北京师范大学智慧学习研究院
Smart Learning Institute of Beijing Normal University

ALECSO

An Overview of Education Development in the Arab Region:

Insights and Recommendations towards Sustainable Development Goals (SDGs)

Please cite the work as follows:
Liu, D., Jemni, M., Huang, R., Wang, Y., Tlili, A., & Sharhan, S. (2021). An overview of education development in the Arab region: Insights and recommendations towards Sustainable Development Goals (SDGs). Beijing: Smart Learning Institute of Beijing Normal University.

Foreword

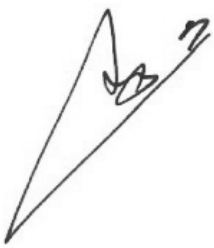
The relationship between China and the Arab region has a long history of economic and cultural exchange, resulting in solid cooperation in different fields. This relationship was expressed through several initiatives, such as the Sino-Arab Cooperation Forum first held in 2004 and the Belt and Road Initiative, which further promoted cooperation between the two regions.

In the same context, the Arab League Educational, Cultural and Scientific Organization (ALECSO) has closely worked with the Smart Learning Institute of Beijing Normal University (SLIBNU) to exchange experts and experiences from both regions, as well as to advance education. This tight cooperation has led to the establishment of the ALECSO-SLIBNU “Smart Education” Joint Lab, the goals of which are to cultivate young talents in both regions about the field of ICT and education, as well as to conduct research to enhance education. The joint lab has published several highly cited books about maintaining education from home during the COVID-19 pandemic, which were later translated into several languages, including Arabic, Chinese, and Turkish.

The current book titled “An Overview of Education Development in the Arab Region: Insights and Recommendations towards Sustainable Development Goals (SDGs)” is another proof of the importance of the ALECSO-SLIBNU joint lab, which focuses on analyzing massive data from the Arab region (22 countries) to promote Sustainable Development Goals (SDGs).

The book provides several valuable insights for different stakeholders (e.g., policymakers, educators, learners) on how to advance and sustain education in the Arab region. I believe that this timely book will serve as a great and useful reference not only for Arab researchers and practitioners, but also for the whole international community.

I wish to thank the authors for their diligent work on this book, which further contributes to the friendly relationship between China and the Arab region, a relationship with longstanding traditions. The prosperity of cultures cannot be achieved without the exchange of thought and ideas. ALECSO will continue to work toward further promoting the fruitful collaboration and deepening the friendly relationship between the Arab region and China.



Dr. Mohamed Ould Amar
Director-General of ALECSO

Foreword

As a close collaboration partner, I would like to congratulate the publication of “An Overview of Education Development in the Arab Region: Insights and Recommendations Towards Sustainable Development Goals (SDGs)” by the Smart Learning Institute of Beijing Normal University (SLIBNU) and the Arab League Educational, Cultural and Scientific Organization (ALECSO). This book illustrates the progress that have been made by the Arab countries in improving education inclusion and equity. We are glad to witness that access to education improved to a great extent in all levels of education in most Arab countries over the past decade. Similar exciting progress can be found in ICT in education. Additionally, the percentage of individuals using internet has increased dramatically in the Arab region across countries with different income levels. The book also illustrates the challenges faced by the low-income Arab countries where most people still have difficulties in accessing to internet and many schools cannot use computers or internet for pedagogical purposes.

Researchers, practitioners, and policy makers therefore need to find more innovative ways of integrating ICT in education. Several insightful recommendations are provided by the book, including improving infrastructure and effective governance in ICT through supportive policy; enhancing education access and quality through the use of innovative technology; enhancing teacher professional development using OER and OEP; and promoting education resilience in crisis.

UNESCO IITE has been joining efforts with SLIBNU and other partners worldwide to promote innovative and inclusive approach of digital transformation of education especially during the COVID-19 pandemic. I hope that this partnership and collaboration could be continued in the future for the shared vision and mission of achieving inclusive and equitable quality education and lifelong learning opportunities for everyone.

Dr. Tao Zhan
Director,
UNESCO Institute for Information Technologies in Education

Foreword

The relationship between China and the Arab region dates to two thousand years ago, when land and maritime Silk Road linked Chinese and Arab nations together. In the long history, China and the Arab region have exchanged goods and cultures, which has contributed to the prosperity of both sides. The connection between China and the Arab countries has become tighter in the new era. In 2004, China-Arab States Cooperation Forum was set up. In 2010, China and Arab states established the strategic cooperative relations of comprehensive cooperation and common development. In 2016, China's Arab Policy Paper was issued, aiming to deepen the cooperation in politics, economy, social development, culture exchanges, and security. In addition, the Belt and Road Initiative proposed by China is supported by the Arab countries.

Cooperation in education and human resources development between the two sides is deeper now than ever, consisting of student exchange, personnel training, and academic research, etc. The scale of student exchange is expanding. The number of Chinese overseas studentsin the Arab countries has rapidly increased and the number of Arab students graduating from Chinese schools or universities is also quickly growing every year. China and Arab states are exploring new models for personnel training. For example, Jordan and China are examining the possibility of establishing a Jordanian-Chinese university to offer education opportunities to Jordanian and Arab students and become a center for technical education. Collaboration also happens regarding academic research. Scholars from China and the Arab region conduct joint scientific research in the field of history, culture, economy, science, technology and of course, education.

In line with the above initiatives, this book, jointly published by the Smart Learning Institute of Beijing Normal University and the Arab League Educational, Cultural and Scientific Organization (ALECSO), aims to help better understand education in the Arab region to achieve sustainable development. The book incorporates rich information and comprehensive analysis of 22 Arab countries in different level of education and provides valuable insights for understanding the education development in the Arab region. More importantly, the Open Interactive Database (OID) that this book is based on provides new opportunities for scholars in China and around the world to utilize the database and conduct studies about the Arab region.

I believe with frequent cultural and educational exchanges, inter-organizational collaborations and jointly research like this book project, the mutual understanding and friendship between the two peoples will be enhanced and the two great civilizations will be both thriving.

Dr. Zuoyu Zhou

Vice president, Beijing Normal University

Preface

The Smart Learning Institute of Beijing Normal University (SLIBNU) and the Arab League Educational, Cultural and Scientific Organization (ALECSO) have been working closely to promote the collaboration between China and the Arab region. SLIBNU thrives to promote the quality of education and enhance the integration between education and ICT, both in China and globally. ALECSO, as the inter-government organization between the 22 Arab countries, has been endeavoring to conduct and coordinate projects related to educational, cultural, scientific and ICT fields in the Arad region and beyond.

Sharing the same vision in enhancing education development, ALECSO and SLIBNU developed the Open Interactive Database (OID), an interactive map which shows detailed statistics about the 22 countries in the Arab region in the field of education, culture, science, ICT, economy, etc. Based on the data from the OID and other sources, a book titled An overview of education development in the Arab region: Insights and recommendation towards Sustainable Development Goals (SDG) was written. The book discusses the education development in primary, secondary and higher education levels in the Arab region. Important issues such as education access and inclusiveness were highlighted. The findings of the book reveal that the Arab countries had made an important progress in increasing education opportunities.

This book could help to achieve the Sustainable Development Goals put forward by United Nation in the Arab region. It could also provide insights for policy makers, researchers, and educators who are interested in the education development in the Arab region. We hope that this book could promote further research and cooperation between China and the Arab region in the field of education.

Dr. Dejian Liu
Co-Dean Smart Learning Institute of BNU
Founder and CEO, NetDragon Websoft Inc

Dr. Mohamed Jemni
Director of ICT at ALECSO

Acknowledgment

Many people have helped us in finalizing this book. They have our great appreciation for the hard work they devoted to conducting research, developing the content, and providing their feedback. Without their incredible support, this book would not have been realized.

Thanks to the researchers who paid diligent effort working on this book and reviewing it, namely Ms. Jiayi Liu, Ms. Tianyue Sun, Ms. Kaidan Yang, and Ms. Jialu Zhao. We would also like to acknowledge the help of several researchers who coordinated the preparation and production of this book, namely Dr. Ting-Wen Chang, Smart Learning Institute of Beijing Normal University; Dr. Xiangling Zhang, Beijing Institute of Education; Dr. Lin Zhu, Beijing International Studies University; and Dr. Hongyi Zhang, Beijing International Studies University.

We would also like to acknowledge the contribution of several experts for their professional feedback to enhance the quality of this book, especially Dr. Zhan Tao, Director of UNESCO IITE and Dr. Tarek Ben Youssef, expert at the Arab League's Educational, Cultural and Scientific Organization (ALECSO).

Finally, our thanks go to all the experts from the Arab League's Educational, Cultural and Scientific Organization (ALECSO), Smart Learning Institute of Beijing Normal University (SLIBNU), Institute for Information Technologies in Education (UNESCO IITE), International Association of Smart Learning Environments (IASLE), for their professional feedback and comments during the preparation of this book.

Contents

List of Figures

List of Tables

List of Indicators

Note: for countries that are not included in the analysis (or some part of it), it is because of unavailability of data related to some indicators.

Economy, Social Development and Culture Chapter

Gross Domestic Product (GDP)

The sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.

GDP per capita

GDP divided by midyear population.

Gross National Income (GNI) per capita

The sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income from abroad, divided by the midyear population.

Literacy rate

Total number of people who can both read and write with understanding a short simple statement about their everyday life, expressed as a percentage of the corresponding population.

Gender parity index (GPI)

The ratio of female to male values of a given indicator. A GPI between 0.97 and 1.03 is signifies parity between women and men. A GPI less than 0.97 indicates disparity favoring male and a value greater than 1.03 indicates disparity favoring female.

National Cultural Dimensions (NCD)

NCD illustrate the effects of a society's culture on the values and behaviors of its members. NCD have six dimensions including Power distance, Uncertainty Avoidance, Individualism, Masculinity-Femininity, Long-Term Orientation vs Short-Term Orientation, and Indulgence vs Restraint.

Information and Communication Technology Chapter

Network Readiness Index (NRI)

NRI measures the equipment and the use of ICT in a country in four domains: Technology, People, Governance and Impact. NRI uses a 0-100 scale. The higher the score, the better the performance of a country.

Percentage of individuals using internet

Proportion of individuals using the Internet, as a percentage of total population of the country (or at least individuals of 5 years and older).

Percentage of personal ownership of computers

Proportion of individuals using a computer, as a percentage of total population of the country (or at least individuals of 5 years and older).

Percentage of personal ownership of mobile phones

Proportion of individuals using a mobile phone, as a percentage of total population of the country (or at least individuals of 5 years and older).

ICT skills

The indicator evaluates how population possess sufficient digital skills such as computer skills, basic coding, digital reading in one country.

Proportion of schools with access to computers for pedagogical purpose

Share of schools with access to computer infrastructure, as a percentage of the total number of schools in a country. The purpose is to enhance teaching and learning and that provides pupils with access to a number of communications services through various devices.

Proportion of schools with access to Internet pedagogical purpose

Share of schools with access to the Internet via fixed narrowband, fixed broadband, or mobile n-etwork, as a percentage of the total number of schools in a country. The purpose is to enhance teaching and learning and that provides pupils with access to a number of communications sev-ices through various devices.

Primary and Secondary Education Chapter

Net Enrollment Rate (NER)

Total number of students of the official age group for a given level of education who are enrolled in any level of education, expressed as a percentage of the corresponding population.

Gross Enrollment Ratio (GER)

Number of students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age.

Persistence to last grade of primary education

Percentage of children enrolled in the first grade of primary school who eventually reach the last grade of primary education.

Percentage of repeaters

Total number of pupils who are enrolled in the same grade as in a previous year, expressed as a percentage of the total enrolment to the specified grade.

Out-of-school rate

Percentage of children in the primary school age, adolescents in the lower secondary school age, youth in the upper secondary school age who do not enroll in schools of corresponding level of education.

Higher Education Chapter

Education attainment rate

Percentage distribution of population aged 25 years and above according to the highest level of education attained or completed with reference to ISCED.

Gross attendance ratio

Number of students attending a given level of education at any time during the reference academic year, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age.

Labor force participation rate

The proportion of the population ages 15 and older that is economically active (people who supply labor for the production of goods and services during a specified period).

Youth not in employment, education or training

The share of young people who are not in employment, education or training, as a percentage of the total number of young people in the corresponding age group.

Government expenditure on education as a percentage of total government expenditure

Total general (local, regional and central) government expenditure on education (current, capital, and transfers), expressed as a percentage of total general government expenditure on all sectors (health, education, social services, etc.).

Government expenditure on education as a percentage of GDP

Total general (local, regional and central) government expenditure on education (current, capital, and transfers), expressed as a percentage of GDP.

Chapter 1

Motivation and Background

Chapter 1. Motivation and Background

1 Sustainable Development Goals

The Sustainable Development Goals (SDGs) or Global Goals are a collection of 17 interlinked global goals designed to be a “blueprint to achieve a better and more sustainable future for all”. The SDGs were set up in 2015 by the United Nations General Assembly and are intended to be achieved by the year 2030 (United Nation, n.d.). They are included in a UN Resolution called the 2030 Agenda or what is colloquially known as Agenda 2030. The SDGs were developed in the Post-2015 Development Agenda as the future global development framework to succeed the Millennium Development Goals which ended in 2015 (United Nation, n.d.).

The 17 SDGs are: (1) No Poverty, (2) Zero Hunger, (3) Good Health and Well-being, (4) Quality Education, (5) Gender Equality, (6) Clean Water and Sanitation, (7) Affordable and Clean Energy, (8) Decent Work and Economic Growth, (9) Industry, Innovation and Infrastructure, (10) Reducing Inequality, (11) Sustainable Cities and Communities, (12) Responsible Consumption and Production, (13) Climate Action, (14) Life Below Water, (15) Life On Land, (16) Peace, Justice, and Strong Institutions, (17) Partnerships for the Goals.

2 Open Science

The Open Education (OE) wave can help to achieve the SDGs of United Nation (Tlili et al., 2020). Under this OE umbrella, open science could be one of the paths to also achieve these goals. Open Science represents a new approach to the scientific process based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools (European Commission, 2016). The OECD defines Open Science as: “to make the primary outputs of publicly funded research results – publications and the research data – publicly accessible in digital format with no or minimal restriction” (OECD, 2015), but it is more than that. Open Science is about extending the principles of openness to the whole research cycle, fostering sharing and collaboration as early as possible thus entailing a systemic change to the way science and research is done.

Open Science is not a new concept itself, although the agreement on this term and its widespread use is relatively recent. Many other terms have been used, and are still used, to refer to the transformation of scientific practice (Science 2.0, e-Science, etc.), but the term Open Science has been preferred by the stakeholders, as it has been stated in the report of the European Commission’s 2014 public consultation on ‘Science 2.0: Science in Transition’ (European Commission, 2015).

One of the rationales behind Open Science movement is that scientific outputs generated by public research is a public good. Science knowledge is a product of social collaboration and its ownership belong to the community, which should be accessed and used at no cost. The other rationale behind the movement is its potential benefit to the society. For researchers, getting access to scientific outputs with no barriers can facilitate better research outcome. For learners and

educators, accessing different scientific outputs (data, statistics, reports etc.) can help them to learn about a specific topic, and contribute to their life-long learning.

3 Description of the Arab region

The Arab region, also known as the Arab nation, or the Arabsphere or the Arab states, consists of 22 Arab countries, which are members of the Arab League. A majority of these countries are located in Western Asia, Northern Africa, Western Africa, and Eastern Africa. The region expanded from the Atlantic Ocean in the west to the Arabian Sea in the east, and from the Mediterranean Sea in the north to the Indian Ocean in the southeast. The eastern part of the Arab region is known as the Mashriq, and the western part as the Maghreb. Standard Arabic is used as the main spoken language throughout the Arab region. However, each country has its local Arabic, known as Darija (Wehr, 2011).

4 Open Interactive Database (OID)

In line with the Open Science wave, an Open Interactive Database (http://observatory.alecso.org/Data/en/) which contains detailed statistics related to the Arab region——22 countries was developed (see Figure 1). Specifically, the indicators covered by the OID, such as in the field of economy, culture and education, can help to evaluate the Arab countries' achievement towards 17 SDGs (see section 1). The purpose of the OID is to provide open-access to data about the Arab region, which researchers, practitioners and decision makers can use to understand, explore and enhance a given field. In addition, this data can promote cross-collaboration between countries to promote the growth of all countries in the Arab region. Specifically, this book analyses the provided data within the OID, as well as other data sources, to provide insights and recommendations towards achieving the SDGs in the Arab region.

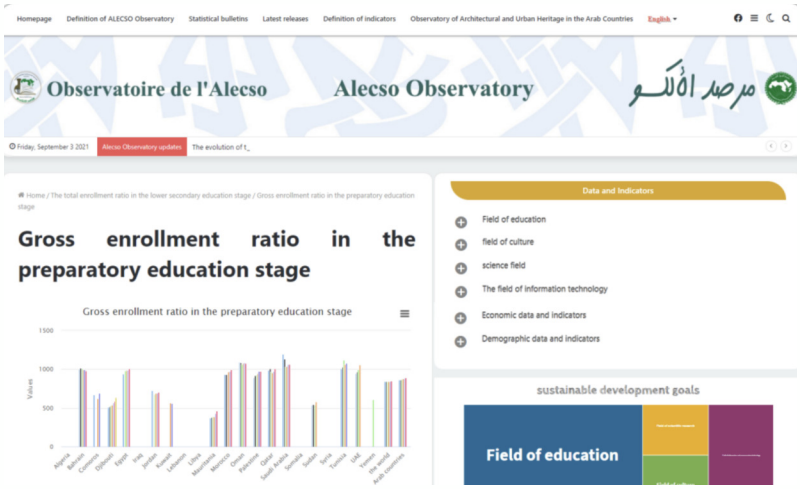


Figure 1: ALECSO Open Interactive Database

Source:ALECSO[1]

[1]Accessed in September, 2021 http://observatory.alecso.org/Data/en/

Chapter 2

Economy, Social Development and Culture

Chapter 2. Economy, Social Development and Culture

This chapter aims to present an overview of economy, social development and culture of the Arab region. As for the economy, both the economy size and structure are addressed. Half of the Arab countries are oil-exporting countries, and six of which belong to the Gulf Corporate Council (GCC), a regional, intergovernmental political and economic union. In the social development part, population, age structure and literacy are presented. As for culture section, Hofstede's National Cultural Dimensions (NCD) is used to illustrate the cultural differences of the Arab countries.

1 Economy

1.1 Economy size

The size of the economy varies significantly across countries. The Gross Domestic Product (GDP) and GDP per capita are used as indicators to illustrate the size of Arab economies. According to The World Bank (n.d.), GDP at purchaser's prices refers the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. GDP per capita refers to the Gross Domestic Product divided by midyear population. Both data are in current U.S. dollars.

As shown in Table 1 (see also Figures 2 and 3), the five countries with relatively high GDP are Saudi Arabia, United Arab Emirates, Egypt, Iraq and Bahrain. The five countries with relatively low GDP are Yemen, Mauritania, Somalia, Djibouti and Comoros. As for GPD per capita, the five countries with relatively high GDG per capita are Qatar, United Arab Emirates, Kuwait, Bahrain, and Saudi Arabia. The five countries with relatively low GDP per capita are Mauritania, Comoros, Yemen, Sudan, Somalia.

Table 1: GDP and GDP per capita

Country	Year	GDP (Current US$) billion	GDP per capita (Current US$)
Algeria	2020	145.16	3,310.4
Bahrain	2019	38.47	23,443.4
Comoros	2020	1.22	1,402.6
Djibouti	2020	3.38	3,425.5
Egypt	2020	363.07	3,547.9
Iraq	2020	167.22	4,157.5
Jordan	2020	43.70	4,282.8
Kuwait	2019	136.20	32,373.3
Lebanon	2020	33.38	4,891.0
Libya	2020	25.42	3,699.2
Mauritania	2020	7.78	1,672.9
Morocco	2020	112.87	3,009.2

Oman	2019	76.33	15,343.0
Palestine	2020	15.56	3239.7
Qatar	2019	146.37	50,805.5
Saudi Arabia	2020	700.12	20,110.3
Somalia	2020	4.92	309.4
Sudan	2020	26.11	595.5
Syria	2007	40.41	2,032.6
Tunisia	2020	39.24	3,319.8
United Arab Emirates	2019	421.14	43,103.3
Yemen	2018	23.49	824.1

Source: The World Bank[2] [3]

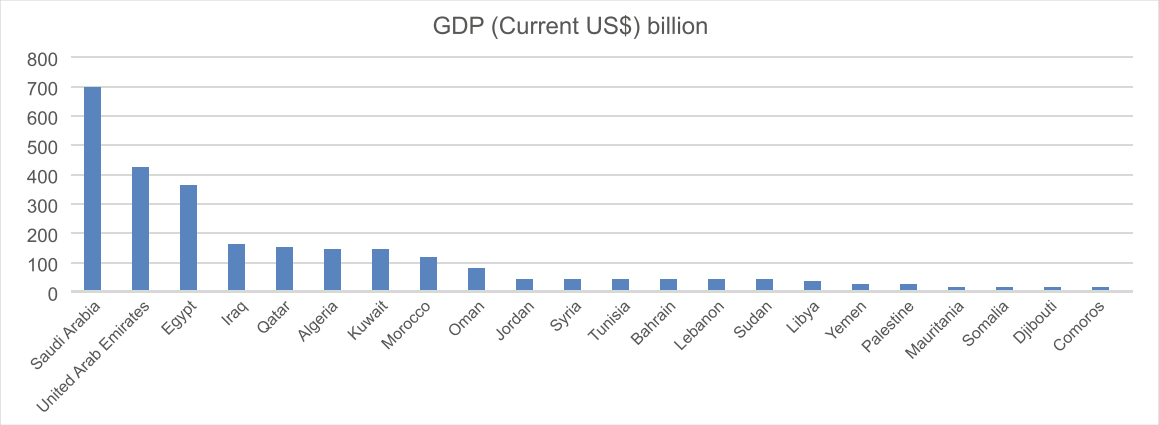


Figure 2: Gross Domestic Product (GDP) of Arab countries

Source: The World Bank[4]

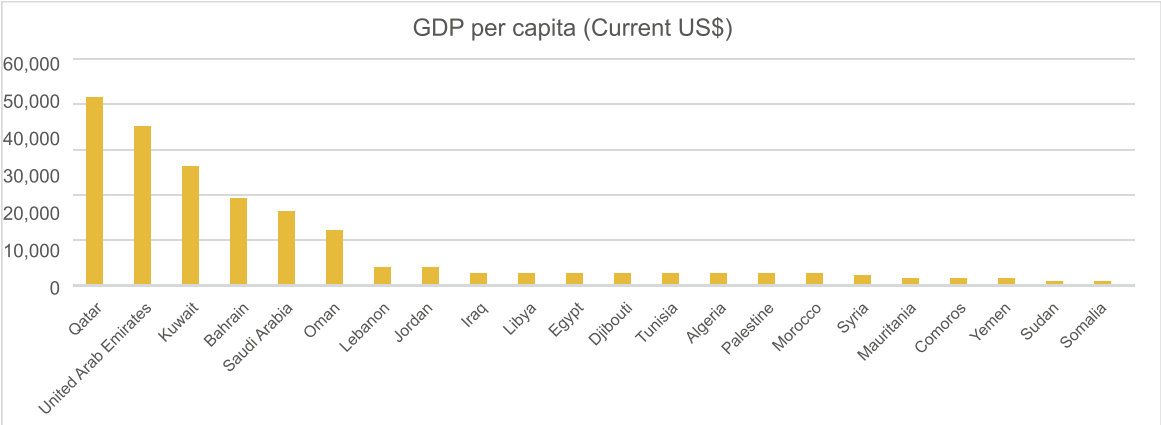


Figure 3: GDP per capita of Arab countries

Source: The World Bank[5]

[2]Accessed in August, 2021 https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=1A
[3]Accessed in August, 2021 https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=1A
[4]Accessed in August, 2021 https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=1A
[5]Accessed in August, 2021 https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=1A

Gross National Income (GNI) per capita is another indicator to evaluate the economy status in the Arab countries. GNI refers to the sum of values added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. GNI per capita is GNI divided by the midyear population (The World Bank, n.d.). According to The World Bank, a country with GNI per capita below $1045 is regarded as low-income economy; a country with GNI per capita between $1046 to $4095 is grouped as lower-middle-income economy; a country with GNI per capita between $4096 to $12695 is grouped as upper-middle-income economy; a country with GNI above $12,696 is categorized as high-income economy. Arab countries are categorized into four categories based on this criterion, as shown in Table 2. Somalia, Sudan, Syria and Yemen belong to the low-income economies; Algeria, Comoros, Djibouti, Egypt, Mauritania, Morocco, Palestine and Tunisia are lower-middle-income economies. Iraq, Jordan, Lebanon and Libya are upper-middle-income economies. Six GCC countries including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates are high-income economies.

Table 2: Gross National Income(GNI) per capita

Income level	Gross National Income (GNI) per capita	Country
Low-income economies	$1045 or less	Somalia, Sudan, Syria, Yemen
Lower-middle-income economies	$1046 to $4095	Algeria, Comoros, Djibouti, Egypt, Mauritania, Morocco, Palestine, Tunisia
Upper-middle-income economies	$4096 to $12695	Iraq, Jordan, Lebanon, Libya
High-income economies	$12,696 or more	Bahrain, Kuwait, Oman, Qatar Saudi Arabia, United Arab Emirates

Source: The World Bank[6] *Fiscal year 2022*

1.2 Economic structure

As shown in Table 3, the Arab countries can be divided into two categories in general: oil-exporting countries and non-oil-exporting countries. There are ten oil-exporting countries in the Arab region, six of which including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates (UAE) belong to GCC. The rest four are non-GCC oil-exporting counties including Algeria, Iraq, Libya and Yemen. Non-oil-exporting countries include Comoros, Djibouti, Egypt, Jordan, Lebanon, Mauritania, Morocco, Palestine, Somalia, Sudan, Syria, Tunisia, most of which locate in Sub-Saharan Africa and North Africa.

According to the International Monetary Fund (IMF, 2016), oil-exporting Arab economies are all highly dependent on oil. Oil is the most important source of government revenue in all these coun-

[6]Accessed in August, 2021 https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

tries. Apart from United Arab Emirates, oil is the main export good in the oil-exporting countries. The diversification of the economy in oil-exporting countries is very low and the oil sector accounts for a large proportion in the economy.

Table 3: Oil-exporting and non-oil-exporting countries in the Arab region

Oil-exporting countries	GCC	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates (UAE)
	Non-GCC oil-exporting countries	Algeria, Iraq, Libya, Yemen
Non-oil-exporting countries	Comoros, Djibouti, Egypt, Jordan, Lebanon, Mauritania, Morocco, Palestine, Somalia, Sudan, Syria, Tunisia	

Source: International Monetary Fund (2016, 2021)

Table 4 shows the GDP of the Arab countries and proportion of each economic sector. Among all ten oil-exporting countries, industry sector which contains oil production accounts for more than 40% of the total GDP whereas the world average is 25%. Industry sector has the highest proportion of the total GDP in Qatar and Kuwait, the number of which are both 57%.

As a consequence of the dominance of the oil sector, the non-oil private sector is relatively small in oil-exporting countries, which only creates limited job opportunities. In addition, the revenue from oil production is usually used in financing of an oversized public sector. In Algeria, Iraq and Saudi Arabia, the government provides more than 30% employment of the total employment (IMF, 2016).

As for the non-oil exporting economies, Egypt, Morocco, Jordan, Tunisia and Palestine have a relatively diversified economy. The proportion of each sector in economy is close to the world average. However, it is worth noticing that agriculture sector is higher than the world average while services sector is lower than the world average in these countries.

In Comoros and Mauritania, the proportion of agriculture sector is over-representative in the economy. Agriculture sector accounts for 33% of the total GDP in Comoros and 19% of in Mauritania. In Lebanon and Djibouti, service sector is the dominant sector which accounts for 78.8% and 76.4% of GDP, respectively.

Table 4: Proportion of different sectors in economy

Country	Agriculture[7] (% of GDP)	Industry[8] (% of GDP)	Manufacturing[9] (% of GDP)	Services[10], value added (% of GDP)
Algeria	12	37	24	46.2
Bahrain	0	42	18	54.9
Comoros	33	9	NA	53.3
Djibouti	1	16	3	76.4
Egypt	11	36	16	50.5
Iraq	1	50	NA	48.6
Jordan	5	24	18	60.9
Kuwait	0	57	7	54.2
Lebanon	3	13	6	78.8
Mauritania	19	25	8	45.8
Morocco	12	25	15	50.9
Oman	2	54	10	48.1
Palestine	7	19	12	60
Qatar	0	57	8	46.7
Saudi Arabia	2	47	13	50.4
Sudan	12	1	NA	12.8
Tunisia	10	23	15	61.7
United Arab Emirates	1	46	9	53.1
Yemen	6	41	NA	18.1
World average	3	26	15	65

Source: The World Bank[11] Year: 2019

2 Social development

2.1 Population size and growth

The total population of the Arab region is 436.08 million at the year of 2020, accounting for 5.6% of the population in the world. As shown in Table 5, Comoros has the smallest population in the Arab region, the number of which is 0.87 million while Egypt has the largest population in the

[7]Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production.

[8]Industry corresponds to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas.

[9]Manufacturing refers to industries belonging to ISIC divisions 15-37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.

[10]Services correspond to ISIC divisions 50-99 and they include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services.

[11]Accessed in August, 2021 http://wdi.worldbank.org/table/4.2

Arab region, the number of which is 102.33 million. Apart from Egypt, the population of most Arab countries is less than 45 million. Out of 22 Arab countries, 11 countries have population less than than 10 million.

Table 5: The amount of population

Country	Total (million)
Comoros	0.87
Djibouti	0.99
Bahrain	1.7
Qatar	2.88
Kuwait	4.27
Mauritania	4.65
Palestine	5.10
Oman	5.11
Lebanon	6.83
Libya	6.87
United Arab Emirates	9.89
Jordan	10.2
Tunisia	11.82
Somalia	15.89
Syria	17.5
Yemen	29.83
Saudi Arabia	34.81
Morocco	36.91
Iraq	40.22
Algeria	43.85
Sudan	43.85
Egypt	102.33
Arab region average	436.38
World average	7753

Source: The World Bank[12] and ALECSO[13] Year: 2020

[12]Accessed in August, 2021 https://data.worldbank.org/indicator/SP.POP.TOTL?locations=1A
[13]Accessed in September, 2021 http://observatory.alecso.org/Data/en/2021/02/08/413/

Table 6: Annual population growth

Country	Total (million)
Lebanon	-0.4
Jordan	1
Tunisia	1.1
Morocco	1.2
United Arab Emirates	1.2
Libya	1.4
Djibouti	1.5
Kuwait	1.5
Saudi Arabia	1.6
Qatar	1.7
Algeria	1.8
Egypt	1.9
Comoros	2.2
Iraq	2.3
Yemen	2.3
Sudan	2.4
Syria	2.5
Palestine	2.5
Oman	2.6
Mauritania	2.7
Somalia	2.9
Bahrain	3.6
Arab region average	1.9
World average	1

Source: The World Bank[14] *Year: 2020*

The annual population growth rate of the Arab region average is 1.9% while the world average is 1%, meaning that the population growth in most Arab countries is faster than the world average. As shown in Table 6, apart from Lebanon, all the other Arab countries have a positive annual population growth rate. The increase rate varies from 1% to 3.6%. Lebanon, on the other hand, has a negative annual population growth rate of -0.4% while Bahrain has the highest annual population growth rate of 3.6%.

[14]Accessed in August, 2021 https://data.worldbank.org/indicator/SP.POP.GROW

2.2 Age structure

As shown in Table 7, 33% of the Arab population is aged 14 and below, 63% of the Arab population is aged 15-64 years old, and 5% of the Arab population is aged 65 and above, while the number for the world average is 25%, 65% and 9% respectively. Therefore, it can be concluded that the Arab region has a larger proportion of young people than the world average.

Age structure varies in different Arab countries. The high-income GCC countries have relative less young population, where the population aged 14 and below accounts for less than 25% of the total population. The low-income counties such as Somalia, Sudan and Yemen and lower-to-middle income countries such as Comoros and Mauritania have a large proportion of young population, where the population aged 14 and below accounts for more than 39% of the whole population.

Table 7: Age structure of the population

Country	Population ages 0-14 (% of total population)	Population ages 15-64 (% of total population)	Population ages 65 and above (% of total population)
Qatar	14	85	2
United Arab Emirates	15	84	1
Bahrain	18	79	3
Kuwait	21	76	3
Oman	22	75	3
Tunisia	24	67	9
Lebanon	25	67	8
Saudi Arabia	25	72	3
Morocco	27	66	8
Libya	28	68	5
Djibouti	29	66	5
Algeria	31	62	7
Syria	31	64	5
Jordan	33	63	4
Egypt	34	61	5
Iraq	38	59	3
Palestine	36	60	4
Comoros	39	58	3
Yemen	39	58	3
Mauritania	40	57	3

Sudan	40	57	4
Somalia	46	51	3
Arab region average	33	63	5
World average	25	65	9

Source: The World Bank[15]and ALECSO[16] Year: 2020

2.3 Literacy

Table 8 shows the adult literacy rate of people in the Arab countries aged 15 and above. Although 100% of literacy rate is the target of the international society, in many Arab countries, there is still a large gap to achieve the goal. The literacy rate in the Arab countries is 73%, lower than the world average level of 86%. The literacy rate is especially low in Mauritania, Comoros and Yemen[17], where nearly one in every two people are illiterate. GCC countries, Jordan, Lebanon and Palestine, have relatively higher literacy rate, the number of which is higher than 90%.

Table 8: Adult Literacy rate (% of people ages 15 and above)

Country	Total	Female	Male	Year
Mauritania	53	43	64	2017
Yemen	54	35	73	2004
Comoros	59	53	65	2018
Sudan	61	56	65	2018
Egypt	71	66	76	2017
Morocco	74	65	83	2018
Tunisia	79	72	86	2014
Algeria	81	75	87	2018
Syria	81	74	88	2004
Iraq	86	80	91	2017
Libya	86	78	94	2004
Qatar	93	95	93	2017
United Arab Emirates	93	95	93	2015
Lebanon	95	93	97	2018
Saudi Arabia	95	93	97	2017
Kuwait	96	95	97	2018
Oman	96	93	97	2018

[15]Accessed in August, 2021 https://data.worldbank.org/indicator/SP.POP.0014.TO.ZS?locations=1A
[16]Accessed in September, 2021 http://observatory.alecso.org/Data/en/2021/02/08/413/
[17]It should be noted that Yemen data is in 2004.

Bahrain	97	95	99	2018
Palestine	97	96	99	2018
Jordan	98	98	99	2018
Arab region average	73	66	80	2019
World average	86	83	90	2019

Source: The World Bank[18]

Youth literacy rate is much higher than the adult literacy rate. As shown in Table 9, the average level of the Arab region is 83% while the world average is 92%. Youth literacy rate is above 90% in 14 countries, among which Bahrain, Lebanon and Libya have achieved 100% literacy rate target.

In terms of gender difference in literacy rate, male adults have higher literacy rate than female adults, but youth literacy rate are close between males and females. Adult literacy rate of male is higher than female in most Arab countries apart from United Arab Emirates and Qatar. As for youth literacy, gender parity index (GPI) is calculated. According to UNESCO Institute for Statistics (UIS, n.d.), gender parity index is defined as the ratio of female to male values of a given indicator. In general, a GPI between 0.97 and 1.03 signifies parity between female and male. A GPI less than 0.97 indicates disparity favoring male and a value greater than 1.03 indicates disparity favoring female. As shown in Table 9, gender parity has been achieved in most Arab countries. However, in Mauritania and Yemen gender disparity strongly favors males. GPI is 0.8 for Mauritania and 0.65 for Yemen, respectively.

Table 9: Youth Literacy rate (% of people ages 15-24)

Country	Total	Male	Female	GPI	Year
Mauritania	64	71	57	0.8	2017
Sudan	73	73	73	1.01	2018
Yemen	77	93	61	0.65	2004
Comoros	78	78	78	1	2018
Egypt	88	89	87	0.97	2017
Syria	92	95	90	0.95	2004
Iraq	94	95	92	0.97	2017
Qatar	95	94	96	1.02	2017
Tunisia	96	97	96	0.99	2014
Algeria	97	98	97	1	2018
Morocco	98	98	97	0.99	2018
Jordan	99	99	99	1	2018

[18]Accessed in August, 2021 https://data.worldbank.org/indicator/SE.ADT.LITR.ZS?locations=1A

Kuwait	99	99	100	1.01	2018
Oman	99	98	99	1.01	2018
Saudi Arabia	99	99	99	1	2017
United Arab Emirates	99	100	99	0.99	2015
Palestine	99	99	99	1	2018
Bahrain	100	100	99	0.99	2018
Lebanon	100	100	100	1	2018
Libya	100	100	99	1	2004
Arab region average	83	85	80	0.94	2019
Word average	92	93	91	0.975	2019

Source: The World Bank[19]

3 Culture

Hofstede's National Cultural Dimensions (NCD) are used as indicators to illustrate the cultural difference of the Arab countries. NCD as the result of a seven-year study investigating the cultural values of the IBM staff working in 72 countries in the 1960s and 1970s, is considered as the most influential cultural framework (Triki et al., 2012; Yang, 2019). NCD have six dimensions including Power Distance, Uncertainty Avoidance, Individualism, Masculinity-Femininity, Long-Term Orientation vs Short-Term Orientation, and Indulgence vs Restraint. The definition of each dimension are as follows:

Power Distance: This dimension refers to the extent to which a society accepts and expects that power is unequally distributed among members. High power distance means that inequality is endorsed by both followers and leaders of a society while low power distance means equally distribution of power is valued by the society.

Uncertainty Avoidance: This dimension deals with a society's tolerance for ambiguity. It indicates to what extent members in a culture feel either uncomfortable or comfortable in unstructured situations. A society with high uncertainty avoidance usually has rigid code for beliefs and behaviors while a society with weak uncertainty avoidance usually has a relaxed attitude towards beliefs and behaviors.

Individualism: This dimension implies the degree to which people in a society are integrated into groups. In culture with high individualism, individuals are expected to look after only themselves and their close family member. For society with high collectivism, individuals can expect their relatives or members of a particular ingroup to take care of them in exchange for unquestioning loyalty.

Masculinity-Femininity: This dimension is a societal character instead of an individual character, which refers to the distribution of values between genders. Countries with high masculinity encou-

[19]Accessed in August, 2021 https://data.worldbank.org/indicator/SE.ADT.1524.LT.ZS?locations=1A

rage competition and people of these countries are more assertive and competitive while countries with high femininity usually value cooperation, modesty, caring for the weak and quality of life. When this dimension is measured, a higher score means high masculinity.

Long-Term Orientation vs Short-Term Orientation: This dimension is related to the choices that people want to focus on. People in a culture with long-term orientation believe the most important events will occur in the future, whereas people with short-term orientation focus on the present. When this dimension is measured, a higher score means a preference for long-term orientation.

Indulgence vs Restraint: Indulgence stands for a society that allows relatively free gratification of basic and natural human desires related to enjoying life and having fun. A society with a preference for Restraint controls gratification of needs and regulates it by strict social norms. When this dimension is measured, a higher score means a preference towards indulgence. (Hofstede, 2011).

Table 10 illustrates the score of the 14 Arab countries on six dimensions of NCD, as well as the average score (calculated by the authors of this book). Generally, the Arab counties have high power distance, meaning that in Arab world, a hierarchical order is accepted by the society member and everyone has its own place in the society. Power distance is especially high among GCC countries and Iraq, where the values are above 90. As for uncertainty avoidance, an average score of 72 indicates that the Arab countries have a strong preference to avoid uncertainty, where certain beliefs and behavior codes are widely accepted by society members. Such preference for uncertainty avoidance is stronger among GCC countries, as well as Egypt and Iraq. In terms of Individualism, the Arab countries have a preference of collectivism, a sense of 'in-group' relationship is important, and everybody tends to protect the fellow member of their group. GCC countries endorse collectivism more than non-GCC countries. Although countries such as Morocco and Tunisia, belong to the collectivism society, they have more individualism orientation than other countries. As for Masculinity-Femininity dimension, the average score is 51, meaning that Arab countries cannot be generally categorized as a competitive-masculinity society or cooperative-femininity society. Iraq, Lebanon and Saudi Arabia have a strong preference of being a masculinity society whereas several northern Africa countries such as Algeria, Egypt and Tunisia, are femininity society. With an average score of 21 on Long-Term Orientation vs Short-term Orientation, it can be concluded that most of the Arab countries have a short-term orientation, where people focus on the present instead of future. It is worth noticing that Egypt has the lowest score with a value of 7 while Saudi Arabia has the highest score with a value of 36. For Indulgence vs Restraint dimension, most Arab countries have a strong preference of restraint apart from Saudi Arabia. Preference for restraint might be a result of impact of religion. Similar to last dimension, Egypt has the lowest score with a value of 4 while Saudi Arabia has the highest score with a value of 52.

Table 10: National Cultural Dimensions

Country	Power Distance	Uncertainty Avoidance	Individualism	Masculinity-Femininity	Long-Term vs Short-Term	Indulgence vs Restraint
Algeria	80	70	35	35	26	32
Egypt	70	80	25	45	7	4
Iraq	95	85	30	70	25	17
Jordan	70	65	30	45	16	43
Kuwait	90	80	25	40	NA	NA
Lebanon	75	50	40	65	14	25
Libya	80	68	38	52	23	34
Morocco	70	68	46	53	14	25
Qatar	93	80	25	55	NA	NA
Saudi Arabia	95	80	25	60	36	52
Syria	80	60	35	52	30	NA
Tunisia	70	75	40	40	NA	NA
United Arab Emirates	90	80	25	50	NA	NA
Arab region average	81	72	32	51	21	29

Source: Hofstede Insights(n.d.)[20]

Summary of the findings

- The income level of the Arab countries ranges from low income to high income. About half of the Arab countries are oil-exporting countries, where oil is a very important source of government revenue.
- The population size of the Arab countries ranges from less than 1 million to more than 100 million. The population in the Arab region is rapidly growing, where youth accounts for a large proportion of the population in many Arab countries.
- The literacy rate in the Arab region is lower than the world average. Male adults have higher literacy rate than female adults. The literacy rate is close between male youth and female youth.
- Culturally, the Arab countries are featured with preference to high Power Distance, Uncertainty Avoidance, Collectivism, Short-Term Orientation and Restraint. Countries varies in Masculinity-Femininity dimension.

[20]Accessed in September, 2021 https://www.hofstede-insights.com/country-comparison/algeria/

Chapter 3

Information and Communication Technology

Chapter 3. Information and Communication Technology

This chapter illustrates the Information and Communication Technology (ICT) in the Arab region. At the beginning of this chapter, an overview of ICT in the Arab region is provided using Network Readiness Index (NRI) as an indicator. Then ICT access and usage are presented using the number of internet users, personal ownership of mobile phones and computers, and evaluation of ICT skills of the Arab countries. In the last part of the chapter, the integration between ICT and education are discussed, by evaluating the access of computer and internet at schools and analyzing the policy and practices of ICT in education.

1 ICT overview: Network Readiness Index

Network Readiness Index (NRI) is one of the most important indicators that has been widely used to measure the equipment and the use of ICT in a country.[21]The 2020 NRI report published by Soumitra Dutta and Bruno Lanvin of Portulans Institute focused on digital transformation and its social and economic impact. NRI uses a 0-100 scale, with 0 indicates the lowest score and 100 as the highest. The higher the score, the better the performance of the country (Dutta & Lanvin, 2020).

NRI 2020 framework includes four pillars, namely Technology, People, Governance, and Impact. Technology pillar evaluates the communication infrastructure, use of technological products, and willingness of adopting new technology in a given country. People pillar concerns how individual, business and government in a given country use and benefit from technology. Governance pillar evaluates policy and regulation environment of a given country. Impact pillar is designed to assess the economic, social, and human influence of participation in the network economy of a given country.

According to 2020 Network Readiness Index report, a total of 134 countries are ranked, which collectively account for almost 98 percent of global GDP. Table 11 presents the data of these 13 Arab countries in terms of four pillars of the NRI: Technology, People, Governance, and Impact. Among the four pillars, most Arab countries have relatively good performance in People pillar but have relatively weak performance in Governance pillar. Despite that individuals, businesses and governments widely utilize ICT for various purposes, lack of trust, inadequate regulation and insufficient inclusion impede effective governance regarding to ICT. United Arab Emirates has the highest NRI score and its score on the four pillars also come on top among the Arab countries. Its overall rank is 30th, out of 134 countries, being the only one Arab country that belongs to the first quartile of all countries. Qatar, Saudi Arabia, Bahrain, Oman and Kuwait are within the second quartile. The five economy entities that have moderate performance in the overall NRI ranking are Jordan, Egypt Lebanon, Tunisia and Morocco, which belong to the third quartile.

[21]Network readiness index(NRI) is originally put forward by the World Economic Forum(WEF) since 2002. NRI was handed over from WEF to Soumitra Dutta and Bruno Lanvin, the originally editors of NRI in 2019 (Wikipedia, 2021).

Yemen and Algeria fall behind the 100th ranks of the index and belong to the last quartile. This result indicates the great heterogeneity in terms of Network Readiness Index in the Arab region. Apart from Jordan and Yemen, countries in Middle East generally have higher network readiness than countries in North Africa. In order to facilitate and accelerate digital transformations in the Arab region, more efforts should be devoted to improving the effective governance of ICT by enhancing trust, regulation and inclusion.

Table 11: Network Readiness Index

Country	NRI	Rank	Technology	Rank	People	Rank	Governance	Rank	Impact	Rank
United Arab Emirates	64	30	55	33	71	11	72	37	61	38
Qatar	60	38	53	35	53	41	69	45	65	30
Saudi Arabia	58	41	50	45	63	26	65	45	54	57
Bahrain	58	42	51	40	52	48	67	42	60	40
Oman	55	44	40	63	50	56	73	35	58	44
Kuwait	52	53	44	55	54	43	54	72	57	47
Jordan	48	69	37	75	54	44	53	73	46	90
Egypt	43	84	33	85	43	80	47	93	48	84
Lebanon	41	90	42	61	48	67	35	123	41	100
Tunisia	41	91	34	81	45	77	44	101	43	98
Morocco	40	93	34	79	39	87	43	102	43	97
Algeria	35	107	26	109	39	86	35	120	41	102
Yemen	18	132	11	131	14	133	17	134	30	128

Source: Dutta & Lanvin (2020)

2 ICT access and usage

2.1 Internet user

The percentage of individuals using internet is used as an indicator to illustrate the level of internet accessibility in a country. The number is calculated by the number of individuals using internet divided by the total population[22](ITU, 2021).

Table 12 shows the percentages of internet users among 13 Arabic states. According to the most recent value, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates have high citizens' internet accessibility, where over 95% of the population can access the internet. However, some countries fall behind: Syrian Arab Republic and Sudan have around 30%-35% internet users in 2017; Yemen is around 25%; Libya, Mauritania is around 20%; Djibouti is less than 15%; Comoros is less than 10%; and only 2% of the people in Somalia are able to access the internet, which is the lowest among these countries.

Table 12: Percentage of individuals using internet

Country	Most recent value	Year	Value of a decade ago	A decade ago	Difference	Change%
Algeria	49.04	2018	10.18	2008	38.86	382%
Bahrain	99.70	2019	53	2009	46.70	88%
Comoros	8.48	2017	2.5	2007	5.98	239%
Djibouti	13.13	2016	1.27	2006	11.86	934%
Egypt	57.28	2019	20	2009	37.28	186%
Iraq	75.00	2018	1	2008	74.00	7400%
Jordan	66.79	2017	20	2007	46.79	234%
Kuwait	99.54	2019	50.8	2009	48.74	96%
Lebanon	78.18	2017	18.74	2007	59.44	317%
Libya	21.76	2017	4.72	2007	17.04	361%
Mauritania	20.08	2017	1.43	2007	18.65	1304%
Morocco	74.38	2019	41.30	2009	33.08	80%
Oman	95.23	2019	26.80	2009	68.43	255%
Palestine	70.62	2019	32.23	2009	38.39	119%
Qatar	99.65	2019	53.10	2009	46.55	88%
Saudi Arabia	95.72	2019	38.00	2009	57.72	152%
Somalia	2.00	2017	1.12	2007	0.88	78%
Sudan	30.87	2017	8.66	2007	22.21	256%

[22]In some cases, population over 5 years old are estimated.

Syria	34.25	2017	11.50	2007	22.75	198%
Tunisia	66.70	2019	34.07	2009	32.63	96%
United Arab Emirates	99.15	2019	64.00	2009	35.15	55%
Yemen	26.72	2017	5.01	2007	21.71	433%

Source: ITU Percentage of individuals using internet[23]

Figure 4 presents the changes in percentage of internet users of these counties over a decade. Large progress about percentage of internet users has been made in Iraq, Mauritania and Djibouti. Internet users only account for 1% of the population a decade ago in each country while the most recent value is 75% in Iraq, 20% in Mauritania and 12% in Djibouti. It is also seen that the percentage of internet users in Yemen, Algeria, Libya and Lebanon has increased more than 3 times since a decade ago.

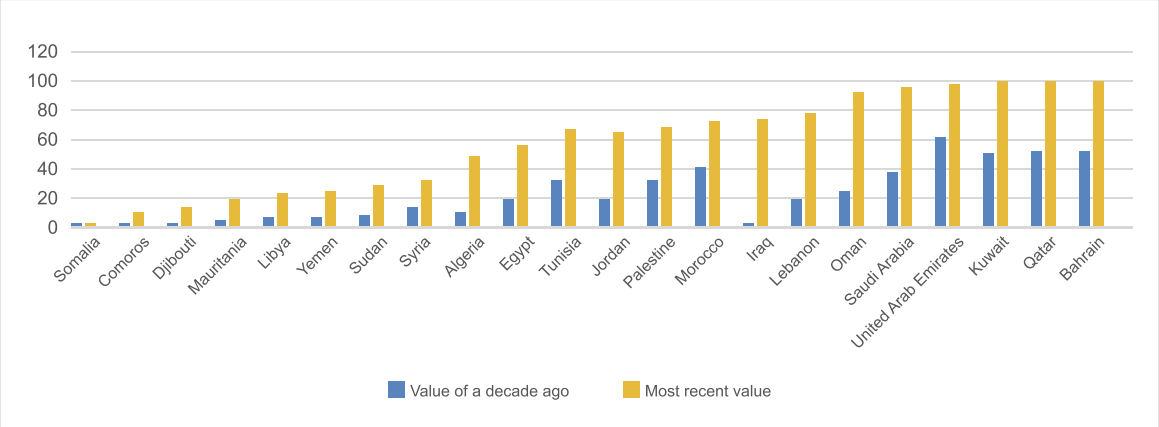


Figure 4: Percentage of individuals using Internet: Change over a decade

Source: ITU Percentage of individuals using internet[24]

2.2 Personal ownership of computers and mobile phones

Table 13 presents the percentage of individuals with computers and mobile phone ownership in several Arab countries. Ownership of computers varies across countries. Only 4.4% of the population in Iraq, 26% of the population in Palestine and 33.3% of the population in Algeria have ownership of computers. In contrast, personal computer ownership in Oman, Bahrain and United Arab Emirates have exceeded 90%.

It is seen that mobile ownership exceeds 70% in every country with available data (see Table 13). The ownership of mobile phones is higher than the ownership of computers in most Arab countries. The affordable price of phones compared to computers might be the reason for these findings. In general, United Arab Emirates is the only country with all individuals possess both a

[23]Accessed in August, 2021 https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx
[24]Accessed in August, 2021 https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

computer and a mobile phone. Over 90% of the population in most countries owns a mobile device. Only 70.3% population in Iraq owns a mobile device, the number of which is the lowest among the Arab countries.

Table 13: Percentage of personal ownership of computers and mobile phones

Country	Computer	Year	Mobile phone	Year
Algeria	33.3	2018	91.7	2018
Bahrain	94.8	2019	100.0	2019
Egypt	56.7	2019	99.4	2019
Iraq	4.4	2019	70.3	2019
Kuwait	81.1	2018	99.0	2018
Morocco	64.3	2018	95.4	2018
Oman	95.0	2019	94.0	2016
Palestine	26.0	2019	86.1	2019
Qatar	82.6	2019	100.0	2019
Saudi Arabia	67.8	2019	99.2	2019
United Arab Emirates	100.0	2019	100.0	2019

Source：ITU Core indicator on access and use of ICT[25]

2.3 ICT skills

The evaluation of ICT skills is presented in this section. The original data is from the Executive Opinion Survey 2018–2019 by the World Economic Forum. Participants of the survey were asked to evaluate to what extent does the active population possess sufficient digital skills such as computer skills, basic coding, digital reading in their countries. The original survey used a 7-point scale. We present in this section the converted score by Portulans Institute. The measurement of ICT skills by Portulans Institute uses a 0-100 scale, with 0 indicates the lowest score and 100 as the highest. The higher the score, the better the performance of ICT skills (Dutta & Lanvin, 2020). Table 14 shows the ICT skills scores of 13 Arab countries. Among these countries, United Arab Emirates, Qatar and Saudi Arabia have the highest ICT skill scores of 85. Yemen has the lowest ICT skills score of 32, indicating that people there have limited ICT skills.

[25]Accessed in August, 2021 https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

Table 14: ICT skills of the population

Country	ICT skills
United Arab Emirates	85
Bahrain	74
Algeria	45
Egypt	65
Jordan	73
Kuwait	52
Lebanon	77
Morocco	42
Oman	72
Qatar	85
Saudi Arabia	85
Tunisia	53
Yemen	32

Source: Dutta & Lanvin (2020)

3 ICT in Education

3.1 Computer and internet access at school

Information and Communication Technology plays an important role in education. By facilitating accessibility and inclusiveness of education, enhancing teacher professional development, improving the quality of learning, and promoting education administration and governance, ICT can complement, enrich and transform education in a better way (UNESCO, n,d.). This section first presents the access of computer and internet at different level of school. It then presents the policy and practices that adopted by the Arab countries in the field of ICT in education.

Computers used in schools can enhance teaching and learning as well as providing students with access to a number of communication services. The proportion of schools with access to computers is calculated by the number of schools equipped with computer infrastructure divided by the total number of schools in a country. Table 15 shows the proportion of schools with computer access of both primary and secondary levels. Among 13 Arab countries, five countries—Bahrain, Oman, Qatar, Saudi Arabia and United Arab Emirates—have realized full computer access in all primary and secondary schools. Comoros has insufficient computer access in educational institutes at both primary and secondary levels. Jordan has insufficient computer access at both primary level and lower secondary level, but achieved full access to computer at upper secondary level. Mauritania has a very low computer access rate at primary level, but it achieved full access at secondary level of education.

Generally, higher level education institutions are equipped with more computers than lower level education institution. To illustrate, for primary education, only six GCC countries have achieved full computer access. Jordan and Mauritania are at the bottom, with 13.4% and 14%, respectively, followed by 30.8% in Comoros, and 66.5% in Lebanon. For the lower secondary level, seven countries have realized full computer access. Comoros has the lowest computer access rate of 40.5%. The rest have all reached above 60% of computer access. For upper secondary schools, 8 out of 13 countries have achieved full computer access for pedagogical purposes, and most countries have reached above 90% computer access.

Table 15: Proportion of schools with access to computer for pedagogical purpose

Country	Primary	Year	Lower secondary	Year	Upper secondary	Year
Jordan	13.4	2019	61.5	2019	100	2019
Mauritania	14	2017	100	2016	100	2017
Comoros	30.8	2017	40.5	2017	52.5	2017
Lebanon	66.5	2019	81	2019	91.8	2019
Morocco	76.5	2019	86.2	2019	89.9	2019
Palestine	93.9	2019	97.9	2019	99.1	2019
Egypt	94.7	2019	94.8	2017	91.2	2017
Tunisia	95.6	2018	99.8	2018	98.4	2018
Bahrain	100	2019	100	2019	100	2019
Kuwait	100	2019	100	2019	100	2019
Oman	100	2019	100	2019	100	2019
Qatar	100	2019	100	2019	100	2019
Saudi Arabia	100	2019	100	2019	100	2019
United Arab Emirates	100	2019	100	2019	100	2019

Source: UNESCO SDG4 Global data book by target[26]

According to the International Telecommunication Union (ITU, 2021), the proportion of schools with access to internet for pedagogical purposes (%) is calculated by the number of primary schools with internet infrastructure divided by the total number of schools in a country. Table 16 represents internet access in schools in the Arab region. It is seen that six GCC countries are facilitated with full internet access, same as the access to computer. Comoros is still at the bottom

[26] Accessed in August, 2021 http://tcg.uis.unesco.org/data-resources/

with the internet access rate in every level of education below 15%. In addition, Jordan has insufficient internet access at both primary and lower secondary level but has achieved full access to internet at upper secondary level.

As it shown in Table 16, all countries except Comoros, Jordan and Tunisia have reached above 70% of internet access at primary schools. All countries except Comoros and Jordan have reached above 85% of internet access at lower secondary schools. All countries except Comoros and Egypt have reached above 89% of internet access at upper secondary level.

Table 16: Proportion of schools with access to Internet for pedagogical purposes

Country	Primary	Year	Lower secondary	Year	Upper secondary	Year
Comoros	8	2017	9.9	2017	12.7	2017
Jordan	13.4	2019	61.5	2019	100	2019
Tunisia	48.7	2018	99.5	2018	95.4	2018
Egypt	71.3	2019	91	2019	47.1	2016
Morocco	82.8	2019	86.8	2019	89.3	2019
Palestine	90.8	2019	95.8	2019	98.3	2019
Lebanon	91.1	2019	94.4	2019	96.2	2019
Bahrain	100	2019	100	2019	98.4	2019
Kuwait	100	2019	100	2019	100	2019
Oman	100	2019	100	2019	100	2019
Qatar	100	2019	100	2019	100	2019
Saudi Arabia	100	2019	100	2019	100	2019
United Arab Emirates	100	2019	100	2019	100	2019

Source: UNESCO SDG4 Global data book by target[27]

3.2 Policy and practices

This section presents the policies and practices related to ICT in education in the Arab region. ICT policies and practices launched in the Arab region are analyzed, such as the Generalization of Information and Communication Technologies in Education (GENIE) program in Morocco, AI Strategy and Electronic Bag Project in Qatar, Universal Access Projects in Sudan, etc. As shown in Table 17, 6 themes are generated from the policy documents we analyzed, namely: providing teacher training to improve their ICT skills; establishing national committee to promote digitalization in education; building E-platform for educational purposes; equipping schools and universities

[27]Accessed in August, 2021 http://tcg.uis.unesco.org/data-resources/

with IT infrastructures, creating digital resources; and integrating emerging technologies into teaching and learning. Examples are provided to illustrate the detail of ICT policies and practices.

Table 17: ICT policies and practices

Theme	Elaboration	Example	Country
Teacher training	Training teachers at schools and universities about the use of technology, equipping teachers with necessary skills for integrating ICT into their teaching practices.	In Jordan, teachers were trained on how to use the technological communication tools, such as Zoom application and interactive online sessions. In Palestine, a national center has been established by MOE to train teachers to integrate technology such as virtual reality and simulation in their teaching.	Morocco Jordan Palestine Qatar Saudi Arabia
Establish committee	Establishing a national committee to promote digitalization in education	A committee has been established in the Federal Ministry of General Education (FMoGE) of Sud-an to promote the applications of ICT in schools.	Oman Sudan
E-platform	E-platforms have been launched for educational purposes.	ICTE portal in Morocco Mint for digital education in Sudan TRA academy in UAE DARSAK platform in Jordan	Morocco Oman Sudan UAE Jordan

Equipment and Infrastructure	Equipping schools and universities with IT infrastructures such as Tablets and personal computers.	In Morocco, the Generalization of Information and Communication Technologies in Education (GENIE) program aims to enhance the development of digital use in educational environment by equipping schools with IT infrastructures. In Qatar, Electronic Bag Project initiated by the Supreme Education Council aims to foster and promote the interactive classroom environment in all schools by providing them with Tablets and personal computers.	Morocco Qatar Algeria Egypt
Digital resources	Create national digital resources laboratory and digital library	Digital library in Saudi Arabia is initiated by The Ministry of Education which covers various disciplines and interactive books	Morocco Saudi Arabia
Integrate technology into curriculum and pedagogy	Emerging technologies have been adopted to facilitate teaching and learning at schools, especially in science education.	In Palestine, simulation, mobile devices, robotics, virtual reality, artificial intelligence and augmented reality are used in science education. In Saudi Arabia, Blackboard have been applied for science education. In Dubai of UAE, schools will incorporate VR technology into their teaching	Palestine Saudi Arabia UAE

Source: Huang et al. (2021)

Summary of the findings

- Most Arab countries are ranked in the second and third quartile in the NRI ranking. Although ICT is widely used for various purposes, lack of trust, inadequate regulation and insufficient inclusion impede effective governance regarding ICT in the Arab region.
- There is a large variation of access to internet in Arab countries. The percentage of individuals using internet ranges from 2% to 100%. Similarly, great variation can be found in terms of ownership of computers, ranging from 4.4% to 100%. It is seen that ownership of phones is higher than computers.
- Most of the ICT policy and practice in the Arab region are concerned about providing teacher training, establishing national committees, building E-platforms; creating digital resources; providing ICT infrastructure to schools and universities, and integrating the emerging technology into teaching and learning.

Chapter 4

Primary and Secondary Education

Chapter 4. Primary and Secondary Education

This chapter aims to provide a comprehensive understanding of education in the Arab region, both at primary and secondary levels. The first section introduces the education system of the 22 Arab countries, which covers the duration of different stages of education. In the second section, students' access to primary and secondary education is presented. This section includes students' enrollment and persistence, out-of-school children, adolescents and youth, and gender disparity. In the last section, Arab students academic performance in large-scale international assessments such as PISA and TIMSS are presented and discussed.

1 Education system

Different systems of education are adopted in the Arab countries, as shown in Table 18. The duration of primary education in most countries is 6 years; four countries including Algeria, Djibouti, Kuwait and United Arab Emirates have a 5-year duration. Palestine and Oman have the shortest duration of primary education with only 4 years. The duration of lower secondary education varies from 2 years to 6 years and in most countries the duration is 3 years. Lower secondary education in Somalia and Sudan has the shortest duration with only 2 years. Oman has the longest lower secondary education duration with 6 years. The duration of upper secondary education is 3 years in most countries. Jordan and Oman have 2 years while Somalia and Tunisia have 4 years. The compulsory education in most Arab countries covers primary education and lower secondary education. The compulsory education in Comoros, Iraq and United Arab Emirates, however, only covers primary education (pre-primary education is not the concern of this book). Compulsory education is not available in Somalia. The number of students in the Arab region can be seen in the Appendix.

Table 18: Duration of different level of education

Country	Year of primary-secondary education (compulsory)	Year of primary-secondary (free)	Duration of primary education	Duration of lower secondary education	Duration of upper secondary education
Algeria	10	12	5	4	3
Bahrain	9	12	6	3	3
Comoros	6	6	6	4	3
Djibouti	10+1	12+1	5	4	3
Egypt	12	12	6	3	3
Iraq	6	12	6	3	3
Jordan	10	12	6	4	2

Kuwait	9	12	5	4	3
Lebanon	10	9	6	3	3
Libya	9	9	6	3	3
Mauritania	9	13	6	4	3
Morocco	9	9	6	3	3
Oman	10	12	4	6	2
Palestine	10	12	4	5	3
Qatar	9	9	6	3	3
Saudi Arabia	9	12	6	3	3
Somalia	0	NA	6	2	4
Sudan	8	11-3	6	2	3
Syria	9	12	6	3	3
Tunisia	9	11	6	3	4
United Arab Emirates	6	12	5	4	3
Yemen	9	9	6	3	3

Source: UNESCO (2020) Global education monitoring report[28]

Note: cells in color mean compulsory education

2 Access to education

This section discusses the Arab students' access to education. Table 19 illustrates the overview of education development level of the 22 Arab countries. Countries with high education development level include United Arab Emirates, Oman, Saudi Arabia, and Qatar, which have achieved or are close to achieve universal primary and secondary education. More than 95% of school-aged children and adolescents in these countries are able to attend primary and secondary education. More than 90% of the enrolled primary school students in these countries continue to the last grade of primary school. The out-of-school rates are less than 3% for children, less than 5% for adolescents, and less than 10% for youth. Bahrain, Egypt and Palestine are the countries with middle education development level. These countries have achieved or close to achieving a universal system for primary education, but not for secondary education. Secondary education enrollment rate in these countries are between 85% to 90%. Countries with middle education development level have higher out-of-school rate for upper secondary youth than than countries with high education development level. If substantial progress is to be achieved in education development, much effort is to be made to reduce the out-of-school students in upper secondary

[28]Accessed in July, 2021 https://en.unesco.org/gem-report/report/2020/inclusion

level among these countries. Countries with low education development level include Comoros, Djibouti, Jordan, Mauritania, Sudan, Syria, and Yemen. Some of these countries are in Sub-Saharan Africa and some suffer from conflicts and wars. Primary education enrollment rate is below 85%. For secondary education enrollment rate, the number is below 50%. One in seven children is out of primary school; one in five adolescents is out of lower secondary school; and one in two youth are out of upper secondary school.

Table 19: Overview of education development level

Education development level	High	Middle	Low
Feature	Universal or close to universal primary and secondary education	Universal or close to universal primary education	Low level of enrollment rate and high level of out of school rate
Countries	Oman Qatar Saudi Arabia United Arab Emirates	Bahrain Egypt Palestine	Comoros Djibouti Jorda Mauritania Sudan Syria Yemen
Primary education NER	>95%	close to 95%	<85%
Secondary education NER	>95%	85%-95%	<75%
Primary education persistence	>90%	>90%	<85% (the number for Jordan is 95%)
Out of school children (Primary education)	<5%	<5%	>15%
Out of school adolescents (Lower secondary education)	<5%	<5%	>20%
Out of school youth (Upper secondary education)	<10%	<25%	>50%

Note: the classification standard is based on UNESCO (2012) World Atlas of gender equality in education report.

2.1 Enrollment and persistance

Net Enrollment Rate (NER) and Gross Enrollment Ratio (GER) are commonly used to evaluate levels of education enrollment. According to UNESCO Institute for Statistics (UIS, n.d.), Net Enrollment Rate is defined as 'the total number of students of the official age group for a given level of education who are enrolled in any level of education, expressed as a percentage of the corresponding population' whereas Gross Enrollment Ratio is defined as 'the number of students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education'. Since it is possible for over-aged students and underaged students in school participation, GER can exceed 100% in some cases. Considering that NER can better reflect the actual enrollment without using repetition and late entrants' information as reference, NER is mainly used as an indicator to evaluate school participation while GER is provided as supplementary information in this book. The information can be seen in Table 20 and 21. The difference between NER of primary and secondary education is shown in Figure 5.

In 2015 Millennium Development Goals released by United Nation, the second goal is to achieve universal primary education. Although according to The World Bank (n.d.), as shown in Table 20, the world average primary school NER has reached an estimate of 90%, the average NER of primary education in the Arab region, however, has only reached 85% in 2018. Meanwhile, NER of secondary education in the Arab region (64%) is slightly lower than the world average level (66%). There is a great variation regarding NER withinthe Arab region, as it shown in Table 20. Arab countries in North Africa and Western Asia generally have a high level of NER whereas countries in Sub-Saharan Africa have a low level of NER. A threshold of 97 percent is often used as a determination of universal primary education (United Nations, 2015). Based on this standard, Qatar, Egypt, Bahrain, United Arab Emirates, Tunisia, Morocco and Algeria have achieved universal primary education. Saudi Arabia and Oman are close to achieving this goal with a 95% NER. NERs of Sudan, Djibouti, Syria, Mauritania, Jordan, Comoros, and Yemen, however, are below the average level of the Arab region. The lowest NER can be found in Sudan and Djibouti, as only 62% of the children of the primary school age in these two countries can participate in school.

Table 20: Net Enrollment Rate in primary and secondary education

Country	Primary education			Secondary education				
	Most recent value	Most recent year	Value of a decade ago	A decade ago	Most recent value	Most recent year	Value of a decade ago	A decade ago
Algeria	100	2018	97	2008	NA	NA	NA	NA
Bahrain	98	2018	92	2006	89	2019	88	2011
Comoros	82	2018	79	2007	50	2018	44	2013
Djibouti	62	2018	48	2008	38	2015	NA	NA
Egypt	98	2018	94	2007	85	2019	77	2014
Iraq	93	2004	79	1996	45	2007	NA	NA
Jordan	81	2018	87	2008	65	2019	77	2011

Kuwait	88	2018	99	2018	87	2015	86	2011
Lebanon	NA	NA	NA	NA	NA	NA	NA	NA
Libya	NA	NA	NA	NA	58	1983	NA	NA
Mauritania	80	2018	73	2008	34	2019	22	2012
Morocco	99	2018	90	2008	66	2019	54	2011
Oman	95	2018	99	2011	96	2019	90	2011
Palestine	94	2019	88	2011	88	2019	81	2011
Qatar	98	2018	100	2007	NA	NA	NA	NA
Saudi Arabia	95	2018	97	2010	96	2018	90	2016
Somalia	NA	NA	NA	NA	NA	1980	NA	NA
Sudan	62	2017	59	2011	40	2018	32	2011
Syria	72	2013	93	2003	49	2013	69	2011
Tunisia	99	2013	99	2003	32	1985	NA	NA
United Arab Emirates	99	2017	94	2007	97	2019	87	2016
Yemen	84	2016	77	2005	48	2016	42	2012
Arab region average	85	2018	84	2008	64	2018	58	2008
World average	90	2018	90	2008	66	2018	61	2008

Source: The World Bank[29] Source: UNESCO Institute for Statistics (UIS) database[30]

Note: If data of a decade ago is not available, data of the adjacent year is used as substitution

[29]Accessed in July, 2021 https://data.worldbank.org/indicator/SE.PRM.NENR

[30]Accessed in July 2021(data are collected separately from each country) http://uis.unesco.org/en/country/ps

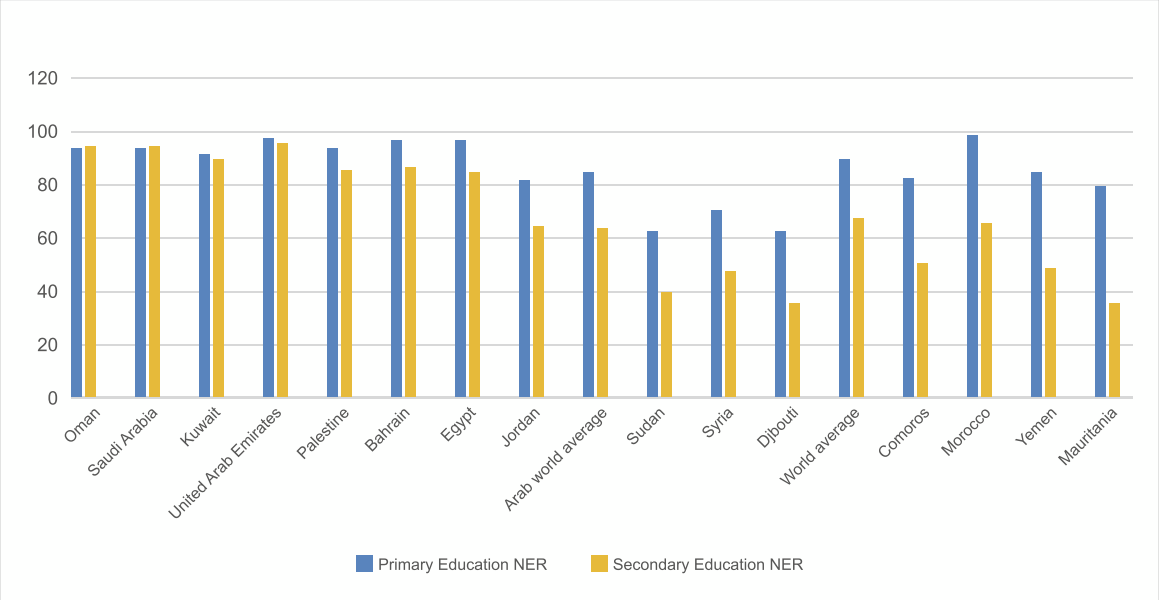


Figure 5: NER of primary and secondary education

Source: The World Bank[31] and UNESCO UIS[32]

Table 21: Gross Enrollment Ratio of primary and secondary education

Country	Primary education	Year	Lower secondary education	Upper secondary education	Year
Algeria	107	2019	NA	NA	NA
Bahrain	98	2019	98	96	2019
Comoros	100	2018	69	45	2018
Djibouti	75	2019	59	43	2019
Egypt	106	2019	101	78	2019
Iraq	NA	NA	NA	NA	NA
Jordan	82	2019	70	54	2019
Kuwait	88	2019	56	57	2018
Lebanon	NA	NA	NA	NA	NA
Libya	NA	NA	NA	NA	NA
Mauritania	100	2019	46	29	2019
Morocco	115	2019	100	62	2019
Oman	103	2019	108	105	2019
Palestine	98	2019	98	78	2019
Qatar	104	2019	101	109	2019
Saudi Arabia	101	2019	106	118	2019

[31]Accessed in July, 2021 https://data.worldbank.org/indicator/SE.PRM.NENR

[32]Accessed in July, 2021 http://uis.unesco.org/en/country/ps

Somalia	107	2019	NA	NA	NA
Sudan	98	2019	98	96	2019
Syria	100	2018	69	45	2018
Tunisia	75	2019	59	43	2019
UAE	106	2019	101	78	2019
Yemen	NA	NA	NA	NA	NA
Arab region average	82	2019	70	54	2019
World average	88	2019	56	57	2018

Note: GER data of lower secondary education and upper secondary education are of the same year

Source: ALECSO[33]

Both enrollment and persistence rates are important when it comes to education access of primary education. Table 22 illustrates the persistence rate of primary education. The persistence rates for Saudi Arabia, Oman, and Egypt are 99%, meaning that almost all the students who enrolled in primary education are able to reach the last grade. Yemen, Mauritania and Iraq have relatively low persistence rate, about one-third of the students who enrolled in primary education did not reach the last grade. The average persistence rate for the Arab region is 82%, meaning that almost one in every five students did not reach the last grade of primary school.

NERs of secondary education also diversify among the Arab region. As shown in Table 20, United Arab Emirates, Oman and Saudi Arabia are among the first rank, which have almost achieved universal secondary education. NERs of Bahrain, Palestine, Kuwait, and Egypt are between 85% to 90%, indicating most adolescents in those countries are able to accept secondary education. NERs of Morocco (66%) and Jordan (65%) are close to the average level of the Arab countries and the world. The situation of secondary education in the Sub-Saharan countries and the countries suffer from conflict is far from ideal. NERs of Comoros, Syria, Yemen, Sudan, Djibouti and Mauritania are among the lowest rank of the Arab countries, the number of which are below 50%.

Poverty and conflict are reasons that hinder children to participate in education. According to the UNICEF (2018) report, Comoros, Mauritania, Sudan and Yemen are regarded as the countries with high acute poverty and high moderate poverty, where the children suffer from high level of deprivation of water, sanitation, housing, information and education. National poverty has reached 45% in Syria and 55% in Yemen due to conflict by 2014 (ESCWA, 2014).

[33]Accessed in July, 2021 http://observatory.alecso.org/Data/en/2021/01/22/acceil/

Table 22: Persistence to last grade of primary education (% of cohort)

Country	Total	Most recent year
Saudi Arabia	99	2007
Oman	99	2018
Egypt	99	2018
Bahrain	97	2018
Jordan	95	2018
Tunisia	94	2016
Morocco	94	2018
Syria	93	2011
United Arab Emirates	92	2012
Algeria	92	2018
Kuwait	89	2018
Qatar	87	2018
Lebanon	85	2018
Djibouti	84	2013
Libya	82	1980
Sudan	75	2016
Comoros	71	2013
Yemen	69	2012
Mauritania	65	2016
Iraq	49	1999
Arab region average	82	2018

Source: The World Bank[34]

Over the past decade, significant progress have been made in primary school participation in the Arab region, as shown in Figure 6. In Sub-sarhara Africa, NER of primary education in Djibouti has a 14 percentage points increase from 48% to 62%, Maruitania has a 7 percentage points increase from 73% to 80%. Despite the conflict in Yemen, the enrollmemt rate experienced a 7 percentage points increase from 77% to 84%. The progress in Sudan and Comoros is rather mild with a 3 percentage points increase in both cases. Moreover, those with relatively good primary education participation level, such as United Arab Emirate, Egypt, Morocco and Barhrain, have made a substantial progress and and achieved universal primary education over a decade. The increase of NER of primary education in those countries varied from 4% to 9%.

[34]Accessed in July, 2021 https://data.worldbank.org/indicator/SE.PRM.PRSL.ZS?locations=1A&name_desc=true

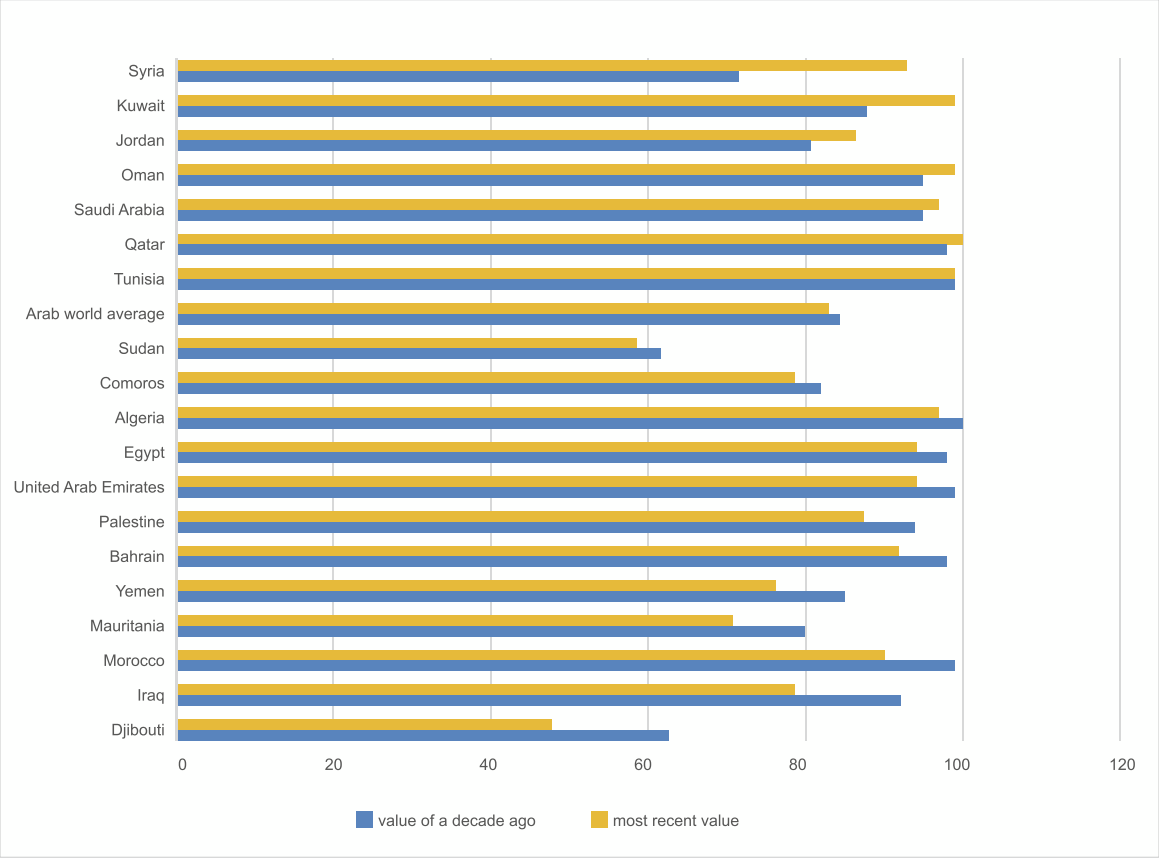


Figure 6: Change of primary education net enrollment rate

Source: The World Bank[35]

Significant progress has also been found in secondary education across the Arab countries, as shown in Figure 7. NER in the Arab countries improved 6 percentage points from 2008 to 2018, the improvement is especially noticeable among the country with a low education development level. NER of secondary education in Comoros has increased 6 percentage points from 44% to 50% and the number of Mauritania has increased 12 percentage points from 22% to 34%. In addition, the enrollmemt rate in Yemen and Sudan also experienced 6 percentage points and 8 percentage points increase respectively. Progress can also be found in the countries with relatively better education participation level. In Morocco, NER has increased 12 percentage points from 54% to 66%. NER has also increased 8 percentage points in Egypt and 7 percentage points in Palestine, NERs of which are both above 85% currently. Most substantial progress can be found in countries with high education development level, such as United Arab Emirates, Oman and Saudi Arabia, with 6 to 10 percentage points increase, these countries are close to achieve universal secondary education.

Progress can be encouraging, yet there are decline as well. Minor decline of primary education NER can be found in Qatar, Saudi Arabia and Oman. Major decrease in primary education NER can be found in Jordan (6 percentage points), Kuwait (11 percentage points) and Syria (21 percentage points). NER in Jordan decreased from 87% to 81% and NER in Kuwait decreased from

[35]Accessed in July, 2021 https://data.worldbank.org/indicator/SE.PRM.NENR

99% to 88% from 2008 to 2018. In Syria, school enrollment rate drops 21 percentage points from 93% to 72% during the past decade. As for secondary education, not much change can be found in Kuwait. However, a decline was observed in Jordan and Syria, with 12 and 20 percentage points decrease, respectively.

Education in Syria has been suffering from severe deterioration in the past decade because of the conflict. In primary education, enrollment rate in Syria decreased 34 percentage points for grades 1 to 12 in the school year ending in 2013 (United Nations, 2015). School participation is even worse for Syrian refugee children. For Syrian refugee children who live in Lebanon aged 6 to 14, only 12 percent of them are able to attend school (United Nations, 2015).

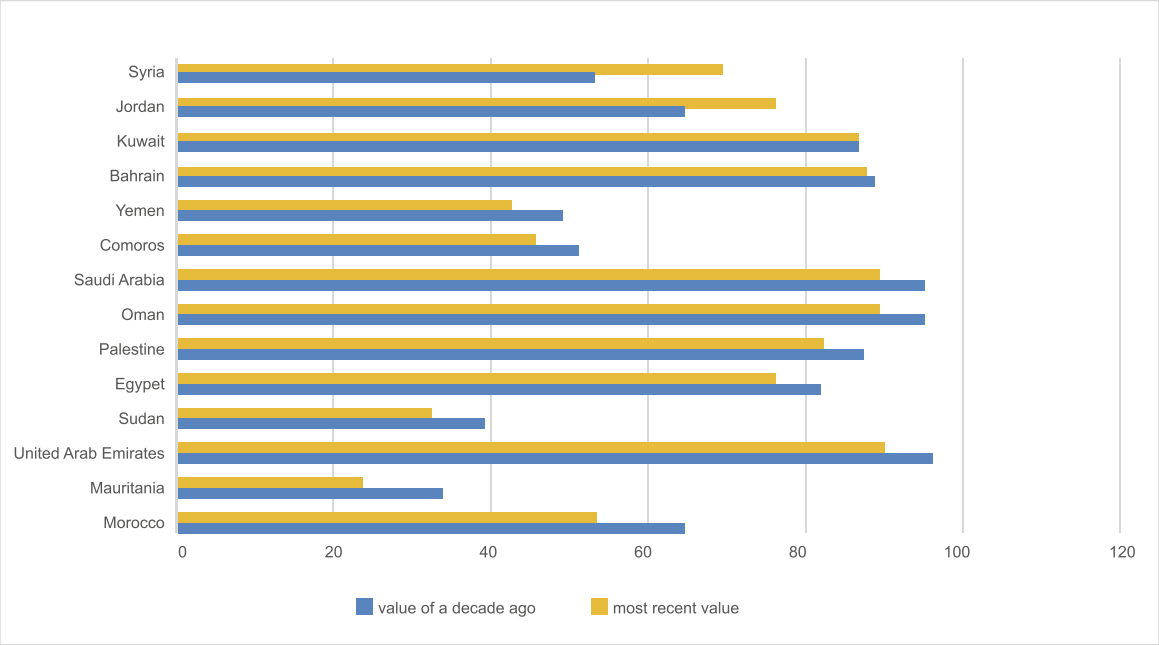


Figure 7: Change of secondary education net enrollment rate

Source: UNESCO UIS[36]

The large difference between NER and GER suggests that the overaged, underaged school participation and grade repetition might be prevalent in a certain country. In Morocco, NER is 66% but GER is 100% for secondary education in 2019. A large gap between NER and GER can also be found in Comoros, the number of which is 82% and 100%, respectively. The problem of repetition is especially sharp in these two countries. As it shown in Figure 8, 8% of primary school students in Morocco and 16% in Comoros are repeaters. In addition to that, Djibouti, Lebanon and Tunisia also have high percentage of repeaters (greater than 4%).

[36]Accessed in July, 2021 http://uis.unesco.org/en/country/ps

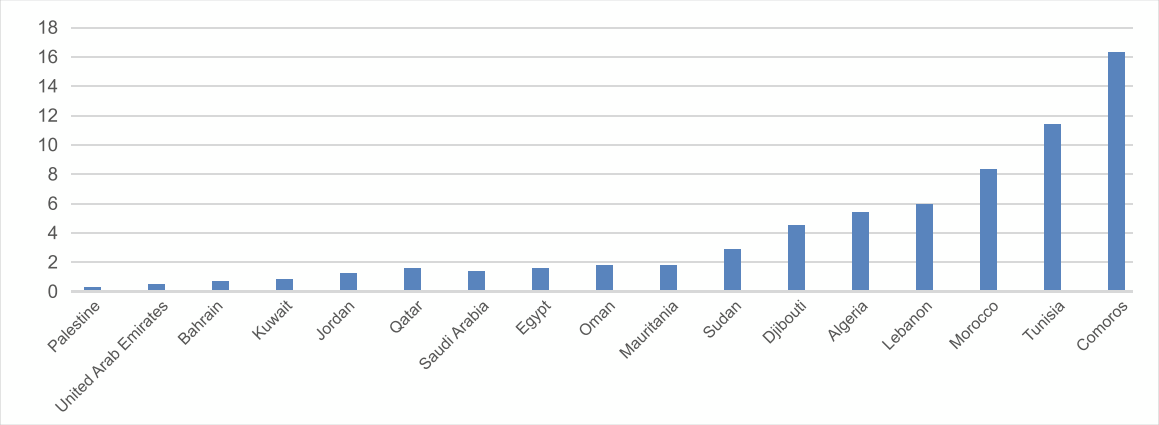


Figure 8: Percentage of repeaters in primary education

Source: ALECSO[37]

2.2 Out-of-school children, adolescents and youth

As shown in Table 23, the total number of the out-of-school children, adolescents and youth is 257 million in the world, 6.3% (16.2 million) of which are from the Arab region. There are 5.2 million out-of-school children of primary school age in 2018 in the Arab countries, which accounts for 8.9% of all out-of-school children worldwide. The number of out-of-school adolescents of lower secondary school age in the Arab region is 3.5 million, accounting for 5.7% of all out-of-school adolescents worldwide. There are more out-of-school youth of secondary education age than out-of-school children and adolescents, the number of which is 7.4 million accounting for almost 5.3% of all out-of-school youth worldwide.

Out-of-school rate increases along with the increase of the level of education. As shown in Table 23, the world average out-of-school rate in primary education is 9%, but the number rises to 16% and 37% for lower and upper secondary level. Out-of-school rate is much higher than the world average in Sudan, Comoros, Djibouti, Mauritania, Jordan, Syria, and Yemen at both primary and secondary levels.

As shown in Table 24, Sudan (32.9%) and Djibouti (33.0%) are among the highest out-of-school rate of primary school-aged children, meaning that one in three children are not able to attend primary school in those countries. Djibouti (47.7%) also has the highest out-of-school rate among lower secondary school-aged adolescents. Nearly one in two adolescents are not able to get access to lower secondary education. Djibouti (66.3%), Mauritania (61.0%), and Syria (66.4%) have the highest out-of-school rate among upper secondary school-aged youth, where nearly two in three youth cannot get access to upper secondary school.

[37]Accessed in July 2021 http://observatory.alecso.org/Data/en/2021/01/22/acceil/

Table 23: Number of out-of-school children, adolescents and youth

	Primary	Lower secondary	Upper secondary	Total
World	58.1	61.2	137.8	257.1
Arab region	5.2	3.5	7.4	16.1
Percentage	8.9%	5.7%	5.3%	6.3%

Source: ALECSO[38] Year: 2018; Unit: million

Table 24: Out-of-school rate in different level of education

	Primary education		Lower secondary education		Upper secondary education	
Country	**Value**	**Year**	**Value**	**Year**	**Value**	**Year**
Algeria	0.4	2019	NA	NA	NA	NA
Egypt	0.7	2019	2.4	2019	23.4	2019
Morocco	0.4	2019	9.4	2019	27.9	2019
Sudan	32.9	2018	34.3	2018	51.6	2018
Tunisia	1.2	2013	NA	NA	NA	NA
Comoros	18.2	2018	19.2	2018	49.9	2018
Djibouti	33.0	2019	47.7	2019	66.3	2019
Mauritania	23.1	2019	28.2	2019	61.0	2019
Bahrain	2.3	2019	3.7	2019	12.7	2019
Jordan	18.7	2019	29.5	2019	45.8	2019
Kuwait	2.7	2016	6.3	2016	18.3	2016
Oman	2.8	2019	2.0	2019	9.9	2019
Palestine	3.5	2019	2.5	2019	25.4	2019
Qatar	1.9	2019	5.1	2019	8.9	2019
Saudi Arabia	1.8	2016	1.0	2016	3.5	2016
Syria	27.6	2013	38.1	2013	66.4	2013
United Arab Emirates	0.2	2019	0.1	2019	1.9	2019
Yemen	15.6	2019	28.4	2019	56.4	2019
World average	9	2014	16	2014	37	2014

Source: UNESCO SDG4 Global Data Book by targe[39] GMR and UIS (2016)[40]

[38]Accessed in July, 2021 http://observatory.alecso.org/Data/en/2021/01/22/acceil/

[39]Accessed in July, 2021 http://tcg.uis.unesco.org/data-resources/

[40]Accessed in July, 2021 https://unesdoc.unesco.org/ark:/48223/pf0000245238

2.3 Gender disparity in access to education

Ensuring inclusive and equitable quality of education and promoting lifelong learning opportunities for all is the Sustainable Development Goal 4 (SDG4) of United Nations (United Nations, 2015). SDG4 has a strong perspective on gender equality. Goal 4.1 aims to ensure that all females and males complete free, equitable and quality primary and secondary education leading to relevant and Goal-4 effective learning outcomes by 2030 (United Nations, 2015). Evaluating gender disparity in access to education, therefore, is important. Gender disparity is not in accordance with the education development level in the Arab region. There are countries with low development level but perform well in gender equity such as Mauriarnia and Comoros and there is Saudi Arabia with a high education development level but has a large gap in gender equity. Gender disparity is more severe at the secondary level than at the primary level. The more detailed information can be seen in Table 25, 26 and 27.

Gender equity performs well in Egypt, Kuwait, Mauritania, Comoros and Bahrain, Females in these countries have equal or higher chances to enroll in education, are more likely to reach the last grade of primary education and have close or lower level of out-of-school rate.

Although Oman and Qatar have a relative good gender equity in primary stage, gender equity faces challenges in the secondary education. In both countries, females have higher chance to participate in primary school. In the secondary education, however, NER for females is 6.8% less than males in Oman. The out-of-school rate for males in upper secondary level is 7.7% in Oman whereas the number for females is 16.9%, meaning that one in thirteen males can not get access to upper secondary education but one in six females can not attend upper secondary education in Oman. In Qatar, the out-of-school rate for lower secondary females is 8% higher than males.

There is a gender gap in access to education in Syria, Djibouti and Saudi Arabia. Females have less chances than males to get enrolled in primary school in Syria and have less chances than males to get enrolled in secondary school in all three countries. Moreover, persistence to the last grade rate for females in Djibouti is 9% lower than males, and 7% lower than males in Saudi Arabia. Females have higher out-of-school rate than males in Saudi Arabia in both primary and secondary education.

The gender gap is the most severe in Yemen. NER for females is 9% lower than males at the primary level. At the secondary level, the gender gap becomes even larger. NER for females is 14.5% lower than males. The out-of-school rate for females is at least 10% higher than males at both primary and secondary school levels.

Table 25: NER in primary and secondary education by gender

	Primary education NER				Secondary education NER			
Country	Female	Male	Difference	Most Recent Year	Female	Male	Difference	Most Recent Year
Algeria	96	98	-2	2008	NA	NA	NA	NA
Bahrain	97	99	-2	2018	94	84.8	9.2	2019

Comoros	82	82	0	2018	51.7	49.1	2.6	2018
Djibouti	63	61	2	2018	37.3	38.3	-1	2015
Egypt	99	98	1	2012	85	84.2	0.8	2019
Iraq	87	99	-12	2004	NA	NA	NA	NA
Jordan	80	82	-2	2018	65.4	63.9	1.5	2019
Kuwait	93	84	9	2018	88.7	84.5	4.2	2015
Lebanon	NA	NA	NA	NA	NA	NA	NA	NA
Libya	NA	NA	NA	NA	NA	NA	NA	NA
Mauritania	81	79	2	2018	34.8	32.4	2.4	2019
Morocco	97	97	0	2017	66.6	65.8	0.8	2019
Oman	100	98	2	2011	93	99.8	-6.8	2019
Palestine	NA	NA	NA	NA	92.2	84.6	7.6	2019
Qatar	99	97	2	2018	NA	NA	NA	NA
Saudi Arabia	95	95	0	2018	94.1	98.5	-4.4	2018
Somalia	NA	NA	NA	NA	NA	NA	NA	NA
Sudan	61	62	-1	2017	40.8	38.3	2.5	2018
Syria	71	73	-2	2013	48.1	48.9	-0.8	2013
Tunisia	100	97	3	2009	NA	NA	NA	NA
United Arab Emirates	95	92	3	2012	95.8	97.6	-1.8	2019
Yemen	79	90	-11	2016	40.2	54.7	-14.5	2016

Source: UNESCO SDG4 Global Data Book bySource: The World Bank[41] *Source: UNESCO UIS*[42]

Table 26: Persistence to last grade of primary education by gender (% of cohort)

Country	Female	Male	Difference	GPI[43]	Most Recent Year
Djibouti	71	80	-9	0.89	2012
Saudi Arabia	90	97	-7	0.93	2007
Yemen	67	72	-5	0.93	2012
Libya	79	84	-5	0.94	1980
Iraq	47	51	-4	0.92	1999
Qatar	87	87	0	1.00	2018
Syria	93	93	0	1.00	2011

[41]Accessed in July, 2021 https://data.worldbank.org/indicator/SE.PRM.NENR

[42]Accessed in July, 2021 http://uis.unesco.org/en/country/ps

[43]Author's calculation based on The World Bank data.

Oman	99	99	0	1.00	2018
Algeria	92	91	1	1.01	2018
Morocco	95	94	1	1.01	2018
Jordan	96	95	1	1.01	2018
Bahrain	97	96	1	1.01	2018
Egypt	100	99	1	1.01	2018
United Arab Emirates	93	91	2	1.02	2012
Tunisia	95	93	2	1.02	2016
Mauritania	66	63	3	1.05	2016
Sudan	77	74	3	1.04	2016
Lebanon	87	83	4	1.05	2018
Kuwait	93	85	8	1.09	2018
Comoros	78	65	13	1.20	2013
Arab region average	82	81	1	1.01	2018

Source: The World Bank[44]

Table 27: Out-of-school rate by gender

	Primary education			Lower secondary education			Upper secondary education		
Country	**Female**	**Male**	**Year**	**Female**	**Male**	**Year**	**Female**	**Male**	**Year**
Egypt	0.7	1.1	2012	1.6	3.1	2019	24.1	22.7	2019
Morocco	2.6	2.3	2017	11.4	7.5	2019	30.1	25.7	2019
Sudan	35.3	30.5	2018	35.5	33.2	2018	49.7	53.5	2018
Comoros	18.2	18.1	2018	18.3	20.1	2018	48.1	51.5	2018
Djibouti	33	33	2019	47.7	47.6	2015	67.1	65.6	2015
Mauritania	21.2	25	2019	25.5	30.8	2019	58.8	63.1	2019
Bahrain	2.8	1.9	2019	0.1	7	2019	6.3	18.1	2019
Jordan	19.3	18	2019	29.6	29.4	2019	43.4	48	2019
Kuwait	0.9	4.4	2016	3.8	8.5	2015	17	19.5	2015
Oman	0.3	1.9	2011	7.3	9.5	2012	16.9	7.7	2018
Palestine	3.4	3.5	2019	0.6	4.5	2019	18.3	32.3	2019
Qatar	0.3	3.4	2019	9.1	1.1	2019	10.3	7.6	2010

[44]Accessed in July, 2021 https://data.worldbank.org/indicator/SE.PRM.PRSL.FE.ZS?locations=1A&name_desc=true

Saudi Arabia	2.6	1.1	2016	2.5	0.4	2018	8.7	2.8	2017
Syria	28.4	26.8	2013	39.2	37.1	2013	66.3	66.5	2013
United Arab Emirates	5.1	8.2	2013	2.8	1.7	2016	1.7	2.2	2019
Yemen	21.1	10.3	2016	34.5	22.6	2016	67.7	45.6	2016

Source: UNESCO SDG4 Global Data Book by targe[45]

3 Academic performance

To evaluate the academic performance of Arab students, data from international large-scale assessments such as PISA and TIMSS was collected. Although not all countries participated in the international assessment, we can have a glimpse of Arab students' academic performance and make comparison between the Arab countries and other countries in the world from available data.

Six countries, including United Emirates, Jordan, Qatar, Saudi Arabia, Morocco and Lebanon, participated in PISA 2018, as shown in Table 28. Students' reading, mathematics and science literacy are evaluated in the assessment. The OECD average score for reading, mathematics and science are 487, 489 and 489, respectively. All the Arab countries that participated in the assessment are below the OECD average. Among these countries, United Arab Emirates has the best performance in all three subjects. Morocco has the lowest score in mathematics and science tests and Saudi Arabia has the lowest score in reading test.

Table 28: Academic performance in PISA

Country	Reading	Mathematics	Science
United Arab Emirates	432	435	434
Jordan	419	400	429
Qatar	407	414	419
Saudi Arabia	339	373	386
Morocco	359	368	377
Lebanon	353	393	384
OECD average	487	489	489

Source: OECD PISA 2018[46]

Ten Arab countries have participated in TIMSS in 2011, 2015 and 2019, as shown in Table 29 and 30. Students in Grade 4 and Grade 8 are evaluated for their academic performance in mathematics and science. The center-point of scale is 500. All the Arab countries are below the center-point in both mathematics and science tests. Bahrain and United Arab Emirates have the best academic performance. Morocco and Saudi Arabia still need more improvement.

[45]Accessed in July, 2021 http://tcg.uis.unesco.org/data-resources/

[46]Accessed in July, 2021 https://www.oecd.org/pisa/Combined_Executive_Summaries_PISA_2018.pdf

Students' academic performance is not always in accordance with the education development level in a certain country. For example, Saudi Arabia is regarded a country with a high education development level (see Table 19). The students' academic performance of Saudi Arabia, however, is lower than most of the Arab countries that have participated in PISA and TIMSS. To achieve a better learning outcome, more improvements in the education system are needed.

Table 29: Academic performance in TIMSS mathematics test

	Grade 4 mathematics			Grade 8 mathematics		
Country	**2019**	**2015**	**2011**	**2019**	**2015**	**2011**
Bahrain	480	451	436	481	454	409
Egypt	NA	NA	NA	413	392	NA
Jordan	NA	NA	NA	420	386	406
Kuwait	383	353	NA	403	392	NA
Lebanon	NA	NA	NA	429	442	449
Morocco	383	377	335	388	384	371
Oman	431	425	385	411	403	366
Qatar	449	439	413	443	437	410
Saudi Arabia	398	383	410	394	368	394
United Arab Emirates	481	452	434	473	465	456

Source: IEA TIMSS[47]

Table 30: Academic performance in TIMSS science test

	Grade 4 science			Grade 8 science		
Country	**2019**	**2015**	**2011**	**2019**	**2015**	**2011**
Bahrain	493	459	449	486	466	452
Egypt	NA	NA	NA	389	371	NA
Jordan	NA	NA	NA	452	426	449
Kuwait	392	337	NA	444	411	NA
Lebanon	NA	NA	NA	377	398	406
Morocco	374	352	264	394	393	376
Oman	435	431	377	457	455	420
Qatar	449	436	394	475	457	419
Saudi Arabia	402	390	429	431	396	436
United Arab Emirates	473	451	428	473	477	465

Source: IEA TIMSS[48]

[47]Accessed in July, 2021 https://timss2019.org/reports/achievement/#
[48]Accessed in July, 2021 https://timss2019.org/reports/achievement/#

Summary of the findings

- The overall development level of education in the Arab region is behind the world average. Net Enrollment Rate in both primary and secondary education of the Arab countries is lower than the world average. Progress has been achieved over a decade and more opportunities for education access are provided, especially in Sub-Saharan Africa, but the speed of improvement is not fast enough. In countries affected by conflicts, such as Syria, development of education regressed.
- There is a large degree of education heterogeneity development within the Arab region. Countries such as United Arab Emirates, Oman, Saudi Arabia and Qatar have a more advanced level of education development, where universal primary education and secondary education are achieved or closed to be achieved. On the other hand, the opportunity of getting access to education is very limited in Sub-Saharan Africa countries including Comoros, Djibouti, Mauritania and countries suffering from conflict such as Syria and Yemen, where less than half of school-aged adolescents are able to participate in secondary education.
- Gender disparity is not in accordance with the education development level in the Arab countries. There are countries with low development level but perform well in gender equity such as Mauritania and Comoros and there is Saudi Arabia that has a high education development level with a large gap in gender equity.
- Arab students' academic performances are behind the world average in PISA and TIMMS tests, even among the countries with advanced education development level, indicating that more efforts should focus on enhancing learning outcome.

Chapter 5

Higher Education

Chapter 5. Higher Education

This chapter aims to illustrate the development of higher education in the Arab region. This chapter includes three sections, namely: access to higher education, gender disparity in higher education and financing higher education. In order to analyze higher education, enrollment and attainment in higher education are addressed. Countries are categorized into three systems: elite system, massified system and universal system based on their Gross Enrollment Ratio (GER). Changes over a decade are also traced to illustrate the progress and recession in higher education. Moreover, attainment in bachelor, master and doctoral level are summarized. In gender disparity section, gender disparity in enrollment and education attainment are discussed first. Then the relationship between gender disparity and social disparity is addressed. Furthermore, as education equity is not the destination of gender equity, gender disparity in labor force is revealed. In financing higher education section, government's expenditure on education and higher education are both addressed to examine different countries' commitment in education.

1 Access to Higher Education

1.1 Enrollment in higher education

The overall development level of higher education in the Arab region is behind the world average. The latest Gross Enrollment Ratio of tertiary education[49] for the world's average is 39% as of 2019, however, the number for the Arab region is 33%. There is a great variation among Arab countries, as indicated in Table 31. The range of GER in tertiary education in the Arab countries spanned from a minimum of 5.3% in Djibouti in 2011 to a maximum of 70.9% in Saudi Arabia in 2019.

According to Trow's developmental theory of higher education, higher education is classified as three sub-systems. To illustrate, countries with GER less than 15% should be referred to "elite systems", countries with GER between 15% and 50% should be referred to "massified systems", and countries with GER greater than 50% can be referred to "universal systems" (Trow, 1972). Based on this standard, higher education in Djibouti, Mauritania, Comoros, and Yemen are regarded as elite systems. Countries include Sudan, Qatar, Tunisia, Jordan, Morocco, Egypt, Oman, Syria and Palestine, can be categorized as massified systems. Algeria, United Arab Emirates, Kuwait, Bahrain, and Saudi Arabia, can be classified as universal systems. The classification of higher education system is shown in Table 31.

[49]Tertiary education and higher education in this report are used interchangeably

In the past decade, the expansion of higher education leads to an increase of enrollment from 30% in 2010 to 39% in 2019 in the world. Similar expansion happened in the Arab region, where the GER of tertiary education increased from 25% to 33%. Substantial progress has been found in Qatar and Morocco, as both of them experienced a shift from elite system to massified system. GER in Qatar doubled from 9.4% to 18.9% and Morocco experienced a 164% increase from 14.6% to 38.5%. Substantial progress can also be found in countries that were massified systems a decade ago, but have now become universal systems, such as Algeria, Bahrain and Saudi Arabia. In particular, Saudi Arabia, with a 36.6% GER in 2010, has expanded to a universal system with 70.9% GER in 2019. GER of Algeria also increased from 29.9% to 52.6%. GER of Bahrain was 44% in 2011, but increased to 55.5% in 2019. In addition, noticeable increase can also be found in Oman, Comoros and Syria, which have experienced more than 50% increase. On the other hand, it is noticed that Yemen, Tunisia, Jordan, and Palestine have experienced about 10% decrease in GER.

Table 31: Gross Enrollment Ratio for tertiary education

Country	Higher education system	Most recent value	Most recent year	Value of a decade ago	A decade ago	Difference	Change%
Djibouti	Elite	5.3	2011	3.6	2010	1.7	47%
Mauritania	Elite	5.8	2019	4.4	2010	1.4	32%
Comoros	Elite	9.0	2014	5.8	2010	3.2	55%
Yemen	Elite	10.2	2011	10.8	2010	-0.6	-6%
Sudan	Massified	16.9	2015	15.9	2010	1	6%
Qatar	Massified	18.9	2019	9.4	2010	9.5	101%
Tunisia	Massified	31.8	2019	35.4	2010	-3.6	-10%
Jordan	Massified	33.1	2019	37.1	2010	-4	-11%
Morocco	Massified	38.5	2019	14.6	2010	23.9	164%
Egypt	Massified	38.9	2018	31.9	2010	7	22%
Oman	Massified	40.4	2019	23.3	2010	17.1	73%
Syria	Massified	43.0	2019	25.9	2010	17.1	66%
Palestine	Massified	43.2	2019	47.8	2010	-4.6	-10%
Algeria	Universal	52.6	2019	29.9	2010	22.7	76%
United Arab Emirates	Universal	52.6	2019	NA	NA	NA	NA
Kuwait	Universal	55.3	2019	51	2014	4.3	8%

Bahrain	Universal	55.6	2019	44.0	2011	11.6	26%
Saudi Arabia	Universal	70.9	2019	36.6	2010	34.3	94%
Arab region average	Massified	33	2019	25	2010	8	32%
World average	Massified	39	2019	30	2010	9	30%

Source: UNESCO Global Data Book by target[50]

1.2 Attainment in higher education

According to UNESCO UIS (2009), educational attainment reflects the proportion of the highest level of education acquired among a population aged 25 and above. It is also an indicator that reflects the formation of a country's human capital (OECD, 2016). It is calculated by dividing the population number that have acquired tertiary qualification on the total number of that population (UIS, 2009).

On average, 34% of the population across the OECD countries have acquired a tertiary education qualification (OECD, 2016). As shown in Table 32, most of the countries from the Arab region are still below the average of OECD educational attainment. Kuwait has the lowest educational attainment, with only 11.1% of the population aged 25 years and older have received tertiary qualification, followed by Oman (12.5%), Palestine (19%) and Qatar (19%). The highest educational attainment is from United Arab Emirates, as 47.3% of the population aged 25 years and above have attained the tertiary level of education. Educational attainment in United Arab Emirates is higher than the OECD average.

As for graduate level, all Arab countries indicate a much lower educational attainment than undergraduate level. The educational attainment of master level varies from 0.5% to 10% in the countries with available data. The educational attainment of doctoral level is below 1% in all countries. It is worth noticing that United Arab Emirates is so far the best-performed country, which has the highest educational attainment in all three levels of higher education among the Arab countries.

Table 32: Educational attainment rate of Bachelor, Master and Doctoral degree

Country	Year	Bachelor	Master	Doctoral
Egypt	2017	NA	0.7	0.3
Bahrain	2018	21.6	1.4	0.2
Kuwait	2018	11.1	0.5	NA
Oman	2015	12.5	1.8	0.3

[50]Accessed in July, 2021 http://tcg.uis.unesco.org/data-resources/

Palestine	2018	19.1	1.7	0.3
Qatar	2017	19	1.5	0.4
Saudi Arabia	2017	26	2.5	0.7
United Arab Emirates	2018	47.3	10.1	0.9

Source: UNESCO Global Data Book by target[51]

2 Gender disparity in higher education

2.1 Gender disparity in education enrollment

Table 33 shows that gender disparity in higher education varies from one country to another. Generally, in countries with low education development level, males are more likely to get enrolled in higher education than females. For most countries with middle to high education development level, enrollment ratios are higher among females. Males have more chance than females to enroll in higher education in Yemen, Mauritania, Comoros, and Djibouti, all the countries with an elite system. It is the most challenging for females to get enrolled in higher education in Yemen, where the chance for females is 56% lower than males. It is seen that when the opportunity of accessing to higher education is scarce, males have better chance to obtain these opportunities than their female counterparts. For most countries with massified or universal higher education system, GER usually favors females. In Sudan, Morocco, Egypt, Saudi Arabia, Syria and Jordan, GER for females is slightly higher than males. In Palestine, Algeria, Bahrain, Tunisia, Oman and Kuwait, enrollment ratio for women is 65% to 105% higher than men. The most abnormal case is Qatar, while the enrollment ratio for males is 7.3%, the enrollment ratio for females is 56.5%, meaning that the enrollment ratio for females is nearly 8 times of males. For United Arab Emirates, the enrollment ratio for males and females are close, the number of females is slightly lower than males.

Table 33: Education enrollment ratio by gender

Country	Female	Male	Difference	Year
Qatar	56.6	7.3	49.3	2019
Kuwait	76.5	37.2	39.3	2019
Bahrain	73.9	41.0	32.9	2019
Algeria	66.1	39.7	26.4	2019
Oman	55.3	29.7	25.6	2019
Palestine	53.9	32.9	21.0	2019
Tunisia	41.7	22.6	19.1	2019
Saudi Arabia	73.7	68.3	5.4	2019

[51]Accessed in July, 2021 http://tcg.uis.unesco.org/data-resources/

Jordan	35.8	30.4	5.4	2019
Syria	45.7	40.5	5.2	2019
Egypt	39.8	38.0	1.8	2018
Morocco	39.1	38.1	1.0	2019
Sudan	17.1	16.8	0.3	2015
Djibouti	4.6	6.0	-1.4	2011
Comoros	8.0	9.9	-1.9	2014
United Arab Emirates	51.1	53.5	-2.4	2019
Mauritania	4.4	7.1	-2.7	2019
Yemen	6.2	14.0	-7.8	2011

Source: UNESCO Global Data Book by target 2021[52]

2.2 Gender disparity in educational attainment

As shown in Table 34, educational attainment for females is much higher than males in bachelor level in Bahrain, Kuwait, Oman, Palestine, Qatar, and Saudi Arabia. It is also seen that, the educational attainment ratio for females in Qatar is 2-times more than males (15.2% for males and 35.3% for females). For United Arab Emirates, the enrollment ratio and educational attainment ratio for males and females are close, the number for females is slightly lower than males.

Females' overrepresentation in undergraduate level does not last to graduate level. Among all the 8 countries with available data (see Table 34), females receive more bachelor's degree than males in 6 countries, but only receive more master degree and doctoral degree than men in 2 countries, namely Oman and Qatar.

Table 34: Educational attainment rate of Bachelor, Master and Doctoral degree by gender

Country	Year	Bachelor Female	Bachelor Male	Master Female	Master Male	PhD Female	PhD Male
Egypt	2017	NA	NA	0.6	0.8	0.2	0.4
Bahrain	2018	28.6	18.3	1.4	1.4	0.2	0.3
Kuwait	2018	15.8	8.8	0.4	0.5	NA	NA
Oman	2015	18.2	10.2	1.9	1.8	0.4	0.3
Palestine	2018	20.1	18.1	1.1	2.3	0	0.5
Qatar	2017	35.3	15.2	2.5	1.2	0.5	0.4
Saudi Arabia	2017	26.9	25.4	1.7	3	0.4	0.8
United Arab Emirates	2018	45.2	48	8.8	10.5	0.6	1

Source: UNESCO Global Data Book by target 2021[53]

[52]Accessed in July, 2021 http://tcg.uis.unesco.org/data-resources/
[53]Accessed in July, 2021 http://tcg.uis.unesco.org/data-resources/

2.3 Gender disparity and social disparity in higher education access

Apart from GER, gross attendance ratio is also used as an indicator to reflect participation in tertiary education. Gross attendance ratio of tertiary education indicates the level of attendance. For calculation purpose, the number of students attending tertiary education regardless of their age is divided by the population of 5-year age group starting from the official secondary school graduation age (UIS, 2021). Adjusted Gender Parity Index (GPI) for gross attendance ratio of tertiary education is used to indicate the level of gender disparity in higher education. As shown in Table 35, gender parity favors females in urban area in most countries. The attendance of female students face challenges in rural areas, as well as in low-income family of low-income countries.

As shown in Table 35, Mauritania, Yemen, Egypt and Sudan are below parity range, favoring males in attending higher education. Comoros, Iraq, Tunisia, Jordan, Palestine, Qatar and Algeria are above parity range, favoring females in attending higher education. Opportunities for males to continue higher education in Mauritania and Yemen is twice higher than females, with the overall GPI value of 0.5. In Yemen, gender disparity correlates with economic disparity. GPI decreases as the level of economic status declines. GPI is 0.9 among the richest group, but the number is 0 among the poorest group. Gender disparity also correlates with rural-urban disparity. GPI is 0.2 in rural areas as compared to 1 in urban areas. Females in rural areas with disadvantaged economic background are the most challenged group in accessing to higher education. In Mauritania, gender disparity in higher education attendance does not correlate with whether students come from a poor or rich family and whether they live in rural or urban areas. In Egypt and Sudan, the overall GPIs are both 0.9, meaning that attendance ratio of female is slightly lower than males. The gender disparity is more salient in rural areas, where GPI is 0.9 in Egypt and 0.7 in Sudan. In urban areas, on the other hand, females have equal or higher attendance ratio than males. In Sudan, females with disadvantaged economic backgrounds are less likely to attend higher education compared to males. GPI for the poorest quintile is 0.4 whereas the number for the richest quintile is 1.1. In Egypt, the situation is reversed. Females are more likely to participate in higher education than males if they are in economically disadvantaged families while females are slightly less likely to participate in higher education if they come from economically advantaged families. In Comoros and Iraq, the attendance ratio is generally in favor of females. Apart from the relatively poor quintiles, females' attendance ratio in higher education is higher than males among other groups in both countries. In Comoros, female attendance ratio is higher than male regardless of whether they come from rural areas or urban areas. In Iraq, however, higher education attendance is in favor of males in rural areas and in favor of females in urban areas. The attendance ratio is in favor of females in Tunisia, Jordan, Palestine, and Qatar regardless of their family economic situation or rural/urban situation.

Table 35: Gross attendance ratio for tertiary education, adjusted gender parity index (GPIA)

Country	Total value	Poorest quintile	Second quintile	Middle quintile	Fourth quintile	Richest quintile	Rural area	Urban area	Year
Mauritania	0.5	1.0	0.5	0.7	0.6	0.5	0.6	0.6	2015
Yemen	0.5	0.0	0.1	0.2	0.6	0.9	0.2	1.0	2013
Egypt	0.9	1.2	1.0	0.6	0.9	0.9	0.9	1.0	2014
Sudan	0.9	0.4	0.4	0.7	1.1	1.1	0.7	1.1	2014
Comoros	1.2	0.4	1.2	1.0	1.3	1.3	1.1	1.3	2012
Iraq	1.1	0.8	0.7	1.1	1.1	1.1	0.8	1.2	2018
Tunisia	1.4	1.3	1.5	1.5	1.3	1.4	1.6	1.4	2012
Jordan	1.3	1.3	1.5	1.3	1.3	1.1	1.4	1.2	2018
Palestine	1.3	1.3	1.2	1.4	1.3	1.3	1.3	1.3	2014
Qatar	1.1	NA	NA	NA	NA	NA	NA	1.1	2012
Algeria	1.4	1.5	1.5	1.4	1.4	1.2	1.4	1.4	2013

Source: UNESCO Global Data Book by target 2021[54]

2.4 Gender disparity and labor force participation

As indicated in the previous section, over-representation of women in higher education is observed in many Arab countries. One reason that drives females to participate in higher education is social and familial expectation. Higher education is associated with greater social economic mobility and independence, even viewed as emancipating by some (Abdulla & Ridge, 2011; Abdulla, 2007). Compared with women with lower education background, women with a university education are much more likely to join the labor force (Chamlou, Muzi & Ahmed, 2011).

Although women are getting more opportunities to attend higher education, it is not the same case in the job market. Participation of labor force among Arab women is much lower than the world average. There are 53% of women between 15 and 64 years old participating in labor force in the world, while the number for Arab women is 22%. Women's employment rate is much lower than their male counterparts. As shown in Table 36, only 22% of women, aged 15-54, are in the labor market, as compared to 76% of men who are in labor market. 12% of women aged 15-24 are in labor force, as compared to 41% of men who are employed. Therefore, a large percentage of women, even with higher education background, does not enter the labor force. Some do not enter the job market due to family restrictions. A study by Chamlou et al. (2011) suggests that there is a significant negative relationship between traditional social norms and participation in labor forces. Moreover, due to the high unemployment rate, it is difficult for women to find a suitable position in the job market. Figure 9 indicates that the percentage of youth in 15-24 who are not in employment, education or training in the Arab countries is the highest in the world (30%).

[54]Accessed in July, 2021 http://tcg.uis.unesco.org/data-resources/

Therefore, the challenge for getting employed for a female is bigger. In Jordan, women with university education have 4-times higher unemployment rate than their male counterparts (Chamlou et al., 2011). Even for the employed women, their salaries are lower than their male counterparts (Abdulla, 2007).

Table 36: Labor force participation rate of different age group by gender[55]

Country	Age 15-64		Age 15-24	
	Female	Male	Female	Male
Algeria	19	74	9	44
Bahrain	47	88	27	52
Comoros	36	57	12	18
Djibouti	54	72	40	39
Egypt	20	75	12	36
Iraq	12	77	5	49
Jordan	16	67	9	37
Kuwait	52	89	17	34
Lebanon	26	76	17	43
Libya	36	69	10	23
Mauritania	29	64	14	30
Morocco	23	75	13	39
Oman	38	85	11	56
Qatar	58	95	35	74
Saudi Arabia	23	81	8	29
Somalia	23	76	16	52
Sudan	31	69	18	35
Syria	16	78	8	51
Tunisia	28	75	18	39
United Arab Emirates	53	94	34	65
Yemen	6	72	5	48
Arab region average	22	76	12	41
World average	53	80	33	49

Source: The World Bank[56] Year: 2019

[55]Using modeled ILO estimate

[56]Accessed in July, 2021 https://data.worldbank.org/indicator/SL.TLF.CACT.ZS

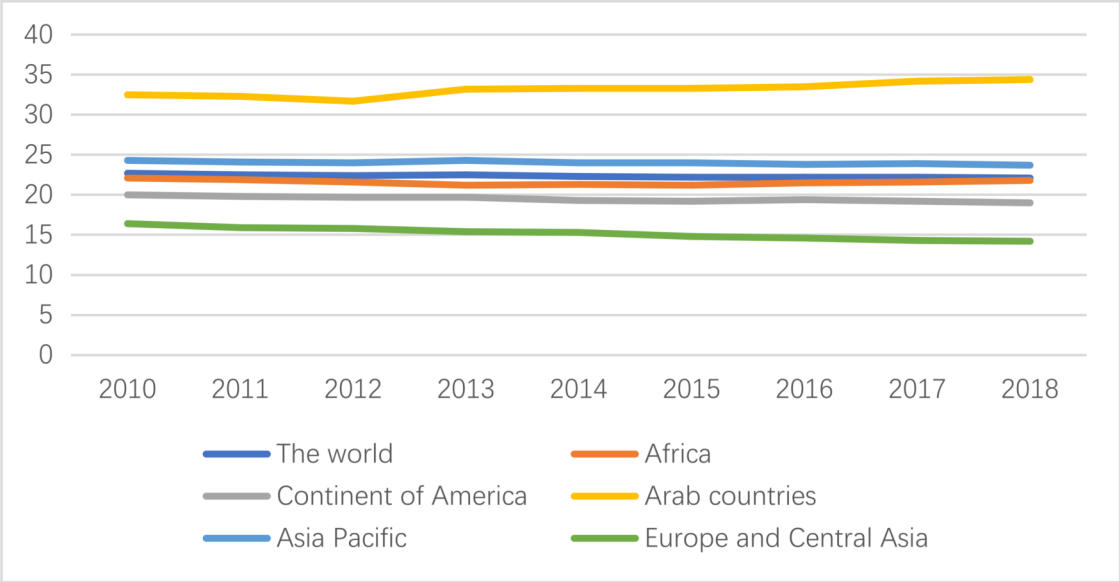


Figure 9: Percentage of youth in 15-24 not in employment, education or training

Source: AlECSO[57]

3 Financing higher education

Commitment in education varies from a country to another. Government expenditure on education, as a percentage of total government expenditure (health, education, social services, etc.) and as a percentage of GDP, are used as indicators for evaluating government's devotion to education.

Two key finance benchmarks are set by The Education 2030 Framework for Action. According to UNESCO (n.d.), countries should allocate at least 4% to 6% of their GDP to education, and/or allocate at least 15% to 20% of public expenditure to education. Globally, 4.4% of GDP and 14.1% of total public expenditure are spent by government on education (UNESCO, n.d.). As shown in Table 37, based on this benchmark, Lebanon, Sudan, Mauritania, Bahrain, Egypt, Oman and Kuwait still need to improve the financial allocation on education. Government expenditure on education in Qatar, Morocco, Saudi Arabia, Syria, Djibouti, Tunisia and Comoros have met the benchmark level around the year 2008.

In 2008, the Arab region average spending on education is 12.5% of the total government expenditure, slightly lower than the world average (14%). As shown in Table 37, Lebanon has the lowest devotion to education, the spending on education in Lebanon accounts for only 5.9% of the total government expenditure and 2% of GDP. Comoros allocates 29.2% of its public expenditure on education and Djibouti allocates 8.4% of the total GDP on education, both are the highest among all the Arab countries. Although these two countries have low education development level in education (see Table 19), the devotion in education cannot be neglected.

[57]Accessed in September, 2021 http://observatory.alecso.org/Data/en/

Table 37: Government expenditure on education

Country	% of government expenditure	% of GDP	Most recent year
Lebanon	5.9	2	2008
Sudan	9.4	2.2	2008
Mauritania	10.3	2	2006
Bahrain	10.6	2.5	2008
Egypt	10.9	3.8	2008
Oman	11.2	3.9	2006
Algeria	11.4	4.3	2008
Yemen	12.5	5.2	2008
Kuwait	13.4	3.8	2006
Qatar	15.1	4.2	2008
Morocco	17.5	5.3	2008
Saudi Arabia	19.3	5.1	2008
Syria	20	4.6	2008
Djibouti	22.5	8.4	2007
Tunisia	25.3	6.3	2008
Comoros	29.2	4.4	2008

Source: The World Bank[58]

To illustrate the different countries' commitment to higher education, government expenditure in higher education is used as the indicator, as shown in Table 38. Since there is a large variation in terms of the availability year of data, only data after 2000 will be analyzed. In 2008, the world average expenditure on tertiary education is 21% of the total expenditure on education. Using the world average value as benchmark, Comoros, Djibouti and Mauritania are below the world average, indicating deficiency in spending on higher education. As mentioned above, Comoros allocates nearly 30% of its public expenditure on education, with only 10% of the education expenditure spent on higher education. It can be assumed that in Comoros, more priority in expenditure has been given to primary and secondary education.

[58]Accessed in July, 2021 https://data.worldbank.org/indicator/SE.XPD.TOTL.GB.ZS

Table 38: Government expenditure on tertiary education
(% of government expenditure on education)

Country	Most recent value	Most recent year
Somalia	1	1973
Qatar	8	1978
Comoros	10	2015
Djibouti	16	2010
Saudi Arabia	17	1998
Mauritania	18	2016
Morocco	20	2009
Sudan	21	1981
Iraq	22	1989
Jordan	23	2018
Bahrain	24	2013
Syria	24	2009
Tunisia	24	2015
Algeria	27	2008
Oman	27	2009
Lebanon	29	2013
Kuwait	33	2006
Egypt	40	1996
Libya	53	1999
World average	21	2008

Source: The World Bank[59]

[59]Accessed in July, 2021 https://data.worldbank.org/indicator/SE.XPD.TERT.ZS?end=2013&locations=1A&start=1997

Summary of the findings

- There is a heterogeneity in terms of the access to higher education in the Arab region. Among 18 countries with available data, higher education in most countries is in massified stage. 5 countries have universal systems, 9 countries have massified systems and 4 countries have elite systems.
- Progress has been made in higher education expansion in the Arab countries, especially in those located in Sub-Saharan Africa, such as Comoros. Substantial progress has been
- made by several countries in North Africa and Middle East in the past decade. For example, Qatar and Morocco have shifted from elite system to massified system. Bahrain, Algeria and Saudi Arabia have shifted from massified system to universal system.
- Women benefit mostly from higher education expansion. Women's enrollment is much higher than men in most Arab countries, especially among countries with better economic development level. In Yemen, on the other hand, gender parity haven't been achieved within rural females with disadvantaged economic background. It is seen that among these countries, gender disparity favors females at undergraduate level and favors males at master and doctoral level. Nevertheless, gender parity in education does not always lead to parity in labor force participation. Although women get more access to higher education, they are still underrepresented in labor market.

Chapter 6

OER Policies and Initiatives

Chapter 6. OER Policies and Initiatives

1 OER initiatives by countries

Table 39 summarizes the OER initiatives in the Arab countries. These initiatives can be classified into four categories, namely creating open universities, developing OER repositories and Massive Open Online Courses (MOOCs) providers, launching OER regulations, and organizing e-learning trainings and OER seminars/workshops (Tlili et al., 2020).

Table 39: Initiatives of OER

Initiative category	Country	Initiative
Creating open Universities	Sudan	Open University of Sudan
	Palestine	Al-Quds Open University
	Saudi Arabia	Arab Open University
Developing OER repositories and MOOCs providers	Saudi Arabia	Shms repository (https://shms.sa/)
		Rwaq (https://www.rwaq.org/)
	Qatar	Qatar University institutional repository (https://qspace.qu.edu.qa/)
	Bahrain	“my digital library” (http://eteacher.edunet.bh/course/view.php?id=615)
	Jordan	Edraak (https://www.edraak.org/en/)
	Egypt	Supercourse of Science
		Digital Assets Repository (DAR) system at the Library of Alexandria
	Tunisia	Virtual University of Tunis
Launching OER regulations	Bahrain	One of objectives of Bahrain OER policy is to ensure that all learning materials developed by public funds will be under an CC-BNNC license.
		The Open Data Platform in Bahrain is a governmental initiative launched to establish a unified centre, to make public data available to the public and develop a strategy for open data, in order to promote transparency and encourage e-participation.
	Morocco	Open Digital Space for the Mediterranean (e-Omed) project
		GENIE programme incorporates OER regarding validation and certification of digital resources.

	Lebanon	Notre Dame University-Louaize calls for continuous training of faculty members and students on the use of OER in teaching and learning.
Developing OER repositories and MOOCs providers	Sudan	Open University of Sudan provides 430 textbooks as open content
	Algeria	University of Bejaia encourages staff and students to use, create and publish OERs
	Kuwait	Developing national OER policy
	Qatar	Developing national OER policy
	Jordan	Ministry of Education, in partnership with UNESCO, launched the Open Education Management Information System (EMIS) in 2016.
	Oman	National OER Policy
	Saudi Arabia	Developing national OER policy
		The Saudi Arabia National OER program includes the following objectives: (1) offer quality education for Arab citizens in the region and develop OER leadership in the region; (2) provide educational opportunities for Arabic speakers; (3) contribute to the quality of lifelong education; (4) enhance the quality and accessibility of teaching and learning resources; (5) strengthen the coordination in design, development and quality assurance of OER; (6) establish the best open educational practices, products, and outstanding processes through self-evaluation and peer review.
Launching OER regulations	Morocco	The national OER Strategy Forum
	Tunisia	The 1st International Open Educational Resources (OER) Seminar
	Libya	International Libyan conference on open educational resources and digital warehouse
	Saudi Arabia	OER Workshop 2014, Riyadh
		About 1000 OER Champions are being trained from PE/HE/LLL across the country
	Lebanon	Open Education Week 2017
		CC Summit 2015
	Oman	Open Educational Resources Workshop at Higher College of Technology, 2017
	Egypt	OER National Strategy Forum, 2016

2 OER related projects by ALECSO

Recognizing the potentials of OER to enhance education and to be involved in the international movement to support open and online education, ALECSO is endeavoring to promote the development and use of OER in education to make it more effective, accessible, and smarter through various projects.

2.1 ALECSO-US Open Book initiative

Earlier in 2013, Secretary Clinton launched the Open Book Project, an initiative of the U.S. Department of State and ALECSO, leading education innovators to expand access to free and high-quality open educational resources in Arabic, with a focus on textbooks in science and technology. This movement could benefit the scientific learning in countries, which could further foster economic growth. Specifically, the aims of this initiative are:

(1) Developing an increased awareness of OER in the Arab countries and the U.S., including refining the concept and identifying connections with copyright and open licenses;

(2) Exploring the benefits of OER for governments, institutions, faculties, students, and the public, specifically examining how OER affects teaching and learning practices including the interrelationships and synergy of OER with open access, open data, open policy, open science;

(3) Evaluating the impact of OER on education business models and practices in the Arab countries and the U.S.

World Learning, which is an American educational and development organization, ensured the preparation and the implementation of the exchange program. The two phases of that program are as follows:

Phase 1: A group of Arab fellows travel to the U.S. in order to pursue a rich and varied program encompassing several activities and visits. Two participants from each Arab country are selected and traveled to the U.S. in March 2014 for 3 weeks. During this visiting, Arabic fellows are expected to (1) learn about the day-to-day operations and projects that the American organization is engaged with; (2) share aspects of the foreign organizational practices and challenges (especially as pertains to OER) with U.S. counterparts; and (3) work with the host organization on the development of an action plan or methodology to create/develop and apply OER in the foreign fellow's originating academic institution.

Phase 2: A group of practitioners and experts from the U.S. traveled to Arab countries (Tunisia and Jordan) at the end of 2014 in order to work with the fellows on implementation of the plans created in Phase 1, and to meet and identify key stakeholders in academia, government, and the NGO community that are already involved in the OER movement.

In that light, an Arab/American coordination meeting on the exchange experience and expertise in the field of Open Educational Resources was held in ALECSO in October 2014. The purpose of this meeting was to draw up a state of progress of the Open Book Project and to identify and discuss the areas of future potential collaboration with the American side, related to the promotion of OER in the Arab countries. At the end, the agreement was reached to continue collaboration in all aspects regarding the implementation of the Open Book Project and its potential amendment

to cover OER promotion activities (Jemni et al., 2017).

2.2 ALECSO OER project

Apart from the Open Book initiative, an entirely new OER project with a set of core activities for the promotion of Open Educational Resources in the Arab countries was also launched. These activities include launching OER policies, raising OER awareness and developing OER infrastructure in the Arab region. The project can be divided into three categories:

(1) Policies for OER: To support different stakeholders (decision and policy makers, institution staffs, unions/teachers' associations, administrators/school leaders, teachers, students and parents) in the Arab countries toward using and developing OER at both national and Pan-Arabic level, ALECSO should draw from international OER' best practices and from existing guidelines (Stacey, 2013). These guidelines must be contextualized and localized according to each country's status and specificities. In addition, policies should cover best practices for sustainable development of OER, ensure quality while developing OER, make open licensing schemes during and after developing OER as well as developing national OER repositories.

(2) Raise Awareness and capacity building on OER: It is of the utmost importance to raise awareness, inform and train different stakeholders about the added value of OER and their expected benefits in accessing and enhancing education.

(3) Technical Infrastructure: Promoting OER at Pan-Arabic level means somehow offering a Pan-Arabian OER Infrastructure where teachers will be able to search and retrieve suitable OER. The proposed infrastructure could be deployed nationally at different Arab counties (as national OER Portals) and then it could be integrated into a federated Pan-Arabian infrastructure promoting interoperability of these national OER portals.

In line with these objectives, the ALECSO OER project activities can be further divided, as shown in Table 40 (Jemni et al., 2017).

Table 40: ALECSO OER project activities

Activities	Sub-activities
Activity 1: Policies for OER	A1.1 Analyzing and selecting existing guidelines for ORE development
	A1.2 Preparing translating/localizing guidelines for ORE development
Activity 2: Raise awareness	A2.1 Raising awareness plan to conduct local, regional, and national activities (e.g., mission awareness campaigns and training workshops for key stakeholders in Arab schools)
	A2.2 Training workshops: (a) preparing training material (b) organizing training workshops
Activity 3: Technical infrastructure setup	A3.1 Architecture and Specifications of technical infrastructure
	A3.2 Set up national OER repositories progressively in selected Arab countries

	A3.3 Set up federated infrastructure integrating all national OER'repositories developed in A3.2 into a Pan-Arabian OER Infrastructure
Activity 4: Technical infrastructure take up/deployment	A4.1 Detailed implementation plan for the use of the technical infrastructure in selected Arab countries
	A4.2 Pilot deployment showing the technical infrastructure under exploitation for stakeholders from selected Arab countries
Activity 5: Evaluation	A5.1 Evaluation plan with appropriate evaluation instruments to be used for evaluating the use and development of OER at Pan-Arabic level
	A5.2 Evaluating the use of ORE based on analytical approach

2.3 ALECSO MOOCs project

The Massive Open Online Courses MOOCs concept, which emerged from open educational resources and e-learning, represents currently one of the newest and latest trends in the realm of online learning (Siemens, 2013). As its name implies, MOOCs have two key distinctive dimensions: "massiveness" and "openness" (Jemni et al., 2017). MOOCs are intended to provide free open learning to online learners via the Internet. In this way, online learners could conveniently gain new and advanced knowledge and skills. Moreover, this new trend of learning is in accordance with the international movement which encourages open access to learning (Belawati, 2014).

Despite that a learner can find various online content and courses available on MOOCs providers and open educational repositories, most of these high-level online courses are neither accessible nor adapted to specific needs of learners in the Arab region. Therefore, ALECSO called for a need to develop MOOCs, a promising field, in the Arab region in order to promote and empower the development and adoption of OER and MOOCs. To achieve this goal, ALECSO came up with a series of projects which aimed at promoting Arab MOOCs. Specifically, the general goals of these projects are summarized in Table 41 (Jemni et al., 2017):

Table 41: Goals and objectives of ALECSO MOOCs project

Goals	Objectives
Define MOOC capacity building steps in ALECSO member states' institutions	• Determine MOOC approach and technology needs of Arab states' institutions • Develop workshop material to address those needs • Run a number of these workshops in ALECSO member states
Propose a platform for Arabic language MOOCs development and hosting	• Review any available technologies supporting Arabic language MOOCs development, hosting, and referencing • Determine gaps in currently available MOOC technologies to accommodate Arabic language MOOC development, hosting, and referencing • Propose a plan (adaptation of available technologies, development of technologies) to fill these gaps • Deploy a platform for Arabic language MOOCs development, hosting, and referencing
Build teaching MOOC prototypes (with a focus on Arabic language MOOCs)	• Based on digital material supplied by teachers in Arab universities and ALECSO, produce MOOC courses on the developed platform
Host and evaluate the developed prototype MOOCs and their delivery to target audiences	• Ensure the proper hosting of the platform and MOOC courses material • Run (with ALECSO designated instructors) the MOOC courses developed on the targeted audiences • Carry an evaluation of the delivered MOOC courses (technology, delivery to target audiences)

2.4 Arab OER Hub

The Arab OER Hub is a unified platform for Arabic Open Educational Resources available online on the global OER platform (www.oercommons.org). The Hub provides unified access to all OER contents developed in the Arab countries (ALECSO, n.d.). It does not only help to develop, use, share and promote open educational resources, but also provides opportunities for cooperation, sharing and exchange between Arab teachers and authors of educational contents with the aim of producing and sharing these resources and facilitating access to them by teachers and learners across the world. The Arab OER Hub also offers users with several tools that enable them to create, add and host digital contents and grant appropriate open licenses, thus make these contents available and accessible online as open educational resources. These tools include in particular:

(1) Sharing existing educational resources, making them available via special online links and addresses (national platforms, specialized websites etc.), typesetting and indexing them by adding

relevant standards and metadata, and allocating the appropriate open license.

(2) OER Author: The Hub includes a tool for creating and managing digital content, which enables OER authors to edit digital educational content, present it in the form of learning units, and then add the needed metadata to facilitate automatic typesetting and ensure more effective search and access.

The OER Author tool makes it easy to combine digital contents in various formats (text, images, audio/video files, etc.) and to save them as open, licensed educational resources. These resources are then available and shared by teachers, learners and all those interested from all over the world. Resources and all multimedia files contained in these resources can be downloaded. The OER Authors tool are characterized as follows (ALECSO, n.d.):

(1) Importing external resources from Google Docs: a new resource can be created by downloading a Google Doc and using it via the OER Author tool;

(2) Adjustment: the open content can be adjusted and adapted to meet the basic characteristics of the Commons, the State's requirements, and the special needs of learners and classrooms;

(3) Setting up and integrating open educational resources: it is possible to set up, integrate, adjust, adapt, allocate, and reorganize/reformulate existing resources in order to create new resources.

3 Challenges

The authors did a survey about OER usage in the Arab countries where 735 Arab participants were involved in it. 313 participants suggested that OER is not being used in their countries and 270 participants reported that OER is being used with limited content. Only 152 participants suggested that OER is being used in their countries. Even when OER is used, it is usually used in a very simple way by accessing open resources online instead of a structured way for effective open teaching and collaboration.

Factors that contributed to the Arab region participants' difficulties while developing and publishing OER are shown in Figure 10. The absence of motivational factors is one of the common problems which made the Arab participants do not develop and publish OER (26%), followed by lack of time (21%), copyright (20%) and the absence of authoring tools (17%) and lack of awareness (16%).

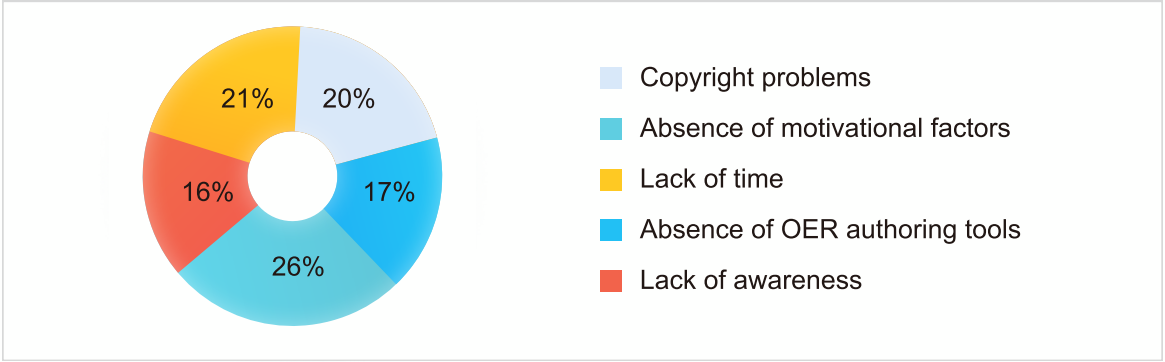


Figure10: Challenges in OER

Summary of the findings

- OER initiatives in the Arab region include creating open universities, developing OER repositories and Massive Open Online Courses (MOOCs), launching OER regulations, and organizing e-learning trainings and OER seminars/workshops.
- ALECSO endeavors to promote the development and use of OER in the Arab region through launching initiatives, implementing projects and building OER platform.
- Challenges for developing and publishing OER in the Arab region include the absence of motivational, lack of time, copyright and the absence of authoring tools and lack of awareness.

Chapter 7

Recommendations

Chapter 7. Recommendations

1 Improve ICT infrastructure through supportive policy

It is seen that internet access in the Arab region varies from a country to another, where some countries have very low internet access compared to others. It is also seen that ownership of mobile devices in the Arab region is higher than ownership of computers. This could be explained with computers are more expensive than mobile devices. Therefore, more supportive governmental policies should be initiated to enhance the infrastructure in several Arab countries, including internet access, as well as computer ownership. For instance, it is possible to initiate a national plan, in cooperation with several high-tech companies, to equip at least one family with internet access and a computer. Additionally, as ownership of mobile devices is higher than computers in the Arab region, governments and institutions should therefore launch supportive policies of mobile learning to make full use of mobile technology in education.

2 Enhance education access through the use of Online-Merge-Offline (OMO) learning

It is seen that access to education in the Arab region is unbalanced. Therefore, to enhance education access, more education policies should be initiated to create second-chance opportunities for those who cannot attend or drop-out of school. In this context, cross-country collaborations could be established to adopt successfully implemented learning experiences for increasing education access. For instance, Online-Merge-Offline (OMO) learning approach merges both the physical and online environments together, to provide both students (online and offline) a more engaging and authentic learning experience. OMO provides those who cannot attend schools, for any of the reasons, the chance to attend school from home and benefit from an authentic and engaging learning experience just like their peers in classrooms.

3 Improve education quality by next generation information technology

It is found that the Arab region is scoring low in core subjects, such as science and mathematics, based on PISA and TIIMS results. Therefore, to enhance students' achievements in these subjects, it is possible to use next generation information technology. For instance, it is possible to use virtual labs and simulation environments to improve students learning outcomes, for instance, in biology, chemistry and physics.etc. These environments could reduce the costs of building physical labs in schools and universities. Additionally, the Arab region can adopt the learning experiences of those countries ranked on top of the list, according to PISA and TIIMS, such as China. For instance, international teacher training could be developed about STEM education and curriculum design and assessment.

4 Enhance teacher professional development using OER and OEP

Both learners and teachers lack the needed skills to create and publish OER. Therefore, several training sessions should be organized to help them work with OER as well as to deal with the

problem of low OER quality (e.g. how to select relevant OER). These sessions should also cover the basic technical skills to produce OER, such as video editing or sound mixing, as well as open licenses. These session should also be organized as blended learning, where they can be provided first to introduce participants to theoretical ideas and concepts, followed by hands-on workshops, where the participants (teachers and learners) can be practically involved in learning these skills (e.g. teachers working on specific software to edit a video). Furthermore, these training sessions should cover standardized meta-data tagging of a given OER to facilitate its indexing by search engines, hence increasing its visibility to learners.

5 Promote education resilience in conflicts

To provide a learning opportunity for refugees and those in conflict areas, where infrastructure is the major issue, low-cost learning technologies or mobile classrooms that could be easily deployed and moved might be helpful. For instance, intelligent ready-made classrooms, could be one of the solutions. These classrooms are equipped with adequate facilities, such as solar system for electricity, chairs, tables, mobile devices, etc.

6 Enhancing the effective governance in ICT

Despite individuals, businesses and governments widely utilize ICT for various purposes, lack of trust, inadequate regulation and insufficient inclusion impede effective governance regarding ICT. To establish a trustful environment of using ICT in the Arab region, more laws/regulations should be issued in the Arab region to protect users/publishers, such as copyright laws or privacy laws. Also, considering population in many Arab countries have limited ICT skills, cybersecurity trainings could be designed to help Arab users learn how to safely use ICT and protect themselves, when needed. Particularly, ICT trainings for those at an early-age is mandatory, as they are exposed to the frequent use of ICT and lack the basic knowledge of protecting themselves online, such as not sharing their personal information with strangers online or also the way of choosing strong passwords to keep them safe.

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Appendix

Number of students in the Arab region

Country	Primary education	Lower secondary education	Upper secondary education	Most recent year
Algeria	4.516.571	NA	NA	NA
Bahrain	115.819	53.063	48.94	2019
Comoros	124.24	50.755	22.94	2018
Djibouti	68.701	41.857	23.642	2019
Egypt	13.265.036	5.407.347	4.006.451	2019
Jordan	1.147.202	612.388	220.396	2019
Kuwait	276.318	NA	NA	2019
Lebanon	516.514	223.205	182.964	2019
Mauritania	677.458	181.58	78.293	2019
Morocco	4.432.229	1.811.339	1.109.452	2019
Oman	290.045	343.833	92.745	2019
Palestine	497.002	547.031	240.157	2019
Qatar	159.109	62.172	55.197	2019
Saudi Arabia	3.390.589	1.555.992	1.603.366	2019
Sudan	4.899.664	1.137.585	1.067.449	2017
Tunisia	1.201.736	509.713	516.901	2018
United Arab Emirates	486.086	310.937	217.543	2017
Yemen	3.900.134	1.155.575	760.296	2016
World average	739.447.189	337.640.718	263.625.826	2019
Arab World average	49.125.662	20.497.277	12.968.263	2019
Iraq	NA	NA	NA	NA
Libya	NA	NA	NA	NA
Somalia	NA	NA	NA	NA
Syria	NA	NA	NA	NA

Source: ALECSO Observatory[60]

[60]Accessed in July, 2021 http://observatory.alecso.org/Data/en/2021/01/22/acceil/