The Extent Of Applying Intelligent Systems For Learning Within Higher Educational Institutions In Jordan: The Mediating Factor Of Cultural And Social Transformation Towards Smart Education

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ABSTRACT

Current study aimed at examining the extent of applying intelligent systems for learning and pedagogy within higher educational institutions in Jordan. For that sake, a quantitative approach was adopted utilizing a questionnaire which was distributed on (194) head department and dean from all private and governmental universities in Amman Jordan during the academic year 2019-2020. Characteristics of expert systems were used including (Technological Infrastructure, Staff Knowledge, Educational competitive Advantage, and Problem Solving Skills). Cultural and social transformation towards smart education was used as the mediating factor that paved the way for adopting intelligent learning systems in higher education in Jordan.

Results of study indicated that there is a good level of adoption of intelligent learning systems within higher education in Jordan as according to deans and head departments of faculties. In addition to that, results indicated that this adoption of intelligent learning systems in higher education was attributed to the cultural and social transmission towards smart education.

Study recommended examining the learner's emotional state during the use of intelligent learning systems which may include analysis of facial expressions, tone of voice, heartbeat or other vital signs.

Keywords: Intelligent Learning Systems, Smart Education, Educational competitive Advantage, Smart University

INTRODUCTION

Education is the foundation for building and advancing societies, and no community will rise without education. Rather, we find that economic progress, which includes industrial, agricultural, and others, lies in the advancement of education in educational institutions responsible for the educational processes of students (Tondeur et al., 2017). Therefore, we must go to the development of education as much as possible, and from this standpoint and from the words that are repeated in our ears recently in the intelligent education that makes us more curious to search for it because we have a motive about the development of education; we find that the core of its focus is on the content of technology and interaction with technological products In certain ways in all fields, especially communications and software (Henriksen et al., 2015).

Technology is originally a Greek word, consisting of two syllables. The first section: "techno", which means craft, skill, or art, as for the second"loggia", it means science or study. Hence, the word technology means performance science or application science.As for the concept or definition of information technology it is a set of tools, processes and methodologies, such as coding, programming, data communication, data conversion, storage, retrieval, systems analysis and design, system monitoring and equipment used to collect, process and display information, and information technology also includes office automation, multimedia ,and communication (Hanushek et al., 2016).

PROBLEM STATEMENT

Computers have been used in the field of education for more than thirty years. Computer based training and computer aided instruction systems are among the first to be considered as attempts to teach using computers. These systems were not intended for the individual learner's needs, but the decisions regarding the student's roaming and movement within the scientific subject were governed in the form of a pre-planned measures and

schemes which managed to limit the ability of a learner to sail into the sea of education and draws from that sea all what needs to be learned and known (Kumaran et al., 2016).

Fatima and Pasha (2017) argued that despite the efficiency of CBT (computer-based training) systems and CAL(computer-assisted learning" systems in assisting learners, they do not provide individualized care to the student as a natural (human) teacher does. Abu-Naseret al. (2016) stated that in order for the computer-based educational system to provide such interest, the system must think about both the specialized field and the learner himself as well, and this has encouraged research in the field of building intelligent learning systems.

Lu et al. (2018) added that Intelligent tutoring systems provide flexibility in the presentation of the scientific material and a greater ability to respond to the needs of the student, and these systems acquire the advantage of intelligence through their ability to display educational decisions about how the learning process goes through, as well as the acquisition of information on the learner's personality, and this allows a large amount of diversity by changing the system's interactions with the student. Field studies have shown that intelligent learning systems are highly effective (Chahal and Bakshi, 2015; Aithal and Aithal, 2016).

From that point, current study sought to examine the influence of some characteristics of environment and intelligent learning system in education and the extent of intelligent learning systems applicability in higher education in Jordan. Study hypotheses can be summed as follows:

H_1: Characteristic of intelligent systems for higher education supports its applicability within higher education in Jordan.

H2: Characteristic of intelligent systems for higher education has an influence on Cultural and social transformation towards smart education

H3: Cultural and social transformation towards smart education can influence the applicability of intelligent learning systems

H4: Characteristic of intelligent systems for higher education has an influence on its applicability that is attributed to cultural and social transformation towards smart education

In understanding the relationship between variables which helped forming the aforementioned hypotheses the following model was developed:
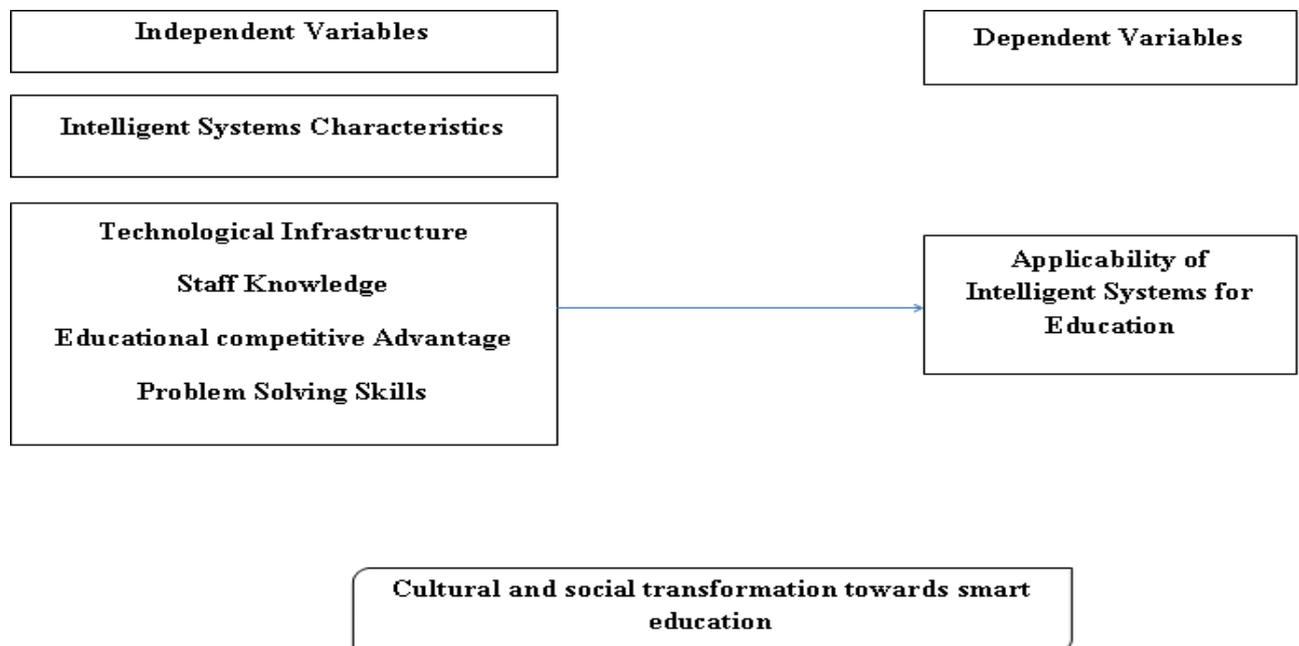

Figure (1): Study Model[Abu-Naser et al., 2016; Chahal and Bakshi, 2015; Aithal and Aithal, 2016]

LITERATURE REVIEW
ARTIFICIAL INTELLIGENCE (AI)

The term intelligence has become associated with many walks of life that we live in, and Intelligent Systems have become a feature of this era and its greatest productions, they are present in most of the facilities and systems that we use, such as intelligent buildings, intelligent cities, intelligent device, intelligent web ... etc., and given what these systems have brought from Significant changes in every area of society and in the way people

think, we can call the era in which we live in the intelligent age (Lu et al., 2018).Krishnamoorthy and Rajeev (2018) added that the concept of "intelligent" has been expanded from small devices and companies to intelligent environments and large areas that represent society and entire cities and all of its institutions, and from these spaces intelligent universities.

As forSzolovits (2019), he argued that intelligent university is an educational institution with high efficiency and effectiveness, using intelligent technology in the infrastructure of its systems in order to make the educational process more dynamic and effective, as it provides rich, interactive and constantly changing educational environments, working to enable individuals capabilities and behaviors and encourage them to interact and cooperate, and to increase participation and communication between Students and teachers in the framework that makes them participants and responsible in developing and raising the level of the educational process, and aims to shift from a consumer of knowledge to a product and its transformation of the entire society into a knowledge society, a contribution to promoting learning goals in the 21st century which are: learn how to know, learn how to do, learn how to be, learning to live together.

According to Acemoglu and Restrepo(2018) intelligent systems are systems that integrate technologies, technological system, or multiple technological systems responsible for sensing, operating, controlling, and others in the same context with a system or systems responsible for a specific function or multiple functions in order to achieve description and analysis of specific data interacting with the technologies and technologies present in these The system or systems to give results for this interaction is represented by procedures and predictions that are implemented intelligently to serve its user (i.e. it is possible to analyze the inputs to the systems without any human intervention and produce results from the analyzes of benefit to its user).

INTELLIGENT SYSTEMS IN EDUCATION

According to Topol(2019) intelligent systems in education is education that relies on technological and non-technological systems that allow a person to interact with it by using it with some different materials and systems to help and motivate him to gain access to information in a certain amount and generate creativity, innovation and other similar names for using it with a specific period, and that interaction is done with certain methodological foundations that help define human capabilities And its development to be employed in the most productive places, it appears and is generated in professional works, manual projects to produce a specific system, computerized applications and other places that allow interaction for students

Konar(2018) added that intelligent systems in education are systems represented in software (algorithms) that stimulate and stimulate mental capabilities by transferring certain logic that helps to produce better, and these systems depend on university specialties such as information technology and engineering mainly in the production of systems and the tool that allows them to work and impose their strength and this strength is to study mathematics and science materials And other materials and transform them as a force to be able to stimulate the human mind, and these systems include applications and programs on computers and tablets.

INTELLIGENT SYSTEMS IN LEARNING

Many teaching methods depend on presenting facts and concepts to learners and then taking a test with questions. This method is effective in exposing people to large amounts of information and testing their ability to remember, but it often prints in the mind information that learners can remember and they may not be able to apply it well when needed. In contrast, intelligent learning systems use simulation and more interactive learning environments that compel learners to apply their learned knowledge and skills and therefore these systems constitute environments that help learners to retrieve and apply knowledge and skills more effectively in practical situations (Wilamowski and Irwin, 2018).

Intelligent learning systems consist of the following basic components as According to Abu-El-Reesh and Abu-Naser(2018):

EXPERT SYSTEMS

intelligent learning systems contains teaching strategies, basic instructions, and desirable information to be taught to the learner including concepts, topics, facts, procedural knowledge and guiding knowledge (heuristcs) that the student is intended to learn, and includes the rules of education and a set of related issues, questions and exercises, which is more than just a representation of data, it is a model or formulation of the way in which an experienced person (expert) represents specialist knowledge, and this unit may include an expert system, which is a system that aims to provide expert-level solutions to issues in a specific field, and expert systems usually deal with information that is not appropriate or incomplete information (Salman and Abu-Naser, 2019).

PEDAGOGY SYSTEM

Pedagogy system introduces the learning process method, such as determining the necessary information when needed for review or the need to present a new topic, and based on the information received from the student

unit, the Fundamentals of Education Unit works on making educational decisions that reflect the different needs of each student, and the learning methods are usually predetermined, such as: Teaching, teaching, examining, auditing, consulting. Pedagogy systemresponsible for implementing one of these methods and the appropriate time, when executing a teaching client, the system displays a specific lesson to the student, adopting a plan to display the contents of the lesson in addition to the desired goals of studying the subject (Al Rekhawi and Abu Naser, 2018).

EXPLANATION SYSTEM
According to Al Rekhawi and Abu Naser (2018), this system takes advantage of all available information from the specialist knowledge base (contents of lessons, goals, topics and exams) as well as information from the student unit in order to answer student questions and provide appropriate explanation and this unit can perform the following burdens:

- Determine the contents of the answer or explanation

- Determine the explanation style (such as the level of details, notes, clarifications, examples, reference to related concepts, etc.

- Collecting information and arranging sentences to be coherent and reasonable, which can be absorbed.

USER INTERFACE
This component controls the interactions with the learner, such as conducting dialogue, designing screens, and how to display the scientific material to the student in the best manner by providing browsers of knowledge and tools for navigating the lessons in sequence and browsing the previous or subsequent lesson and goals. This unit can contain additional student tools such as a notebook, audio or light signals, as well as a time clock or direct assistance (Alshawwa et al., 2019).

The following figure highlights the systems involved within intelligent learning:
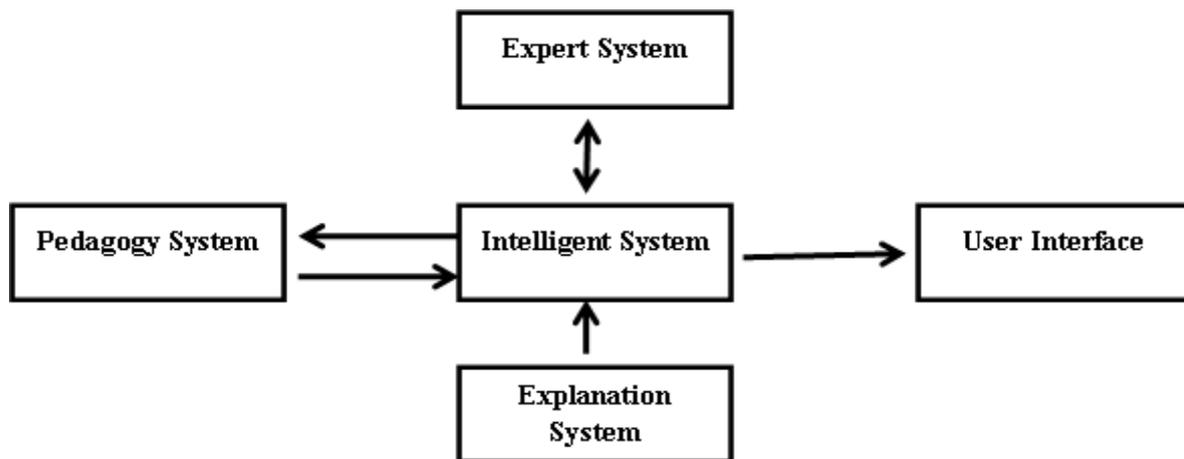

Figure (1): Intelligent Learning System Structure[Al-Shawwa et al., 2019; Abu-El-Reesh and Abu-Naser, 2018]

CHARACTERISTICS OF INTELLIGENT LEARNING ENVIRONMENT FOR HIGHER EDUCATION
According to Qwaider and Abu-Naser (2018), the intelligent environment that suits an intelligent system for education should be:

- Built in a form of an S-Campus "intelligent campus" consisting intelligent physical infrastructure that includes intelligent buildings and teaching classrooms. Also, aintelligent campus should have an IT hardware infrastructure that is intelligent enough to (advanced wired and wireless network infrastructure, laptop and tablet computers, cameras and sensors, storage devices, intelligent boards, displays, monitoring systems, communication systems.

- A intelligentIT software infrastructure which includes (learning systems management systems, enterprise management systems, control and control systems, security and protection systems, social network systems, intelligent electronic library, interactive website, pages on communication sites.

- Intelligent and efficient trained staff.

- Intelligent Learning Environments includes a set of intelligent interactive educational software and systems, intelligent e-books, educational materials and components.

- Intelligent strategy, plans, and educational goals.

- Intelligent Management System: It uses integrated management software for education and institution systems.

THE IMPORTANCE OF INTELLIGENT SYSTEMS IN HIGHER EDUCATION

According to Hazari et al. (2019), intelligent systems in higher education is important in terms of organizing communication and cooperation in the field of education between all elements of the educational process among them and with educational services from anywhere and at any time, in addition to that, Crow et al. (2018) argued that intelligent systems in higher education have the ability to enrich the education process and research environment, and solving problems and obstacles of traditional learning systems through technical empowerment. Nestelet al. (2018) saw that its importance can appear through working to build a new person is the most important goal of the intelligent university, a different and unorthodox person in the way he learned and dealt with, characterized by intellectual and behavioral flexibility, mastered various and many skills, capable of self-learning, loves renewing and searching for information on his own and producing knowledge, he has Entrepreneurship, innovation and creativity. On the other hand, Molnáret al. (2018) argued that it is certain that the student in this case can interact with systems that he himself use by using technology-based tools or on systems, resources, and other materials so that develops the mental skills and abilities to interact with them, if we stand between the concept of development and dependent intelligence completely dependent on technological products that It allows the student to develop his intelligence by interacting with it, systems that are not highly dependent on technology and depend on other systems which are the systems that develop intelligence in interaction with them, systems that depend on product technology very little and rely on other systems, which are systems that develop intelligence to interact with it, and other systems that develop intelligence by dealing with it.

HYPOTHESES DEVELOPMENT
TECHNOLOGICAL INFRASTRUCTURE IS THE FIRST STEP TOWARDS A WELL-BUILT INTELLIGENT LEARNING

Infrastructure is used for information on continuous technical products such as telephones, fax machines, faxes, computers, CDs, audio and video tapes, coaxial cable, satellites, and optical communication lines (Peters, 2018).Salloum and Shaalan(2018) agrees that when launching a teaching strategy that is based on intelligent systems there is a need to prepare the infrastructure of teaching institution in order for it to match the requirements of advanced learning mechanism. At the same time, Shen(2018) stated that with a weak and fragile infrastructure there is no chance for intelligent systems to survive and give its best let alone intelligent systems of teaching. On the other hand, Williamson (2018) saw that technological infrastructure is the set of means and capabilities that are usually coordinated by a central information organization. For example, the communication network that is run by a specific institution and is shared by many commercial and service establishments that form a common infrastructure. Laws and customs form the mechanisms that link the exploitation of both physical and mental compounds to the IT infrastructure. The common facilities of the IT architecture are the embodiment of the structure and the realization of practical applications.

Based on that, we in current study hypothesize that technological infrastructure within higher education institutions in Jordan support the applicability of intelligent learning systems.

STAFF KNOWLEDGE CAN SUPPORT THE APPLICABILITY OF LEARNING INTELLIGENT SYSTEMS

Staff knowledge and experience is a key issue here, with no experience and knowledge in dealing with technology in general and intelligent systems in particular there would be no chance for individuals to exploit the best of intelligent systems in education which can help in supporting all materials of education in a way that transmits the benefits for students as well (Kurvaeva et al., 2018).

On the other hand, Chumachenkoet al., (2019) argued that with a good staff knowledge of technology and its ramifications in intelligent education systems; there would be a chance to maximizing students' ability to teach and learn, make individuals able to take leadership roles in the outside world, move from the stage of acquiring knowledge to the stage of employing it to tackle real problems, and provide good educational opportunities without any restrictions.

Cummings et al. (2018) added that when individuals have the needed knowledge in dealing with intelligent systems in education there would be a chance for better educational outcomes from the systems as well as students would more able to identify themselves within these systems and act according to what they learnt from

them; from that point, *we present here that staff knowledge within higher education institutions in Jordan support the applicability of intelligent learning systems.*

EDUCATIONAL COMPETITIVE ADVANTAGE IS A PREREQUISITE FOR SUCCESSFUL ILS APPLICATION

According to Amarakoonet al. (2018), educational institutions, especially universities in the twenty-first century, face major challenges due to global openness and the advancement of knowledge and technology, the university student has shifted from a local to an international student and universities from the local to the international competition and transformed the simple development requirements into complex, complex and renewable requirements. Competition between universities is a very positive phenomenon that has been produced by many contemporary factors, including globalization, the knowledge economy, quality standards, global rankings of universities and many other factors, and it is also an indication of the strong economy of any country because the economy is based in essence on the efficiency and effectiveness of higher education in achieving comprehensive community development; which means Attention to the system of university education, reform and periodic development.Benešováet al. (2018) noted that competiveness between universities pushes it to the necessity of building the competitive capacity that enables it to achieve a competitive advantage with other universities in terms of attracting the best human resources and creating the most prominent scientific disciplines and creating the academic environment with its financial, financial, moral and cognitive components.

Based on the above argument, out sub-aim here is to examine whether educational competitive advantage within higher education institutions in Jordan can support the applicability of intelligent learning systems.

PROBLEM SOLVING SKILLS PRESENT BETTER INTELLIGENT LEARNING SYSTEMS OUTCOMES

Problem solving skills, as its name indicates, expresses the ability to find effective solutions to the various problems that confront us in practical or private life, and in a timely manner that guarantees avoiding or minimizing losses as much as possible. This includes several major steps that must be followed (Khella and Abu-Naser, 2018). On the other hand, when individuals enjoy a good level of problem solving skills there would be a chance for enabling the educational and administrative team to a new set of educational and administrative capabilitiesin addition to providing multi-faceted methodological solutions to meet the needs of students and their employee., problem solving can also increase productivity and reduce operating costs (Hooshyar et al., 2018).

METHODOLOGY

A quantitative approach was adopted in current study in order to verify its hypotheses. Depending on a questionnaire; (194) deans and heads department participated in the study from different private and governmental universities in Amman, Jordan. The questionnaire consisted of two sections, the first included demographic variables (gender, age, academic qualification, and position) while the second section consisted of statements that are related to study variables (Technological Infrastructure, Staff Knowledge, Educational competitive Advantage and Problem Solving Skills) in addition to statements regarding the mediating factors which was (Cultural and social transformation towards smart education).A Cronbachs' alpha test was used to test the reliability of the questionnaire. It was found that a value of (0.97) for the all items was greater than accepted percent 0.60(Sekaran and Bougie, 2013).

RESULTS AND DISCUSSION
DEMOGRAPHICS

Table (1): Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30-35	62	32.0	32.0	32.0
	36-46	71	36.6	36.6	68.6
	47-57	45	23.2	23.2	91.8
	+58	16	8.2	8.2	100.0
	Total	194	100.0	100.0	

Table (1) highlighted results of analysis regarding age of respondents. Majority of sample age ranged between 36-46 years old with a frequency of 71 individuals forming 36.6% of total sample.

Table (2): Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	142	73.2	73.2	73.2
	Female	52	26.8	26.8	100.0

Total	194	100.0	100.0	

Table (2) above indicated that majority of sample were males forming 73.2% of the sample with frequency of 142 individuals compared to females who appeared to form 26.8% of total sample.

Table (3): Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3-8	61	31.4	31.4	31.4
	9-14	42	21.6	21.6	53.1
	15-20	75	38.7	38.7	91.8
	+21	16	8.2	8.2	100.0
	Total	194	100.0	100.0	

In table (3), it can be seen that majority of sample (38.7%) had an experience of 15-20 years in the education field compared to the least experience of more than 21 years forming 8.2% of total sample.

Table (4): Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Head department	82	42.3	42.3	42.3
	Dean	112	57.7	57.7	100.0
	Total	194	100.0	100.0	

In table (4) above, it can be seen that 57.7% of the sample who responded to the questionnaire were deans of faculties with frequency of 112 compared to head departments who formed 42.3% of total sample.

Table (5): Questionnaire Analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Intelligent Systems Characteristics					
Technological Infrastructure					
Educational departments are supported with computer, laptops and internet connection	194	1	5	4.15	1.025
Every department has its own IT specialist	194	1	5	4.09	1.039
All department depends on a single network to upload exams and other learning related materials	194	1	5	4.10	.960
Every department is controlled through a server that makes sure the network is always ready and maintained	194	1	5	4.13	.904
The institution makes regular agreement with the best technology providers in the country	194	1	5	4.13	.904
Staff Knowledge					
Staff is aware of technology and its skills	194	1	5	3.88	1.046
All staff in the department an log in, use, and connect to internet solely	194	1	5	4.04	1.040
Training sessions, seminars and related conferences are always a part of the staff's routine	194	1	5	3.91	1.088
All individuals can use educational technologies to teach and build curriculums	194	1	5	3.99	1.084
Most of the staff been a part of an intelligent system learning network	194	1	5	3.78	1.100
Educational Competitive Advantage					
Total quality is a part of the educational body in Jordan	194	1	5	3.77	1.116
The ministry is always looking for a place of development and enhancement to support the entrance of technology in education	194	1	5	3.86	.976
Jordanian universities are seen to be the 1st destination for foreigner students due to its	194	1	5	3.85	1.045

high quality outcomes					
Both private and governmental universities enjoy a high level of educational outcomes due to quality assurance	194	1	5	3.75	1.153
The ministry of higher education makes sure that all educational solutions are available within Jordanian universities	194	1	5	4.05	.951
Problem Solving Skills					
Higher education in Jordan is known to be resilient to technological advancements	194	1	5	3.99	.908
The flexibility of the educational systems in higher education makes the transmission easier and more manageable	194	1	5	3.98	.924
IT specialist in different fields are always ready to solve any sudden problems within the systems	194	1	5	3.95	.898
Academic staff have full awareness regarding the usage of technology and education	194	1	5	3.96	.892
Academic staff is always ready to enhance the curriculum with technology and intelligent systems	194	1	5	3.89	1.069
Applicability of Intelligent systems for Education					
Intelligent learning systems will stimulate and open certain areas of the human mind	194	1	5	4.10	.879
Jordanian educational system is resilient and flexible to change	194	1	5	3.99	1.080
Ministry of higher education cooperates with many parties that are able to support technological advancements in education	194	1	5	4.15	.844
The nature of Jordanian society is always ready to accept technology	194	1	5	4.25	.757
Students have been prepared for technology in higher education through their schooling education before	194	1	5	4.03	1.000
Cultural and Social Transformation Towards Smart Education					
Most educational institutions in Jordan are now supported with the best technologies in education	194	1	5	4.34	.717
There is a deep belief that technology is the best choice for both teachers and students	194	1	5	4.09	1.027
The ministry of higher education supports any educational transmission from conventional to technological education	194	1	5	4.13	.869
All students are aware of the importance of technology in their educational journey	194	1	5	4.45	.713
There is a social support towards computerizing all educational processes in higher education	194	1	5	4.43	.711
Valid N (listwise)	194				

Table (6): Descriptive Statistics of Variables

	N	Minimum	Maximum	Mean	Std. Deviation
Infrastructure	194	1.00	5.00	4.1206	.82631
Knowledge	194	1.00	5.00	3.9186	.90603
Advantage	194	1.00	5.00	3.8536	.88722
Problem	194	1.00	5.00	3.9557	.78052
Applicability	194	1.00	5.00	4.1052	.72389

cultural	194	1.00	5.00	4.2866	.63859
Valid N (listwise)	194				

As it appears in table (5, 6) respondents had positive attitudes towards variables and statements of questionnaire as they all managed to score higher than mean of scale which was 3.00.

COLLINEARITY STATISTICS TEST

Multicollinearity between the independent variables is checked using the Collinearity statistics: Tolerance and Variance Inflation Factor (VIF). The minimum acceptable cutoff value for tolerance is typically (0.10). The maximum acceptable cutoff value for the VIF is (10). In other words, to indicate no problem with multicollinearity tolerance value should not be less than (0.10) while VIF value should not be more than (10) (Belsley, et al. 2005).

Table (7): Collinearity statistics test

Model	Collinearity Statistics	
	Tolerance	VIF
Technological Infrastructure	.222	4.498
Staff Knowledge	.171	5.856
Educational competitive Advantage	.185	5.415
Problem Solving Skills	.289	3.456

As we see in table (7), VIF values for each independent variable was less than 10, with tolerance ranges between (0.231-0.297) it means that there was no occurrence for any multicollinearity problem between the independent variables.

Main Hypothesis:

H$_1$: Characteristic of intelligent systems for higher education supports its applicability within higher education in Jordan.

H2: Characteristic of intelligent systems for higher education has an influence on Cultural and social transformation towards smart education

H3: Cultural and social transformation towards smart education can influence the applicability of intelligent learning systems

H4: Characteristic of intelligent systems for higher education has an influence on its applicability that is attributed to cultural and social transformation towards smart education

Table (8): Path analysis by using IBM SPSS Amos 21.0 program

RAMSEA	CFI	GFI	p- value	df	Chi^2
0.066	0.98	0.984	0.36	8	3.797

•	GFI	≥0.90
•	CFI	≥0.90
•	RAMSEA	≤0.08

In order to test the structural model fit, the value of $X^2 = 3.797$ was not significant at 0.05, (GFI = 0.984) was an excellent indicator, the CFI = 0.98 was an excellent value, (RAMSEA = 0.066) was an acceptable value.That means the structural modelwas fit.

As Shown in the following table (9), the study hypotheses were supported:

Table(9): Amos Results

			Estimate	S.E.	C.R.	P**
cultural	<---	F1	.590	.061	9.637	***
Applicability	<---	F1	.827	.063	13.062	***
Applicability	<---	cultural	.184	.054	3.370	***

- F1: intelligent systems Variable

- ** Significant at 0.05 level

Table (10): Estimates for direct and indirect impact

Standardized Direct Effects	P	Standardized Indirect Effects	Standardized Total Effects

intelligent systemscultural	0.619	0.000**		0.619
cultural Customer Applicability	0.162	0.000**		0.162
intelligent systems Applicability	0.765	0.000**	0.10	0.865

** Significant at 0.05 level

Table (9) indicated that C.R. Values were significant at level 0.05 which means:

- Characteristic of intelligent systems for higher education supports its applicability within higher education in Jordan.

- Characteristic of intelligent systems for higher education has an influence onCultural and social transformation towards smart education

- Cultural and social transformation towards smart education can influence the applicability of intelligent learning systems

Also it is found that Standardized Indirect Effect of cultural and social transformation towards smart educationis significant at 0.05 level, that means Characteristic of intelligent systems for higher education has an influence on its applicability that is attributed to cultural and social transformation towards smart education, as shown in the following chart:
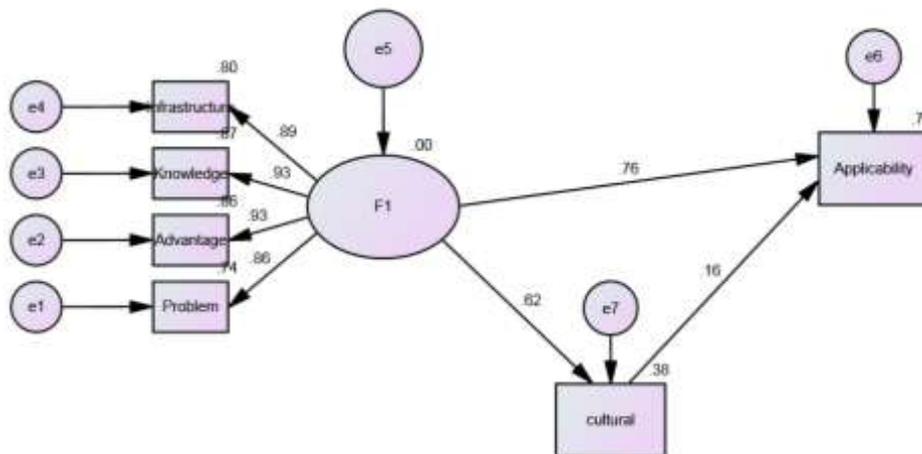
DISCUSSION

Through analysis above, and based on previously supported hypotheses; it can be said that what researcher hypothesized in current study was accepted and there was an influence of intelligent learning systems on the extent of adopting such systems within higher education in Jordanian universities that is attributed to the cultural transmission towards smart education. It appeared from the analysis that there is an actual adoption of intelligent educational applications within Jordanian universities as it appeared through the responses of deans and head departments of faculties. This was attributed to the high adoption of TQM practices within education in a way that guarantees a high level of educational outcomes that would end up in increasing the competitiveness of higher education in Jordan.In addition to that, analysis pointed out that most universities in Jordan now are adopting many intelligent learning systems which include smart campus technologies, intelligent learning and education management, intelligentclassrooms, intelligentmanagement of student services, and security management at the university.

From that point, it can be seen that there is a good level of intelligent learning systems within higher education in Jordan that was attributed to the cultural and social transformation towards smart education. Analysis supported the influence of cultural and social transformation towards smart education through the responses of deans and head departments who supported the fact that intelligent education isn't now an academic requirement; it became a cultural and social requirement from every individual who wishes to receive a level of education that prepare them to launch their life into the practical world. In addition to that, it was seen through analysis and the responses of sample individuals on questionnaire statements that the importance of smart systems lies as the basis for progress in this era upon which leading institutions are based and keeping pace with future developments in addition to it is a new vision for the teaching method at the university by mixing the use of modern technologies and preserving the environment in the various facilities and components of the

university. It will make advanced technologies for information and communications technology from the traditional university an academic structure managed in a smart way, and will change the method of work in all areas, and make the process of learning and education more useful and enjoyable, and enhance the value of educational materials and concepts of self-learning, and make the campus safer.

However, results of current study matched many scholars who argued that intelligent and smart education is the best road to take now as it supports many educational and academic needs and it makes education more fun as (Peters, 2018; Kurvaeva et al., 2018)noted out. In addition to that, results of current study agreed with (Williamson, 2018; Shen, 2018) who argued that intelligent systems in the educational institution are able to create an academic entity with high efficiency and effectiveness that works to create a scientific revolution in knowledge acquisition and management, and in the production of interactive information and the method of receiving it, and it is considered an effective tool in changing the movement of contemporary life, it works to provide programs with a competitive educational quality of high Through the e-learning environment, it supports and promotes lifelong learning.

As for the characteristics which supports the adoption and application of intelligent learning systems in education we can see that results agreed with what Chumachenkoet al., (2019) stated that include intelligent and buildings, intelligent IT Infrastructure, trained human cadres with the essential digital skills and intelligent educational environment.

CONCLUSION AND RECOMMENDATIONS

It can be said that there is a consensus on the importance of intelligent education systems and learning through artificial intelligence because of its distinct impact in raising the level of cognitive achievement, given the activities characterized by intelligent learning systems such as the ability to adapt according to the needs of the learner and provide collective learning opportunities, meaning a group of Students work to solve problems in specific environments, which gives social and cognitive benefits.

Among the important things in building smart learning systems is reducing the time and cost of designing and developing these systems, and among the strategies presented is the development and use of authoring systems tools to build systems in an integrated way. Building and developing these tools for the Arab beneficiary will have a significant impact on the educational system in the entire Arab world, as it increases the opportunities for cooperation between Arab specialists who are located in geographically separated places.

The interest in intelligent learning has increased a lot after the growth of the international network for information, but we must be aware that preparing a course requires time to prepare it and upload it to the information network, and this time and effort may be three times as much as the time and effort required by preparing the course in the traditional style (preparation for the semester) The usual), because the teacher needs to prepare in advance and organize the contents of the course in a more complete and comprehensive way.

The importance of the smart university lies in the fact that it is considered the main pillar of sustainable development for the formation of human capital by preparing graduates with high qualifications and skills that create a scientific revolution to achieve excellence and competitiveness in the midst of intense competition in higher education, in addition to raising the value of higher education and improving the overall quality of education.

In conclusion: We must know smart education is no longer an option but has become a necessity, and the question should not be about the possibility of accomplishing this, but rather about the time frame for achieving it.

RECOMMENDATIONS

There are some advanced research projects to produce intelligent education systems that can embody the psychological state of the learner and not only the cognitive status of the educated student, and the new generation of these systems is called "effective tutoring systems". Current study recommends examining the learner's emotional state during the use of intelligent learning systems which may include analysis of facial expressions, tone of voice, heartbeat or other vital signs.

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