TOWARDS QUALITY HIGHER EDUCATION IN THE ARAB WORLD: CHALLENGES OF THE PRESENT AND ASPIRATIONS OF THE FUTURE

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ABSTRACT

This paper aims at providing an objective evaluation and transformation of Higher Education in the Arab World with a focus on its contribution to knowledge and human development. It argues that despite the great expansion in the number of higher education institutions and the great increase in the number of students enrolled in them, the needs and aspirations of Arab societies have not been fulfilled as the contribution of these institutions to human development and applied science and technology does not measure up to international standards.

In order to improve the quality of higher education provision, outcomes, and economic feasibility, the paper provides a survey of e-learning and blended education and argues that blended education should be adopted as the backbone of higher education in the Arab World due to its excellent content, methodology, outcomes, and economic feasibility.

Keywords: E-learning, Blended Learning, Meta Analysis, Ranking of Universities, Research and Development, Open Courseware, Coursera, Face-to-Face Learning.

INTRODUCTION

The focus of this paper is on making Higher Education more democratic, equitable, accountable, and especially affordable in this era of economic turndown and unprecedented increase in student enrollment.

After stating what it considers the major role of institutions of HE, the paper gives a general overview of HE in the Arab World and shows that Arab World universities have a long way to go before they achieve eminence in world rankings and contribution to the production of knowledge. It then addresses investment in R&D, which it shows is much below international level and needs to be dramatically increased.

In order to rectify the above imbalance between what is available and what is desired, the paper presents online learning, and particularly blended learning as the way to excellence. It ends with recommendations for improving and/or transforming HE in the Arab World.

The Role of Institutions of Higher Education

Among the most important roles institutions of higher education perform are the following

- Contributing to the scientific, technological, cultural and social development and/or transformation at the national, regional, and global level.
- Providing the environment necessary for excellence in teaching, research, entrepreneurship and scholarship.
- Contributing to making higher education more accessible, equitable, affordable and accountable.
- Contributing to the creation of highly trained knowledge societies able to meet the challenges of the twenty-first century's higher education demands of student and faculty mobility and the global market's demands of employability with emphasis on both theory and application, critical thinking, problem solving, team-work and interpersonal skills.
- Improving the country's/region's cultural, scientific, and technical visibility through contributions to global intellectual property (patents, trademarks, industrial design and utility models).

A General Overview of the State of Education in the Arab World

There is no doubt that the twenty-first century has witnessed a surge in the number of higher education institutions and the number of student enrollments. In 1940 there were only ten universities in the Arab world, the number rose to 140 in 2000, 260 in 2007 to around 450 now (Romani, 2009). The

number of students rose from 137,000 in 1960 ; 400,000 in 1970; 1,800.000 in 1980; 7.2 million in 2007 to around 8 million now.

There has also been a boom in cross-border education especially in the Gulf Cooperation Council countries. The UAE and Qatar host around forty branches of Western universities. In 2009 the number of branches of foreign universities housed in Dubai International Academic City reached 32. Six American and two Australian university branches are housed in Qatar. In Saudi Arabia, King Abd-Allah university of Science and Technology was established in 2009 with an endowment of $10 billion. In 2003, there were only eight universities in Saudi Arabia. In 2009 the number of higher education institutions reached (100) with a total budget of $15 billion (Romani, 2009).

Despite this quantitative increase both in number of institutions and amount of funding, knowledge production and innovation have been modest. The number of Arab patents registered in the USA "over the twenty year period 1980-1999/2000 amounted to 171 for Saudi Arabia, 77 for Egypt, 52 for Kuwait, 32 for UAE, 15 for Jordan, 6 for Syria and 6 for Bahrain, compared with 16,328 for South Korea, 7,652 for Israel (Sasson, 2007).

According to the 2012 report of the USA Patent and Trademark Office (Figure 1), the total Arab world contribution adds up to 1087 patents compared with 2,433,555 for the United States, 852,028 for Japan, 114,125 for Taiwan, 98,079 for South Korea, 22,728 for Israel, 17,661 for Finland. The total number of registered patents for the Arab world from 1971 to 1997 was 273, which makes the total number for the last 15 years only 814 patents).

It should be pointed out, however, that the above statistics for 2010 and 2011 show a positive trend for improvement in most Arab countries. As indicated above, the number of patents for 2010 and 2011 is 14/24 for Kuwait; 20/21 for Egypt; 9/13 for the UAE, 5/20 for Lebanon, 1/4 for Morocco, 1/5 for Jordan; 2/3 for Tunisia, 2/3 for Oman, 0/1 for Qatar. It should also be pointed out that the statistics show a relative decline for the last two years for, Germany 13633/12968, United Kingdom 5038/4924, France 5100/ 5022.

Another important indicator of a country's contribution to the development of science, technology, innovation, and both cultural and social transformation are the rankings of its universities and research institutions. Unfortunately the two more important objective measures of these contributions show that the Arab world has a long way to go before it appears on the list of leaders of research and technology. As indicated in Figure 2 (the 2012 Shanghai Ranking of World Universities), there are no Arab universities among the top one hundred, or two hundred universities. With its population of almost 400 million people, the Arab world can boast of only three Saudi universities (one among the top 201-300, and two others among the top 301-400) and one Egyptian university among the top 500. Finland, a small country with a population of about 6 million, can boast of one university among the top 100, 2 among the top 301-400, and 2 among the top 401-500.

As expected 151 American universities are on the list of the top 500 universities. Fifty-three of them are among the top 100; 32 among the top 101-200; 24 among the top 201-300; 28 among the top 301-400; and 14 among the top 401-500. China has overtaken France, Canada, and Japan with a total of 28 universities. Israel now has a total of 6 universities, three of them among the top 100.

In the 2012 National Taiwan University Ranking per scientific and technical papers (Figure 3) there are no Arab universities in the top 500 world universities. The reason for this is most probably due to the weighting of indicators in the two instruments. In the Shanghai Ranking of World Universities only 40% of the total grade is allocated to research. The remaining 60% is distributed as follows

- 10% to the size of the institution
- 40% to the quality of faculty members
- 10% to graduates who won the Noble and/or Field prizes

Comparing the data in Figures 2 & 3 reflects a more-or-less one-to-one correspondence between the Shanghai, and the NTU rankings. The few exceptions have to do with Germany and Italy which scored better on the NTU ranking (45/36; 27/20 respectively), and the UK, and China, which ranked lower in the NTU scale (32/38; 24/28 respectively).

PART A1-Table A1-1a, Breakout by U.S. State and Country of Origin Number of Patents Granted as Distributed by Year of Patent Grant. Granted: 01/01/1977 - 12/31/2011

Origin	Pre 1998	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	All Years
Total, U.S. And Foreign Origin	1856438	163204	169145	176083	184046	184424	187048	181319	157741	196437	182928	185244	191933	244358	247728	4508076
--Subtotal--U.S Origin	1055217	90697	94090	97011	98655	97125	98590	94128	82586	102267	93690	92001	95038	121179	121261	2433535
--Subtotal–Foreign Origin	801221	72507	75055	79072	85391	87299	88458	87191	75155	94170	89238	93243	96895	123179	126467	2074541
JAPAN	331801	32118	32514	32922	34890	36339	37248	37032	31834	39411	35941	36679	38066	46977	48256	852028
GERMANY	143462	9582	9895	10824	11894	11957	12140	11367	9575	10889	10012	10085	10352	13633	12968	298635
TAIWAN	16320	3805	4526	5809	6545	6730	6676	7207	5993	7920	7491	7779	7781	9636	9907	114125
UNITED KINGDOM	55725	3724	3892	4085	4351	4190	4028	3895	3553	4323	4029	3834	4009	5038	4924	113600
FRANCE	55952	3991	4097	4173	4456	4421	4126	3686	3106	3856	3720	3813	3805	5100	5022	113324
KOREA, SOUTH	8584	3362	3679	3472	3763	4009	4132	4671	4591	6509	7264	8730	9566	12508	13239	98079
CANADA	37227	3536	3678	3925	4063	3857	3894	3781	3177	4094	3970	4125	4393	5513	5754	94987
ITALY	23501	1821	1686	1967	1978	1962	2022	1946	1591	1899	1836	1916	1837	2254	2333	50549
SWITZERLAND	26654	1374	1390	1458	1557	1532	1433	1405	1106	1388	1280	1403	1454	1889	1865	47188
SWEDEN	18296	1346	1542	1738	1933	1824	1629	1388	1189	1360	1278	1260	1231	1594	1864	39472
AUSTRALIA	9190	830	832	860	1032	992	1049	1093	1032	1538	1545	1613	1550	2079	2213	27448
ISRAEL	5407	820	792	836	1031	1108	1260	1092	976	1325	1219	1312	1525	1917	2108	22728
FINLAND	5306	629	695	649	769	856	944	954	751	1005	943	908	997	1232	1023	17661
CHINA, PEOPLE'S REPUBLIC OF	554	88	99	161	265	391	424	596	565	970	1235	1874	2270	3303	3786	16581
CHINA, HONG KONG S.A.R.	2587	373	413	545	621	588	681	642	596	753	756	717	587	716	658	11233
SPAIN	2562	308	265	318	340	358	358	312	318	381	363	418	403	492	565	7761
INDIA	405	94	114	131	180	267	356	376	403	506	578	672	720	1137	1259	7198
SAUDI ARABIA	110	14	13	19	12	10	19	15	18	20	20	31	23	58	61	443
TURKEY	49	2	4	6	14	18	32	19	10	25	24	35	36	45	52	371
KUWAIT	26	6	13	8	6	8	7	4	3	7	8	15	15	14	24	164
EGYPT	36	1	3	8	6	5	6	4	7	4	12	2	3	20	21	138
UNITED ARAB EMIRATES	18	1	2	2	6	6	3	3	5	9	2	10	9	9	13	98
LEBANON	20	3	2	4	2	2	6	3	1	2	5	2	6	5	21	84
IRAN	29	0	1	0	2	0	0	0	1	2	3	2	6	8	17	71
MOROCCO	21	2	2	2	1	0	1	1	1	3	1	4	3	1	4	47
JORDAN	9	3	1	0	3	1	1	2	0	1	2	0	1	1	5	30
TUNISIA	11	0	0	0	0	1	0	1	1	2	0	2	0	2	3	23

Figure 1. Number of Patents Granted as Distributed by Year of Patent Grant Breakout by U.S. State and Foreign Country of Origin (U.S. Patent, 2011) Conti....

PART A1-Table A1-1a, Breakout by U.S. State and Country of Origin Number of Patents Granted as Distributed by Year of Patent Grant. Granted: 01/01/1977 - 12/31/2011

Origin	Pre 1998	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	All Years
SYRIA	5	0	1	4	1	2	0	1	0	3	1	0	0	0	1	19
OMAN	1	0	0	0	0	0	0	0	1	0	0	5	1	2	3	13
IRAQ	9	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10
QATAR	0	0	0	1	0	0	0	0	2	2	0	1	2	0	1	9
BAHRAIN	2	0	2	1	0	0	0	0	0	0	0	0	0	1	0	6
YEMEN	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3

Figure 1. Number of Patents Granted as Distributed by Year of Patent Grant Breakout by U.S. State and Foreign Country of Origin (U.S. Patent, 2011)

Country	1-100	101–200	200-300	301-400	401-500	Total
U.S.A	53	32	24	28	14	151
U.K	9	10	11	3	5	38
Japan	4	5	—	7	5	21
Canada	4	3	10	1	4	22
Switzerland	4	2	1	—	—	7
France	4	5	5	3	4	21
Sweden	3	2	2	4	—	11
Denmark	2	1	1	—	—	4
Germany	3	10	10	6	7	36
Israel	3	1	—	2	—	6
Netherlands	2	6	2	2	1	13
Australia	5	3	3	7	6	24
Norway	1	—	2	1	1	5
Finland	1	—	—	2	2	5
Russia	1	—	—	—	1	2
Belgium	1	3	2	—	1	7
Taiwan	1	1	2	1	4	8
South Korea	—	1	2	3	4	10
Italy	—	4	5	3	8	20
Brazil	—	1	1	3	1	6
Mexico	—	1	—	—	—	1
China	—	4	3	7	14	28
Hong Kong	—	2	3	—	—	5
Argentina	—	1	—	—	—	1
Austria	—	1	2	—	-4	7
Singapore	—	1	1	—	—	2
Spain	—	—	3	4	4	11
Czech	—	—	1	—	—	1
Saudi Arabia	—	—	1	2	—	3
Brazil	—	—	1	—	—	1
Ireland	—	—	1	2	—	3
South Africa	—	—	1	1	1	3
Greece	—	—	—	2	—	2
Hungary	—	—	—	1	1	2
India	—	—	—	1	—	1
Poland	—	—	—	2	—	2
Portugal	—	—	—	1	1	2
Iran	—	—	—	1	—	1
Egypt	—	—	—	—	1	1
Chile	—	—	—	—	2	2
Turkey	—	—	—	—	1	1
Croatia	—	—	—	—	1	1
Serbia	—	—	—	—	1	1
Slovenia	—	—	—	—	1	1
Grand Total	100	100	100	100	100	500

Figure 2. Shanghai Academic Ranking of World Universities 2012-Top 500 Universities (Shanghai, 2012)

Country	1-100	101 – 200	201 – 300	301 - 400	401 - 500	Total
U.S.A	54	31	25	27	19	156
Canada	5	4	4	5	4	22
Germany	3	10	15	5	12	45
U.K	8	12	6	6	—	32
Japan	4	4	3	7	5	23
Australia	3	4	2	—	3	12
Denmark	2	—	2	—	—	4
Netherlands	6	3	1	2	—	12
Sweden	3	2	2	2	2	11
France	2	4	3	6	5	20
Switzerland	2	5	—	—	1	8
Brazil	1	—	—	3	3	7
Finland	1	—	1	3	1	5
South Korea	1	1	3	3	4	12
Belgium	2	—	4	1	—	7
Singapore	1	1	—	—	—	2
China	1	4	5	7	7	24
Italy	1	5	6	8	7	27
Taiwan	1	1	—	—	2	3
Spain	—	2	3	2	5	12
Israel	—	3	1	1	—	6
Norway	—	1	1	1	1	4
Hong Kong	—	1	1	3	—	5
Austria	—	1	2	—	2	5
Mexico	—	1	—	—	—	1
Czech	—	—	1	—	—	1
Greece	—	—	1	1	2	4
Russia	—	—	1	—	—	1
Ireland	—	—	2	2	—	4
Scotland	—	—	2	—	1	3
New Zealand	—	—	2	—	—	2
South Africa	—	—	1	—	2	3
Portugal	—	—	—	1	2	3
Argentina	—	—	—	1	—	1
Poland	—	—	—	1	1	2
Slovenia	—	—	—	1	—	1
Taiwan	—	—	—	1	2	3
India	—	—	—	—	2	2
Thailand	—	—	—	—	1	1
Chile	—	—	—	—	2	2
Croatia	—	—	—	—	1	1
Hungary	—	—	—	—	1	1
Grand Total	100	100	100	100	100	500

Figure 3. National Taiwan University Ranking 2012 (NTU Ranking, 2012)

Investment in R&D as per UNESCO Institute for Statistics Estimates, August 2010

Figure 4 shows that Israel spends 4.8% of its GDP on research and development while Arab states in Africa spend 0.3%, Arab states in Asia 0.1% and Egypt 0.2%. It also shows a direct correspondence between the percentages allocated and the development of the

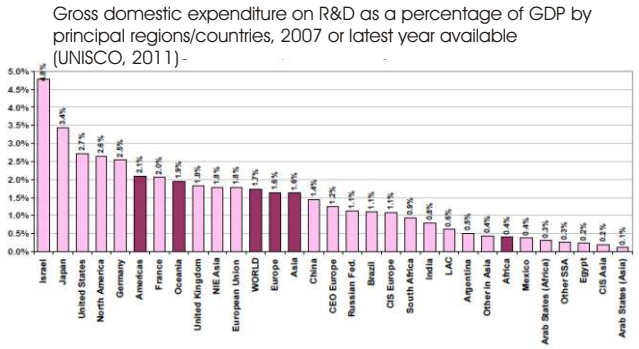


Figure 4. Which Regions are Most R&D Intensive?

respective countries: Japan 3.4%; USA 2.7; North American 2.6%; NIC Asia 1.8%; China 1.4%; Russian Federation 1.1%; India .8%; World 1.7%: Europe 1.6%.

The following three Figures (Figures 5,6 & 7) show that the more developed the country or continent the higher the contribution of the business enterprise. Business enterprise funding in Europe is almost equal to government funding. In the Americas it is much less than government funding. In

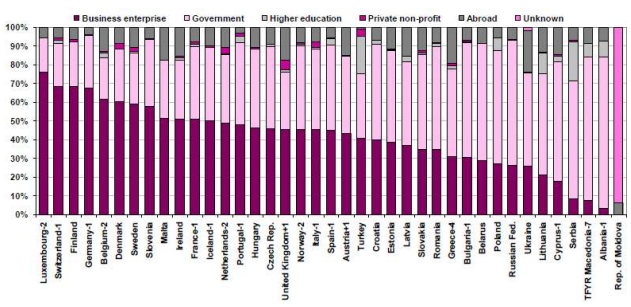


Figure 5. Funding in Europe GERD by Source of Funds, 2009 or Latest Available Year (UNISCO, 2011)

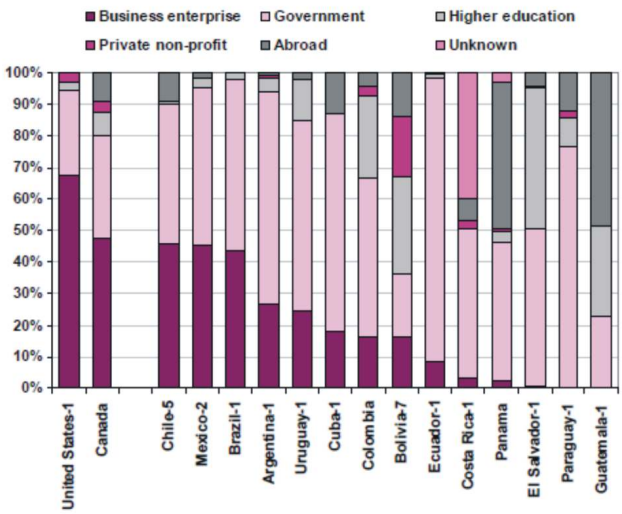
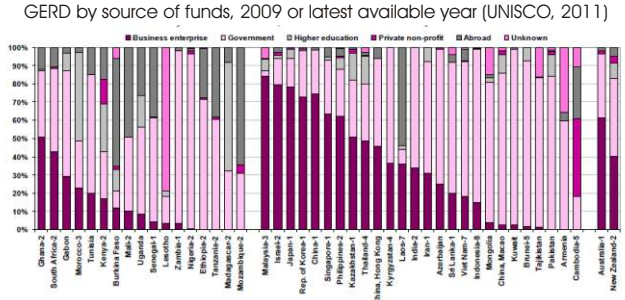


Figure 6. Funding in the Americas GERD by source of funds, 2009 or latest available year (UNESCO, 2011)



Note: +1 = 2010, -1 = 2008, -2 = 2007, -3 = 2006, -4 = 2005, -5 = 2004, -7 = 2002, -8 = 2001.
Source: UNESCO Institute for Statistics, July 2011.
According to World Intellectual Property Indicators (WIPO, 2009), the business sector accounted for 83.8% of applications to the Patent Cooperation Treaty (PCT) for 2008 with developed countries at the top of the list, as indicated below:

Figure 7. Funding in Africa, Asia and the Pacific GERD by Source of Funds, 2009 or Latest Available Year (UNESCO, 2011)

Africa most funding comes from the government. In Asia, there is a surge in the contribution of business enterprise but most funding comes from the government. The size of investment in R&D is of course, reflected in the country's scientific and technological performance.

According to World Intellectual Property Indicators (WIPO, 2009), the business sector accounted for 83.8% of applications to the Patent Cooperation Treaty (PCT) for 2008 with developed countries at the top of the list, as Shown in Table 1

The above review shows that the major challenges facing higher education in the Arab World have to do with raising the quality of higher education, investing more in R&D, keeping pace with scientific and technological developments, and bridging the great gap between business and academia, which can be done through the adoption of online learning and blended education as indicated in the online learning section.

Online Learning

Online learning has been gaining more interest, credibility

Sweden	94.2%
Japan	93.6%
USA	83.3%
UK	79.6%
Israel	72.5%
India	69.6%
China	68.6%
Spain	51.0%
Singapore	45.2%
Brazil	45.1%
South Africa	40.9%

Table 1. World Intellectual Property Indicators

and momentum. In 2002 the number of students enrolled in at least one online course was 1,620,970. In 2010 the number reached 6,142,280 as per a report on online education in the United States, which also arrived at the following key findings

- Over 6.1 million students were taking at least one online course during the fall 2010 term, an increase of 560,000 students over the previous year.
- The 10% growth rate for online enrollments far exceeds the 2% growth in the overall higher education student population.
- Thirty-one percent of higher education students now take at least one course online.
- Reported year-to-year enrollment changes for fully online programs by discipline show most are growing.
- Academic leaders believe that the level of student satisfaction is equivalent for online and face-to-face courses.
- 65% of higher education institutions now say that online learning is a critical part of their long-term strategy.
- There continues to be a consistent minority of academic leaders concerned that the quality of online instruction is not equal to courses delivered face-to-face (Allen and Seaman, 2011).

The report also points out that 51% of its 2,500 college academic officers consider e-learning, and face-to-face outcomes the same, 22.7% consider e-learning somewhat inferior, 9.7% consider it inferior, 13.8% consider it somewhat superior, and 2.7% consider it superior (Allen and Seaman, 2011).

In a survey study of 2000 United Sates colleges and universities their top-most academic officers confirmed that e-learning outcomes are of the same quality or better than those of face-to-face education. The study also states that 57% of them said e-learning is a vital indispensable part of their institutions long-term strategy (BizEd, 2007).

Another survey conducted in 2003 indicated that 81% of all American Higher Education colleges and universities offer a minimum of one electronic or blended course and that 24% of them offer complete programmes leading to awarding academic degrees. The percentage goes up to 97%, and 49% in the case of government universities and Higher Education institutions to alleviate the rising cost of university education (Allen and Seaman,2003).

Andrew Ng, a professor of computer science and artificial intelligence at Stanford University, taught (this year) an online course in Machine learning to a class of 100,000 students. (If he were to continue offering the course to a class of 400 students he would, as he said, need 250 years (Friedman, 2012)). Due to his success in this endeavor, he and Daphne Koller, who is also a professor of computer science and artificial intelligence at Stanford, founded Coursera, which is an online platform for bringing high quality courses free of charge to the world community (Pereira, 2012).

These high quality courses are prepared by the following university consortium: Princeton University, the University of Pennsylvania, the University of Michigan at Ann Arbor, Stanford University, the California Institute of Technology, Duke University, the Georgia Institute of Technology, Johns Hopkins University, Rice University, the University of California at San Francisco, the University of Illinois at Urbana-Champaign, the University of Toronto, the University of Washington, and the University of Virginia (DeSantis, 2012).

MIT and Harvard have recently joined Coursera through their joint venture Edx. "In March 120,000 students signed up for the first MITx course, "Circuits and Electronics (DeSantis, 2012)".

What is worth underscoring here is that the online revolution is led by America's, Canada's and Australia's top universities. Harvard University President, for example, said that " Harvard and MIT will use these new technologies and the research they will make possible to lead the direction of online learning in a way that benefits our students, our peers, and people across the nation and the globe... (Savage, 2012)".

Professor John Hennessy told his colleagues that when it comes to higher education, a "tsunami is coming". Harvard and MIT awarded their Edx first certificate to 7000 students, which is double the number of degrees MIT awarded at this year's (2011) commencement (Savage, 2012).

Announcing the strategy of Deakin University in Australia, the

vice chancellor said "the universities which continue to succeed will be those which embed the opportunities of the internet in their culture and in the way they enhance the student experience (Savage, 2012)".

At the end of this short review we can say that online learning is an important engine for positive change in Higher Education especially that it provides lower-cost quality education. It requires, however, a technology friendly environment. Its major disadvantage is the lack of the face-to-face component.

Blended Learning

To Dziuban et al the term "blended learning" refers to courses that combine face-to-face classroom instruction with online learning and reduced contact hours.(Dziuban et.al., 2004)."

To Garrison and Vaughn it is "The thoughtful fusion of face-to-face and online learning experiences ... such that the strengths of each are blended into a unique learning experience ... Blended learning is a fundamental redesign that transforms the structure of, and approach to, teaching and learning (Garrison and Vaughan, 2008) ".

Advantage of Blended Learning

- High quality teaching materials produced by the best experts locally, regionally, and/or globally.
- High quality evaluation, review, and development methods that focus on the acquisition of all relevant learning outcomes.
- Minimizing social status differences and giving students more time to think.
- Efficient use of university resources cutting down their utilization by a minimum of 5%. This includes classroom, laboratories, transportation, printed material, etc.
- Increased student engagement and changing their role from passive receivers to active participants.
- Making education more democratic and equitable by allowing the enrollment of large numbers of additional students.
- Enhancing the national and/or regional human capital.
- Providing a learning environment which is more friendly to students hesitant to participate actively in face-to-face classes due to the anonymity provided by online learning and the greater time duration they need for answering questions and doing homework.
- Curbing the cost of higher education, increasing access, and enhancing its quality.

Some Challenges for Blended Learning

Major challenges facing blended education are as follows

- Training the faculty and support staff in the design, production, provision and evaluation of the blended learning academic material.
- The time, effort and support required for transforming the face-to-face system in a blended system.
- Providing the required technology comprising high-speed wireless, high-speed bandwidth, smart phones, and cloud computing equipment.
- Local, regional, and international real cooperation and networking.

Spread of Blended Learning

In 2004 only 45,000 k-12 students took one e-leaning course In 2010 the number of k-12 students taking part in e-learning programmes rose to over four million. With the rising cost of education, bleak budgets, and shortage of teachers, schools had to look for ways to cut spending and to find creative staff alternatives, and thus adopted the blended education model. As of 2010, 40 United States Organizations adopted this model and thousands of schools are offering blended model learning programs (Staker, 2011).

Ontario's 24 colleges of applied arts and technology provide training programmes for 31,000 adult learners every year. Due to the rise in the demand for training and the lack of additional funding, Ontorio College Sector Committee (CSC) started exploring new strategies and methodologies for increasing access to training, improving the quality of outcomes, and curbing cost, and thus opted for the blended model (Clark, 2011).

Dziuban, leader and proponent of blended learning did a two-year study (four semesters) comprising a total of 270 students divided into three equal groups doing face-to-

face, online, and blended courses respectively. He states that "students rate the quality of their blended experience as high as or higher than their face-to-face courses (Dziuban et.al., 2004).

In the United States of America, the Department of Education released in July 2009 the findings of an analytical study and review of 1100 studies of online and blended education for post-secondary and K-12 students, who appeared to do better than students enrolled in face-to-face classes. This result prompted the secretary of the Education Department to emphasize the necessity for including the digital content in faculty lectures taking into account using the required open source management systems, which have proven their economic feasibility at schools and university colleges throughout the United States and also to underscore the importance of availing "ourselves of this historic opportunity to use American Recovery and Reinvestment Act funds to bring broadband access and online learning to more communities (Nagel, 2009).

According to the U.S. Department of Education revised meta analysis review of a thousand empirical studies of online learning published in 2010 there is no significant difference in the quality of outcomes between purely face-to-face classes and purely online classes. There is, however, a significant difference between blended classes, on the one hand and both face-to-face, and e-learning on the other hand as stated below

Instruction combining online and face-to-face elements had a larger advantage relative to purely face-to-face instruction than did purely online instruction. The mean effect size in studies comparing blended with face-to-face instruction was $+0.35, p<.001$. This effect size is larger than that for studies comparing purely online and purely face-to-face conditions, which had an average effect size of $+0.05, p=.46$. In fact, the learning outcomes for students in purely online conditions and those for students in purely face-to-face conditions were statistically equivalent (Means et.al., (2010).

Recommendations for Higher Education Development in the Arab World

The following recommendations are made in the light of what has been established above as regards the spread of online learning, and the high quality of blended learning, which is being adopted as the viable model of learning at many, if not the majority of, institutions of Higher Education worldwide.

If the Arab World is to make real progress in the production of knowledge, it desperately needs to transform its HE system by seizing the opportunity of the great advances in science and technology particularly in the area of emerging technologies for online and blended learning : the internet, cloud computing, mobile computing, web 2.0 tools, virtual and mixed reality worlds, the semantic web, etc.

In addition to adopting blended learning as the learning and teaching model at its schools, colleges, and universities, the Arab World should work toward realising the following recommendations.

- Establishing an Arab Area of Education similar to the European Area of Education with the same universal aims:

  (i) Making lifelong learning and mobility a reality;

  (ii) Improving the quality and efficiency of education and training;

  (Iii) Promoting equity, social cohesion and active citizenship;

  (iv) Enhancing creativity and innovation, including entrepreneurship, at all levels of education and training (European Commission, 2011).
- Establishing an Arab open courseware consortium similar to the MIT Open Courseware Consortium, which in 2011 had around 15,000 courses (over 2,000 of them prepared by MIT), received 127 million visits by 90 million visitors, with 1,018 of its courses translated, and 290 mirror sites established (MIT, 2011). Once an Arab Open Courseware consortium is established, it should be most beneficial to educators, students, researchers and self learners. It could be the start of an academic and technological awakening in the Arab World.
- Promoting a culture of cooperation between the business sector and higher education universities and research centers.

- Increasing expenditure on R&D to 4% of the Arab countries GDP.
- Concluding an Arab higher education protocol to guarantee the quality of education, the equivalence of programmes and degrees, and the mobility of students and faculty informed by the Bologna Process (European Commission, 2012).

Conclusion

This paper has provided a general review of the state of higher education in the Arab World, and has shown that despite the great increase in the number of HE institutions, and the number of students attending them the Arab world has not significantly contributed to the production of knowledge especially in science and technology as indicated by its poor performance in the world ranking of universities, its modest contribution to patents, low allocation of funds for research and development and the absence of real cooperation between its academic, business, and industrial enterprises.

The paper has also provided a general review of online and blended/hybrid education with emphasis on the advantages of technology-based academic provision and has argued for adopting the blended education approach as it contributes to making HE more accessible, affordable, sustainable and accountable.

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