The Role of Digitization In Revitalizing The Course System At Northern Technical University

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Abstract

Northern Technical University in Iraq relied in their education on the course system, which was marked by some kind of difficulties. A questionnaire was distributed to staff members including professors, technicians, administrators, administrators along with students subject to the curriculum system as a secondary source for collecting data and information. The study found that NTU as a modern university has an infrastructure supported by an electronic educational administrative information system. It provides an integrated digital platform for teachers to participate extensively in lectures, courses, scientific and practical workshops, create interactive lessons and assignments, tests and assessment through a solid. Such a platform could facilitate the students to complete their homework and academic duties in the time available to them. Students could be informed and notified by sending them an email that includes educational contents and details. This will definitely assist the university to keep using the course system.

The study dealt with data analysis by using structural equation modeling technique and the confirmatory factor analysis strategy as a means to measure the observational variables represented by the digitization axes, which in turn matched the measures of statistical analysis Amos.

Keywords: Digitization, Course system, Registrations, Accounts management, Library, Study programs, Assessments, Electronic services

دور الرقمنة في تنشيط نظام المقررات في الجامعة التقنية الشمالية

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الملخص

اعتمدت الجامعة التقنية الشمالية في العراق في تعليمها على نظام المقررات ، واتسم هذا النظام ببعض الصعوبات. تم توزيع استبيان على الأساتذة والفنيين والإداريين والطلاب الخاضعين لنظام المناهج كمصدر ثانوي لجمع البيانات والمعلومات. وجدت الدراسة أن

جامعة NTU كجامعة شابة وحديثة لديها بنية تحتية مدعومة بنظام معلومات إداري تعليمي إلكتروني ، وتوفر منصة رقمية متكاملة للمعلمين للمشاركة على نطاق واسع في المحاضرات والدورات وورش العمل العلمية والعملية ، وإنشاء دروس تفاعلية ، وإنشاء مهام. والاختبارات والتقييم من خلال منصة صلبة وفعالة سهلت على الطالب إنجاز واجباته المدرسية وواجباته في الوقت المتاح له من خلال إخطارهم وإبلاغهم عن طريق إرسال بريد إلكتروني يتضمن محتوى تعليميًا وتكنولوجيا المعلومات والاتصالات ، حث الجامعة على الاستمرار. مع نظام الدورة. تناولت الدراسة تحليل البيانات باستخدام نمذجة المعادلات الهيكلية واستراتيجية تحليل العامل التوكيد كوسيلة لقياس متغيرات الملاحظة المتمثلة في محاور الرقمنة والتي بدورها تطابقت مع مقاييس التحليل الإحصائي اموس.

<u>**الكلمات المفتاحية:**</u> الرقمنة ، نظام الدورة ، التسجيلات ، إدارة الحسابات ، المكتبة ، البرامج الدراسية ، التقييمات ، الخدمات الإلكترونية

I. INTRODUCTION

Digitization is information and communication technology for communication and interaction between students and teachers in the curriculum system. It contains a mobile phone ,media methods of communication with the Internet, the development of Internet of things science remote sensing monitoring and eavesdropping devices, which changed the way of learning behaviors for individuals[1][2][3][4].

Higher education in Iraq has acted as a system of courses such as changing the education strategy and renewing curricula, including study programs assessments and electronic services. With a developed scene for the university educational environment andbuilding, the digital platform that contains electronic tools registration ,accountsmanagement, library ,, and the mechanization of the mechanisms ofthese tools have been setup effectively and actively .

To work in the course system with the participation of students with academics through personal learning, cooperation with peer' s research, and targeted scientific projects that contribute to increasing focus and understanding the entire syllabus without resorting to memorization and indoctrination. Access to digital resources such as electronic literature collection, fitness programs, and broadcast programs was required. Digital simulation games for social studies classrooms ,the electronic course , the process of paying tuition fees and wages electronically, and finally the electronic administration and what it includes of timetables classrooms, curricula, teaching staff, and study timings[5][6].

In the current study[7], it has been found that the digital competence of individuals affects the structure of informal digital learning and professional behavior. To better understand the meaning of informal digital education for learners and the effects of digital competence, the study incorporated digital competence into a decomposing theory model of planned behavior and tested the model using survey data from university students in Belgium. The study explored different aspects of Belgians' learning behaviors from cognitive, metacognitive, social, and motivational. The results showed both behavioral factors of planned behavior and digital competence that explained students' digital self-learning.

While their formal educational institutions in Iraqi universities are still underutilizing the potential of digital technology in teaching and practical training. Northern Technical University is increasingly emphasizing the significance of digitally supported teaching methods and self-learning[8], as seen by the current survey, which indicated that %95 of students use digitally supported teaching methods and self-learning. It is taught through the use of digital technology and the instructors' trust. The previous current study has shown that in the presence of digitization, teachers will spend more time preparing lectures in an electronic format than in a conventional one [9].

The previous study on the accreditation of students for learning in higher education focused on the adoption of a specific educational platform improved by technology or practical application[10], and some advocates recommended for the full use of digital technologies in learning[11]. Some of the characteristics that impact students' use of technology in learning, such as ease of use and happiness in study situations, have been found in the previous research[12].

In this research,the researchers relied on digitization, which included information on teaching and learning management, classroom[13], preparing questions and collecting results, reinforced by timetables for time management and the methods of payment of fees and wages for academics staff at the university reinforced by the availability of an electronic library that allows teachers and students

to write research and create projects.Applied techn ologycontribute s to supplying the requirements of the localmarket[14].

Digitization was defined as the conversion to digital format, which is the process of switching traditional methods to electronic systems after being processed to eliminate the problems of file accumulation and the difficulty of retrieving data for useby computer networks [15][16]. Its type and container were to a digital string, and the technical work accompanies creative and office work to organize the post-information to index and tabulate it and represent the content of the digitized text[17]. The university course system is a semester-based system that allows freedom of choice in front of the ‹student to study the courses (lessons) Studentsdesires[18]. Which covers the academic units and the number of hours required in each semester from among a variety of study subjects determined by the university and college[19].

ne of the duties of the registration system is to register the courses for each studentin the academic level. Guiding and directing students according to the principles, conditions, and controls of the course system [20]. With the confirmation of the names of the course supervisors, and then receiving student registration forms for courses from the supervisors. Finally, fixing the unified university number for each student[21]. Study programs are programs that include a set of courses. Each course is classified as either core or elective, and each program has a specific number of core and elective courses[22].

A. *Study Model:*

Figure No. (1) shows the hypothetical study variables that have a significant correlation with the study axes, specifically, digitization and the course system, to be analyzed later by the constructivist modeling system.
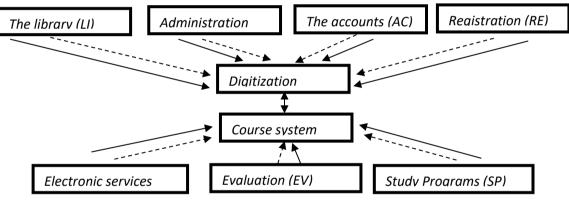

Figure No. (1): The Hypothetical Study

Relying on the default model as gown in Figure (1), several major and minor hypotheses were formulated as follows: The first hypothesis: This hypothesis proposes that there is a significant correlation between digitizing and course systems in the field of study which the following sub-hypothesis can be formulated: There is a significant correlation between registration (RE), the accounts (AC), administration (AD), the library (LI), the electronic service (ES), the Evaluation (EV), the study programs (SP) and course system.

On the other hand, the second hypothesis proposes that there is a significant effect between digitizing and course systems in the field of study from which the following sub-hypothesis can be formulated: There is a significant effect between registration (RE), the accounts (AC), administration (AD), the library (LI) the electronic service (ES), the Evaluation (EV), the study programs (SP) and course system.

The questionnaire contained 30 questions that were adopted as variables and divided into independent variables (x1, x2, x3, x4, x5, x6, x7, x8, x9, x10, x11. x12, x13, x14, x15, x16) have computed axes namely Registration(RE) Accounts ,(AC) Administration ,(AD) Library ,(LI) all independent axes , computed for dimension (digitization)(DI) and dependent variables ,(y1,y2,y3,y4,y5,y6,y7,y8,y9,y10,y1 1, y12, y13, y14) which were calculated for the axes of study

programs(SP) assessment ,(EV) electronic services ,(ES) so that all axes were filtered by dimension ,
(courses system)(SO) .

II. METHOD

Amos system was adopted to draw the study model and encode its axes and dimensions, as the
data were not distributed normally after conducting a test of normality,as shown in Table1 .

Table 1. The Tests of Normality

	Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Statistic	*Df*	*Sig.*	*Statistic*	*Df*	*Sig.*
x1	.184	485	.000	.912	485	.000
a. Lilliefors Significance Correction						

Scale-free least square distribution was chosen to perform the statistical tests, and the descriptive e-
statistics test was adopted. Structural Equation Modeling(SEM) ,is an important analysis of data
phenomena, and behaviors. Models are designed according to strategies to characterize variables and
their elements in a quantitative manner, after which their validity and conformity with the design are
 tested for field data, which were obtained by theConfirmatory Factor Analysis method. (CFA) as a
tool for measuring and determining the relationships between the latent variables that are inferred
from the viewing variables.T he study dealt with the latent variables of digitization represented in its
dimensions registration, accounts, administration, and library,) the latent variables of the courses and
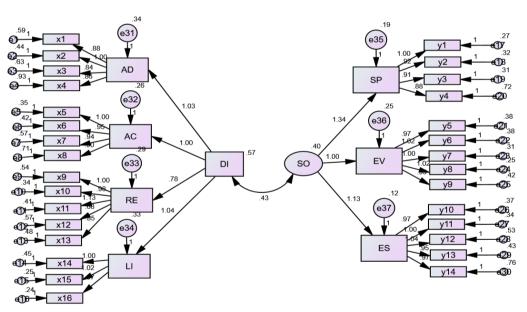their dimensions (study programs, assessment, electronic services as shown in Figure2.

Fig. No. 2: The first stage of the study model results

When displaying the analysis of the results that appears in the model, the number of distinct sample
moments was 741. The number of distinct parameters to be estimated is 68 and the Degrees of freedom
is 673, It is noted that the probability ratio/degrees of freedom CMIN/DF is 2.73 The value that lies
between 2 and 5 meaning that the value of the chi-square does not exceed the upper bound and as
calculated by the equation below, the product of the minimum chi-square divided by the degrees of
freedom as defined in question no. 1.

CMIN/DF= 1593/673= 2.37 (1)

Which must be from 2 in the case of exact fit, and less than 5 in the case of accepting the model. It is
noted in Table2 that the imposed model is identical to the data when is compared with the saturated
model at 0 degrees of freedom, which has no value to be done through only theoretical calculations.

Table2. The chi-square minimum

Model 2	NPAR	CMIN
Default model	68	1593,660
Saturated model	741	.000
Independence model	38	70149.493
Zero model	0	79345.493

It is noted in Table3. of the results of the goodness fit index that the measure of the variance of the quality of fit between the hypothetical model and the field model is 0.98, which corresponds to the value of (R^2), which is assumed to vary by the value of $GFI > 0.9$, while the measure of the root mean residual index (RMR) Root Mean Square Residua is 0.04, which means the mean value of all the standard residuals that express the average discrepancy between the hypothetical correlation matrix and the matrix based on the questionnaire data, which as it approached zero, the indicator was close to matching, which means that the default model is identical and of high quality to the data, which shows the extent to which the scheme is accepted default to study. Adjusted Goodness of Fit Index (AGFI) a measure to correct the goodness of fit by decreasing it as the complexity of the model increases. If its value of 1 indicates a perfect fit, and if it is greater than 0.85, the fit is acceptable. We note its value in Table 3. Is 0.978.

Parsimony Adjusted GFI (PGFI) is close to 1 which means that the model is identical and perfect. Normative Fit Index (NFI) gives information about the goodness of conformity in the case of the development of the model for conformity, So, if its value is 1 it indicates complete conformity; while if it is greater than 0.9, this indicates the best fit, its value in the study model is 0.977. Relative Fit Index (RFI) what is meant by this measurement is the data conformity with the model. If it is greater than 0.9, it means a good match with the data, and if it is greater than 0.95, it indicates a better match in our study, with a value of 0.976 [23][24].

Table3. The Root Mean Square Residual and Goodness Fit Index

Model	RMR	GFI	AGFI	PGFI	NFI Delta1	RFI rho1
Default model	.040	.980	.978	.890	.977	.976
Saturated model	.000	1.000			1.000	
Independence model	. 048	.116	.068	.110	.000	.000

Source: Prepared by researchers based on the results of (AMOS V26) analysis.

It is noticed that the sample size is large, amounting to 485, and the presence of (connectivity), which means the dependent variable is a continuum one. With the moderation between the dependent variables and the random error, no abnormal values appeared in the statistical analysis. However, the problem of the multiplicity of relationship appeared linearity between the independent variables. So, we relied on the unweighted least squares method for the free scale[25]. Figure No. (3) shows the results of the regression relationships between the latent dimensions and the observations. Most of which are significant in terms of the probability value (P-value) ، which is significant at a value of 0.05. It is found that the value of the standard regression coefficient is within the lowest and highest confidence limit which does not include the value 0. On the other hand, we did not find that there are some saturations for weak observations whose value is less than the index 42% for the number of sample members responding to our study, so the model is valid for all criteria
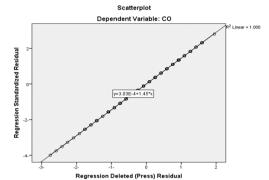
Figure 3. Graphic layout of the study variables model

Figure (3) shows the linear regression equation for the digitized for both the digitized independent and dependent study variables, the course system, and the matching ratio for the hypothesized model is R $2 = 1,000$ and that the linear equation (2) represents the effect between variable X and variable Y.
Y=3.03E-4+1.45*X   (2)
Table No. 4 shows the results of the regression relationships between the latent dimensions and the observations. Most of which are significant in terms of the probability value (P-value), which is .significant at a value of 0.05. It is found that the value of the standard regression coefficient is within the lowest and highest confidence limits, which does not include the value(0).   On the other hand, we did not find that there are some saturations for weak observations whose value is less than the index for the number of sample members responding to our study, so the model is valid for all criteria %42.

Table No. 4: Regression Weights & Standardized Regression Weights & Variances

Viewing variables				Estimate SE	Standardized Estimate	Estimate SECRP Lower	squared multiple correlations upper
	AC	<---	DI	1.000	.829	.573	.653
	RE	<---	DI	.780	.739	.396	.638
	ES	<---	SO	1.128	.896	.343	.786
	EV	<---	SO	1.000	.785	.262	.617
	SP	<---	SO	1.336	.886	.290	.803
	LI	<---	DI	1.044	.808	.193	.546
	AD	<---	DI	1.026	.799	.246	.687

Table 5. The correlation between axes

Model Summary [b]

Model	R	R Square	Adjusted R Square	std. The error in the Estimate
1	.657 [a]	.432	.431	.68685

ANOVA [a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	173.137	1	173.137	367.004	.000 [b]
	Residual	227.859	483	.472		
	Total	400.997	484			

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	std. Error	Beta	t	Sig.
1	(Constant)	1.408	.116		12.094	.000
	DI	.668	.035	.657	19.157	.000

The F test indicates the results of the linear regression analysis and the extent of variance between the study variables, which revealed the results of the analysis in the SPSS v26 program. It is noted from Table No.5 that there is an effect between digitization and the courses system, where the calculated F value reached (367.004), P-value = (0.000), which is less than 0.0 1 at the level of substantial significance (0.0 1) at the degree of freedom 1, (127-1), the t value is (19.094) it is larger than its tabular value (18.513), indicating that the null hypothesis is rejected and the alternative hypothesis is accepted, indicating a substantial effect between the research variables. As shown in table5, the coefficient of determination R^2 is (0.432), which means that digitization has explained a percentage of (43%) of the changes in the courses system, and it was significant in terms of the moral effect of the independent variable digitization. There is a value of (0.668) for the significant test at the value of 0.000. Its value is less than 0.0 1 at the level of significance, and whose impact value is 19.157. This indicates that Raising of the digitization variable by one standard deviation will result in an increase of 66.8% of the standard deviation unit in course system activation.

III. CONCLUSION

In a nutshell, The university must realize the importance of digitization and information and communication technology and the need to activate it accurately, as an integrated, independent, usable, and available device through the design of platforms and interactive interfaces that allow access to information quickly. In reducing costs and amounts spent on the educational process traditionally. The resources required through digitization must be supported by a large volume of data storage and infrastructure that contribute to enhancing anticipation promptly, emphasizing the role of electronic management through the use of digitization, such as connecting tables customized lessons, and assignments, coding halls, and digital labs. In addition to publishing educational instructions and instructions through the university or college website or educational platforms. And reaching the desired goal through evaluation, which is the final result of the students' effort and their transition to a higher academic level or their graduation from the study. With the increase in the number of students, electronic assessment has become an important factor in accelerating and obtaining the test result and

facilitating the task of teaching in terms of repairing examination books. To facilitate the payment method, Zain Cash and credit card method has been adopted. This method allowed for electronic payment and continuous updating of curricula according to the requirements of the labor market and the availability of jobs to serve the educational process. Exploiting the time and making the whole year contain winter and summer courses with the availability of faculty members and academics, classrooms, electronic learning means, and the platforms they include, Virtual classes, timetables, timetables, and study programs added to the educational process accelerating and shortening the possible university years, providing the electronic library, accrediting books, university theses, electronic university theses, magazines, local and international sources, and among the latest updates the presence of a technical staff that facilitates access to information for both the teaching and the student.

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