Digital Transformation and Openness in the Turkish Higher Education System

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1. Introduction

This chapter introduces openness in education and open educational resources (OER) in Turkey. To better understand and conceptualize the Turkish case, there is a need to briefly introduce Turkish HE and how openness is perceived by Turkish Society. By 2021, the total population of Turkey is around 85 million and approximately 10% of its population (around 8 million) attends higher education (HE). HE in Turkey is delivered through face-to-face, distance, and open education modalities. In this context, it should be noted that due to Turkish regulations, there are distinct differences in the definition of distance education and open education. Accordingly, open education offers open admissions with minimal entry requirements and flexible learning opportunities (e.g., self-paced, attendance is not required), on the other hand, distance education offers partly flexible admissions (e.g., predefined entry requirements, attendance is required, students should pay for the courses). The demand for HE is high, but the number of accepted students is relatively low compared to the total demand. As such, open education is a viable solution for the Turkish HE system.

The idea of open education aims to mitigate inequity and social injustice, remove the barriers and democratize the education system (Tait, 2008, 2013; Taylor, 1990; Rumble, 2007). Inspired by the same notions and with a purpose to respond to social demand (Yildirim & Adnan, 2019), the first open education faculty was founded in 1981 (Kondakci et al., 2019). Currently, four state universities are delivering open education as dual-mode universities. That is to say, open education in HE has 40 years of experience and considering primary education, dating back to the early 1950s, open education has a 65-year history in Turkey (Bozkurt, 2017a, 2019).

Macro (National) level: Turkish HE strives for realizing digital transformation and most of the investments targets digital infrastructures. Higher Education Council (HEC) further supports openness related initiatives and targets to improve the digital literacy of HE students and academics. While the terms open access and OER are articulated in strategic planning documents, these efforts didn't echo much in practice due to low interest and awareness in the general public and scholarly circles.

Meso: The interest to open education and OER and OEP at the institutional level demonstrates an imbalanced distribution. At the HE level, while some universities show great efforts, the vast majority remain unconcerned with the openness movement in education. MOOCs, among open education initiatives, have drawn much attention (Aydin, 2017; Aydin & Kayabaş, 2018), but not many universities are motivated to open up their content through MOOCs. According to the Pelletier et al. (2021), "although cultural motives highlight the value of openness and sharing in social life, the requisite awareness in practices is absent in the Turkish HE landscape, which further hinders the adaptation of open educational practices (OEP) and open educational resources (OER). One of Turkish HE's main challenges is to overcome the perception that "openly available" means poor quality" (p. 42). In addition to the negative perception of

open and free learning content, another reason might be the national free education policy. From primary to HE, education is free and funded publicly. As such, the need for OER and motivation for OEP is lower when compared to countries where education is difficult to afford.

Micro level: Regardless of top-down pressure to disseminate the OER and OEP, there is resistance from the shareholders in the micro level. Another bottleneck is openness related projects were not sustainable thus far. Besides, national policies aim to start the change from top to down, which can be an adverse strategy as openness is mostly related to the awareness and perceptions of individuals. Additionally, it can be argued that most of the HE institutions concentrated on the digital transformation process with a belief that ensuring access can promote openness.

2. Macro Level Digital Transformation

As explained in the above section, digital transformation is one of the ultimate goals of the Republic of Turkey. The project gained momentum by 2002 and many other developments such as eGovernment services, Vision 2023 Project, and the foundation of the Presidential Digital Transformation Office. As a response to these developments, HEC, the national level regulatory institution and individual HE institutions defined digital transformation as a strategic orientation in planning. The next sections cover the actions and processes regarding digital transformation at the national level.

THE VISION 2023: The Republic of Turkey identified the year 2023 as a symbolic turning point when the republic will celebrate its 100th anniversary. In this regard, "Turkey's Strategic Vision 2023" is defined as the roadmap to follow. A total of six macro themes are determined: International Relations, International Security, Internal Politics, Economy, Culture, and Education Science and Technology. Education, Science and Technology theme has the ability to affect educational policies. As a response to this national strategic project, important developments were witnessed. These developments and how they shaped eGovernment, eSociety and digital transformation efforts are briefly explained in the following sections.

2.1 eGovernment, eCitizenship and eSociety

Though the idea of eCitizinship and eSociety dates back to 1972, the project was implemented by 2002 with MERNIS Project (Bozkurt, 2017). In this regard, the purpose of the project was to establish digital infrastructure to prepare the Republic of Turkey for eGovernment, eCitizenship and eSociety. The project enabled readiness for digital transformation and can be considered as a milestone in this perspective (Nüfus ve Vatandaşlık İşleri Genel Müdürlüğü, 2017a). One of the many aims of the project was to use information and communication technologies strategically to provide eGovernment services in almost all fields including education (Aktan, 2003; Kuran, 2001). Starting from 2002, each citizen was given a unique ID number and many eGovernment services provided through https://www.turkiye.gov.tr/ (Figure 1) including a wide range of HE Services.

2.2. Services provided by the HEC

HEC is the national level regulatory organization in Turkey. Having a centralized HE system, most of the critical functions related to financial and academic affairs are collected under the authority of HEC. As stated above, Turkey has one of the most populated HE systems in Europe. As a result, providing information about the HE system, ensuring that all stakeholders have equal access to information and services related to HE. Therefore, HEC puts the priority on digitalization of the functions of the Council.

Figure 1

eGovernment landing page
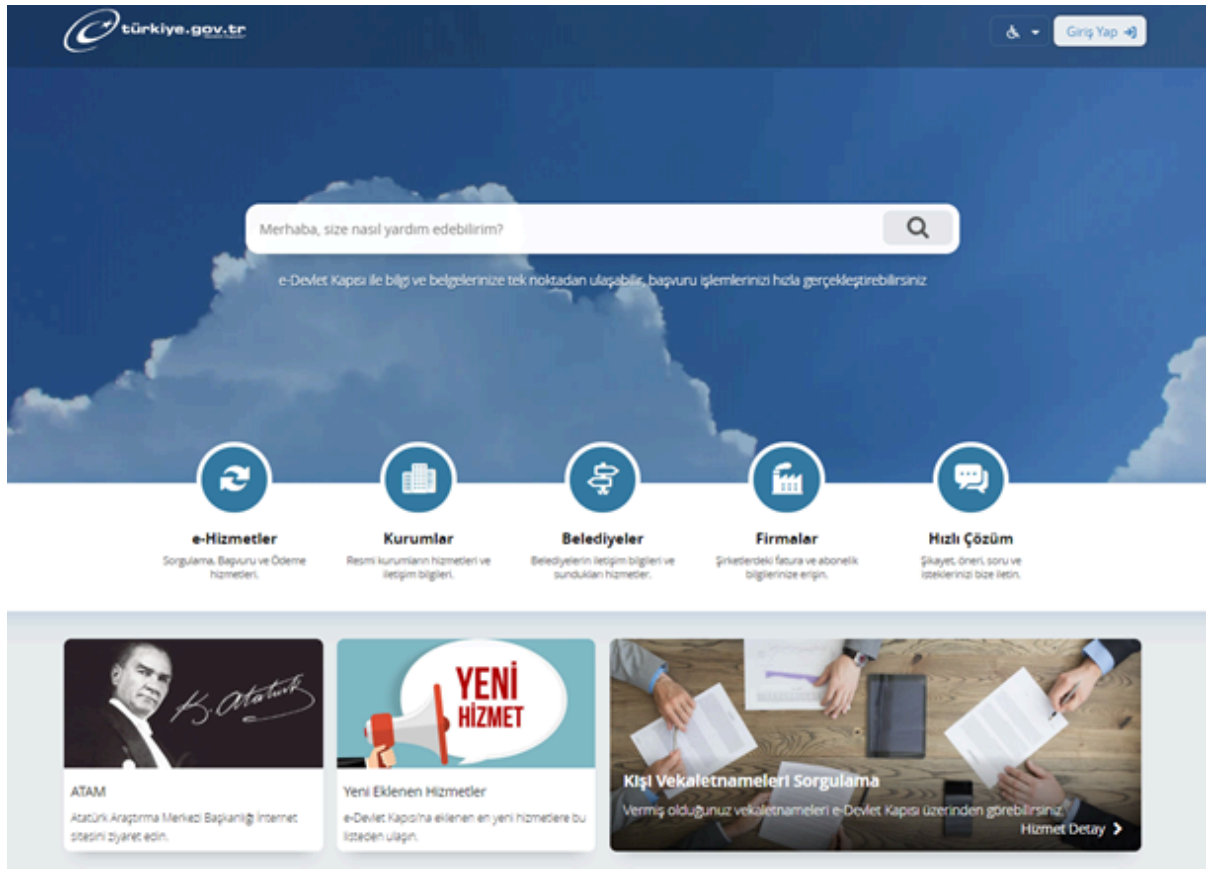
When examined, it can be seen that many universities have already integrated their student support services to eGovernment platform (e.g., enrolling, requesting documents etc.) and HEC also provided a number of services most of which are related to student affairs. One of the important services provided through eGovernment service is accessing the national thesis and dissertations database which will be explained in detail in the Macro Level, Infrastructure section.

HEC declared that 2019 will be a thematic year for digital transformation in Turkish HE. The purpose of the Digital Transformation is reported as to increase digital capacity to globally compete in HE ecology (YÖK, 2019a). In this context, the pilot project has been initiated in 8 state universities. The purpose of the project, on the first hand, is to increase the digital literacy of HE students and academics. Accordingly, a digital literacy online course designed and offered to all the students of those universities, and a MOOC on digital competencies, entitled Teaching and Learning at Higher Education in Digital Age for academics has been provided. It was further stated that the project will move forward with initiatives targeting "open access" and "open science" in Turkish HE. For this purpose, an open-access repository will be developed. To reach this purpose, the use of ORCID, to fully integrate the Turkish academics into the infrastructure, is required (YÖK, 2019b).

Figure 2

The list of digitalized functions of the HEC in Turkey

Higher Education Quality Council: In addition to the classic presentation of resources related to accreditation and quality assurance, the council provides a platform to manage quality assurance. The evaluation system is accessible to the authorized members. Besides, HEQC provides an e-learning platform for evaluator training. Finally, the publications (e.g., HEQC e-bulletin) of the council are accessible on the website of HEQC. The digital platform of HEQC is available here.

Higher Education Atlas: This digital platform is one of the most comprehensive platforms among all other platforms offered by the HEC. The Atlas aims at providing a comprehensive guide for students about studying undergraduate and associate degree programs in Turkey. This service is critical for students as they get a nationwide and comprehensive exam to access higher education. The students compete for a limited number of seats for highly demanded undergraduate programs. As a result, making the correct program in the correct university is highly critical to getting settled in an undergraduate or associate degree program. The Higher Education Atlas is available here.

Degree Recognition Digital Platform: Another digitized service is the degree recognition service for the degrees earned abroad. Turkish and foreign citizens may process their applications for recognition of their degrees under this digital platform. Besides, the platform provides a special space for forced immigrants whose countries are under political tension, conflict or occupation.

Higher Education Information Management System: In this platform, key data related to the number of students, key students characteristics (e.g., grade level of the students, international students, students with disability), distribution of the students across different universities), statistics of academic (e.g., distribution by title, distribution by field). Since the database is provided by the top authority on HE in Turkey, it provides the most accurate and up-to-date data on HE statistics in Turkey. The database for statistics on HE in Turkey can be accessed from here. However, a more comprehensive part of information system management is related to a platform that manages the performance data of academics in Turkey. The system is a complete performance assessment of academics in Turkey. Regardless of their individual institution, each academic staff member may enter performance data (e.g., publication data, project work, citation etc.) and get a performance score, which is remunerated or rewarded. The data from this platform can be transferred into each university's performance assessment system. The transferability of data between the national-level system and institutional systems enable the universities to apply their own performance measurement criteria and score the performance according to their own criteria. In that sense, the HE information system is a good example of the connection between national (macro-level) and mezzo level digital platforms.

Associate Professorship Application Management System: In Turkey earning the title of associate professorship requires an examination of a candidates file by a jury. The process is managed by the Interuniversity of Council, an autonomous body that manages key policies related to academic practices in Turkey. As part of the process, the candidates upload the file, which includes all performance items (e.g., publications, teaching, basic information) of the candidate and the jury members receive the file electronically. Once the jury members finish the assessment process, they submit their scores through the system.

National Thesis center: It is a database that can be accessed over the internet and provides access to all master's and doctoral theses prepared at the universities in Turkey (Figure 3). By 2018, it has become a mandatory act to publish thesis open access through the platform.

Figure 3

The landing page of thesis center.

DergiPark Project: Started in September 2013, TÜBİTAK ULAKBİM provides online hosting services and an editorial workflow management system for academic journals published in Turkey via DergiPark platform (Figure 4). The aim of the project is to improve the quality and aid the development of academic publishing in Turkey in accordance with international standards, to enhance the visibility and usage of national academic journals worldwide, and to ensure the implementation of the ULAKBİM Journal Management System efficiently.

DergiPark has started offering services using Open Journal Systems (OJS) infrastructure initially. However, as the number of journals and users has increased in time, OJS has become inefficient. A new system compatible with new technologies has been developed, also taking user demands into consideration. This new system, ULAKBİM Journal Systems (UJS), enabling easier handling and faster workflow, has been put into service as of 2017 (DergiPark, 2019).

Figure 4

DergiPark landing page.

2.131
Journal
Journal applications are evaluated by our team. If the application meets the criteria, journal will be given a page. Please click on the link to apply.
Journal Application

551.896
Article
Articles on DergiPark are all open-access. If you want to submit your article and get a chance to reach out to many more people click on the link.
Submit Article

456.237
Researcher
If you register to DergiPark, you will get access to all services given by DergiPark. Click on the link to register
Register

1.569
Publisher
Publishers in DergiPark can be filtered by their publisher type, which is determined by DergiPark team. Click on the link to see all publisher types and publisher list
All Publishers

About DergiPark

TÜBİTAK ULAKBİM provides online hosting services and an editorial workflow management system for academic journals published in Turkey via DergiPark platform.

Authors can contact editors, if they have any questions about the journal.

Daily visitors of DergiPark is over 100.000

Read More

2.3. Services provided by the Ministry of Education

FATIH Project: This project is known as the action for "Enhancing Opportunities and Improving Technology" and FATIH refers to the Turkish acronym of the word. The project aims at widening access to quality education by improving the content and ensuring the access of every student to this content. Based on this aim project is built on six guiding principles: accessibility (providing services in different time and context), productivity (target-oriented tools, productive environment, and subjects for development), equality (granting access to all users), measurability (accurate measurement of process and outcomes), and quality (enhancing the quality of education). FATIH project has set ambitious goals toward improving hardware and software infrastructure. The project aims at providing VPN-broadband and high-speed access to every school; installing an interactive board and wired/wireless access into every classroom; providing EBA (Education Informatics Network) applications, cloud account, and sharing course notes to every teacher; EBA applications, cloud account, digital identity, sharing homework, and individual learning materials to every student. Despite these ambitious goals, the project falls short of its original targets. However, the project has evolved to modify its goals and add different dimensions into its scope.

Education Informatics Network: Another widely used digital platform in Turkey is known as EBA (Education Informatics Network). The Ministry of Education describes EBA as "Turkey's digital education platform." EBA provides digital courses, a digital material sharing platform, web-based applications, and foreign language content for students and teachers. EBA enables the users to share content (including texts and audio-visual materials). In that sense, EBA has certain social media functions. The applications are related to a wide variety of tools including games, experiments, puzzles, language learning, experiments, and information about projects.

2.4 Recap

Considering the economic, political, and demographic characteristics of the country, it can be argued that digitalization in Turkey reflects three main concerns. First of all, the political system and consequently the public administration structure clearly indicate that Turkey is a unitary republic, and every public service is developed and delivered at the top of the bureaucratic hierarchy. In other words, the administration (typically the ministries or presidential offices) is responsible for developing and delivering these services. As a result, the "macro-level" has a critical role in digitalization of services in Turkey. The mezo and micro levels will be as successful as the macro-level respond to the digitalization trends and develop digitalization services in their service functions. Both the Ministry of Education and HEC have proven that they are progressing towards fully digitalizing their functions. However, digitalization of the core practice, that is teaching, is not progressing as fast as digitalization of administrative functions. The second concern of digitalization in public services including education is related to serving the disadvantaged groups in the society. Low socio-economic status, women, rural areas, individuals with a disability are some of the key groups who are disadvantaged in their reach to and soliciting the public functions. Digitalization has the potential to mitigate the impact of their disadvantaged status by, first, levelling the knowledge needed to fully benefit from these services and providing access to the services. Both the Ministry of Education and HEC have demonstrated significant steps toward digitalization of their functions. However, there is still a way to go for fully digitalize education services. Third, the current economic decline can be seen both as a threat and an opportunity towards the aim of digitalization in education and the economy. The economic crisis may lead to postponing the investments for further digitalization. Besides, digitalization can be interpreted as a reason for downsizing in the economy and decreasing the labor force (e.g., teachers) in different sectors. However, digitalization should not mean downsizing the skills. The most critical point in relation to the job market is to carefully assess the impact of digitalization on critical skills and identify how digitalization is likely to impact employment patterns. In essence, digitalization should not be considered as another trend causing further social problems.

3. Digital Transformation Within Higher Education at Meso Level in Turkey

3.1. OER Policy

There have been, directly and indirectly,many attempts to shape policy and affect decision-makers in Turkish HE (Erginer & Dursun, 2005; Kalkınma Bakanlığı, 2013, 2014; MEB, 1982;) which were later mainly centered around the Turkish Presidency "Strategic Vision 2023" (Bozkurt, 2019a). The project mainly had 9 subcategories, one of which was "education, science, and technology". While these attempts sounded perfect in theory, there were many fails in practice. One of the reasons for these failures, in the Turkish context, is decisions taken were not implemented by the authorities (Akıncı & Seferoğlu, 2010), and sustainable policies were not developed (Akıncı, Kurtoğlu & Seferoğlu, 2012). Though the HE institutions were the significant actors of the digital transformation (Yıldız Aybek, 2017), in ability to cooperate and collaborate with other shareholders (Balyer & Öz, 2018; Özmusul, 2012) and inefficiency to produce adaptive mechanisms to adopt the change can be considered as major reasons (Koral Gümüşoğlu, 2017; Taşkıran, 2017). Tough the awareness (Glahn, 2019; Rogers, 1962) and technology is significant in such processes (Akgün-Özbek, & Özkul, 2019; Fırat, 2016; Sözler, 2017; Telli, 2018); the ignorance of curricula (Coskun, 2015), future planning (Balyer, & Öz, 2018), transformation in mind settings and society lead such attempts to fail (Öztemel, 2018). The current state of the art is identified in many important institutional declarations (MEB, 2018; TÜBİTAK, 2014), however, apart from developing infrastructure (e.g., integration to e-Government Infrastructure) (Okur, 2019), they were unable to go beyond being written statements (Bozkurt, 2019a).

In Turkey, it is very difficult to talk about an overarching policy encompassing all digitalization activities in every institution. Part of the issue is related to the decentralized nature of the HE system and individual institutions' autonomy. However, the Higher Education Law (code: 2547), draws a general framework for the policy of digitalization. Chapter 4, Article 12 states that HE institutions should produce, develop, use and extend educational technologies. As implied in the article, individual HE institutions (universities) are autonomous in developing their own strategies in different domains, including digitalization practice. For example, establishing the OpenMETU platform is based on this law. Besides, HEC Open Access and Institutional Archive Policy, METU's Open Access, and Institutional Archive Policy, and the Directive on Receiving, Storing, and Accessing Electronic Copies of the Theses are the other legal basis for it. In addition to these initiatives, it has SHERPA/RoMEO database for publishing policies, SHERPA/JULIET for funders' open access policies, and Creative Commons for copyrights. On the other hand, the university was specified OpenMETU's policy, and it is;

> It is of the strategic importance for our university to adopt the basic purposes of conducting high-level education and research in the fields of science and technology, and to present the scientific knowledge produced to the service of science. The scientific knowledge produced by our university must be freely accessible within the framework of ethics and laws because freedom of access to knowledge is a crucial support factor for all researchers to ensure that qualified knowledge and its products and services. In this context, OpenMETU aims to make the scientific knowledge that is produced in METU accessible.

Also, under one of the decisions (2012/103) that was taken by The Scientific and Technological Research Council of Turkey facilitated the development of open digital course content at the undergraduate level.

One of the broadest digital transformation policy initiatives in HE was laid down in February 2019 by the HEC(HEC, 2019). As part of the digitalization policy initiated by HEC, a project will be implemented at eight Turkish public universities (Figure 6).

Figure 6

HEC Digital Transformation Project.

The project is planned to be broadened to cover other universities later on. As part of the project, HEC develops tools to increase the digital literacy of the academics and students. The policy envisages accomplishing "open access" and "open-science." Establishing an infrastructure at universal standards which covers an open access archive is one of the targets of the policy. These infrastructures are aimed to be connected to the European Open Access infrastructure by widening the use of ORCID number, cooperating with the Turkish Scientific and Technological Research Council of Turkey (Bozkurt, 2019b).

For this purpose, the Turkish Scientific and Technological Research Council took the following steps about open access and open science in 2019,

- Adoption of TUBITAK Open Science policy,
- In open access activities, adoption of 2019 as a pilot year and 2020 as a transition year for compulsory policy implementation,
- Introducing open access /open data requirements in the second half of 2019 in the scope of the pilot program in Head of Research Support Program (ARDEB) in TUBITAK,
- Transition of aperta.ulakbilim.gov.tr (Institutional Archive and Research Data Management) system to live system where archives of articles and research data as a result of necessity
- Starting of the open data portal, acikveri.ulakbilim.gov.tr in 2019. The portal includes educational information on research data and management, and sample plans of research data management,
- Dissemination of TUBITAK Academic Archive.

Widening the use of LMS at universities is another major objective of the policy. Finally, enriching the course materials, digitalizing the materials, and granting open access to these materials is expressed as the major aim of the project (HEC, 2019).It is important to note that all eight public universities covered in the project are located in the eastern part of the country. These universities are Ağrı İbrahim Çeçen University, Bayburt University, Bingöl University, Iğdır University, Munzur University, Muş Alparslan University, Siirt University and Şırnak University (Figure 7). Some concrete steps to be taken by HEC on this project are as follows:

- Reporting of the studies conducted by universities and the number of publications in open academic archives based on the format that is determined by HEC on a semi-annual basis,
- Establishing a commission under the chairmanship of the rector/vice-rector responsible for open access and open science, and organizing awareness meetings for academics in order to establish an open ecosystem within the universities,
- Arrangement of Academic Incentive Regulation in order to encourage the publication in the open access journals and the production of open course materials
- Ensuring the participation of the relevant staff of the universities in the training meetings to be organized by HEC.

Figure 7

Institutional Participation to HEC Digital Transformation Project (Anadolu University eGazete, 2019).

Another noteworthy development that has been affected the digitalization of HE, especially at the management level is about the strategic planning movement. Its origin was based on an agreement between the Turkish Government and the World Bank, entitled Programmatic Financial and Public Sector Adjustment Loan Project in 2001 (World Bank, 2002). As a result of this project, a guidebook was prepared in 2003 for helping the administrators of the public institutions (including HE) understand and govern their institutions according to strategic plans as well as guiding them about how to prepare their plans (Presidential Department of Business and Strategic Management, 2019). The Public Financial Management and Control Law, another artifact of the project and issued at10 December 2003, required the strategic planning and management in every public (or state) institution, including universities and other HE institutions. After this legislation, several significant changes in organizational structure and the guidebook have been placed. For instance, in each HE institution, an independent department was established to coordinate and support the institutions' strategic management efforts and their financial resources as well as expenditures in 2006. Similarly, after several changes, separate guidebooks for various sectors were developed including one for the HE institutions in 2018, entitled the Strategic Planning Guide for Universities.

The importance of this movement regarding our report is about its nurturing effect on digitization of the management processes. In other words, the Strategic Management of Universities Movement acted as a catalyst to increase the use of digital technologies and resources to plan, manage, monitor, and evaluate the management processes in HE institutions. The Sakarya University Information System (SABIS) can be given as one of the exemplary implementations.

Another exemplary implementation can be found in the Erzurum Ataturk University. The university has launched an initiative, called e-Service Gate (e-Hizmet Kapısı) which shares almost the same goal of the SABIS. Both SABIS and e-Service Gate were elaborated in the following sections of this report, but we would like to express again that developments in the management of HE institutions have been creating a need for digitization.

In addition to the aforementioned developments, Erzurum Atatürk University has also initiated another project to address the digital transformation of the University and as an attempt to support the HEC Digital Transformation Project. The university established an office that intended to facilitate, manage, and monitor every digitization process in the University. The scope of the Digital Transformation and Software Office was identified as conducting research, development, and dissemination activities on effective integration of digital technologies into education, research and development, social contribution, and governance processes. The office also wants to be the reference point of digital transformation in HE institutions. As can be seen in Figure 8, the Office developed a Digital Transformation Life Cycle. The Office has been implementing several projects in the line of the Life Cycle. Digital Literacy Core Course, Digital Exhibition, Course Information System, Collaborative Research Platform, e-Books, Student Clubs Portal, Artificial Intelligence, and Robotic Coding Studio are among these projects. The Digital Literacy Core Course project intends to help students improve their digital literacy skills. The course proposes to give students the ability to produce digital content, to provide information about digital education and research opportunities, and to enable the use of these digital opportunities to develop lifelong learning skills. E-Books project, on the other hand, can be considered as an OER project that focuses on transferring the academic works of the faculty members into digital resources (Atatürk University, 2019).

Figure 8

Atatürk University Digital Transformation Life Cycle
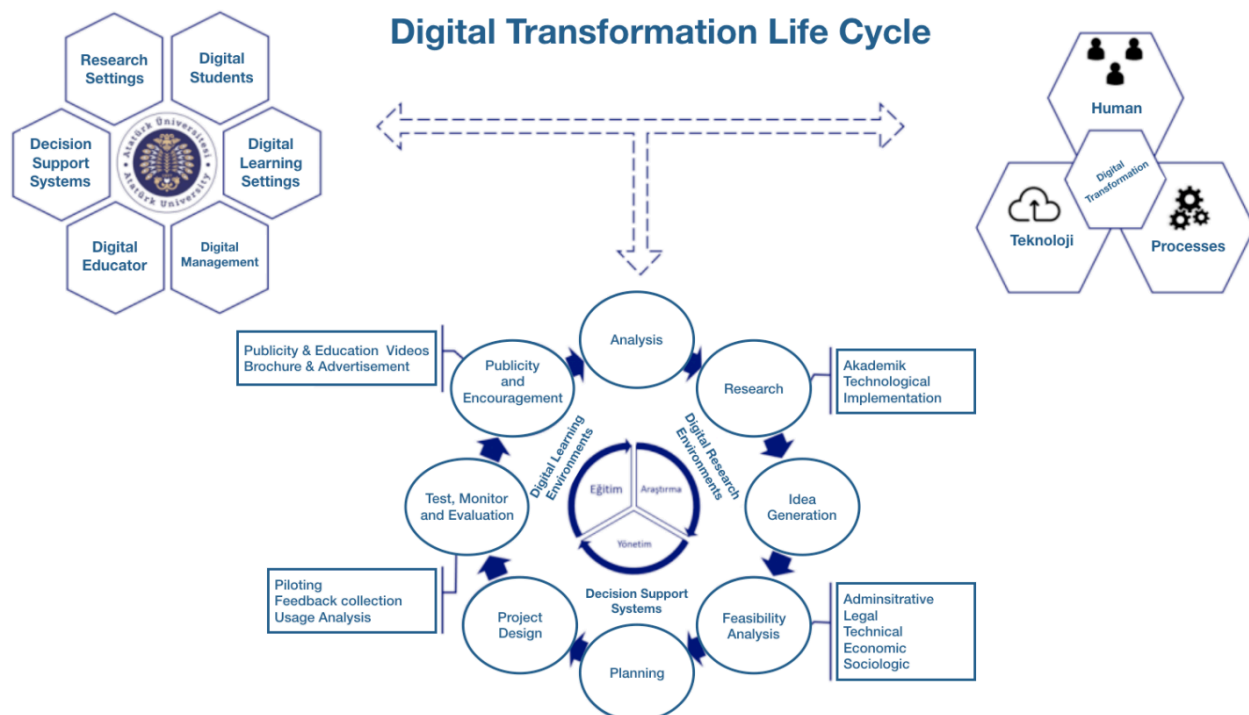
In short, it can be stated that while there were strategies for digital transformation and, partly for open up education movement, these efforts did not reach expected outcomes because decisions were taken from central organizations, such as HEC, and HE institutions have adopted these strategies not because they were needed because they were required by a higher organization. Besides, most of the efforts were technology-centric practices, and unfortunately, critical issues such as the transformation of society, learners, faculty members, and most importantly mind settings

were a secondary concern (Bozkurt et al., 2021). Another problem with these ideal, but unsuccessful attempts is the way that decisions were taken. Accordingly, it can be claimed that these decisions were taken by a small, privileged group (e.g., HEC members) and therefore decisions taken were not echoed in many layers of HE.

3.2. OER Change

In Turkish HE institutions and many of the state institutions, strategic planning is a regular practice, however, their efficiency is questionable. It is for sure that academic strategies are essential for future projections in the Turkish HE System (Erdem, 2015) and when examined, it can be seen that Turkish HE institutions mostly focused on training human resources and their institutional mission statements are based on generic universal values (Özdemir, 2011) and lack in bringing tangible missions, especially in terms of triggering change supporting opening up education movement. When their visions were examined, it is found that most of the Turkish HE institutions prefer focusing on research rather than presenting diverse visions with diverse roles (Özdem, 2011). It is for sure that variables such as the young Turkish population and expectancy in increasing student numbers in HE shape HE institutions' missions and visions (Kavak, 2011a). However, it should be further noted that the state of the art in missions and visions is positive for private universities while it is a bit problematic for state universities (Eren, Orhan, & Dönmez). There is competition between state and private universities with expected positive outcomes (Kavak, 2011b), however, there is still a lot to do for sustainable success (Ayten, 2016) and it is still vague how the competition would affect the digital transformation.

When three state universities examined that deliver education through open education faculties (Anadolu, Atatürk, and İstanbul Universities),it is seen that out of around 7 million students by 2018, "the 3.5million ODL students constitute around 50% of the overall HE population, or 4% of the overall country population" (Table 1) (Bozkurt, 2019c, p. 41). Interestingly, when the mission and vision statements of these universities were examined, it is seen that these three universities, similar to Özdem's (2011) findings, fail to provide tangible statements, except Anadolu University, which indicates the importance of lifelong learning.

Table 1

Open Universities in Turkey and Their Student Numbers by 2018.

University	Associate's			Bachelor's			Overall			
	Male	Female	Total	Male	Female	Total	Male	Female	Total	
									f	%
Anadolu	630046	745791	1375837	1059454	735331	1794785	1689500	1481122	3170622	88.4
Atatürk	88653	121329	209982	23447	31512	54959	112100	152841	264941	7.4
Istanbul	18988	31817	50805	44751	55097	99848	63739	86914	150653	4.2
Total	737687	898937	1636624	1127652	821940	1949592	1865339	1720877	3586216	100.0

Although the digital infrastructures in Turkey are at their infancy, the infrastructures presented in detail in the following sections, and the quality assurance system have impacted the behaviors at the institutional level. The universities invested in their LMSs, digitalized their electronic documentation systems, digitalized the data processing on academic performance. Although standardization and assessment of the standards are not at the desired levels, various (internal and external) mechanisms are applied to assess the standards of the practices. As a result, Turkish universities progress towards ensuring access of their students to digital resources (e.g., e-books, e-resources), improve the quality of their teaching and learning processes through LMS applications, save time and financial resources in digital documentation.

These platforms aim to be beneficial for the community and worldwide. All of them are free of charge. Such a portrait highlights the opportunity for more accessible educational resources which give students more active roles for their own learning process. Within some policies which are in the Law of Higher Education, Higher Education Quality Assurance System, and the Higher Education Quality Council of Turkey Law No. 2547 on HE, these platforms launched

and serve sustainable qualified content. Besides, HEC, Scientific and Technological Research Council of Turkey, the Ministry of Industry and Technology can be actors that determine policies. Bilgeİş, for instance, was specified a goal that will be reached as a strategy. On the other hand, Anadolu University, which launched Akadema, put some strategies about Akadema, but not any strategies found for AtademiX. However, Digital Transformation and Software Office, ensuring that AtademiX continues its activities again is aimed. After these MOOC platforms, open courseware was subject to review. As an example, METU's open course platform can be given. METU example represents other universities' platforms, but it is more compatible with leading ones. For example, it has a membership with OEC, the award from them, and Creative Common License. Also, OpenMETU has some purposes for change. Firstly, the academic archive and open access system should have international standards like Open Archive Initiative (OAI), Registry of Open Access Repositories (ROAR), Registry of Open Access Repositories Mandatory Archiving Policies (ROARMAP), Dspace, Directory of Open Access Repositories (DOAR), Open Education Consortium (OEC) etc. Secondly, METU's national and international prestige will be increased. Also, making a great contribution to the development of national and international cooperation with the help of scientific communication is the final purpose. Finally, for the digitalization of HE, AVESIS was examined. However, this platform is not related to courses. Academic data are collected and categorized within it. It is commonly used by most universities in Turkey.

To sum up, it can be claimed that investing in digital infrastructures (e.g., LMS) is considered as an indicator of the change and strategic planning and, in a panoramic view, not considered as an indicator for developing digital infrastructures for the use of OER initiatives. The problem is that Turkish HE suffers from awareness of OERs and strategic planning is operation from top to bottom and therefore the strategic plans are now welcomed with wide participation. Such a view results in resistance from the shareholders in the bottom layers that put Turkish HE in a vicious cycle. As explained in the previous section, there were some efforts to foster OER and OER-related issues, however, there isn't a mechanism to regulate, measure, and control these efforts. According to Bozkurt (2019b), TÜBİTAK has funded some OER related projects thus far and it can be claimed that TÜBİTAK is more effective than HEC.

3.3.OER Infrastructure

There is almost no shared infrastructure for the digitization of HE in Turkey, and each initiative explained below offers its own infrastructure to disseminate the (O)ERs. In this part of the report, we used some sort of a developmental approach and classified the initiatives under four movements: open courseware movement, MOOC movement, campus systems movement, and distance education centers movement.

Open Courseware Movement

OER is defined "as teaching, learning and research materials that make use of appropriate tools, such as open licensing, to permit their free reuse, continuous improvement and repurposing by others for educational purposes" (Orr, Rimini, & Van Damme, 2015). The focus of it is taking original work from others and making it adapted and producing repurposed learning resources. Inspired by the values of openness philosophy, OERs have liberal licensing like Creative Commons that enable this process (Orr et. al., 2015).

Open Courseware Project can be shown as one of the few examples of the initiatives that offered shared infrastructure for the dissemination of OERs in Turkey. It was launched in 2006 with the initiative of the Turkish Academy of Sciences (Baysal, Çakır & Toplu, 2015; Kursun, 2011; TÜBA, 2012; Özkul, 2007; Yazıcı, Özkul & Çagıltay, 2008). The initial infrastructure was largely a replication of the MIT's Open Courseware (OCW) initiative. The Turkish version of OCW aimed at opening the entire course content to the access of the students. The content included syllabus, presentations, audio-visual materials, project work, homework, readings, and examinations. Although the initial initiative was owned and run by the TUBA, around 45 universities contributed to the OCW of Turkey, and the initiative received funds from the State Personal Development Agency of Turkey. The four major goals were identified for the OCW in Turkey: (1) to increase the number of open educational sources in Turkish, (2) to enrich course materials for students, (3) to provide a source enabling comparing and enriching their courses for academics, (4) to develop a source available to anyone who wishes to advance his/her knowledge on the topic. In 2010 the Turkish OCW evolved into a new phase and signed an

agreement for translation and copyright for 25 courses besides 30 courses developed entirely by Turkish scholars. Besides, 45 universities signed an agreement on supporting the OCW initiative as a requirement of the National Open Courseware Consortium (UADMK). During 2007-2012, course materials belonging to 85 courses in varying fields were developed for the TUBA's OCW project. The site is still open to the public and active, but unfortunately, no development or update has been provided since late 2013 because of bureaucratic reasons. According to the latest figures accessed (up to May 2015), approximately 1.2 million individual users accessed these course materials. Additionally, as technological infrastructure, an open-source learning management system (LMS), Moodle, was adapted and has been used since the beginning. More information can be found at acikders.tuba.org.tr. However, as reported by Al and Madran (2013), the project did not reach its full potential because of the low public interest, inefficiency to encourage faculty members and unsustainable policies.

Along with TUBA's OCW Project, several universities also invested in institutional OCW projects and some of them still continue their initiatives (Figure 9). Middle East Technical University (ocw.metu.edu.tr), Ankara University (acikders.ankara.edu.tr), and Hacettepe University (acikders.hacettepe.edu.tr), for example, have shown more advocacy to the OCW movement in Turkey. These institutions and almost all the other participant universities have the same infrastructure. In order to present an example of it, METU's Open Courseware (METU OCW) system is elaborated: METU OCW is a free and open educational resource for faculty, students, and self-learners throughout the world. METU OCW can be valuable whether you're a student looking for some extra help, a faculty member trying to prepare a new course, or someone interested in learning more about a subject that interests you. METU OCW does not grant credits or degrees and does not provide access to faculty. METU OCW gives you open access to the materials used in a variety of courses. Now, materials related to 143 courses from different departments are published in the portal. These courses are mainly in English and related to a variety of areas, including aerospace engineering, architecture, cognitive science, etc. The most visited courses are Multimedia Design and Development, Serious Games and Simulations: Theories and Applications, The Technique of Mechanic, Academic Oral Presentation Skills, and Probability and Random Variables. The total page view recorded is 324,788 since October 2015. These viewers access educational resources from all around the world, but the top access ratios belong to Turkey and the US. All the course materials presented are licensed with Creative Commons Attribution Non-Commercial-Share Alike License. Also, the platform is a member of the Open Education Consortium (OEC) and UADMK. In 2016, OEC gave the Outstanding Site Award that is of the branch of Open Education Excellence. The Turkish Informatics Association (TBD) which is the pioneering movement of the "civil community" that tries to disseminate "the culture of informatics" by the members from all levels of the society gave The Best Education Site Award in 2011. Also, it was considered to give the first prize in the e-education category in 2013. In addition to these, the Open Education for Excellence Multimedia Course award in 2011, and the Open Education for Excellence Outstanding Site award in 2016 were given by OEC.

As mentioned above a big majority of the HE institutions, especially those that signed the UADMK agreement, have also initiated their own OCW, openly shared many course materials but had sustainability problems, and except a few indicated above ended in a couple of years. For instance, Anadolu University's Yunus Emre: New Generation Learning Portal is an interesting case about size and sustainability. Anadolu University has decided to open up its course materials designed and developed for its distance students to the public via a new custom-made online learning platform (content management system, CMS), entitled as Yunus Emre, a historical poet, and philosopher, materialized with the motto of "what you share is yours, not what you save". More than six million users accessed the course materials related to 167 courses between 2008-2013. Due to the lack of a formal feedback system (no data collected), it is difficult to assess the impact of the project. However, an increase in the number of participants to the University's e-certificate programs was observed after launching the Yunus Emre portal. One can infer that the project served well to achieve one of the goals of the project: introducing Anadolu University's distance programs. On the other hand, all these materials were only open access materials (reuse) and it was not possible to remix, revise, retain, and redistribute (please refer to Wiley & Hilton, 2018). Owing to the digital transformation project initiated in 2014, the Yunus Emre Portal was closed temporarily for technological infrastructure improvement. However, later a similar project gained more attention and the Yunus Emre was ended.

Figure 9

TÜBA Open CourseWare Project.
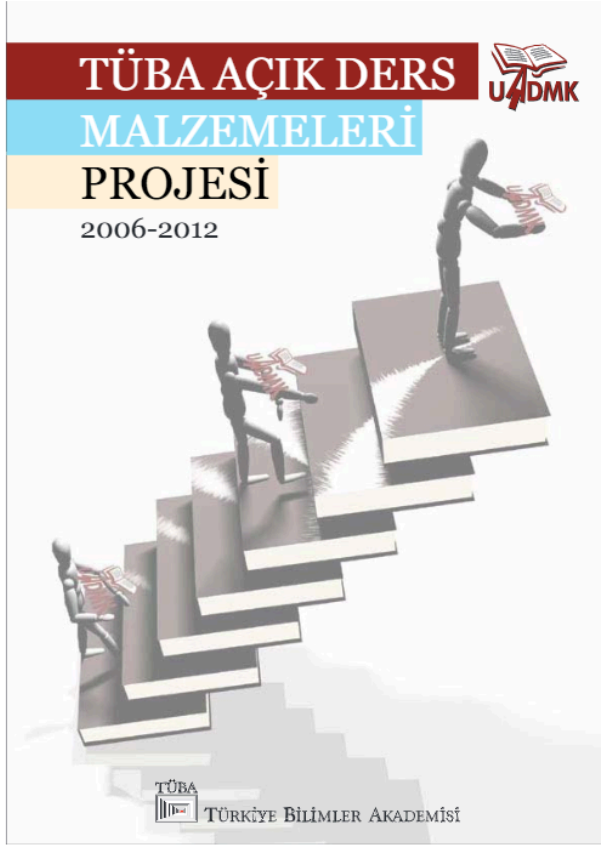
It is important that scientific knowledge be accessible for other researchers, within the ethical framework, for scientific progress. Therefore, METU was established OpenMETU with the idea that open access systems can serve one of the basic purposes of universities which makes it easy to produce new things and services with new knowledge at national/international levels. METU aims to access scientific knowledge by the Internet without financial limitations, legal barriers, and technical restrictions with this platform. METU Graduate Electronic Thesis Archive was established in 2003 by the Head of the University Library. After that, all master's and doctoral dissertations have been accessible. It is the first open-access system in this area in Turkey. OpenMETU is the new version of this platform (Figure 10). It is an institutional academic archive that also includes research data, software products, articles, book chapters, conference proceedings, and presentations without subject limitation. Users can search what they are looking for based on their subjects, time, author, title. Scientific literature can be read, saved, copied, printed, indexed, given the link to full text, transferred as data to software, and it can be used for every legal purpose. It ensures free research outputs and publishing, uploading, and downloading. Also, fair use, recognition, and visibility of a study, rate of citation, and scientific communication will be provided. In those days, funders expect that authors should publish their studies on open access platforms, so OpenMETU can ensure this at the institutional level. While everyone can upload course material on OCW of METU, in OpenMETU, just students and other members of METU can upload their academic works. SHERPA/RoMEO and SHERPA/JULIET databases are used. Also, Open Researcher and Contributor ID (ORCID) is the sustainable digital definer that supports automatic connection within a person's professional activities is used in this platform. On the other hand, members' open access data is licensed by Creative Commons. OpenMETU system has coordination with international open-access systems like OAI-PMH protocol, Open Education Consortium, and OpenAIRE, and is connected with the European Open Science Cloud (EOSC).

Figure 10

OpenMETU infrastructure at METU
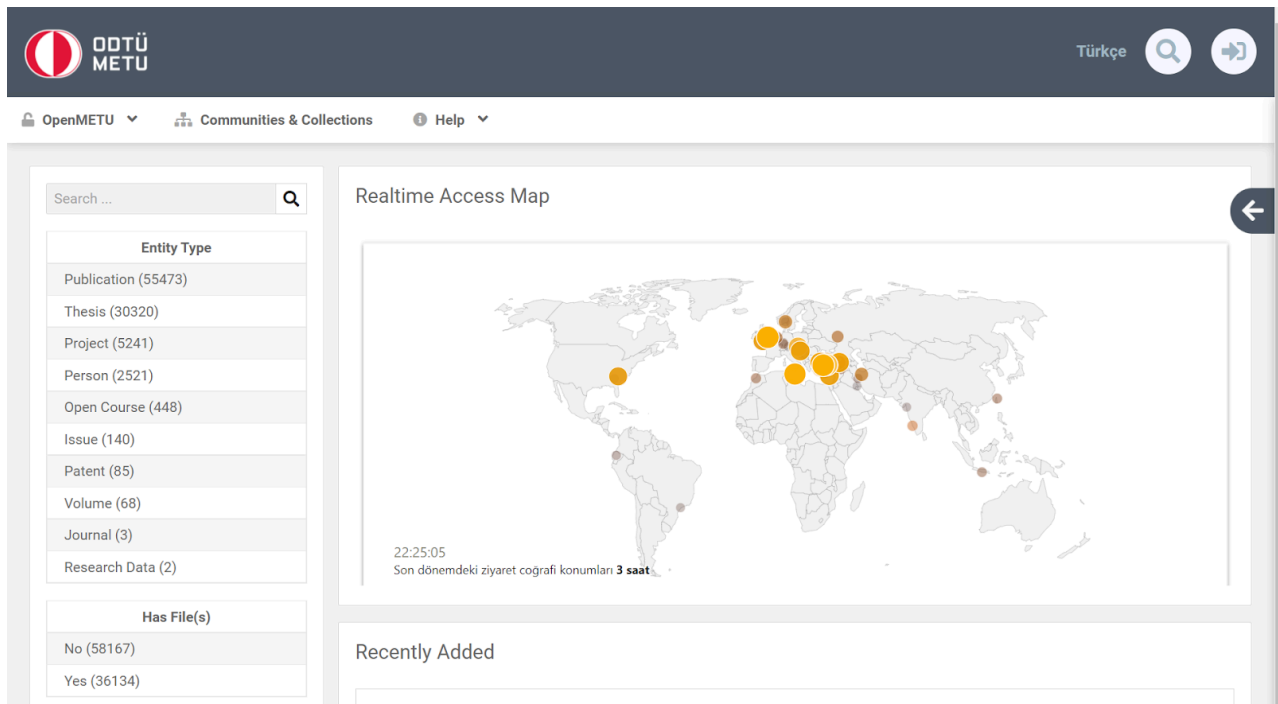
MOOCs Movement

Massive Open Online Course began for the first time in 2008 with two researchers, George Siemens and Stephen Downes, launching the "Connectivism and Connective Knowledge (CCK08)" course online at their universities. Thousands of people followed the course free and without credit (Aydemir, Çelik, Kurşun, & Karaman, 2018). EdX, Coursera, Futurelearn, Udacity, Udemy, and Fun are very popular portals across the world. MOOCs are courses designed for large numbers of participants, that can be accessed by anyone anywhere as long as they have an internet connection, are open to everyone without entry qualifications, and offer a full/complete course experience online for free (OpenupEd, 2014). OER and MOOCs are both related to general policies, but there have some general differences: (1) Use of the term "open": In reference to OER, it means free to access and free to reuse, revise, etc. while in MOOC, it just means free to access and free to use. (2) Form of resource: OER is not a specific educational tool, and it can be many things even a full learning course, but MOOCs are designed just as full courses, which means discussions and assessment tools also are integrated. (3) Audience: In OER, the focus is on teachers who will use the adapted resources or incorporate OER into their own learning environment. However, in MOOCs, there are ready-to-go courses for learners (Orr et al.2015). Following the global trends in MOOCs, some local initiatives were launched in Turkey (Aydin, 2017; Bozkurt et al, 2021). In terms of the jointly created infrastructures for the dissemination of MOOCs, no success story can be told in Turkey. However, HE institutions with deep experiences in distance education have been playing important roles in the dissemination of the MOOCs movement in Turkey. AKADEMA platform of Anadolu University, AtademiX of Atatürk University, and Bilgeİş of Middle East Technical University are among the major MOOCs initiatives. In this part of the report, we would like to briefly introduce these initiatives.

Bilgeİş forms one of the earlier examples of MOOC portals in Turkey. It was established in 2015 by Middle East Technical University (METU) with the support of the European Union (EU) and the Turkish Government. The project originally aims to serve the in-service training needs of employees in the private and public sectors. However, the fact that the project does put any limitations on university students makes it relevant to the digitalization of the formal HE. The project is coordinated by the Middle East Technical University (METU) and the Turkish Ministry of Labor and Social Security and the European Union. Bilgeİş project aims to (i) contribute orientation skills of employers and employees; (ii) support labor market that has coherency with technology; (iii) increase capacity of employees and employers about the usage of Information and Communication Technologies (ICT). Within this frame, in the 5 pilot cities of Turkey, (Ankara, İstanbul, İzmir, Eskişehir, and Gaziantep), universities, chambers of commerce, and industry, continuing education centers, organized industrial zones in these cities were identified as stakeholders and these institutions signed a

cooperation protocol. During the development of the portal, the in-service needs of employees and employers in pilot cities were analyzed, and in order to meet these needs, initially, 100 online courses for professional development of employees in various fields were developed and opened up to the use of employees and students. The MOOCs cover various topics, including graphic design, website development, software development, digital photograph, human resource management, etc. In addition to the online materials, various meetings such as conferences, seminars, and workshops are planned as part of the project in order to make the project more sustainable. Besides, in order to ensure sustainability, the courses are updated on the basis of stakeholder feedback. When the participants complete the course successfully, they get a certificate from the Middle East Technical University. According to recent data, Bilgeİş has reached around 130.000 users. Of the users, 4300 of them are employers, 39.652 are employees, and the rest consist of students and non-workers. Bilgeİş also uses a customized version of an open-source LMS, Moodle. One of the reasons for this preference might be the project coordinators' familiarity with this technological infrastructure.

Anadolu University's AKADEMA platform is another widely used infrastructure in the MOOCs movement in Turkey. AKADEMA was initiated as a social responsibility project by Anadolu University. The main objective of the project was to provide learning environments and materials to anyone of any age and to provide them with a structured learning experience to support lifelong learning processes. As a product of Anadolu University's long-lasting experience in Open Education, this platform includes courses in which everyone can acquire knowledge, skills, and attitudes free of charge without any prerequisites. There are supervised and self-paced courses under AKADEMA. The participants have access to all course content in both course types anytime and anywhere. In the self-paced courses, it is possible to communicate with the instructor at predetermined date intervals. Those who successfully complete the courses are given a certificate of completion signed by the Rector of Anadolu University. Self-paced courses are considered to be successful in order to fulfill the tasks expected from the participants between the course start and end dates. On the other hand, in individual courses, there is no communication with the instructor. Course Completion Documents are delivered to the participants electronically. Participants can access the content of these courses at any time and learn by themselves. On the contrary of supervised courses, participants are not given a Certificate of Completion. In 2017, new courses in different categories were opened. The number of categories increased to 13 and the total number of courses increased to 58. Also, 47705 participants registered for the ACADEMA. A total of 1192 Course Completion Certificates were given. Until 2019, the university's LMS used in regular distance courses, Blackboard, was used to offer these courses but later an open-source learning management system, Canvas, was put in use. New courses opened in different categories again. The total number of categories increased to 14 and the total number of courses increased to 80. These 14 categories are research and evaluation, instrument training, language education, science and technology, fine arts, law, personal development, music, health, sports, social sciences, education, management and economy, and special education.

AtademiX is the first enterprise free course platform of quickly spreading the MOOC movement in 2015. It is founded with ATAUZEM's, Erzurum Ataturk University's distance education center, technical infrastructure. The first lectures of the project were Introduction to Ottoman Turkish, Introduction to Arabic, and Introduction to Biostatistics. In the following periods, it is planned to offer courses for different interest groups in various fields including Nuclear Energy, Criminology, Crisis Management to Graphic Design, Skin Care to Strategic Management. The courses are given by Atatürk University faculty members as well as field experts from different institutions and organizations through AtademiX. Course categories at AtademiX are collected under 4 topics which are "Public Training," "Sectoral Training," "Academic Training," and "Senior Academic Training." The courses are taught on the Internet by the use of various course materials and exercises. Course materials include lecture notes, presentations, interactive videos, discussion forums, assignments, and end-of-class projects in order to support active participation. In addition, thanks to the sync, live lessons that cover a significant part of the courses, individuals have the opportunity to interact with the course instructors and other individuals taking the course. These courses are open to everyone who wants to have different levels of education. The lectures are open to participants from all over the world and can take place in the same class with participants from different cities of the world. In addition, the participants benefit from the knowledge and experience of prominent people in respective fields. AtademiX has a mobile-compatible interface, so students are able to follow the lessons with their mobile devices as well as computers. Participants who registered AtademiX are from all provinces of Turkey. The majority of the participants (X=32%) are in Erzurum followed by İstanbul (8%) and Ankara (6%)

(Aydemir, Bingöl, Çelik, Karapınar, Karaman, & Kurşun, 2016). The level of education of the participants varies. Of the participants, 1.5% hold primary and secondary education degrees, 7% associate, 42% undergraduate, and 46% graduate degrees. A total of 4872 participants enrolled in 13 courses offered at AtademiX, and approximately 650 people were awarded online attendance certificates (Aydemir, et al., 2016). Ottoman Turkish was the most registered course with 1205 people (24.73%) while the Public Health Education course was given the highest number of participation certificates(317; 48.77%). In addition, it was found that the highest attendance was accomplished for public courses (46.78%) followed by senior academic (26.46%), academic (15.72%), and sectoral (11.04%) courses (Aydemir, et al., 2016). An online certificate is offered to the participants when they met the accomplishment the criteria. AtademiX is one of the members of Open Education Europa. Within the scope of Digital Transformation and Software Office contribute to the sustainability of AtademiX. Open Education Faculty and Computer Science Research and Application Center of Ataturk University actively contribute to the AtademiX. As a technological infrastructure, AtademiX is also using Moodle.

Along with Akadema, BilgeIs, and Atademix, there is a relatively small-scale number of other MOOC initiatives in various institutions. For instance, Yaşar University, a foundation (private) HE institution located in Izmir, has transformed all of its core courses to MOOCs and presented them to the public in a new portal entitled Hayatboyu (lifelong) (hayatboyu.yasar.edu.tr). Yaşar University uses the OpenEdX platform for this initiative. Currently, the University offers 20 courses in various topics including augmented reality, design thinking, project management, ethics, aesthetics, semiotics, technology and society, scientific research, and so forth. Some of these courses (7 out of 20) are in English while all the others are in Turkish (Yaşar University, 2019). According to the project coordinator, by the end of 2019, there were more than 5000 registered users in these self-paced courses (Aydin, 2019).

Another MOOCs project was initiated by Sakarya University which also uses the OpenEdX Platform to offer open online courses. The project is entitled SAUX (stands for Sakarya University Extended) and currently, seven courses have been created and presented to the learners. More information can be found at saux.sakarya.edu.tr.

On the other hand, another state university, Hacettepe University, has launched a project that also included MOOC offerings. The LIFE (LIbraries for Everyone) Program was launched by Hacettepe University Technopolis Technology Transfer Center with funding from the Bill & Melinda Gates Foundation. The program is implemented at the libraries administered by local governments and aims to support the technology infrastructure to enable citizens' access to basic computer and internet facilities; to facilitate their use of internet-based services such as e-government and e-municipality services; and to offer free training to citizens at these public libraries to assist them to acquire the necessary ICT use skills. For the impactful delivery of these services to citizens, the program also aims to train the staff of the municipal public libraries not only in ICT skills but also in subjects of librarianship for their professional development, so that they can offer library services in a more effective manner. One of the major work packages of the project proposes the design and delivery of MOOCs in various topics. This part of the LIFE project is called as Academy in which there are 18 active and 9 archived courses (Herkes İçin Kütüphane, 2019).

Along with the HE institutions, some other public and private institutions are also offering small-scale MOOCs. For instance, the Information Technology and Communications Authority (BTK) is a government agency that was established for the purpose of regulating and supervising the telecommunications sector. BTK has launched an initiative, entitled BTK Akademi, to support the safe use of communication technologies, especially the Internet. Quite a number of online self-paced courses are being offered in this portal to any who would like to learn. The courses mainly focus on communication technologies, including Blockchain, Cellular systems, R Coding, Coding with Scratch, Screen Dependence, etc. (BTK Akademi, 2019).

Another example was launched in 2017 by a couple of entrepreneurs, intended to create a Coursera-like environment in Turkey, entitled as UniversitePlus. Currently, they collaborate with three major universities (Bosporus University, Yildiz Technical University, and Yeditepe University) to offer 46 courses. According to their website, nearly 40000 learners are actively taking their courses (UniversitePlus, 2019).

Campus Systems Movement

A campus system refers to integrated technological systems that help all stakeholders (faculty members, administrators, staff, learners, etc.) increase the effectiveness and efficiency of the main functions of the institution. In other words, it means digitizing or using digital technologies in every main function of a HE institution: education, research and development, social responsibility, and governance. All the subsystems in a campus system talk to (communicate) each other easily, and nowadays they learn from their experiences (machine learning).

Although the use of online or offline systems for various functions at a university has been in place for years, integration of these systems and embedding machine learning and artificial intelligence components as a campus system is relatively new for Turkey. Nowadays, all the HE institutions are trying to adopt systems that can be integrated into their existing campus system, or changing their whole old systems into new campus systems.

Campus system movement might not seem like a topic related to OERs. But these systems are the technological infrastructures that foster the dissemination and use of OERs. So, in this part of the report, we would like to describe the developments in the major subsystems of a campus system in Turkey: Learning management system (LMS), electronic document management system (EDMS), academic data management system (ADMS), and some other specialized ones.

Learning Management System (LMS)

When meso level digitalization practices are examined, it can be observed that most of the HE organizations adopted Learning Management Systems (LMS) in order to facilitate digitalization of teaching and learning practices. During the first years, individual HE institutions developed or adapted their own infrastructures to offer an online presence to their courses and the faculty members. But later, some adopted commercial international LMSs, some started to use Turkey oriented commercial LMSs, and some others preferred the open source LMSs.

The Middle East Technical University, for example, built its own online tool to manage teaching and learning processes during the earlier days and provided online space for each course offered by the university. The course list was automatically retrieved from the registrar's office, and faculty members were able to upload their course materials as well as manage their course routines including attendance and grading. Nevertheless, the portal became inefficient in the face of growing demand and increasing workload in a very short time. As a result, METU adopted an open-source LMS system, modified and added certain components to the existing structure in order to manage the teaching and learning process. This LMS doesn't only offer the same functions as the previous one but also some others such as plagiarism check.

Anadolu University, on the other hand, which accommodates nearly half of the HE students in Turkey, decided to use Blackboard, a commercial product, after many years of using a content management system, developed in-house based on the needs of its distance learners and the instructional strategy employed in distance education programs (self-paced study with traditional media). Anadolu University's preference for Blackboard was related to the intent of shifting its self-paced instructional strategy to a guided study that included more digitized education and more opportunities for learners to interact with each other and the instructors. However, due to technical problems encountered to meet the needs of a million students and the costs, Anadolu decided to use a custom LMS during the beginning of 2019 and developed one in-house based-on previous experiences in content management systems. Known as Anadolum e-Kampus, the new LMS is capable of delivering any type of learning content and specifically designed for the individualized learning experience. Another salient feature of the e-Kampus is it provides all its services through Web and mobile technologies. In contrast to generic LMSs, e-Kampus provides many accessibility options for learners with special needs and benefits from AI-based technologies to enhance learning experiences and provide individualized learning opportunities.

Electronic Document Management System (EDMS)

This system is not directly related to teaching and learning, and it is not limited to HE. The EDMS can be considered an effective tool to manage bureaucratic processes. Like in the case of other digital services, EDMS helps institutions to

save from printing and ensure fast and precise formal communication in public organizations, including universities. Another advantage of EDMS, these services are controlled by a central authority and all state institutions use these services for an integrated and effective bureaucratic process. Besides, signing any document through EDMSs is ensured through digital signatures which provides a complete digital bureaucratic experience.

Academic Data Management System (ADMS)

On the other hand, Academic Data Management System is a software system that includes the academic performance management model developed for the purpose of taking inventory of academic activities, measuring and evaluating the performances of institutions, units, departments, and people, and creating a sustainable quality assurance system. Several products, such as AVESIS, a Turkey oriented for-profit company, are available in the market. ADMS, which is basically a performance management system, includes various useful tools in addition to its features that are compatible with the purposes outlined above. ADMS is expected to contribute to the promotion of the human resources potential and administrative practices of our university in addition to the facilities that it will provide to faculty members such as preparing a resume file in different formats and printable. ADMS is a very common platform in Turkey and currently, 28 universities are using the platform. ADMS software system is based on the Balanced Scorecard Performance Management Model. In this context, providing personal web pages for researchers, pursuing resume, project obligations, and project outputs of researchers within the scope of Scientific Research Projects (BAP), academic performance evaluations, academic incentive allowance processes, production of institutional evaluation reports, determination of assignment and promotion criteria and university ranking data for applications such as entrepreneurial and innovative university indexes. As of today, studies are being carried out in order to transfer the information of the researchers existing in various systems to ADMS, and the system will be put into use in the near future. In this context, researchers' publications in the ISI Web of Science (WOS) Database have been questioned and transferred to their personal areas in the ADMS system. Also, researchers are expected to activate the publication records transferred to the ADMS System. Academic Incentive applications for the articles added to the ADMS System via WOS services. It can be validated through ADMS connection without the need to submit an additional proof document. A publication introduced in AVESIS periodically is scanned on SCOPUS, ISI-WEB of SCIENCE, and PUBMED. This helped that possible citations matched with the author and added their profile.

Digital Infrastructure for Auxiliary Services

Many universities adapted specialized digital tools for specific purposes to be able to increase the effectiveness and efficiency of their services. For example, the Middle East Technical University (METU) developed its own course syllabus development and course syllabus management portal. The course syllabus portal provides guidelines on how to write course objectives and course learning outcomes. The portal enables storing the Syllabi as well, which facilitates retrieval of the syllabus in several different forms. As a result, the university has been able to save from printing and distributing syllabus. Besides, the portal brought a standard to syllabus development practices. Since the syllabus program requires to fill exactly the same components, all of the course syllabi pose the same sections.

Another example can be given from Anadolu University. Accordingly, with a specific focus on open and distance learners, from enrollment to course delivery, and services after graduation are all provided through an infrastructure that recognizes its user through their national IDs. Compete course enrollment system, student support system, bureau automation system (Anadolu has more than 120 bureaus, or administrative local offices, all around Turkey and also in some other countries), inventory tracking system, and so forth.

SABIS, on the other hand, is a campus system designed and developed in-house by Sakarya University. It is actually like a shell that integrates all kinds of systems in the university, including learning management, personnel management, library, project management, student information, knowledge management, performance management, budget management, etc., and enables easy communication among these subsystems as well as easy access to all these services. Due to its responsive design, it can be used in any device and operating system. So that it supports any time anywhere access to the services. It also supports various languages. SABIS is also designed in a way to support the requirements and implementation of the Bologna Process which makes it vulnerable especially for those institutions that seek external evaluation and accreditation. It supports the accreditation process for the whole university or a single

faculty or a program or a center. In line with the mission, vision, and strategies, SABIS enables all units affiliated to the organization to determine their objectives and activities, to monitor the status of the objectives and to evaluate the results of these plans, to improve strategic plans, and also to take measures against conditions that may change in the strategic plan (Kocabıçak, 2018).

A similar initiative was launched by Erzurum Ataturk University just recently (December 2019). The e-Service Gate is also a shell system that brings all the subsystems of the university together and integrates with each other. It intends not only to increase the usage and accessibility of these services but also to secure easy communication among these subsystems. Additionally, the initiative addresses data protection and safety requirements and concerns. According to the university administrators, the system will soon be open to all the other stakeholders (rather than just students, academic and administrative staff) to be able to ensure transparency and accountability in the university, to measure and monitor the social contribution of the university, and to increase the visibility of the quality and variety of the services provided by the University. They also claim that the e-Service Gate is an important step in corporate cyber security measures that allow the management of user information and passwords in a more secure manner in line with the 2016/12 Circular on the protection of personal data and information and communication security measures (Ataturk University, 2019).

Distance Education Centers Movement

One other widely used popular service is online master's degree programs delivered through Distance Education Centers in many HE institutions in Turkey (Table 2). Accordingly, by 2018, there were a total of 39.236 students in these programs. However, some concerns should be articulated which are also related to other issues such as policy, quality, and change. When they first emerged, they were perceived as a change agent, on the other hand, the change winds could not go beyond using LMSs and many offered programs suffer from quality mostly because of insufficient quality assurance and accreditation mechanisms.

Another bottleneck that is observed is the common compulsory courses that are available nearly in all programs. In order to reduce cost, human resources, logistics, and some other operations, many courses are delivered by Distance Education centers. However, as in the case of delivering master programs through distance education, the quality is low while the quantity (number of universities delivering these courses) is rather high.

Table 2

Total number of students in Turkish HE (See Master program students' numbers > Distance education [eLearning/Paid]).

	Total number of students in 2018					
	Male		Female		Total	
	ƒ	%	ƒ	%	ƒ	%
Overall	4047302	53.5	3513069	46.5	7560371	100.0
Associate's	1424366	18.8	1344391	17.8	2768757	36.6
• *Formal education (F2F/Free)*	451531	6.0	323945	4.3	775476	10.3
• *Formal education (F2F/Paid)*	214158	2.8	106787	1.4	320945	4.2
• *Distance education (e-learning/Paid)*	20990	0.3	14722	0.2	35712	0.5
• *Open education (Free)*	737687	9.8	898937	11.9	1636624	21.6
Bachelor's	2292542	30.3	1949299	25.8	4241841	56.1
• *Formal education (F2F/Free)*	903108	11.9	932084	12.3	1835192	24.3
• *Formal education (F2F/Paid)*	250119	3.3	178885	2.4	429004	5.7
• *Distance education (e-learning/Paid)*	11663	0.2	16390	0.2	28053	0.4
• *Open education (Free)*	1127652	14.9	821940	10.9	1949592	25.8
Master's	275781	3.6	178892	2.4	454673	6.0
• *Formal education (F2F/Free)*	224644	3.0	168085	2.2	392729	5.2
• *Formal education (F2F/Paid)*	30779	0.4	8457	0.1	39236	0.5
• *Distance education (e-learning/Paid)*	20358	0.3	2350	0.0	22708	0.3
Doctorate	54613	0.7	40487	0.5	95100	1.3
• *Formal education (F2F/Free)*	54613	0.7	40487	0.5	95100	1.3

In short, there are efforts to establish digital infrastructures, these efforts aim to integrate HE institutions to the central networks, such as eGovernment services. These efforts mainly host students support services. OER related platforms such as MOOCs are independent and there isn't a jointly established initiative. Because currently there aren't institutional OER repositories, there isn't a communication and information exchange observed. The biggest so-called OER repository is HEC's thesis database, however, it is only accessible through login and operates through eGovernments infrastructure. The earlier attempts to establish an OER repository are failed and there are only independent fewer institutional efforts:

- UADMK
- ODTÜ
- Ankara Üniversitesi
- Ege Üniversitesi
- Başkent Üniversitesi
- Hacettepe Üniversitesi

3.4. Quality of OER

Developing policies to improve the quality of HE has become an important agenda item for many countries. The issue of improving and securing quality in HE has become one of the main concerns in Turkey as well. The studies and recommendations made in the Bologna process were published in the European Quality Assurance Association in Higher Education (ENQA) report titled Principles and Standards of Quality Assurance in the European Higher Education Area, which was published in 2005. In Turkey, the quality assurance studies in HE carried out so far have not produced concrete results on digital platforms yet. The widespread approach was limited to the preparation of annual reports, which did not include any strategy and largely determined the state of the universities.

Especially after the Bologna Process in 2001 as a result of the need for restructuring the HE system and alignment with the European Union legislation, there were some efforts to provide quality assurance in Turkish HE(Koral Gümüşoğlu, Toprak & Şakar, 2019; Toprak & Şakar, 2019). For instance, integration to the European Credit Transfer System (ECTS)

and providing diploma supplements can be given as examples. After a long while, HEC established the HE Quality Board in 2015 (Figure 11) (YOKAK, 2019) and efforts on quality assurance gained momentum. Currently, there are 12 evaluation and accreditation agencies that examine programs in Turkish HE. These agencies can be listed as followings (Toprak & Şakar, 2019) :

- [Association for Evaluation and Accreditation of Engineering Programs-MÜDEK](#)
- [Association For Evaluation And Accreditation Of Medical Education Programs-TEPDAD](#)
- [Science, Literature, Faculty of Science and Letters, Faculty of Languages, History and Geography Curriculum Programs Assesments and Accreditation Assocciation-FEDEK](#)
- [Association for Evaluation and Accreditation of Educational Institutions and Programs of Veterinary Medicine-VEDEK](#)
- [Evaluation and Accreditation Association for Teaching Programs-EPDAD](#)
- [Association for Evaluation and Accreditation of Nursing Programs-HEPDAK](#)
- [Communication Education Evaluation and Accreditation Board-İLEDAK](#)
- [Health Sciences Education Programs Evaluation and Accreditation Association-SABAK](#)
- [Tourism Education Evaluation and Accreditation Board−TURAK](#)
- [Evaluation and Accreditation Association for Programs in the Faculties of Pharmacy-ECZAKDER](#)
- [Turkish Psychological Association](#)
- [Theological Studies Accreditation Agency-İAA](#)

Figure 11

[HEC Quality Council](#)
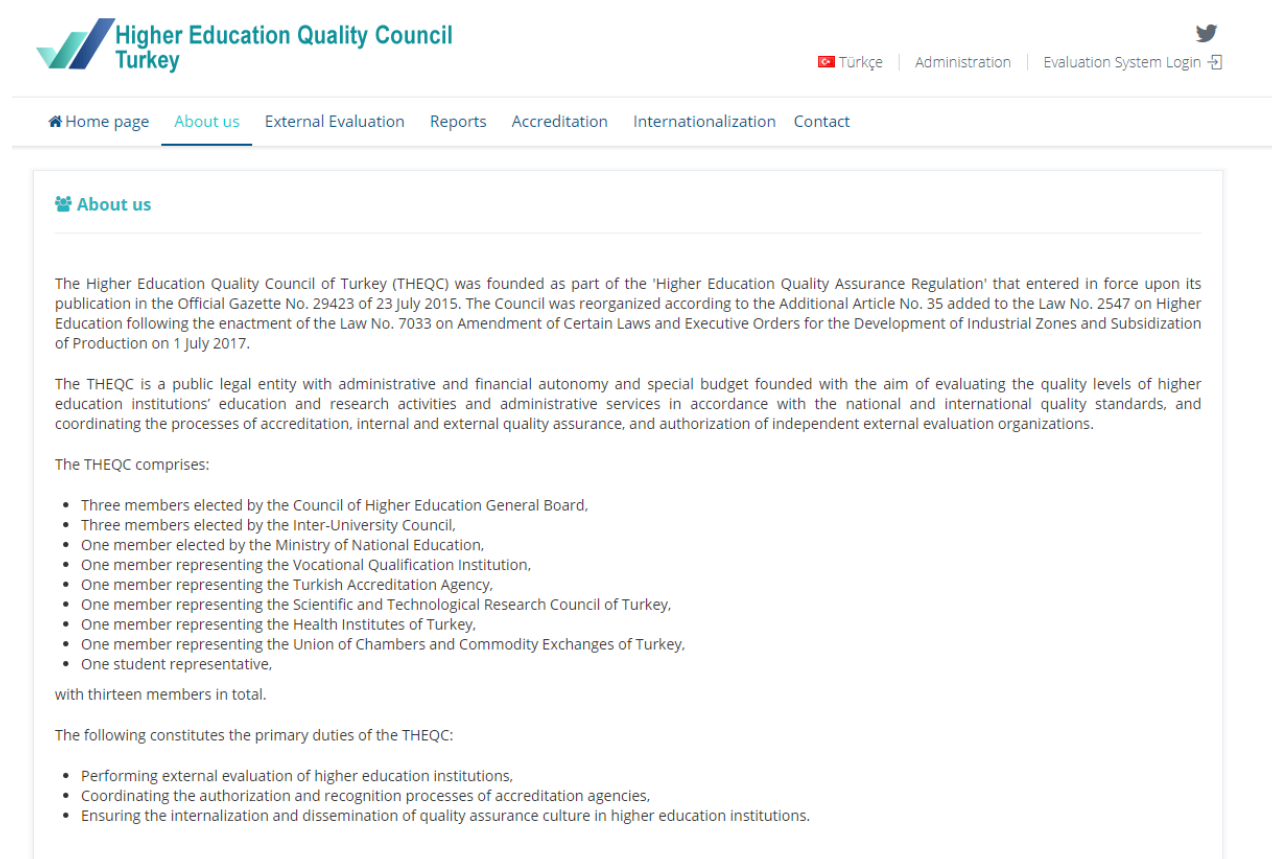
In Turkey, the quality assurance systems at HE level are regulated by the HEC's Higher Education Quality Council (HECQ). Although this is a national-level quality assurance body, the policy and practices of this council directly applies to the individual HE organizations. HECQ applies two quality assurance mechanisms: self-assessment (internal

assessment) and external assessments. It is very difficult to find a clear focus on quality assurance systems for digital resources, while there are items that indirectly apply to the quality assurance of digital resources. For example, "accessibility" forms an important criterion in the internal quality assurance of individual HE organizations in Turkey. Therefore, the universities are obliged to ensure access of all of the students to available databases and the National Academic License for Electronic Resources (EKUAL) and Turkish Academic Network and Information Center (ULAKBIM). Access to digital services is largely regulated by individual libraries of HE institutions. Likewise, in the external evaluation system of HEQC similar understanding applies to an external evaluation committee. Accessibility to educational resources is an important assessment criterion is an important criterion. As a result, students' access to academic materials, databases, and learning resources is a major concern of every university in Turkey and the way how the criterion is assessed is similar at every university (HEQC, 2019). For example, Anadolu University's quality assurance mechanism is based on the Higher Education Quality Assurance System and the Higher Education Quality Council of Turkey Law No. 2547 on HE, Additional Article 35 (18/6/2017-7033/18 art.). Higher Education Quality Assurance System sets out the principles that regard the authorization of independent external evaluation institutions, accreditation processes, and internal-external quality assurance of education and research activities as well as administrative services of HE institutions.

On the other hand, the digitalization of HE takes an important part in METU's 2018-2022 strategic plan which was prepared in 2017. In the situation analysis part, it was stated that studies on determining the educational objectives and program outcomes of the undergraduate programs have been completed and necessary information has been entered into the METU Syllabus program. The same structure has been nearly completed for graduate programs and studies are still ongoing. ODTUClass (LMS), a Moodle-based teaching management system, is used in all courses at METU. As of 2016, 69% of the faculty members and 83% of the students use the program within the scope of 5,371 courses that were opened in the ODTUClass program. Open Course Material (ocw.metu.edu.tr) currently offers 143 courses and serves an average of 4.500 visitors per month. Also, the digitalization of education highlights the sectoral tendency analysis part. Increasing the accessibility of open course materials to knowledge in the field of education by distance education; Spreading online learning and mobile applications rapidly in learning, and growing expectations that technologies such as smart boards will be widely used in HE were identified. Therefore, in the strategic plan, METU attributes importance to effective science communication and open access in sharing knowledge with society and the world as a strategic priority. In this context, some strategies were defined under the objectives and goals. For example, Objective 5 states that develop and implement educational policies to educate competent graduates with creative, innovative, and leadership characteristics. Under this objective, dissemination of innovative teaching methods, measurement and evaluation methods and the use of instructional technologies, production, and sharing of instructional materials was developed as a goal. OpenMETU was effectuated on the 2nd of December,2019, and it has lots of policies that regulate operation. For example, the rights of every stakeholder are described very deeply. Also, it is compatible with the OAI-PHM protocol, OEC, and OpenAIRE, and it has a connection with EOSC.

3.5 Recap

As it has mentioned at the beginning of this report, one might expect more initiatives at the macro level since the Turkish educational system at all levels is quite centralized. However, analyses of the current implementations and developments have shown that more initiatives regarding digital transformation in the Turkish HE system can be observed at the institutional, or micro level. A similar assumption can be made about the joint initiatives because of the collectivist cultural characteristics of Turkey. But, except for the National Open Courseware Consortium that did not last long, no significant joint initiatives for dissemination of OERs have been noticed, yet. However, as stated above, individual institutions, especially those that have historically a long tradition in open and distance learning as well as educational technology, have been voluntarily taking action to create and disseminate (O)ERs and working on transferring their systems into a more digitized structure.

In terms of infrastructure, we have identified four movements: open courseware movement, MOOCs movement, campus systems movement, and distance education centers movement. There are a few sustainable initiatives and a couple of noteworthy but unsustainable ones in each movement. For instance, TUBA's Turkish OCW portal still receives a lot of internet traffic although the project is not active, and no improvements or updates are provided. However, a few

universities continue to offer OCW in their institutions, such as METU, Ankara University, and Hacettepe University. A similar trend is observed in other movements too. It was noteworthy that a big majority of these initiatives use either similar open-source solutions or create their custom ones. But no effort has been put in place to establish a link or interaction among these similar initiatives.

In terms of policy, it was quite disappointing that only a few institutions have some sort of written policies for digital transformation. Ataturk University, for instance, established an office directly working with the rectorate to lead the change in the institution. Also, the newly established OpenMETU portal has clear policies, and they are all stated on the website which is open.metu.edu.tr under the Open Science Policy and Frequently Asked Questions parts. On the other hand, the HEC initiated a digital transformation project following Vision 2023. As a part of this project, 9 universities, located in the eastern part of the country and have limited resources, were asked to participate in the pilot face of the project. The faculty members and the students are required to take online courses to improve their technology skills. Anadolu University's infrastructure was used during this project. The project coordinators are currently focusing on a policy paper to share with all the HE institutions in Turkey.

Increasing the quality of HE has been one of the major goals of the HEC. The Higher Education Quality Council (HECQ) was established some years ago under HEC and became an independent agency soon after. This agency regulates the quality processes in Turkey. The agency follows a similar evaluation and monitoring process as European Universities Association (EUA); provides guidance and recommendations for the improvement of quality of all kinds of services, including internal quality assurance systems, education, research and development, social support, and governance. So, we can say that HECQ, to some extent, does monitor the (O)ERs offerings of the HE institutions and the digital transformation processes although the evaluators are not directly required to investigate these offerings and processes. In terms of the institutional level, every institution has its own quality assurance processes for their (O)ER offerings in one way or another. However, these processes are not well documented and hard to learn from outside.

In terms of change, it is slow, and the strategy is mainly a top-down approach. In other words, all the HE institutions are trying to digitize their processes and services; but due to lack of experience, shortage of vendors, insufficient technological infrastructure, shortage of time to invest in change, and some other reasons, the improvement is not as it is expected. Also, the research shows that there is an awareness issue among faculty members toward digitizing and sharing their experiences. That might be why the projects are usually initiated by the administrators of the HE institutions rather than professors or instructors or learners.

All of these limitations and challenges directly affect HE institutions' digitalization. Also, HE institutions that do not have sufficient vision have slow adoption of this transformation. Some other main reasons for this are; unaware of the changes in their competitors and new competitive methods, inadequacy in developing their methods with new technologies, staying slow in catching up with new technologies, having concerns and skepticism about the reliability and sustainability of digital services, having no enough information about the new student profile, and strict corporate policies can be considered (Taşkıran, 2017).

In sum, we have observed some significant developments which are based on HEC and Scientific and Technological Research Council of Turkey, and Vision 2023 policies, and support of the European Union and the Turkish Ministry of Labor and Social Security at an institutional level for digitization and dissemination of (O)ERs than the macro level.

4. Awareness, Creation, Use, and Dissemination of OERs in Turkey
Micro-Level Developments

4.1. Infrastructure

In Turkey, although there is increasingly growing awareness among individual faculty members about finding, using, creating, licensing, and sharing (O)ERs, there are several infrastructures for the dissemination of OER among faculty

members. The National Thesis and Dissertation Center, institutional library services, social academic networks, and the Higher Education Council's Courses Platform (YOK Dersler), which was created as a reaction to the Coronavirus Pandemic, are among the major infrastructures at the micro-level.

National Thesis and Dissertation Centre

It is a database that can be accessed over the internet and provides access to all master's and doctoral theses prepared at the universities in Turkey. By 2018, it has become a mandatory act to publish thesis open access through the platform. At the individual level, the national thesis center can be regarded as a change agent in terms of promoting open access and being a role model for universities.

Institutional library services and OER repositories

The OER repositories are usually supervised by library services at the institutional level and individuals' contributions to these services require signing up for these services. As a matter of fact, many (so-called) OER repositories do not function fully. That is, the content that can be uploaded is usually restricted to publication types (e.g., conference proceedings and pre-print versions of the publications). Such an organizational structure confines OER only to its members, which prevents the dissemination of OER in a broader sense.

One of the biggest challenges of OER related library services and repositories is the copyright policy. While there have been many efforts to promote the use of Creative Commons (Holt & Madran, 2014), it can be claimed that these efforts did not make the expected impact. As is, they operate on the basis of copyright/copyleft policies which we consider as a dilemma in terms of opening up education.

Another initiative that can be mentioned is TÜBİTAK's DergiPark (JournalPark) infrastructure. DergiPark is a ScholarOne or Open Journal System (OJS) like academic journal management infrastructure for journals issued in Turkey. It is considered that DergiPark infrastructure is one of the good and organized examples of OER. DergiPark (n.d.) explains its purposes as followings:

- to improve the quality and aid the development of academic publishing in Turkey in accordance with international standards,
- to enhance the visibility and usage of national academic journals worldwide,
- to ensure the implementation of the ULAKBİM Journal Management System efficiently.

The promise of DergiPark is the way it hosts journals. As of now, although every journal published in DergiPark has a separate domain name and outlook, all journals use the same infrastructure. In order to benefit from DergiPark services, each journal must stick to an open access policy and adopt a Creative Commons license. In this regard, individual contributions to journals, such as articles or reviews, are published as an OER.

Social academic networks

OER-related activities in Turkey at the micro-level can be significantly related to open scholarship and are generally referred to as network-based activities (Veletsianos & Kimmons, 2012). In this context, the use of academic social networks is an example that can be examined at the micro-level.

In the context of OER and OEP at the micro-level, individual-level practices are mostly related to participating in academic and social networks, and these networks are, in many cases, perceived as the process of creating an online identity. The main tendency to use these academic social networks (e.g., ResearchGate, Academia, Publons, etc.) is the inability and incapability of local structures, for instance, at the institutional level. In this regard, in the context of Turkish HE, academic social networks are often used to increase the widespread effect of academic studies and to provide visibility in online environments. In other words, because sharing, promoting, and disseminating OER is limited to a few institutional repositories, and these are, interestingly, confined to only institutional access (they usually require identification even if they are OER repositories), academic social networks are very popular in Turkish HE.

Academic social networks such as [Academia](#) and [ResearchGate](#) are used for the purpose of networking and collaborating with other academics (Muscanell & Utz, 2017) and further used to make the content open access by respecting their rights. Many scholars in Turkey have the belief that making open access educational content, if not OER, is sharing them in academic social networks. In many cases, copyright issues are bypassed by publicly sharing pre-print copies of the publications, and, frequently, copyright issues are violated (Ovadia, 2014). In a sense, such an approach eliminates options with financial necessities for gold access and green access (Lovett, Rathemacher, Boukari & Lang, 2017). Though the copyrights of the openly shared publications are held by journals, researchers publish their full-text studies on academic social networking platforms because they either are not aware or do not take into account this issue (Jamali, 2017). In Turkey, the case is not different from what Jamali (2017) reported. As well as reasons reported in the related literature, lack of awareness and the gap in providing such services through institutional means can be considered as the main reason behind this scene.

YÖK Dersleri (HEC Courses) Platform

After the first wave of the COVID-19 pandemic, the HEC decided to support all the HE institutions by opening up the course materials of the major open and distance learning (ODL) providers (Anadolu University, İstanbul University, and Erzurum Ataturk University). The materials consisted of printable textbooks and some videos. They were all specifically designed and produced for distance learners. A website, entitled YÖK Dersleri (HEC Courses, yokdersleri.yok.gov.tr) was built including search and browsing opportunities. Later, another University, METU, also shared its OpenCourseWare (OCW) materials (video lectures) in this portal.

HEC just recently shared a guidebook about how the HE institutions can adapt technology-based or -enhanced learning into their regular programs and courses during and after the pandemic (HEC, 2020a). In this guidebook, HEC, for the first time, mentioned that they would like to transform the YOK Dersleri Platform into an OER repository and encouraged all the instructors and professors to share their course materials, as well as their online courses as MOOCs in this platform. Although this encouragement was only a verbal invitation and nothing more, it can be considered as an important step for increasing awareness. In this guidebook, HEC also provided a series of guidelines and recommendations concerning different aspects of educational processes in the Universities, and how the universities can implement online distance education, blended learning, hybrid learning, and technology-enhanced learning.

YOK Dersleri Platform currently provides access to hundreds of textbooks and lecture videos, quite a number of which are related to social, educational, administrative sciences, and humanities while some are related to health, engineering, science fields.

Overall outlook

In all, it can be concluded that there is low awareness regarding the philosophy of openness and there are varieties in the way Turkish scholars perceive openness. Though there are many recent initiatives to promote OER and open access, it is generally related to quality-related issues which hinder the development of OER in Turkey. However, it should be noted that within the scope of digital transformation in education (Taşkıran, 2017) and eGovernment (Bozkurt, 2017b), the ideas of establishing open academic repositories at international standards at all universities and giving priority to open access and open scholarship (HEC, 2019) have increasingly been embraced by the universities.

The awareness of OER is lower than expected and currently available OER repositories need to be improved in many aspects (Bozkurt, 2019b; Erdem-Aydın & Aydın, 2019). First, there is a need to develop policies and walkthroughs to catch quality standards, widen their scope, and make them compatible with international counterparts. Currently, while there is an eGovernments infrastructure that connects many services, the library services, and OER repositories are incapable of operating among similar services. By 2020, such efforts are initiated by public entities (mostly by HECand with rare examples from individual universities) and commercial entities demonstrate less interest because, most probably, they don't consider this area that they can make a profit. As explained earlier, there is a tendency to associate openness and OER related concepts with low quality. Such a perception in academic circles at individual and institutional levels curtails the developments of OER in Turkey. Such an outlook directs faculty members and researchers to use academic social networks as if they are OER repositories.

In the Turkish HE System, one of the most properly functioning OER repositories is DergiPark infrastructure. However, despite all its promises and potential, the type of OER is limited to only scholarly publications (e.g., articles, reviews, editorials, etc.). It can be argued that an initiative at the macro, national level serves well for the individual, macro level. PowerPoint presentations and lecture notes are widely used OERs in Turkey. Educators at universities integrate any educational materials into their teaching materials because, generally, library services provide access to these materials by institutional subscription. It can be stated that this is an ill-structured vision because, at an individual level, educators are not encouraged to produce and share OER, in contrast, they are encouraged to use institutional subscribed services.

Moreover, although we cannot provide any scientific evidence, our personal observations showed that during the Coronavirus period, Udemy and Khan Academy Turkey as well as the YÖK Dersleri Website (elaborated above) were the most frequently used educational resource repositories. The Google statistics also support this observation (Figure 12).

Figure 12

The most frequently used OERs during the Coronavirus Pandemic
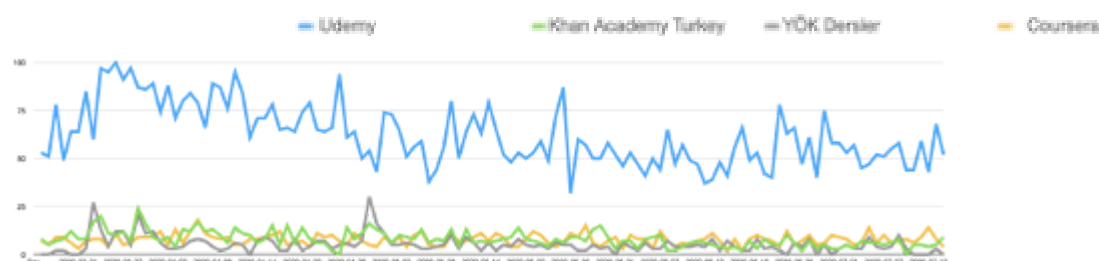
The infrastructure for OER in Turkey has been settled at the micro-level by individual universities. However, the users of these infrastructures are the individual academics. Before COVID-19 the use of infrastructure by academics has increased very sharply. For example, at the METU, the use of LMS infrastructure there were around 500-1000 entries (students and academics). After the COVID-19 measures, 1619 academic staff members and 24734 students have been actively using the LMS system. In May 2020, 1,258,823 sessions were opened by the academics of METU.

4.2 Quality of OER

At the micro-level, individual instructors and professors are responsible for the quality of the resources they provide to their students in their courses. One of the major issues concerning OERs and resources, in general, is copyrights. The current Law of Intellectual and Artistic Property Rights (Code: 6698) has been revised by adding articles 33rd 34th to the Law. These articles are related to the use of resources created by others. According to these articles, as long as the creators are cited the resources can be used for not-for-profit educational processes. However, especially in article33, it was clearly indicated that these can be used in face-to-face educational processes but nothing about open and distance learning. Evidently, there is a shortage of clear legislation about copyrights for educational use of different resources. This legal gap creates hesitation among individuals in sharing their resources in open context. This situation can be considered as a barrier to the dissemination of OERs in Turkey.

Another trend that can also be considered as a barrier for OERs is the administrators' tendency to use their own brand and resources. We, as ODL experts, have been consulting several HE institutions to help them implement remote education successfully since the beginning of March 2020. During this consulting process, we tried to encourage the university administrators for the usage of available resources in the courses as well as in faculty training. However, they resisted using those created by other institutions or faculty members of other institutions because they felt that it wouldn't be appropriate for their reputation and brand. So, they preferred the resources created by their own staff. This was directly mentioned in the personal conversations with almost all the administrators in quite a number of institutions. One can easily relate this situation with the severely competitive structure of the Turkish Education System at all levels including HE. In short, the administrators' hesitation for use of OERs created by others can also be considered as a barrier to the dissemination of OERs and OEPs in Turkey.

Given this fact, quality assurance of OER practices at micro-level functions according to traditional measures in which the individual university and the HEC play the prime function. Although these checks do not reflect quality assurance in conventional understanding, the interventions and measures of individual universities aim at ensuring that the academics fulfill their OER practices according to certain standards. For example, during the ongoing pandemic, the HEC issued several circulars in order to regulate the delivery of online courses. In one of the circulars, HEC identified the principles of conducting online examinations.

On the other hand, as it has mentioned in the earlier section of this chapter, Anadolu University's AKADEMA Platform presents around 120 MOOCs to Turkish speaking audiences at no cost. In almost all the courses a guided study approach is employed that requires interaction with real instructors. The instructors are required to create their own course materials (educational resources) and to license them with Creative Commons' Attribution-ShareAlike 3.0 License (CC BY-SA 3.0). Anyone can access these resources anytime without registering for the courses. In order to secure the quality of these courses, AKADEMA staff uses the OpenupEd Quality Label assessment tool, developed based on EADTU's (European Association for Distance Teaching Universities) E-xellence Label, learner satisfaction surveys, and a few other criteria. The instructors can also use the same resources for self-assessment of their courses. They also receive the results of the assessments and are asked to revise their materials and processes if necessary (AKADEMA, 2020).

Besides these and the THEQC's "Distance Education Working Group", which was elaborated below under the Macro Level Update, no other quality implementations were able to be observed.

4.3 OER Policy

As we stated in macro and meso level reports Turkey possesses a centralized HE system. The governance of the Turkish HE system has been further centralized by the regulation which authorized the president of the state as the ultimate authority in appointing the rectors of the university, which by-passed the university in absolute terms. As a result, like in the case of other critical issues in HE, the issue of OER relies extensively on the decisions of the HEC. As a consequence, the policy formation largely remains to HEC and the president of the state. During the ongoing COVID-19 crisis the measures against the crisis in HE have largely been shaped by the HEC. These measures may sound reasonable given the fact the majority of the universities have not institutionalized their practices. However, interventions in the details (e.g., how to conduct online exams) curb the creativity of the universities, particularly those which have the capacity to be innovative in their measures in OER practices.

During the ongoing pandemic, the HEC has been developing tactics rather than entire policies to institutionalize OER in Turkey. The initial reaction of HEC to the pandemic was to suspend face-to-face classes. However, for a one-week period, the HEC banned delivering the courses remotely. Nevertheless, after one week the same authority ordered the universities to shift into remote teaching for all of the classes. The instructional and assessment strategies were left to the universities. So, each preferred a different approach: a large number of them preferred synchronous online learning and online exams, some text-based traditional open education and assignments, some mixture of all, and so forth. In late May, the HEC decided to end the semester through remote teaching, even for the exams. These decisions indicate the fact that the key authority regulating HE, including OER, in Turkey follows an emergent approach for policy formation.

As it has mentioned above, HEC is willing to transform the YOK Dersleri Platform into an OER repository (Üstün et al., 2021). This intention was announced in the latest guidebook HEC shared (2020a). However, no policy paper was issued, or action was taken.

4.4 OER Change

Based on our observations we argue that the change in the mindsets of the HE administrators, professors, and staff as well as other stakeholders towards advancements in creating, using and sharing of the educational resources openly has been very slow. The copyright issues, shortage of training and support for faculty members, shortage of time and digital skills, lack of incentives (external motivators) as well as the shortage of awareness about the importance and

potential of OERs can be listed as the major barriers for the advancement and dissemination of OERs in micro-level in Turkey. The same list of barriers with slight differences can be given for the institutional level.

On the other hand, there are several changes happening we would like to report. First, some institutions, like Anadolu University, have been working on several incentives for the dissemination of openness among faculty members. Anadolu has announced at the end of 2019 that starting June 2020, it will give at least 50 percent more points to each article or book or any scientific work published in open access journals or resources. For instance, if one professor prefers to publish his work in an open-access journal indexed by SSCI/SCI will get 150 points instead of 100 (Anadolu University, 2020). The main purpose behind this incentive is simply to support the openness movement.

The second change we observed is about the increasing use of social media along with academic social networks among the faculty members to share or promote their publications. Twitter, LinkedIn, Facebook, Instagram, WhatsApp, and personal blogs are the most frequently used ones. These posts in social media definitely help the dissemination of educational resources. An increasing number of professors, even those with limited digital skills, are joining this trend. However, some argue that those who post very often and use some of the marketing tools to promote their posts from the academic integrity and ethics perspective, it seems that these posts help the dissemination of some educational resources openly.

The third change is related to the use of online academic databases provided by the ULAKBIM (the Turkish Academic Network and Information Center) of TUBITAK. ULAKBIM has initiated a project to provide access to the major online databases. The project, entitled EKUAL, helps all the HE institutions, their faculty members, researchers, staff, and students access these globally well-known databases. Although no statistics were found, our personal observations show that an increasing number of people are using these databases on campus or remotely.

The fourth change, although doesn't directly relate to OERs, has just recently occurred as a consequence of the Coronavirus Pandemic. The rapid transition to distance education uncovered the need for quality support services for faculty members and students. The results of a survey study (Aydin, in review) conducted in three different HE institutions located in 3 different provinces in Turkey support this need for quality faculty and student support. Two questionnaires were developed based on the EDUCAUSE DIY Survey Kit: Remote Work and Learning Experiences administered to faculty members and students separately. One of the close-ended items in the questionnaires was about the support services. A large number of the faculty members (86 percent of the total 417 professors) stated that they received satisfactory support at the right time period (Figure 13).

Figure 13

Faculty member responses to the item related to their satisfaction with the support they received
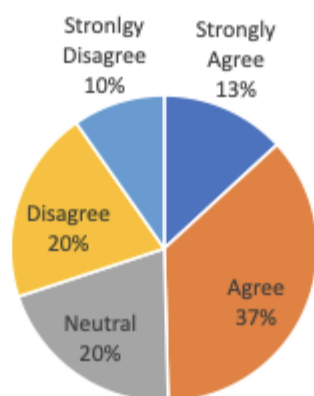
One of the major themes derived during the analysis of the participants' answers to the open-ended question regarding how to improve online distance education in their institution was about the need for constant, flexible, on-time, on-

demand faculty support. One of the participants' responses (from the institution located in Eskisehir) was in a way summarizes what many others indicated in their answers:

I wish we had some more experience in the technology we have to use now before the Virus [Covid-19]. Also, I regretted that I did not pay attention to distance education before. I always tried to stay away from distance education and believed that it was not really an education. But now I know that it can be as successful as what we do in class, but still it is up to us [as instructors]. Not me but many colleagues still do not know how to teach with technology. We need to learn the technology and also educational ways, or specific online pedagogy to use this technology. However, we do not have time. So, we need help. … Center tries to help us but there are only … [a few] staff and I am ashamed to ask them all the time. There is a need for more structured and formal training and support…

On the other hand, half of the students (50 percent of the total 2224) the students either agree or strongly agree that they received satisfactory support during the remote learning (Figure 14) and similarly one of the themes reached after the analysis of the open-ended question was the support.

As has mentioned above, these results have supported the need for better faculty and student support systems, and as a result, the HEC asked all the HE institutions in Turkey to establish or enrich their Distance Education Centers (UZEMs). Now, almost all the institutions have these centers and try to employ qualified staff.

Figure 14

Student responses to the item related to their satisfaction with the support they received
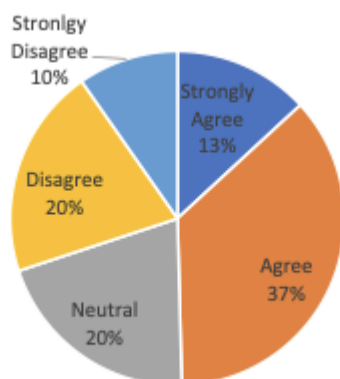
In brief, change is a long and slow process in Turkey but the pandemic we are going through has definitely been working as a catalyst for the change towards the creation, use, and dissemination of OERs.

5. Coronavirus Period Update for Macro and Meso Levels

5.1 Introduction

During the first couple of weeks, all HE institutions could not do anything except closing all the facilities and sending students, academic and administrative staff home. During the beginning of the pandemic, even the HEC has announced that no distance education will be provided. However, shortly after the first wave of the pandemic, HEC declared the use of distance education strategies to complete the courses. Those who have appropriate technological infrastructure and human resources started to offer online courses starting March 23 while many others just provided some video and text-based materials and assignments via different means (WhatsApp, Web sites, Blogs, email, regular mail) to their students. At the same time, a considerable number of the HE institutions discovered the Zoom, a Web Conferencing tool. In April and May 2020, they offered 40 minutes long synchronous sessions to their students. In general, almost all used the assignments as the major assessment tool. However, those institutions with sufficient technological

infrastructure tried online exams. Although we cannot provide any scientific evidence, our personal observations showed that during this period, Udemy and Khan Academy Turkey as well as the YÖK Dersleri Website (elaborated below) were the most frequently used educational resource repositories.

The following section summarizes what happened countrywide (macro), regional and institutional levels (meso) during the Covid-19 lockdown period in Turkey.

5.2 Macro Level

5.2.1 OER Infrastructure

As has mentioned above, after the first wave of the COVID-19 shock, the HEC has decided to support all the HE institutions by opening up the course materials (those specifically designed and produced for the distance learners) of the major open and distance learning (ODL) providers (Anadolu University, İstanbul University, and Erzurum Ataturk University). The materials are mostly text-based and some video-based, and specifically designed and produced for the distance learners of these ODL providers. A website, entitled YÖK Dersleri (yokdersleri.yok.gov.tr) was built including search and browsing opportunities. Later, another University, METU, also shared its OpenCourseWare (OCW) materials in this portal.

On the other hand, a large number of HE institutions did not have any or sufficient educational delivery infrastructure. A few institutions did have almost nothing; a few others employed internationally known cloud-based LMSs (Blackboard, Desire2Learn, etc.) and Web Conferencing tools (Collaborate, Adobe Connect, etc.); an increasing number of them preferred the Turkey based companies' cloud LMSs (Advancity's ALMS, Vedubox) and a Turkish Web Conferencing tool (Perculus); some others were using the open-source learning management systems (Moodle, Canvas, etc.) along with Web Conferencing tools (BigBlueButton, OpenMeetings, etc.); and finally just a couple of them utilized their own in-house produced LMSs (Anadolu University's eKampus). However, almost all, except those with a background in providing online learning services to a large number of students and those who preferred cloud-based LMSs, experienced technical problems during the first weeks of the lockdown. Later, they improved their bandwidth and server capacities. Also, some decided to use more than one LMS and Web Conferencing tools for their emergency remote teaching. This flexibility and improvements in the infrastructure helped to overcome the problems.

It might be worth mentioning a Turkish company's success during this period. Advancity (2020) was established as a startup in Sakarya University's technology development park by a small group of young entrepreneurs in 1999 and since 2004 focused solely on providing online learning infrastructure to the HE institutions. They first developed their Web Conferencing tool for synchronous online learning, Perculus in 2005 and later in 2010 their LMS, entitled ALMS. Currently, they are serving 70 HE institutions (Advancity, 2020) out of 207 totals in the country and around 800.000 students. In a personal conversation with its CEO (2020, May 23), Cem Atacik expressed that they were also not ready for a huge demand, and during the first weeks they had some difficulties in meeting the demands of their client institutions. They even had to reject some of the new customers (not only in HE but also in K12 institutions) to be able to meet their current customers' needs and expectations. Synchronous sessions, as well as online exam demands, were the most difficult ones for them due to the fact that these features created a tremendous data load to the servers and the software. However, he thinks that they did a good job and according to their own customer satisfaction survey results, a great deal of the HE institutions (almost 80 percent) they serve are quite satisfied. Advancity has plans to establish sort of an OERs environment integrated into the LMS and Web conferencing tool, where professors, institutions will be able to share their course materials with others who are using the same infrastructure.

The most extensive report on academics' use of OER infrastructure in Turkey was reported by HEC (HEC, 2020b). In May, the HEC of Turkey issued a circular ordering the completion of all academic activities (teaching and evaluation) through online infrastructure and the COVID-19 crisis. The HEC reported the performance of 127 public universities and 62 foundation (de facto private university) universities in online teaching. The order of the HEC to complete the academic year with distance education practices has tested the already existing infrastructures of the universities. According to the data retrieved from the universities in Turkey, 121 universities (64%), (76 public, 45 private) adopted the distance teaching (remote teaching) practices on March 23, 2020. The remaining 41 (41%) universities (28 public, and

13 private) universities adapted the remote teaching practices on March 30, 2020 (Figure 15). Although these remote teaching practices which started in the last week of March cannot be categorized as totally OER practices, they tested the infrastructures reported in Macro and meso level reports. Although quality is a very important concern, the fast shift of the universities to remote teaching indicates the capacity of the infrastructures.

Figure 15

The transition of Turkish universities to online teaching during COVID-19 crisis
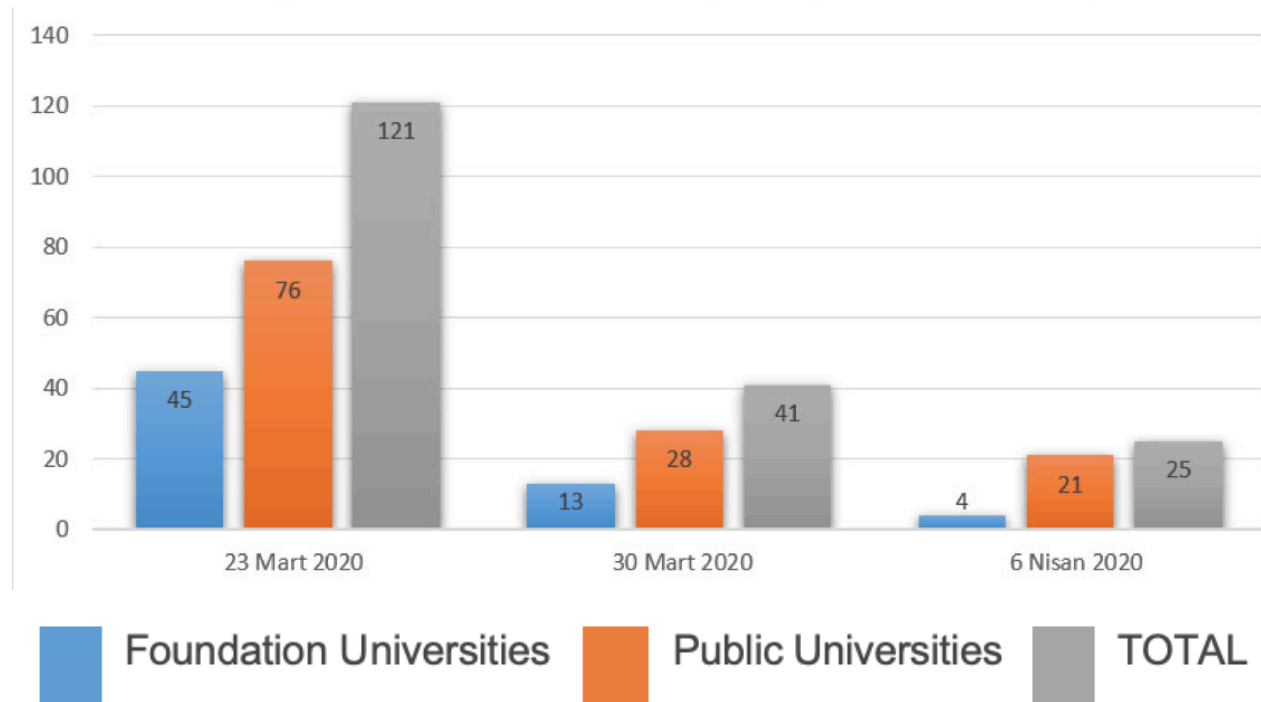
The transition of the universities into remote teaching has been reflected upon the number of courses taught by remote teaching practices. Before suspending the in-class, face-to-face teaching in Turkey there were 736,341 courses taught in Turkish universities. After suspending face-to-face teaching Turkish academics offered 663,808 (90,1%) courses in associate degree programs, undergraduate programs, and graduate programs remotely through their universities online and distance education infrastructure (Figure 16). It is important to note that the performance of public universities in offering courses as part of their remote learning practices

Figure 16

Rate of courses transited from face-to-face into remote teaching during COVID-19 crisis
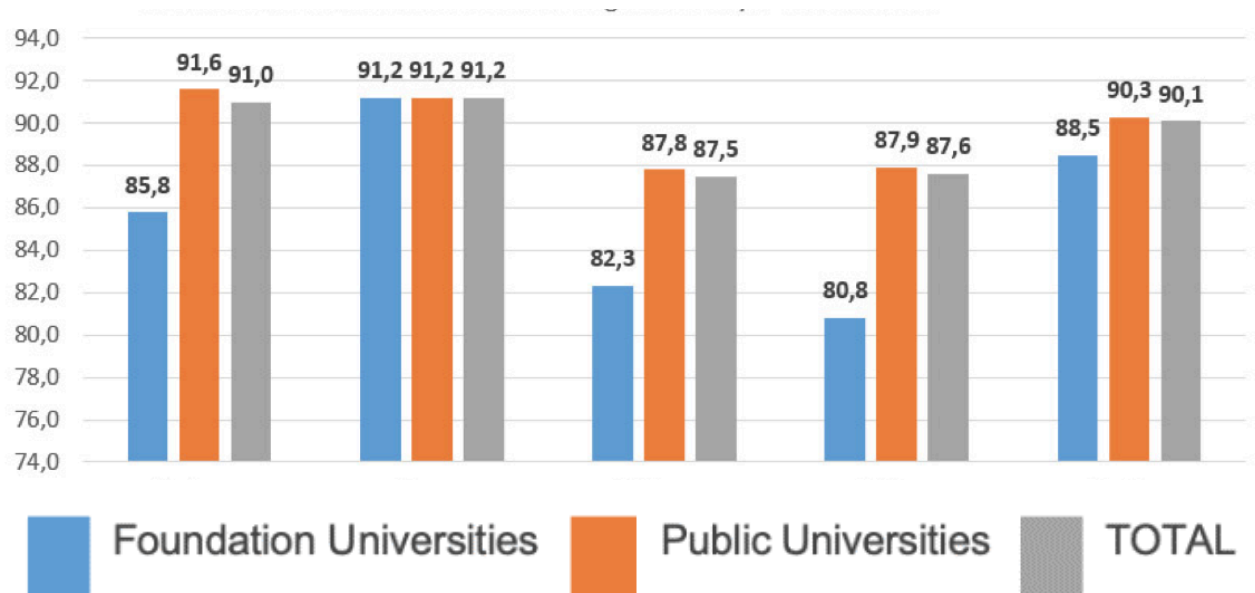
According to the data retrieved by the HEC from individual universities, academics tend to adapt distance teaching for courses classified as "theoretical" courses. The distinction between theoretical and practical courses reflects the thinking that some subjects lend themselves to remote learning while others do not. This distinction is one of the major arguments of the academics in resisting remote teaching (this group of academics initially postponed some part of the courses to accelerated summer semester; however, later on the HEC announced that there will not be an accelerated semester as such). According to HEC data, almost the entire theoretical courses (99,2%) and the great majority of the practical courses (89%) were delivered through remote teaching.

According to HEC data of the total number of courses at the HE level in Turkey, 22% of them were delivered through synchronized teaching. In private universities, this ratio is 53,2% while in public universities the ratio is 29,1%. Interestingly, courses at the graduate level the ratio of synchronized teaching is 50,1% while for associate degree and undergraduate programs it is 22,1% and 17,8% respectively.

When the distribution of remotely taught courses into the discipline of study is considered, social sciences take the lead in remote teaching (91%), followed by basic and natural sciences (78%), engineering (77%). Remote teaching was lowest in health sciences (54%).

According to the same report of HEC, the most challenging part of remote teaching during the pandemic was related to the measurement and evaluation. The reports of the individual academics indicated that during the pandemic they shifted from the traditional in-class exams into homework (90,5%) and/or project (83,1%) based evaluation.

Since the transition into remote teaching was very sharp, it initially caused ambivalent feelings and attitudes on the part of the academics. Limited knowledge and lack of experience in remote teaching were two main causes of resistance on the part of academics. In order to ensure the readiness of the academics the universities provided technical support and short online training. These trainings were provided by the universities' units which are responsible for remote and online teaching and learning.

The final part of the HEC's report is related to the online student support services provided by the universities. During the unfolding pandemic the universities get in contact with their students through traditional media (e.g., SMS and e-mail) (95%). However, some universities went beyond traditional media and provided technical support (91%) and instituted a unit for online contact/communication (70%) with the students. Finally, although it is not covered in the report, some of the universities attempted to provide internet services and hardware for their students in order to ensure just remote teaching for all of their students.

The remote teaching experience during the Pandemic in Turkey will have implications to extend and deepen OER in the country. We anticipate that at the national level the HEC will initiate new policies, programs, and practices for OER, while at the institutional level the universities will increase their investment in OER. For example, an increasing number of universities will re-define their structures to open distance education centers, allocate more resources to these centers and shift some of the teaching and training to these centers.

Another interesting development was observed in K12 education. Before the pandemic, EBA (Educational Informatics Network) of the Ministry of National Education (MoNE), an educational resources platform, was already established and in use by the students, teachers, administrators, and parents. The MoNE announced on March 12, 2020, that all the schools will be closed for at least two weeks, and during this period distance education courses will be provided via EBA starting 23 March 2020. At the same time, they also introduced three state TV channels dedicated to offering educational TV programs related to almost all the courses in every grade level. TV was preferred because not every student in public schools was able to access a computer (laptop, notebook, desktop, tablet, etc.) and the Internet. Through these channels, the MoNE tried to offer K12 education to millions of students. At the same time, in late April, the MoNE had an agreement with Zoom and started to offer synchronous lectures in some grade levels. Every day, thousands of sessions were offered to millions of students by the students' own teachers. This could be one of the largest centralized synchronous session offerings in the world.

5.2.2 Quality of OER

During the pandemic, no quality measures were set or looked for since the emergency situation required easy and fast actions to meet the educational needs of the learners. However, the HEC was working on a guide and it (July 2020) shared its first version with directors of the distance education centers (UZEM) about reopening of HE institutions after the pandemic, which mainly focuses on how distance education, blended or hybrid learning can be implemented in the educational processes. It also included a few parts about the quality of the learning processes but not the quality of the resources.

On the other hand, Turkey established the Turkish Higher Education Quality Council (THEQC) in 2015 in order to evaluate the quality of academic and administrative processes in Turkish HE organizations. The THEQC is an autonomous body and empowered both financially and administratively in order to fulfill its mission in guiding HE institutions in their quality processes. The THEQC has been accredited by the European Association for Quality Assurance in Higher Education (ENQA), an umbrella organization that represents quality assurance organizations from the European Higher Education Area (EHEA) member states and work closely with the Asia Pacific Quality Network (APQN), the International Network for Quality Assurance Agencies in Higher Education (INQAAHE), a world-wide association of 300+ organizations active in the theory and practice of quality assurance in higher education, the Council for Higher Education Accreditation (CHEA) of USA, and the Asia-Pacific Quality Network (APQN). The THEQC has three types of activities: external evaluation of HE institutions, the authorization and recognition processes of accreditation agencies, internalization and dissemination of quality assurance culture in HE institutions (THEQC, 2020a).

The THEQC has developed a set of standards and a rubric to evaluate the HE institutions. However, those standards and the rubric do not include any specific section or any note about open and distance learning as well as OERs or OEPs. Except one part of the rubric includes criteria for the quality of the materials provided to the students in their courses.

The English version of the rubric can be accessed here. In other words, the THEQC does not have a different section or focus on OER, considers OERs like conventional ERs, and apply the same evaluation criteria in evaluating these resources. However, during the pandemic, the THEQC has also focused on online distance education and formed a "Distance Education Working Group" as of 27 March 2020 to be able to guide HE institutions on the components. The working group identified six main components of quality distance education (THEQC, 2020b):

- Distance Education Policy
- Infrastructure and Accessibility
- Competencies
- Learning and Teaching Processes
- Professional Human Resources and Support Services
- Information Security and Ethical Aspects

Along with these components, the working group has also revised the evidence that the institutions applied for accreditation or evaluation can present in their Institutional Self-Evaluation Report Writing Guide. No accreditation or evaluation has been conducted yet according to this revised version of the Guide and the rubric, but accreditation of 13 universities as well as 59 revisits are scheduled to be conducted in late 2020. During these accreditation and evaluation processes, the external evaluators will be using the revised versions and looking for how effectively the HE institutions implemented the ODL. Still, no specific focus on the quality of OERs will be given during these evaluations.

5.2.3 OER Policy

It is difficult to claim that there are broad policy initiatives on open education and OERs or OEPs before the Coronavirus pandemic except for the Principles and Procedures for Distance Education in HE Institutions Act (HEC, 20.02.2014) and Open Higher Education Regulation (06.11.1982 Resmî Gazete #: 17860). This period created awareness about this shortage of policy papers. In conclusion, the HEC's Distance Education Working group, an informal group formed by some experts from different universities working on distance education offerings of their institutions started to be more active in developing policies compared to the prior to the Coronavirus period. Before they were only responsible for examining the new distance education program proposals and reporting their recommendations to the HEC but during the Coronavirus lockdown, they also tried to develop some policy papers to be able to help the universities. HEC's one of first policy papers, the "Pandemic Period Distance Education Applications RoadMap", was issued on March 18, 2020, indicating that the Universities can offer online, open and distance education to complete the semester and use alternative assessments (HEC, 2020a). Later, in April and May, the HEC issued several policies concerning disabled students, academic calendar, final exams, and so forth. One of these policies allowed the institutions to offer 10 to 40 percent of the courses in a program completely online. This might increase the integration and widespread usage of OERs and MOOCs into formal education programs. Lately, in July 2020, the HEC started to work on a guide and shared its first version with directors of the distance education centers (UZEM) about the reopening of HE institutions after the pandemic. In this guide, the HEC provides a series of guidelines and recommendations concerning different aspects of educational processes in the Universities. One part of this guide mentions the HEC's plan for transforming the YÖK Dersleri Platform into an OERs Platform and encourages the institutions to share their resources and the massive open online courses via this platform (HEC, 2020a).

5.2.4 OER Change

Although the pandemic is still unfolding, the HEC, the government agency that takes all the decisions related to HE in Turkey, has already changed a great deal of its previous decisions. For instance, the HEC was not allowing the institutions to offer online education in the fields of science, health, and other applied sciences but the emergency remote education has shown that it is possible to teach online in these fields too. So, the HEC now encourages innovative use of technology in these fields as well as all the others.

Additionally, the need for quality learning materials during the pandemic also created an awareness about the educational resources in Turkish. That was possibly why the HEC included its plan to transform the YÖK Dersleri Platform into an OER Platform. However, there are still several gray areas in this policy paper, such as copyright issues, technological infrastructure, procedures to create and deliver the OERs.

5.3 Meso Level

5.3.1 Infrastructure

As mentioned above, a large number of HE institutions did not have any or sufficient educational delivery infrastructure and the resources to be used in their online courses. In terms of delivery, each institution tried to utilize different alternatives:

- A few didn't have any LMS or any other technological solutions,
- A few others employed internationally known cloud-based LMSs (Blackboard, Desire2Learn, etc.) and Web Conferencing tools (Collaborate, Adobe Connect, etc.),
- Almost one-third of the institutions preferred Turkish third-party solutions (Advancity's ALMS and their Web Conferencing tool, Perculus),
- Some others employed the open-source LMSs (Moodle, Canvas, etc.) along with Web Conferencing tools (BigBlueButton, OpenMeetings, etc.),
- Just a couple of them utilized their own in-house produced LMSs (Anadolu University's eKampus).

Each alternative and each institution had to deal with varying issues and a few common ones, especially during the first weeks of the lockdown in March. For instance, low bandwidth, access to the internet (students, professors), insufficient server setup, problems in customization, heavy simultaneous asynchronous sessions were the major common problems in terms of technological infrastructure. After a while, a big majority has chosen to collaborate with available vendors to be able to cope with these difficulties and also due to lack of skilled technical support staff in their institutions and legal barriers to employing these kinds of staff.

On the other hand, Anadolu University has initiated a technological infrastructure project to be able to help those institutions that do not have any LMS or those who were having difficulties in their LMSs. Anadolu University has been using Canvas and BigBlueButton successfully for years for its face-to-face (on-campus) courses, graduate courses, and certificate programs. With this experience, Anadolu collaborated with the Information Technologies and Communications Agency (BTK), a state institution focusing on the regulation of electronic communications systems in the country. Anadolu set up the same LMS and Web Conferencing tool into BTK's servers and used their internet infrastructure. Anadolu also provided the look and feel customization, and technical support as well as training to the universities that use this system. Since April 2020, around 10 universities have successfully been using Anadolu's this service at no cost, completely free (mergen.btk.gov.tr).

In terms of educational resources, our observations and personal interviews with the available faculty members and administrators have revealed that many institutions let the individual instructors and professors choose the resources they provided to the students. Besides, a great deal of them preferred the materials they had been using in their face-to-face courses, mainly textbooks, presentations, study notes, worksheets, etc. Some prepared their own videos (mostly lectures) by using their mobile devices and Web conferencing tools. A few used Khan Academy Turkey, YouTUBE videos, and the online articles and books provided by ULAKBIM (a state agency established to build Internet and other online services to the universities). On the other hand, only a few institutions provided support for their faculty to create learning materials, mostly videos and texts. But no promotion or encouragement for opening up all these resources was observed.

5.3.2 Quality of OER

Same as macro-level in institutional or regional level no quality measures were set for the educational resources as well as processes due to the need for immediate actions during the pandemic.

5.3.3 OER Change

Our observations have shown that pandemics helped develop awareness at the meso level, too. Institutions have been trying to take actions to improve their technological infrastructure as well as to train their faculty members about finding, creating, and using quality educational resources. The administrators of the HE institutions have initiated

projects to improve their servers, LMSs, Web conferencing tools, and so on; have been looking for experienced experts in instructional design, distance education, assessment, and evaluation to employ; have started to offer online training sessions throughout the summer to improve their professors' knowledge and skills in online teaching and use of digital tools.

5.4 Summary for Coronavirus Period

This report presents digital educational architectures at micro, meso, and macro levels in the Turkish context. At the macro level, both public and private sectors have developed sound policies and practices in order to digitalize their functions. The e-government initiative defines a standard in the digitalization of public services in Turkey. Particularly the policies and structures at a national level are critical in terms of empowering strategies and practices at meso and micro levels. Parallel to the e-government initiative, the HEC has accelerated the digitalization of its functions. The macro-level is critical in setting the digitalization ecology in the country. However, it is difficult to argue that digitalization at the macro level follows similar lines of progress at the meso and micro levels. This is particularly evident in HE and the digitalization of teaching functions at HE institutions. Different universities in Turkey instituted different structures and progress at different levels in the digitalization of their teaching functions. While the Turkish context has a long tradition in open education and digital educational architectures, it was seen that the experience gained is imbalanced. For instance, while some universities have expertise and experience in this regard, some others mostly ignored these aspects and there is a large gap among the universities in terms of digitalization of their functions. At the national, macro level, there is a top-down approach and this strategy hampers the adaptation and widespread use of digital educational architectures which is multiplied with the resistance due to the lack of awareness. The centralized and top-down approach ensures every HE institution has the basic infrastructure. However, the similitude of the entire system curbs the innovative capacities of individual universities. As a result, in the Turkish HE system, only a few universities were able to prove advanced digitalization in HE. Besides, the imbalance between HE institutions in their digitalization practices has negative repercussions on the disadvantaged segments of society. Although digitalization is conceptualized as a social justice tool mitigating the impact of their disadvantaged status these groups have limited access to these infrastructures.

As reported in the meso level on the digitalization of Turkish HE, there is a limited number of joint digitization initiatives at this level. Given the fact that meso level joint initiatives are limited, Turkey needs to progress further at the meso level in the digitalization of HE in order to create an integrated OER ecology. The National Open Courseware Consortium is one of the unique joint initiatives for the dissemination of OERs in Turkey. Instead of joint initiatives, individual institutions, particularly those that have a long tradition in open and distance learning, progressed more in OER than the others. The open courseware movement, MOOCs movement, campus systems movement, and distance education centers movement are the key meso level initiatives for OER in the TurkishHE context. Interestingly, meso level OER initiatives are organized by national-level public organizations such as HEC and the Scientific and Technological Research Council of Turkey.

At the micro-level, there are many infrastructures that are facilitated by central authorities, but they do not specifically adopt the OER/OEP strategy. The most common digitalization infrastructure is the learning management system (LMS). Each institution customizes an LMS according to their own characteristics. These infrastructures mostly serve for storing and delivering educational content. In addition to the LMS, another common infrastructure is the distance education centers of the universities.

Over the last 5 years, with the introduction of faculty performance appraisal and incentive payment for faculty members at public universities, the HECestablished a digital infrastructure in order to evaluate and score the performance of the faculty members. Subsequently, several universities established their own parallel systems which facilitated the transfer of data between micro-level systems (at university level) and macro-level systems (Higher Education Council). This system can be considered as a key digital mechanism connecting two levels in Turkish HE. However, Turkish faculty members prefer to store their academic outputs (books, articles, etc.) in international databases in order to promote these outputs. Many social academic networks (e.g., ResearchGate, Academia, Publons, etc.) fill the gap stemming from the incapability of central structures.

The quality of OER is one of the weakest dimensions in OER practices in Turkey. Unfortunately, there is not a sustainable and institutionalized quality assurance system exclusively for OER at any level. Even the existing quality assurance systems do not possess a separate quality assurance for OER in Turkey. As a result, there is an urgent need for an overarching quality assurance system working at micro, meso, and macro levels for OER in Turkey.

Change and adaptation of OER practices by faculty have been very slow in Turkey as there has not been a clear incentive system or imperative for adopting OER practices. Until now, the micro-level adaptation of digitalization in HE has been progressing on the will of the individual faculty members. Besides, it is important to note that at universities that instituted a culture of OER, the faculty exhibited an intrinsic motivation towards OER. However, at the majority of the universities, such culture has not been evidenced yet.

Overall, the OER and digitalization in HE in Turkey has been very slow and not integrated at macro, meso, and micro levels. However, the unfolding COVID-19 crisis has created an opportunity for advancing digitalization in HE at the macro, meso, and micro levels. It is important to stress that the digital transformation of Turkish HE will not be limited to building certain infrastructures but establishing more full-degree programs at undergraduate and graduate levels. Hence, the recent COVID-19 crisis can be considered as an external catalyst that triggers change and transformation. One peril that may hinder the realization of this opportunity is that students, academics, and academic leaders are espoused to certain weak or bad OER practices under emergency remote teaching. Associating digitalization and OER practices with emergency remote teaching may lead to developing a certain level of resentment towards OER.

6. Overall Conclusion

Turkey has a considerably young and large population, and education has still been seen as one of the major ways of escaping poverty and having a decent living standard. So, an ever-increasing demand for HE has been observed for decades. With more than 200 public and private universities, the Turkish HE education system tries to respond to this demand. Those institutions offering open education, especially Anadolu University's open education system with its approximately 1 million students, have been a solution for this demand. One may easily infer that openness has a critical role in Turkish HE, yet efforts to forge the open education system are needed.

By the second decade of the millennium, the Turkish HE system has made great progress in realizing digital transformation. However, openness is a multifaceted concept, and limiting its capacity to only access solutions can hinder the progress and success of openness in education initiatives.

The negative perception against open education, OER and OEP stand as one of the greatest challenges of the Turkish HE system and further imply that there need to be projects to raise awareness, encourage institutions and motivate individuals.

It is very difficult to observe a systematic program aiming at widening the use of OER. We believe that Turkey needs a sound policy orchestrating the actions for introducing infrastructure, quality, and change at macro, meso, and micro levels. In other words, we see the need for an overarching policy to enrich OER and ensure the effective use of OER. The key target of the policy should be enabling different systems at micro, meso, and macro levels to communicate with each other. Currently, there are infrastructures introduced at meso and macro levels. As we reported at micro-level above, the national level regulatory body, the HEC has introduced the YÖK Dersleri Platform; however, this platform has not gained the momentum to accomplish an integration of the different infrastructures yet. Besides, although they are not common, there are certain infrastructures developed by individual academics within the framework of self-standing projects. Accomplishing a connection and convergence among these infrastructures will be an important step towards enriching the OER and widening its use across the country. While investing in OER it is important to invest in the human resources to run the infrastructures as well as the hardware. In Turkey, prioritizing the hardware and underestimating the role of the human side is very common in public policies. However, both at macro and meso levels locating talents and ensuring that each institution and individual user (typically individual academics) receive necessary support is an important step towards widening the use of OER.

When it comes to quality, the case is not quite different from structure and change. The surveys and analyses that we conducted within the framework of this study show that the current quality frameworks employed at the HE level in Turkey do not recognize OER. In other words, OER does not have any visibility against quality assurance processes employed in Turkish HE organizations. Interestingly, although Turkey possesses a centralized HE system and an autonomous quality assurance system, OER is not recognized as an item for assessment within the framework of quality assurance.

Finally, a key challenge is that a national-level policy is expected to handle attitude change at macro, meso, and micro levels towards OER. Although the COVID-19 accelerated the engagement of the universities, academics, and students with OER, the cool stance towards OER at meso and micro levels is very evident. This reception towards open education practices is not peculiar to the Turkish context. In several different countries, we witness the limited reception of virtual courses (Amirault & Visser, 2010) and online distance programs (Sadykova, 2012). However, in the Turkish context, the misconceptualization of and poor practice of open education augmented the detachment of individual academics and students with OER. It is also important to note that the flagship universities of the country have traditionally put a distance between themselves and open education practices. As we stated in our report at micro, meso, and macro levels, this is largely related to a misunderstanding of the philosophy of openness and the way Turkish scholars and universities perceive openness. As a result, we believe that the overarching policy that we propose should encompass a set of actions to accomplish first a mindset change on the meaning, philosophy, and practices of OER. Building the skills of the academic leaders, academics, and students to build key skills to operate under digitalization and openness would be an important step towards widening the use of OER. Skills such as networked learning, active self-regulated learner skills, media, and digital literacy, autonomy-driven learning, interactive and collaborative learning in an authentic international environment, and open-mindedness are some of the key skills (Rajagopal et al., 2020) that Turkish academic leaders, academics, and students need to build for more effective use of OER.

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8. Appendices

Appendix 1: Turkish Higher Education System

The basic structure of the Turkish National Education System consists of stages of non-compulsory pre-school education; compulsory primary (elementary and middle school) and secondary (high school) education; and higher education. Primary education begins at the age of 5.5 (66 months), lasts eight years and comprises elementary and middle school education, four years each. Secondary education is also four years and divided into two categories as "General High School Education" and " Vocational and Technical High School Education". The entry into these categories is through composite scores obtained from a centralized exam for secondary schools.

The higher education system in Turkey is managed by the HEC which is an autonomous public body responsible for the planning, coordination, governance, and supervision of higher education within the provisions set forth in the Constitution of the Turkish Republic and the Higher Education Law. Both state and non-profit foundation universities are founded by law and subjected to the Higher Education Law and to the regulations enacted in accordance with it.

Higher education in Turkey comprises all post-secondary higher education programmes, consisting of short, first, second, and third cycle degrees in terms of the terminology of the Bologna Process. The structure of Turkish higher education degrees is based on a two-tier system, except for dentistry, pharmacy, medicine and veterinary medicine programmes which have a one-tier system. The duration of these one-tier programmes is five years (300 ECTS) except for medicine which lasts six years (360 ECTS). The qualifications in these one -tier programmes are equivalent to the first cycle (bachelor's) plus second cycle (master's) degree. Undergraduate level of study consists of short cycle (associate's [önlisans]) and first cycle (bachelor's [lisans]) degrees which are awarded after successful completion of full-time two-year (120 ECTS) and four-year (240 ECTS) study programmes, respectively.

Graduate level of study consists of second cycle (master's [yüksek lisans]) and third cycle (doctorate [doktora]) degree programmes. The second cycle is divided into two sub-types named as master without a thesis and master with a thesis. Master programmes without thesis require 60 to 90 ECTS credits and consist of courses and a semester project. 60 ECTS non-thesis master programmes are exceptional and exist in a few disciplines. The master programmes with a thesis require 90 to 120 ECTS credits, which consists of courses, a seminar, and a thesis. Third cycle (doctorate) degree programmes are completed having earned a minimum of 180 ECTS credits, which consists of completion of courses,

passing a proficiency examination and a doctoral thesis. Specialization in medicine, accepted as equivalent to third cycle programmes are carried out within the faculties of medicine, university hospitals and the training hospitals operated by the Ministry of Health.

Universities consist of graduate schools (Institutes) offering second cycle (master's) and third cycle (doctorate) degree programmes, faculties offering first cycle (bachelor's degree) programmes, four-year higher schools offering first cycle (bachelor's) degree programmes with a vocational emphasis and two-year vocational schools offering short cycle (associate's) degree programmes of a strictly vocational nature.

Since 2003, first cycle degree holders may apply directly to third cycle (doctorate) programmes if their performance at the first cycle degree level is exceptionally high and their national central Graduate Education Entrance Examination score is also high, and their application is approved. For these students, theoretical part of the programmes requires additional courses of 60 ECTS credits.

Admission of national students to short and first cycle degree programmes is centralized and based on a nationwide one/two-stage examination(s) conducted by an autonomous public body (Assessment, Selection and Placement Centre [Öğrenci Seçme Yerleştirme Merkezi: ÖSYM]). Candidates gain access to institutions of higher education based on their composite scores consisting of the scores on the selection examination and their high school grade point averages. Admission to graduate programmes is directly conducted by the higher education institutions (HEIs) within the frameworks of the publicly available national and institutional regulations. Admission of foreign students to programmes at all levels of higher education can be done by direct applications of candidates to HEIs based on publicly available national and institutional regulations.

The Turkish National Qualifications Framework for Higher Education (TYYÇ: Türkiye Yükseköğretim Yeterlilikler Çerçevesi): The National Qualifications Framework for Higher Education in Turkey developed with reference to the QF for European Higher Education Area and the EQF for lifelong learning was adopted by the HEC in 2010. The framework has been developed as a part of a single national qualifications framework, which would eventually consists of 8 level national framework covering all levels of educations on completion of the ongoing work at the national level, in which the higher education levels lie on levels between 5 to 8. The levels of the TYYÇ with reference to the European overarching qualifications frameworks as well as that to ECTS credits and student workload are shown below.

* The national credit system is based on contact hours (i.e. theoretical or practical hours per week). 1.0 credit stands for each hour of lecture a week and 0.5 credit stands for each hour of laboratory or practical a week.

The basic structure of the Turkish National Education System consists of non-compulsory pre-school education, compulsory primary (elementary and middle school) and secondary (high school) education, and higher education. Primary education begins at the age of 5.5 (66 months), lasts eight years and involves four years each of elementary and middle school education. Secondary education is also four years but is divided into two categories, "General High School Education" and " Vocational and Technical High School Education". Entry into these categories is based on composite scores obtained from a centralized exam for secondary schools.

The higher education system in Turkey is managed by the Council of Higher Education (CoHE [Yükseköğretim Kurulu: YÖK]), an autonomous public body responsible for the planning, coordination, governance and supervision of higher education within the provisions set forth in the Constitution of the Turkish Republic and the Higher Education Law. Both state and non-profit foundation universities are established on the basis of law and subjected to the Higher Education Law and to the regulations enacted in accordance with it.

Higher education in Turkey includes all post-secondary higher education programs, which consist of short, first, second, and third cycle degrees, in terms of the terminology of the Bologna Process. The structure of Turkish higher education degrees is based on a two-tier system, except for dentistry, pharmacy, medicine and veterinary medicine programs, which have a one-tier system. The duration of these one-tier programs is five years (300 ECTS), except for medicine, which lasts six years (360 ECTS). The qualifications in these one -tier programs are equivalent to the first cycle (bachelor's) plus second cycle (master's) degree. Undergraduate level of study consists of short cycle (associate's [önlisans]) and first cycle (bachelor's [lisans]) degrees which are awarded after successful completion of full-time two-year (120 ECTS) and four-year (240 ECTS) study programs, respectively.

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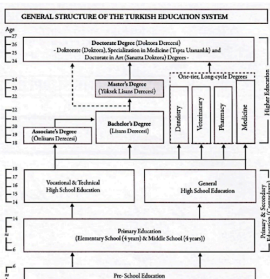
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Admission of national students to short and first cycle degree programs is centralized and based on a nationwide one/two-stage examination(s) conducted by an autonomous public body (Assessment, Selection and Placement Center [Öğrenci Seçme Yerleştirme Merkezi: ÖSYM]). Candidates gain access to institutions of higher education based on their composite scores, which consist of their scores on the selection examination and their high school grade point averages. Admission to graduate programs is directly conducted by the higher education institutions (HEIs) within the frameworks of the publicly available national and institutional regulations. Admission of foreign students to programs at all levels of higher education can be done by direct applications of candidates to HEIs based on publicly available national and institutional regulations.

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* The national credit system is based on contact hours (i.e. theoretical or practical hours per week). 1.0 credit stands for each hour of lecture per week, while 0.5 credit stands for each hour of laboratory work or practicum per week.

Higher Education Levels/Cycles			AWARDS/ DEGREES	LENGTH (Year)	TOTAL ECTS CREDITS (Year x 60 ECTS)	TOTAL STUDENT WORKLOAD (h) (1 ECTS=25-30h)
QF-EHEA	EQF-LLL	TYYÇ LEVELS				
3	8	8	Doctorate / Specialization in Medicine / Doctorate in Art	3 (min.)	180 (min.)	4.500 -5.400
2	7	7	Master's Degree	1 - 2	60 -120	1.500 -3.600
1	6	6	Bachelor's Degree	4	240	6.000 - 7.200
Short Cycle	5	5	Associate's Degree	2	120	3.000 - 3.600

TYYÇ LEVELS, QUALIFICATIONS TYPES AND ECTS CREDITS

GENERAL STRUCTURE OF THE TURKISH EDUCATION SYSTEM

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