounds of social relationships, can be considered as a means of happiness in the current process. Nevertheless, future research should aim to determine what makes children happy in a process which the students are deprived of all facilities which the schools provided.

Key words: happiness, happiness at school, COVID-19.

Introduction

“Boredom is a disease of epidemic proportions. ... Why are our schools not places of joy?” (Goodlad, 1984, p. 242)

As a myth which the human being seeks, happiness has always been one of the main aspirations of humankind. Thus, the conceptualization, search and realization of happiness have been on the agenda of several philosophers, scientists and researchers for a long time. Especially with the positive psychology movement in 1990s, the concept of happiness gained more importance (Carr, 2011). Behind the popularity of happiness which is sometimes ‘used interchangeably with well-being, subjective well being and life satisfaction’ (Eid & Diener, 2004; Lu, Shih, Lin, & Ju, 1997), there is a great variety of impacts it created on the lives of people.

World Health Organization defines health as “a state of complete physical, mental and social well-being” (WHO, 1948) and emphasizes happiness, well-being, as an important component of health. In fact it was revealed in several researches that happiness has positive effects on the physical health of people; even there is a well known assumption that happy people live longer (Diener & Chan; Siahpush, Spittal, & Singh, 2008; Veenhoven, 2008). According to Veenhoven (1988, 2008), people’s living longer may be associated with the fact that happiness has not a direct effect on health but it protects physical health and is related to the happiness factors. In this regard, the positive impact the happiness has on the mental, psychological, health can be considered as a happiness factor protecting human health. In fact it was identified in various researches that happiness reduces stress and anxiety and thus can improve psychological health directly and indirectly (Aubert, 2008; De Neve et al., 2013; Dohrenwend, 2000; Ekman, Davidson, Ricard, & Wallace, 2005; Ryan & Deci,

2000; Seligman, 2002; Talebzadeha & Samkan, 2011; Kendall, 1994; O'Connor, Dinan, & Cryan, 2011; Steptoe et al., 2011). In addition to the benefits of happiness for physical and mental health of individuals, it has also significant impacts on the social behaviour and socialization of people. In that regard, researches show that happy people are more sociable and exhibit better social behaviours and thus have stronger social relationships compared to unhappy people (De Neve et al., 2013; Diener & Seligman, 2002; Talebzadeha & Samkan, 2011). In parallel with all these benefits of happiness for people, it is expected that happy people or people who have higher subjective well-being, become more successful in various life domains. According to Diener (2013), happiness is not just a momentary outcome but it may also be the predictor and reason of future behaviour. Within this context it was revealed in various researches that happy people are more successful in such aspects of life as marriage, friendship, education, career, etc (Lyubomirsky, King, & Diener, 2005; Diener & Biswas-Diener, 2002; Mastekaasa, 1994) and cope with the changes and uncertainties of life more successfully (De Neve et al., 2013; Sarıçam, 2014).

Happiness's bringing success in many areas of life has led the concept to attain an important place in the field of education as well. In this regard, the happiness of children, as an important component of cognitive, social and emotional development of them, is engaging the attention of educators, policy makers and education researchers all around the world. This tremendous interest in the happiness of children includes various reasons in itself. In fact it is revealed in several researches that happiness influences children's cognitive, social and emotional development to a large extent (Anand, 2016; Fredrickson, 1998; Holder & Coleman, 2012) and children experiencing a happy childhood may have happiness in their later lives as well (Jose, Ryan, & Pryor, 2012). Also, it was revealed in a large number of studies that happiness brings better learning and plays a significant role in the students' motivation and educational achievement (Boehm & Lyubomirsky, 2008; Datu et al., 2017; The Centre for Adolescent Health, Murdoch Children's Research Institute, 2018; Ale-Yasin 2001; Talebzadeh & Samkan, 2011) In this sense, it is worth noting that the education systems should aim at happiness and a good education system should be organized in a way to contribute to the happiness of children (Noddings, 2003). In order to ensure the education systems to attain this goal, the role of the schools as one of the places which produce happiness (O'Rourke & Cooper, 2010) must be taken into consideration. Because, children spend most of their time in schools and the schools are among the first environments where the children acquire social skills required for their later lives, they have a key function in influencing children's experiences, emotional and social development, thus life courses (Baker et al., 2003). Going to a school and being

in peer groups contribute to the development of children's social and individual skills such as friendship, trust, sensitivity, optimism, self-efficacy, flexibility, sociability and effective coping with challenge and stress; thus contribute to children's happiness to a large extent (Bird & Markle, 2012; Huebner, et al., 2006; Boehm & Lyubomirsky, 2008; Lyubomirsky & King, 2005, p. 804). Especially the characteristic of 'coping with challenge and stress effectively' has utmost importance in the current process which the uncertainty and stress prevail all around the world. As it is proposed many years ago, people need the companion of other people in the cases of stress and uncertainty (Reis, et. al., 2010). Accordingly, it is expected that being with other students in a happy school environment reduces the stress and anxiety of children and provides them with more self-efficacy and social support perception (McCabe, Bray, Kehle, Theodore, & Gelbar, 2011). Within this context, the significance of schools which give way the students to experience these relationships and happiness comes into prominence. Nevertheless, education systems have been witnessing an unprecedented process globally and attempting to survive of a process without schools in some parts of the world today. As it is already known, with the declaration of pandemic caused by COVID-19 on 11th of March 2020, the schools and all the education services were closed in almost 200 countries affecting more than 1.5 billion students and the education and teaching services started to continue with online lectures (UNESCO, 2020; Spinelli, et al., 2020). Although the schools were reopened in some parts of the world, some countries like Turkey are attempting to reopen schools gradually; there are still millions of students who have not been to the schools since March 2020. The closures of schools not only resulted in students' loss of learning outcomes (Tarasawa, 2020) but some negative impacts on their psychological, social and emotional development. In fact, it is already known that during a severe pandemic like COVID-19, closures of schools may disrupt children's usual lifestyle and can potentially promote distress and confusion (Dubey et al., 2020). As it is pointed in various researches that students may expose to such stressors as fears of infection, uncertainty, monotony and boredom, lack of face to face interaction with their friends and teachers, home confinement and lack of outdoor activities, plays and this may result with prolonged psychological, social and emotional problems on children (Brazendale et al., 2017; Brooks et al., 2020; Cao et al., 2020; Wan, et al., 2020; OECD, 2020; Sprang & Silman, 2013; YoungMinds, 2020).

As it is already known, the children are among the most affected and suffered from the consequences of any natural disaster (Bulut, 2020) and COVID-19 epidemic may be considered as a natural disaster with the destruction it has caused on children and education of children. Within this context, it is possible to argue that the crisis created by the COVID-19 epidemic may go beyond being

a physical health problem and be a psychological health problem and a threat against the happiness, wellbeing of children soon. So, more studies addressing the psychological impact of the process are required. Nevertheless, considering the researches in the literature, it is revealed that the studies generally focus on the academic aspect of the process (Almanthari, Maulina, & Bruce, 2020; Dikmen & Bahçeci 2020; Pınar & Akgül, 2020; World Bank, 2020; Yılmaz, Güner, Mutlu & Doğanay, 2020) and tend to neglect the psychological and social aspects of it and especially the issue of happiness. Moreover, once the issue of happiness is considered separately, it is identified that in spite of all the positive influences happiness and happy schools have in students' cognitive, emotional and social development (Mahon et al., 2010) and the roots of happiness are created in childhood (Seligman, 1995), the issue of happiness in schools has been a neglected issue in both policy and practice and the concept of happiness at school has not been given due importance (Guilherme & de Freitas, 2017). Concerning the literature of happiness, it is identified that the concept of happiness was generally associated with the self-efficacy and success of students but the issue of what makes children happy and unhappy were mostly ignored (Asıcı & İkiz, 2018; Pan & Zhou, 2013; Schnittker, 2008).

Considering lack of literature regarding what makes children happy and unhappy at school, we intended to do a research about the determinants of children's happiness at school. The data of the research were collected before COVID-19 pandemic which affected the whole world and education systems. However, the focus of the study has evolved to a different point with the COVID-19 outbreak. In that regard, we started to consider how we could evaluate the data which we obtained from this study in terms of the happiness of children who were out of school during the COVID-19 outbreak. We firstly thought to analyze the concept of "happiness at school with COVID-19 outbreak" longitudinally by reaching the same sample. Nevertheless, from the pandemic declaration in Turkey in March 2020 to the time when this study was prepared and the revision processes were completed, primary and secondary schools were not permanently opened and there was a significant decrease in the number of students attending the school during the period when the schools were open temporarily. For this reason, it was not possible to enrich the research data, the research was only discussed on the data obtained before the COVID- 19 outbreak. Thus, this can be considered as a limitation of the study. However, considering the process in which the data were collected, we believe that this research has utmost importance as it is a happiness study that pertains to a period when our daily life routines have not yet changed with the COVID-19 pandemic and we have not faced with various physical, social and psychological problems caused by it yet. All in all, in the light of all these ideas with this study we aim to discuss how the knowledge of what makes children happy and unhappy at school prior to the COVID-19

outbreak can be used for children's happiness for ongoing process which is characterized by uncertainty and stress due to the COVID-19 pandemic. We believe that a deeper appreciation of what makes children happy and unhappy at school will contribute to the development of means to enhance the happiness of children both in the current process which there is almost no access or limited access to the school and in future.

1 Methods

1.1 Research design

This is a qualitative study using a phenomenological approach. Descriptive phenomenological design, one of the qualitative research designs, was used to examine the phenomenon of "happiness at school" in the study. In the descriptive phenomenological design, perceptions formed as a result of experiences about a phenomenon, concept or situation are presented (Ersoy, 2016).

1.2 Sampling and study group

This study is a part of the project titled "Happiness Workshop" conducted by researchers in the fall semester of 2019-2020. The project, whose application permissions were obtained from Kars Provincial Directorate of National Education, was carried out in two primary schools (School A and School B), which were determined by convenience sampling method. Some characteristics of the schools where the study was conducted and the students studying in these schools are as follows:

School A is located on the university campus and provides education to approximately 140 students at the kindergarten, primary and secondary school levels. At primary school level, there is a classroom for each grade level. School B is a village school located 13 km from Kars city center and provides education to approximately 25 students at kindergarten and primary school level. At the primary school level, multigrade classrooms were available in Grades 1 and 2, and Grades 3 and 4. The study group of the research consists of all students (n:18) studying at the 4th grade of School A (n:18) and all students (n:16) studying at the 3rd and 4th grades of School B. In other words, 34 primary school students attending in the 3rd and the 4th grades (between the ages of 8-11) during the first term of 2019-2020 school year constituted the sample of the research. While 16 of the participants are female, 18 of them are males.

1.3 Data collection instrument

As the primary source of data is the experiences of the participants who are studied, in depth interviews are often used as a means of data collection in phenomenological researches (Ploeg, 1999, p. 36; Creswell, 2007). Semi-

structured interviews are one of the most widely used interview types and semi-structured interview forms are frequently preferred by the researchers due to such advantages as being flexible, not having a certain standart, enabling the researcher to collect more detailed data and analysing the data more easily (Yıldırım & Şimşek, 2005). Accordingly, a semi-structured interview form including three open-ended questions were created by the researchers. In the process of creating the interview form, the researchers made a detailed literature review and examined the related data collection instruments. The questions in the interview form were presented in a clear and understandable way, considering the cognitive and affective levels of the students. Also, the interview form was examined by two experts working in the field of guidance and psychological counseling and according to expert opinions; necessary corrections were made in the form.

1.4 Data collection process

Ethical rules were adhered to in all stages of the study. In order to conduct the interviews, permission was obtained from the provincial directorate for national education. The data of the research were gathered by a researcher and five guidance and psychological counseling department students guiding her in November of 2019-2020 academic year. The purpose of the research and the number of questions to be asked in the research were briefly explained to the students and they were asked whether they would like to participate in the study. As the students ages' and comprehension levels may differ and the students may be affected by each other, the questions were directed to students individually and the answers were written down.

1.5 Data analysis

The data obtained through the interviews were analyzed using descriptive analysis. In the descriptive analysis, the data are summarized and interpreted according to previously determined themes (Yıldırım & Şimşek, 2005). The questions in the interviews were used as sub-themes, and the answers given to these questions formed the codes and categories. Codes and categories were taken directly as an expression or a word in the expressions of the participants without adopting a 'reductionist' attitude. Reliability analysis was conducted in order to evaluate the coder reliability. Reliability analysis was carried out by both the researcher who conducted the study and an independent researcher in the field of guidance and psychological counseling. For this process, the coder reliability formula ($\text{Reliability} = \text{Consensus} / (\text{Consensus} + \text{Disagreement}) \times 100$) was used (Miles & Huberman, 2015) and the confidence percentage was calculated as 95%. An agreement has been reached for the encodings that cause a difference of opinion between the coders.

2 Findings

In line with the opinions of primary school students, the concept of “happiness at school” and three sub-themes explaining this theme were created. These are 1. Opinions of the students about what makes them happy at school, 2. Opinions of the students about what makes them unhappy at school, 3. Opinions of the students about what may be the means to make them happier at school. These themes are explained in the table 1 below:

Table 1

<i>Happiness at school</i>					
<i>Sub-theme</i>	<i>Category</i>	<i>Code</i>	<i>n</i>	<i>%</i>	
What makes children happy at school	Relationships among friends	Playing/Enjoying	34	44.2	
		Making friends	4	5.2	
	Sense of belonging	Being with friends	16	20.8	
		Being with teachers	11	14.2	
	Doing more educational/instructional activities	Reading books	7	9.1	
		Studying	5	6.5	
		TOTAL	77	100	
	Breakdown of friendship relations	Being upset by their friends	30	54.5	
		Upsetting their friends	21	38.2	
	Low academic achievement	Having difficulty in understanding the subject	4	7.3	
<i>Happiness at School</i>			TOTAL	55	100
What makes children happier at school	Creating more free time at school	Increasing the time allocated for breaks	24	58.5	
		Increasing the time of physical education courses	3	7.3	
	Creating more time for the non-academic courses	Dancing in music courses	1	1.8	
		Renewal of school fixtures	11	26.8	
		Renewal of such stuffs as desk, whiteboard, dustbin, etc			
	Renewal of school fixtures	Increasing the numbers of computers	2	3.6	
		TOTAL	41	100	

2.1 Opinions of the students about what makes them happy at school

According to the opinions of primary school students, the factors regarding what makes them happy at school were identified as relationships among friends (n=38), sense of belonging (n=27), doing more educational/instructional activities (n=12). In the category of relationships among friends, two codes like playing/enjoying (n=34) and making friends (n=4) were identified. In the category of sense of belonging, two codes like being with friends (n=16) and being with teachers (n=11) were found out. Lastly, in the category of doing more educational/instructional activities, two codes like reading books (n=7) and studying (n=5) were identified.

According to table 1, primary school students specified the factors which makes them happy as relationships among friends, sense of belonging, doing more educational/instructional activities. Within this context, 44 % of students statements are intended for playing with friends/enjoying with them; 20.8 % of them are intended for being together with friends and 14.2 % of them are intended for being with their teachers.

Considering the findings about the factors leading to students' happiness at school, it can be argued that what makes children happy at school is their relationships with their friends and teachers.

2.2 Opinions of the students about what makes them unhappy at school

According to the opinions of primary school students, the factors regarding what makes the students unhappy at school were identified as breakdown of friendship relations (n=51) and low school success (n=4). In the category of breakdown of friendship relations, two codes like being upset by their friends (n=30) and upsetting their friends (n=21) were identified. In the category of low school success, the code of having difficulty in understanding the subject (n=4) was found out.

According to table 1, primary school students specified the factors which make them unhappy at school as breakdown of friendship relations and low school success. Within this context, 54.4 % of students' statements are intended for being upset by their friends; 38.2 % of them are intended for upsetting their friends and 7.3 % of them are intended for having difficulty in understanding the subject.

Considering the findings it was revealed that the opinions of students about the factors which makes them unhappy at school shared similarities with the factors which makes them happy at school and the students emphasized the importance of relationships with their friends for their happiness. In this regard, it can be argued that the relationships which the children have with their friends and teachers influence their life quality to a large extent (Demir, Doğan, & Proscal, 2013; Lee, 2016; Lee & Lee, 2014; Yoo, 2015; Van Hall et al., 2017). In

addition to the relationships, the children's emphasis on low academic achievement indicates the impact of their learning on their happiness. In parallel to this finding, a number of studies also reveals that learning of students has a direct effect on students' happiness (Kim & Kim, 2014; Lee, 2016).

2.3 Opinions of the students about the means to make them happier at school

According to the opinions of primary school students, the means to make them happier at school were identified as creating more free time at school (n=24), creating more time for the courses such as P.E, music, art, etc (n=4), renewal of school fixtures (n=13). In the category of creating more free time, the code of increasing the time allocated for breaks (n=24) was identified. In the category of creating more time for the courses such as P.E, music, art, etc, the codes of increasing the time of physical education courses (n=3) and dancing in music courses (n=1) were determined. Lastly, in the category of renewal of school fixtures, the codes of renewal of such stuffs as desk, whiteboard, dustbin, etc; (n=11) and increasing the numbers of computers (n=2) were found out.

According to table 1, primary school students specified the factors contributing to happiness at school as creating more free time at school, renewal of school fixtures and creating more time for the courses such as P.E, music, art, etc. Within this context, 58.5 % of students' statements are intended for increasing the time allocated for breaks; 26.8 % of them are intended for renewal of such stuffs as desk, whiteboard, dustbin, etc. and 7.3 % of them are intended for increasing the time of physical education courses.

As for the factors contributing to children's happiness at school, it is revealed that most of the children referred to creating more free time for themselves. Within this context, it can be argued that the children are not happy with the current situation and are in need of having more time for courses such as P.E, music, art, etc and fun with their friends. In fact, it is already suggested that by allowing the students to express themselves, the courses, such as physical education, art and music, etc, contribute to the students' both individual and social development, thus their subjective wellbeing (Özkan, 2010).

Considering the findings of this research regarding the factors leading to their happiness/unhappiness and contributing to their happiness at school, it was identified that the children mostly emphasized the importance of the relationships and free time they have with their friends and teachers. Within this context, it can be argued that the core of children's happiness is the social relationships they established with their friends and teachers.

3 Discussion

In this study we aimed to determine what makes children feel happy and unhappy at school, the determinants of their subjective well-being, and by using this information we attempted to develop insights for the ongoing process which is characterized by uncertainty and stress and for the future. Primary school which is included in the school age period is a period including the ages of 6- 12. In this period which is also called as middle years, the children start becoming independent from the family and attempt to socialize in real terms by establishing their own social environment and friendship relations for the first time. During this process, there are such tasks and characteristics that children must accomplish and gain as developing positive attitudes towards themselves, social groups and institutions; learning to get along with their peers and developing conscience, morality and system of values and the necessary concepts for daily life, etc. Havighurst which develops the concept of developmental tasks, defines this concept as tasks specific to a certain period of children, which lead to happiness when successfully achieved and completed, and in case of failure, which cause unhappiness (Bacanli, 2002). Similarly, Seiffge- Krenke and Gelhaar (2008) who tested Havighurst's theory reached results supporting the relationship between developmental tasks and happiness. Considering the developmental tasks of children in middle childhood, who also constitute the study group of this research, it is clear that peer groups and school-based social environments, as the “major locations where peer relationships are formed” (The Centre for Adolescent Health, Murdoch Children’s Research Institute, 2018) have utmost importance in order to complete the development tasks of this period successfully and create a sense of happiness. In fact, it was revealed in this research and several other researches that the positive relationship of children with their friends and teachers is an important component of their happiness (Chaplin, 2008; Diener & Seligman, 2002; Saldarriaga, Bukowski, & Greco, 2015; Shonkoff et al., 2000; Thoilliez, 2011; Csikszentmihalyi & Hunter, 2003; Demir, Orthel, & Andelin, 2013; O’Rourke & Cooper, 2010; Demir, Özen, & Doğan, 2012; Demir, Dogan, & Proscal, 2013; Lee, 2016; Yoo, 2015; Van Hall et al., 2017). Similarly, children’s conceptualization of happiness at school as an increasing and enriching emotion, an expression of sharing (Kesik & Aslan, 2020) and the school as a pleasant and beautiful place of love, solidarity and socialization (Saban, 2008) support these findings regarding what makes students happy/unhappy.

It was revealed in several researches that being in a school environment contributes to students’ social skills, self-esteem, self-confidence and a sense of identity resulting with a higher level of cognitive skills and school success (Cunha & Heckman 2007; Di Pietro et al., 2020; Goodman et al., 2015; OECD, 2017; Sezer & Can, 2019). As stated by some of the students in this research, the

academic achievement or school success is an important component of students' happiness. Actually, it is worth noting that there is a mutual affinity between the learning and happiness of children. As learning quality influences children's happiness, children's happiness influences their learning as well. In fact, it was revealed in a large number of studies that the happiness brings better learning and plays a significant role in the students' motivation and educational achievement (Boehm & Lyubomirsky, 2008; Datu et al. 2017; The Centre for Adolescent Health, Murdoch Children's Research Institute, 2018; Ale-Yasin 2001; Talebzadeh & Samkan, 2011).

Considering the findings of this research and several other researches about what makes students happy/unhappy, it can be deduced that students "experience their happiness with others and from others" (Thoilliez, 2011, p. 346) and the schools are one of the most important places where children can experience it. Nevertheless, today the students all around the world are going through a rough period which they are exposed to unschooling or limited schooling as a result of the crisis situation created by the COVID-19 epidemic in education. The closure of schools as a result of temporary quarantine process and uncertainty of their situation in the near future have had very negative effect on students both physically and mentally. The students were deprived of a stimulating and enriching environment, learning opportunities, social interaction and in some cases adequate nutrition (United Nations, 2020). Losing their routine, having to restrict their social connections (YoungMinds, 2020), exposing to more screen time and less outdoor activity time placed a serious burden on students' mental health. In fact, it is argued that such stressors as fears of infection, anxiety about failure with online education, sense of uncertainty, monotony, lack of face to face contact with classmates, friends and teachers can cause stress and depression among students and result with an adverse effect on their mental health and thus wellbeing (Brooks et al., 2020; Cao, et al., 2020; Wang et al., 2020). Furthermore, this process endangered the students with the situation of inability to complete their developmental tasks as well. As a matter of fact, the students in this reserach are in a period of rapid physical, emotional and intellectual growth (The Centre for Adolescent Health, Murdoch Children's Research Institute, 2018). According to Chaplin (2008), people and thus the relationships are one of the most important components contributing to children's happiness in middle years. Thus being valued by their peers and teachers have a vital importance in both their happiness and multifaceted development. Nevertheless, the current process causes the children to be deprived of the experience of being valued by their peers and teachers constituting an impediment to their happiness. In spite of virtual interactions and learning opportunities provided by various platforms via the Internet, it is revealed that healthy communication between students and teachers has not been established

yet and the children can not experience academic achievement and satisfaction. Moreover, children are still in need of a physical environment where they can share their interests, thoughts and feelings and thus experience happiness (Colao, 2020). Thus, it would be relevant to argue that this period in education has recalled the importance of social relationships for mental and physical health of students (Diener & Seligman, 2002) and the role of schools in meeting the socialization needs of children. Indeed, schools are not only places which deliver educational materials to students, but also social environments which offer them the opportunities to interact with others and enable them to develop the social and emotional skills (Colao, 2020; OECD, 2017; Wang, et al., 2020). In fact, learning objectives can be accessed at the touch of a button but the essential purpose of education should be to increase the wellbeing of students which is closely associated with school performance (Colao, 2020). According to Seligman et al. (2009) the schooling of children should be more than accomplishment and educational content and aim to enable them to experience happiness, as a vehicle for increasing life satisfaction, and as an aid to better learning and more creative thinking. And that necessitates to give an ear to the voices of students about what makes them happy/unhappy in schools. Considering the voices of children in this research about what makes them happy/unhappy and the factors that children perceived as enabling them to feel happy and unhappy, recommendations that can be benefitted for both the current process and future can be derived as follows: First, considering that the students made highlighted references to the importance of relationships for their happiness, they should be given enough opportunities to spend time with their friends in schools and this can be carried out by such practices as increasing break time, time for courses such as P.E, music and art and providing the students with more sporting and artistic classes which enhance both their imagination, creativity and happiness. Secondly, as already stated by the students, the schools and classrooms should be made more appealing by benefiting from various and suitable equipments such as computer, smart board, internet, etc. Lastly, bearing the importance of relationships for the students' happiness in mind, teachers must prioritize the relationships and focus on the social and emotional aspect of their teaching more. They should adopt the fact that providing the students with social and emotional skills is also educational goals in themselves (Durlak et al., 2011) and attempt to focus on these skills in addition to school success.

All in all, if the schools do not contribute to the students' happiness and the students do not experience happiness in schools, can we still maintain that we are succesful as a system, teachers, etc. or as already stated by Dewey (1938, p. 49), "What is the benefit of reading history and geography and/or reading and writing when a person may leave his/her soul and feeling through learning?"

Conclusion

Considering what makes students happy and unhappy in schools in that research, we can argue that even the existence of schools alone, as the main grounds of social relationships can be considered as a means of happiness in the current process. Maybe, in an atmosphere which there is no school and face-to-face relationships are weakened, the factors that make students happy will change. The researches in the literature have put an emphasis on the importance of relationships for the happiness of students until now but possibly, this will evolve and students will be happy with different components or items. Nevertheless, what we must bear in mind that we must discover the ways to make students happy in an atmosphere which the students are exposed to a process which they are deprived of all factors which the schools provided. Then, we must ask such questions and attempt to answer them to weather the storm or sail safe in the storm in terms of students' happiness: While the school provides the students with components making them happy such as friendship, educational achievement, being valued by peers and teachers, etc, how can we transfer these components in the virtual atmosphere and improve the current unfavorable atmosphere? How can we redevelop the relationships among students if we are quarantined for an undetermined process again? As powerful buffers to struggle with the adverse effects of trauma created by COVID can teachers establish a safe and supportive environment for learning? (Terada, 2020). In this sense, do teachers have enough qualifications to ensure the students to feel a sense of accomplishment and motivate them in the online environment and to activate their motivation? Within this context it can be argued that all of that kind of questions should be answered in the current process immediately and so this necessitates more researches in the literature because "education is health" (Colao, 2020).

With this research, we aimed to determine what makes children feel happy and unhappy at school, the determinants of their subjective well-being, and by using this information we attempted to develop recommendations for the ongoing process which is characterized by uncertainty and stress and for education. Nevertheless, this research has some limitations. The greatest limitation of this research is that the research has been carried out before the COVID-19 crisis in education and it is difficult to make an inference to the current process. In this sense, we just attempted to present some implications for the ongoing process. Also, although the qualitative method used in this study provided a profound picture of the views of students about what make them happy/unhappy at the school, its limited sample constitutes an impediment to generalize it to all students in Turkey and the whole participants of the research. In this sense, the reader is invited to judge the applicability of the findings and conclusions to

other samples. Also, it is suggested to expand the sample size including the students from other age groups. In order to develop a full picture, additional studies are needed on both to answer the questions above and reveal what generally makes the students happy/unhappy at school.

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