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The role of educational process dimensions in improving open innovation / An Exploratory study of the opinions of a sample of workers in the College of Information Technology / University of Nineveh

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Abstract

The study aimed to know the role of the dimensions of the educational process in improving open innovation in the College of Information Technology as the applied field of the study, where the survey method was used for a group of workers in the college of the study sample, where the number of questionnaire forms distributed to the workers reached (50) forms prepared for the purpose of collecting and analyzing them, and the study concluded that there is a statistically significant relationship between the educational process and open innovation for the staff working in the college of the study sample. The results of the study showed that all dimensions of the educational process were different, as the dimensions of training and software practice were at a very good degree, followed by the practice of computer programs

and networks - communications at a good degree, and the open innovation variable was at a good degree. Based on the conclusions reached by the study, a set of recommendations were presented, the most important of which is the necessity of the college of the study sample using open innovation in communicating with other educational colleges at home and abroad to keep pace with modern educational technology.

Keywords: Educational Process, Open Innovation.

Introduction

Today, many companies and organizations are competing to win individuals who possess knowledge as a tool to create and generate new innovations due to their personal creativity, knowledge, skills and abilities, considering that innovation is an essential engine in development and sustainable growth. Open innovation is a tool used to organize interaction between individuals, institutions, science, industry and business, as the institution does not depend on its internal development, but actively attracts external competencies and innovations, and it is also part of the strategic work to build an innovative country. The recent crisis, represented by the corona pandemic, has significantly affected the educational process, as it led to the transition from this has led to the ability to facilitate knowledge management and has encouraged institutions to deal with difficulties in promoting knowledge management. In today's digital age, open innovation has fostered changes and transformations in the education process and has become an important part of it and an integral part of our lives as well, because it facilitated overcoming geographical, temporal and cultural barriers, different barriers existing in the transfer of technology, improved the quality of Education, contributed and encouraged the establishment of new companies, created new jobs and improved the ability to absorb knowledge.

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The First Axis: The Methodological Framework of the Study

In this topic, we discussed the problem of the study, its importance and objectives, the possible study design, its hypotheses, the study methodology, the limits of the study, the methods of data collection and the study sample, in the light of the following:

First: The Problem of Studying:

In light of the modern and contemporary developments witnessed by educational institutions in the world, there is a clear gap between the dimensions of the educational process on the one hand and its close link in open innovation on the other hand, which has hindered the organization under study to achieve its goals and continue development and development, and based on the foregoing, the problem of the study can be posed in the following question:

(How well does the faculty of the sample study imagine the role of the dimensions of the educational process in improving open innovation)?

Second: The Importance of the Study:

The importance of the study is represented by its theoretical and scientific importance, which are as follows:

1. Theoretical importance: this study can be a reference that researchers, educational institutions and Arab libraries can use to enhance the role of the dimensions of the learning process and also in open innovation.
2. Scientific importance: the importance of the study derives from the statement of the role played by the learning process on the development of open innovation under modern technology through the possibility of communication with internal and external institutions. The importance of the study also enables to put new concepts into practice for internal and external innovations to enhance the systems

and technology of the educational process of the faculty of the study sample. And the choice of the faculty of information technology as a field of study because it has an effective role in providing services and building society, if developed countries rely mainly on universities and their staff.

Third: The Objectives of the Study:

1. Measuring the relationship of influence and correlation between the dimensions of the learning process and open innovation in the faculty of the study sample.
2. Indicate the availability of the dimensions of the learning process in the faculty of the sample study.
3. Knowledge of the availability of possibilities to improve open innovation in the faculty of the study sample.
4. Providing a theoretical and conceptual framework on the subject of the dimensions of the educational process and open innovation.

- **Fourth: The Virtual Scheme of the Study:**

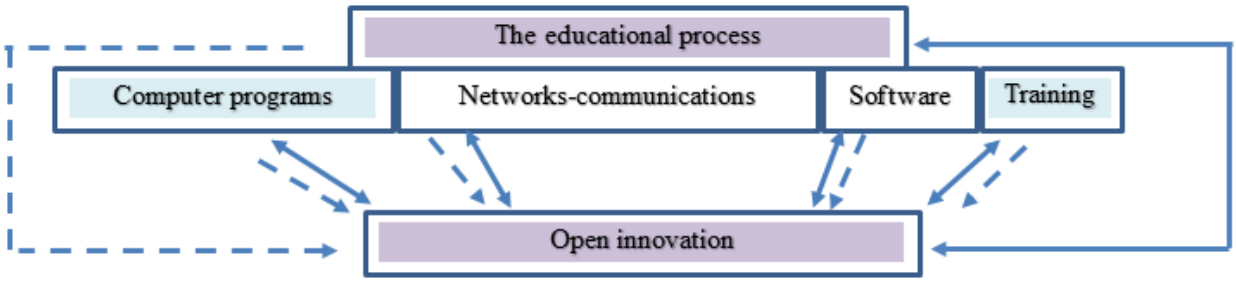

Fig. (1): The scheme of the virtual study (Source: prepared by researchers)

Fifth: Study Hypotheses:

Branching from the problem of the study, its goals and the hypothetical scheme, a set of sub-hypotheses are as follows:

1. There is No Statistically Significant Correlation Between the Dimensions of the Learning Process and Open Innovation, and Several Hypotheses Branch From Them, Namely:
   - There is no significant correlation between software and open innovation.
   - There is no significant correlation between communication networks and open innovation.
   - There is no significant correlation between modern technology and open innovation.
   - There is no significant significant correlation between training and open innovation.
2. There is No Statistically Significant Moral Effect Between the Dimensions of the Educational Process and Open Innovation, and Several Hypotheses Branch Off From Them, Which are as Follows:
   - A-there is no significant moral effect between software and open innovation". At a Significantlevel≥0.05. α
   - B-there is no significant moral effect between networks-communication and open innovation". At a Significantlevel≥0.05. α
   - C-there is no significant moral effect between modern technology and open innovation" at a moral level≥ 0.05. α
   - W-there is no statistically significant moral effect between training and open innovation". At a Significantlevel≥0.05. α

Sixth: Study Curriculum:

The description-analysis approach was used in the current study, which is one of the approaches that corresponds to the subject of the current study and is the most

common in the social sciences, because it focuses on collecting quantitative data about the phenomenon field of study in order to analyze and interpret it.

Seventh: Study Limits:

1. Objective boundaries: the objective boundaries of the study were represented by the learning process, its dimensions and its role in open innovation.
2. Time limits: the period for both theoretical and practical sides extended from 15/7/2024 to 25 /1 /2025.
3. Spatial boundaries: our current study dealt with the Faculty of Information Technology-Ninawa University as a sample of the place of study, through which the relationship between the dimensions of the learning process and open innovation is monitored in order to achieve the goals of the study.

Eighth: Methods of Data Collection:

In order to collect the information required to finish the current study, the researchers used the following sources:

1. Information and data from previous studies and research, including books, theses, journals and conferences related to the topics of the learning process and open innovation.
2. Questionnaire: it is the tool that was used to obtain information, which contains pre-prepared questions addressed to the respondents of the study sample, where the main tool for the study variables, taking into account the measurement of the dimensions of the study and its sub-variables, where the questionnaire was divided into three axes as follows:
   - The first axis: it consists of information related to the respondent, which is gender, testimony and specialization.
   - The second axis includes questions related to the independent variable, which is the dimensions of the educational process.

- The third axis: it included the dependent variable, which is open innovation and the questions related to it, as shown in Table No. (2).

Table No. (2): concerning the study variables (Source: Prepared by researchers)

Variables	Dimensions
The educational process	Computer Programs (1-5) Networks - Communications (12-6) Software (16-13) Training(17-19)
Open Innovation	Open Innovation (25-20)

Description of the Study Sample Community:

Description of the research community and sample: the current research targeted the teaching staff at the Faculty of information technology, as (50) forms were distributed to the individuals of the research sample, from which (43) forms were retrieved valid for analysis by 86.00%, and (7) forms were neglected for not being valid, the characteristics of the individuals of the research sample were characterized by:

- The research sample was distributed according to the gender variable and as shown in Table (3), the percentage of males was 62.8%, while the percentage of females was 37.2%. As for the distribution of individuals ' certificates, the research sample shows that the highest was for a master's degree 67.4%, followed by a bachelor's degree 32.6%, while the specialization was 32.6% for Computer Science and mathematics, followed by 67.4% for Computer Engineering.

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Table (3): Distribution of individuals in the research sample according to Sex, degree and college variables

Variables	The Category	The Number	%
Sex	Females	16	37.2
	Males	27	62.8
	Total	43	100.0
University degree	Bachelor's	14	32.6
	Master's	29	67.4
	Total	43	100.0
College	Computer Science and Mathematics	14	32.6
	Computer Engineering	29	67.4
	Total	43	100.0

The Second Axis: The Theoretical Framework of the Study

The Concept of the Educational Process:

The teaching process is a regular process carried out by the teacher, the aim of which is to transfer the information and knowledge that the teacher has in mind to the students who need knowledge, which they acquire from experience and academic, radio and practical qualification within the classroom (Mahani, 2010: 20), a process that organizes the actions carried out by the teacher inside the classroom, especially when presenting the course material through its sequence in explanation, as it aims to enable learners of theoretical knowledge, practical skill or positive trends, it is a cognitive system consisting of inputs, processing and outputs, the interventions are represented by processing is a coordinated process of organizing the understanding of information and Interpreting and finding the relationship between them and linking them with the previous information, as for the output side, it consists in graduating competent, educated students (habbar, 2020: 3). The educational process is the formulation and identification of courses to guide the activities and behavior of students that must be followed in achieving specific results during a certain period of growth, so it became necessary to work on identifying the goals and objectives

that the educational process seeks and works to achieve, and to indicate the various means necessary to achieve those goals and clarify the extent of their achievement and eliminate punishment that stand in the way of achieving them. This is what can be called the "calendar" process (Ahmad et al., 2020: 1095).

Dimensions of the Educational Process:

1. **Computer Programs:** are the set of commands that are given to the computer to perform a certain task in a certain period of time, and this term is called all the programs necessary to operate the computer, organize the work of its units and coordinate the relationship between these units, and these programs can be as simple as some text processing, or more complex such as accounting systems of a company or three-dimensional graphics processing (al-Aqili and Al-balsha, 2000: 323).
2. **Networks-Communications:** these are all devices, Financial Equipment and programming that facilitate the process of exchanging data and information in all its readable and audible forms. That is why it is not possible to build networks without providing a modern communications infrastructure for servicing networks. (Azaiziya, 2020: 4).
3. **Software:** it is a complementary means of hardware and equipment in business performance , it is a set of commands that are executed in the data processing CPU in a way that ensures the achievement of the organization's goals, and needs qualified personnel to work and design systems and programming, although software is very diverse, there are multiple applications through which many types of software can be identified (Tenawi, 2019: 38). The possibilities of virtual reality for educational purposes cannot be limited, but its use on a daily basis requires huge investments not only in the devices themselves but in the preparation of teachers and the development of curricula as well as this, the

education community will need to determine the appropriate pedagogical methods, the right teaching methods and how to develop or modify the content to meet the needs of students. However, one of the most important parts is to ensure the safety of use because the technology tries to immerse the user in an artificial environment. This creates an opportunity for learning but because of its sensory interaction with the user, safety should always be the priority. (Lisichenko, 2015:160).

4. **Training:** a learning process that includes the acquisition of skills, concepts, rules and trends to increase and improve individual performance. (Hall, Taylor, 2005) defines training as a deliberate and concerted effort aimed at developing and enhancing organizational performance. It is an important and essential factor to maintain the competitive advantage, efficiency and success of the organization (Atiyah, 2021:13).

Elements of the Educational Process:

The educational process is represented by a cognitive system consisting of three main elements, namely: input, processing and output. The inputs represent students, their mental abilities, their various characteristics, teachers, their academic qualifications, educational goals, the textbook course, tools, materials, various educational means and the curriculum, while the processing represents the coordination and organization of memory for future information, understanding and interpretation, finding the relationship between them and (Mahaney, 2010: 20).

Pillars of the educational process:

The educational process consists of a set of elements that interact with each other to achieve educational goals, these elements are as follows:

- The teacher: the teacher represents the main pillar and the axis of the educational process "and the success of the institution to achieve the desired goals, and is an essential factor based on the transfer of scientific information to the community through the school". He performs multiple tasks as an activator, teacher, leader, mentor and educator. He also works to communicate knowledge and information to learners and change their behavior for the better and urge them to participate positively during the lesson. He seeks to facilitate and facilitate the learning and education process (ashash, 2019: 34).

A. The Learner (Students):

The learner is one of the elements of the educational process, where the goals are developed and the study material, educational activities, teaching methods and means are chosen on the basis of the necessary that are in line with his mental and psychological characteristics, as the learner in traditional education does not have any role in the educational process, as he receives information to memorize it with the aim of retrieving it at the time of the exam, while the new approach to curricula works to involve him in the responsibility of leadership and implementation of the learning process (Salima, 2020: 2).

B. The Educational Curriculum:

The process of improving all components and dimensions of the educational process through planning, implementation and evaluation to ensure the progress of the welfare of society, and in this strengthening the policy and philosophy required by society, and this requires changing all components of the educational process for the better (Barnawi, 2021: 231).

C. Teaching Method:

It is a distinct method that the teacher relies on to achieve educational goals because it is necessary to leave the teacher the freedom to choose the educational method that he must follow, as it must be consistent with the

teacher's vision and ideas, the goals of the educational process, and the intellectual level and awareness of the students. (Abdul Qawi, 2020:124).

Educational Objectives:

The educational goal refers to the change in behavior that occurs as a result of learning in one of the three areas (cognitive, affective or psychomotor field), which is a set of phrases or formulations that explain what the behavior of the learner will be after gaining educational experience inside and outside the school institution (Bou hammama, 2005: 6), and the pillars of the educational process can be represented in the form below:

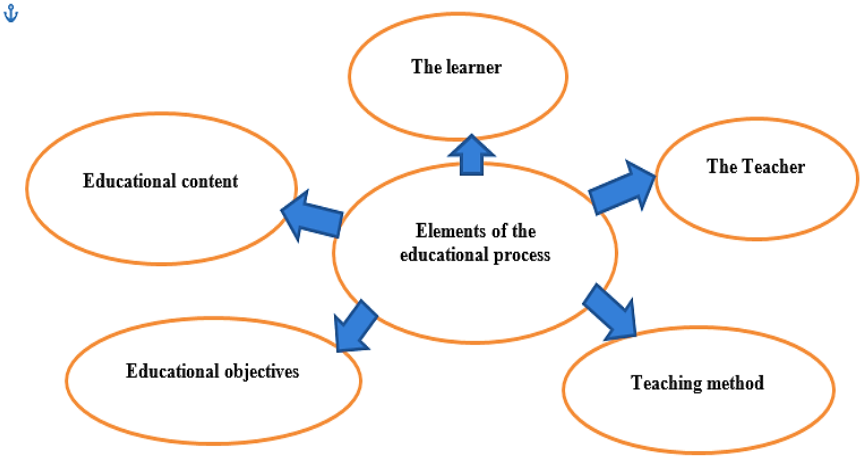

Fig. (2): Elements of the educational process

The Concept of Open Innovation:

The new paradigm of innovation structuring is open innovation and there are two important types of open innovation: inside-out and outside-in, also known as inbound and outbound open innovation respectively (Chesbrough, 2003). He defined open innovation as "a distributed innovation process based on intentionally managed

knowledge flows across organizational boundaries" the open innovation approach looks at the corporate point of view, while the Enterprise Information System approach looks at companies as a black box as one of the pioneers of the open innovation approach (Bogers et al.,2014:17). It was also defined as "knowledge-oriented inflows and outflows to accelerate internal innovation, expand the market for external use of innovation, respectively" (Vanhaverbeke & West, 2006:5). In order to support open innovation through open data initiatives, public sector organizations have started using it to make raw data and records available, usually using machine-readable interfaces, over the past few years (Zuiderwijk & Janssen, 2012: 259). The open innovation model can be used to address important public policy concerns such as academic contexts as well as a variety of industrial contexts such as healthcare and Information Technology (Siegel & Wright, 2015: 582). In addition to the fact that open innovation changes the company's resource base, it is a dynamic efficiency. According to the "ability of a company to integrate, build and reconfigure internal and external competencies to cope with rapidly changing environments" is known as dynamic capability (Teece et al., 1997: 516). And he knew. Chesbrough describes open innovation as "a model that assumes that companies can and should use external ideas as well as internal ideas, internal and external paths to the market, as companies seek to develop their technology". (Chesbrough, 2003). Lichtenthaler points out that open innovation is the systematic performance and practical mechanisms for exploring, exploiting and retaining ideas and knowledge inside and outside the borders of the organization through the innovation process. (Lichtenthaler, 2011: 76).

Application of the Open Innovation Model:

In order to achieve the implementation of the new model shown in Figure 3, the following guiding concepts must be combined:

1. Proactive use of knowledge (incoming and outgoing flows) to accelerate the pace of invention and recognize that relevant ideas can arise from external sources as well.
2. The rapid development of internal ideas, either through their exploitation or, in the absence of this, through the sale of unused intellectual property.
3. Research and development that can be carried out either internally or externally because both have the potential to make money.
4. Ideas must be accepted without trying to find the source of an idea that they are necessary for success.
5. Sometimes obtaining intellectual property is necessary to maintain a high degree of competitiveness (Chesbrough, 2003).

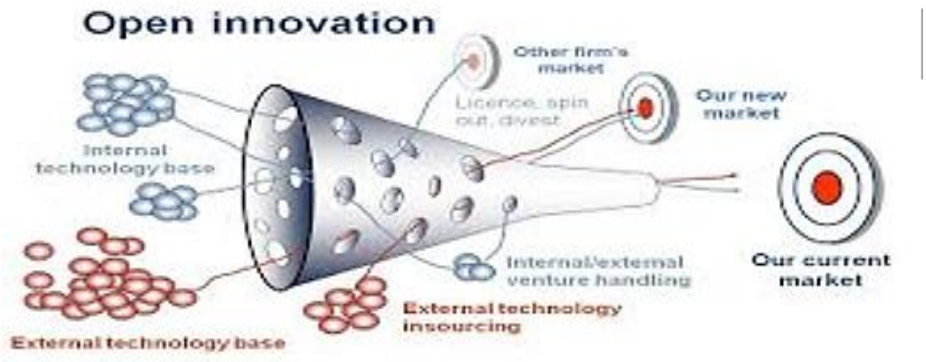

Fig. (3): New model shown

The Three Processes of Open Innovation:

Open innovation covers the challenge and the ability for companies and organizations to involve all the collective intelligence of their ecosystem - and beyond - in their innovation process. External competitors in this ecosystem include customers, vendors, universities, research centers, small and medium-sized enterprises, startups and influential organizations in the industry (Duval & Speidel, 2014: 5). Knowledge production processes also form into three types of open

innovation model, where the company markets ideas from the inside or outside on two axes: from the outside to the inside and vice versa.

1. Outbound innovation axis (from the inside out): this refers to the traditional distribution of internal information to customers, competitors and partners in order to promote IP from a business perspective.(Inauen & Schenker, 2011: 501)
2. The inbound innovation axis (from outside to Inside) is an openness strategy that enables a company, through a reverse process, to enhance its knowledge base through the network by capturing ideas and solutions, with the aim of improving the internal innovation process (Enkel & Gassmann, 2004: 6).
3. The paired process: integrates the first two axes into a real cooperative logic within a network for pooling resources and joint creativity. This strategy combines several platforms, including co-development, co-design, collaborative initiatives, alliances and research collaborations (Pénin et al., 2013).

Statistical Description of the Study Variables

- **The First Axis: The Educational Process:**
  1. Computer programs: Table (4) indicates the opinions of the respondents about the paragraphs of the computer programs represented by (X1_X5), where the arithmetic mean of this dimension was (4.122) and a standard deviation (0.736) and the percentage of agreement of the sample individuals on the paragraphs of this factor (82.44%), respectively, this indicates that the institution adopted this dimension very well, paragraph (X1) received the largest contribution from the general average, where its arithmetic mean was (4.37) and standard (0.72) and response intensity (87.40).
  2. Networks-communications: The paragraphs of this factor are represented by (X12-X6) in which the individuals of the research sample showed agreement on the paragraphs by (77.51%) with a general average (3.88) and a standard

deviation (0.70), this indicates that the institution adopts paragraphs of this dimension at a good rate, and the largest contribution to this average was for paragraph X6, which averaged 4.00 and a standard deviation of 0.72.

3. Software: The paragraphs of this dimension (X16-X13) indicate that the surveyed institution has adopted this factor at a very good rate, as it had a general average (3.99) and a standard deviation (10.7) and the percentage of general agreement by the individuals of the research sample on the concept of these paragraphs (79.85%), and the paragraphs (X14), the average of which contributed the most to the general average of the dimension of 4.07 and a standard deviation (0.67).
4. Training: Table (4) indicated the opinions of the respondents about the paragraphs of computer programs represented by paragraphs (X19-X17) that the Working average of these paragraphs (4.05) and standard deviation (0.68) and the percentage of agreement of the individuals surveyed (83.93%), paragraph X19 had the largest contribution to the average of this factor, the average paragraph was 4.12 and standard deviation 0.66. This indicates that the institution in question adopts the paragraphs of this axis at a very good level.

Table (4). It shows the repetitions, percentage, average, standard deviation and percentage of agreement of the individuals ' answers to the study sample about the factors of the focus of the educational process
(Source: Prepared by researchers based on SPSS outputs)

	Strongly agree	%	agree	%	Neutral	%	disagree	%	Strongly disagree	%	Arithmetic mean	Standard deviation	%
X1	22	51.2	15	34.9	6	14.0	0	0	0	0	4.37	0.72	87.40
X2	15	34.9	18	41.9	10	23.3	0	0	0	0	4.12	0.76	82.40
X3	10	23.3	19	44.2	14	32.6	0	0	0	0	3.91	0.75	78.20
X4	13	30.2	23	53.5	7	16.3	0	0	0	0	4.14	0.68	82.80
X5	14	32.6	18	41.9	11	25.6	0	0	0	0	4.07	0.77	81.40
Average		**34.44**		**43.28**		**22.36**		**0**		**0**	**4.122**	**0.736**	**82.44**
X6	11	25.6	21	48.8	11	25.6	0	0	0	0	4	0.72	80.00
X7	13	30.2	16	37.2	14	32.6	0	0	0	0	3.98	0.8	79.60
X8	10	23.3	22	51.2	11	25.6	0	0	0	0	3.98	0.71	79.60
X9	9	20.9	21	48.8	13	30.2	0	0	0	0	3.91	0.72	78.20

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	Strongly agree	%	agree	%	Neutral	%	disagree	%	Strongly disagree	%	Arithmetic mean	Standard deviation	%
X10	5	11.6	20	46.5	18	41.9	0	0	0	0	3.7	0.67	74.00
X11	9	20.9	19	44.2	15	34.9	0	0	0	0	3.86	0.74	77.20
X12	3	7.0	24	55.8	16	37.2	0	0	0	0	3.7	0.6	74.00
Average		**19.93**		**47.50**		**32.57**		**0.00**		**0.00**	**3.88**	**0.71**	**77.51**
X13	10	23.3	21	48.8	12	27.9	0	0	0	0	3.95	0.72	79.00
X14	11	25.6	23	53.5	9	20.9	0	0	0	0	4.05	0.69	81.00
X15	10	23.3	24	55.8	9	20.9	0	0	0	0	4.02	0.67	80.40
X16	11	25.6	19	44.2	13	30.2	0	0	0	0	3.95	0.75	79.00
Average		**24.45**		**50.58**		**24.98**		**0.00**		**0.00**	**3.99**	**0.71**	**79.85**
X17	11	25.6	24	55.8	8	18.6	0	0	0	0	4.07	0.67	81.40
X18	10	23.3	21	48.8	12	27.9	0	0	0	0	3.95	0.72	79.00
X19	12	27.9	24	55.8	7	16.3	0	0	0	0	4.12	0.66	82.40
Average		**25.60**		**53.47**		**20.93**		**0.00**		**0.00**	**4.05**	**0.68**	**80.93**
Overall average		**26.11**		**48.71**		**25.21**		**0.00**		**0.00**	**4.01**	**0.71**	**80.18**

The Second Axis: Open Innovation:

This factor was represented by paragraphs (X25-X20) and the results from Table (5) indicated that the general agreement rate for the opinions of the individuals in the study sample reached (79.24), which indicates that the concerned institution adopts the paragraphs of this axis at a very good rate, as the general arithmetic mean for this factor reached 3.96 with a standard deviation of 0.65, and paragraph (X20) received the largest contribution from the general average as its arithmetic mean was (4.07) and a standard deviation of (0.63) and a response intensity of (81.40).

Table (5): Shows the frequencies, percentages, averages, standard deviations and agreement rate for the answers of the individuals in the research sample on the open innovation axis (Source: Prepared by researchers based on SPSS outputs)

	Strongly agree	%	agree	%	Neutral	%	disagree	%	Strongly disagree	%	Arithmetic mean	Standard deviation	%
X20	10	23.3	26	60.5	7	16.3	0	0	0	0	4.07	0.63	81.40
X21	4	9.3	28	65.1	11	25.6	0	0	0	0	3.84	0.57	76.80
X22	8	18.6	24	55.8	11	25.6	0	0	0	0	3.93	0.67	78.60
X23	9	20.9	23	53.5	11	25.6	0	0	0	0	3.95	0.69	79.00
X24	11	25.6	22	51.2	10	23.3	0	0	0	0	4.02	0.71	80.40

Hypothesis Testing:

- **First:** The first main hypothesis which states (there is no significant correlation between the educational process and open innovation).

  Table (6) indicated the results of the statistical analysis related to answering this hypothesis by finding the correlation coefficient, as it shows the existence of a highly significant correlation between the educational process axis and the open innovation axis, reaching (0.571). Accordingly, this hypothesis is rejected and the alternative hypothesis is accepted, which states (there is a significant and wave correlation at a significance level ($a < 0.05$) between the educational process and open innovation).

Table (6): Correlation coefficient of the first main hypothesis

	IO	Significant level	Significant
The educational process	0.571	0.000	High Significant

Several sub-hypotheses emerged from this main hypothesis, as follows:

1. The first sub-hypothesis emanating from the first main hypothesis: which states (there is no statistically significant correlation between computer programs and open innovation).

   The results of the statistical analysis are shown in Table (7), showing a significant correlation between the software factor and open innovation, the value of which was estimated at (0.462) at the level of significance ($a < 0.05$). Therefore, it rejects this hypothesis and accepts the alternative hypothesis, which states (the existence of a statistically significant wave correlation at ($a < 0.05$) between computer programs and open innovation).

Table (7): Correlation coefficient between computer programs and open innovation

	IO	Significant level	Significant
Computer programs	0.462	0.002	High Significant

2. The second sub-hypothesis arising from the first main hypothesis: which states (there is no statistically significant correlation between networks - communications and open innovation). Statistical analysis was conducted on the answers of the individuals in the study sample to answer this hypothesis and the results are in Table (8), as it showed the existence of a positive correlation with statistical significance between the factor of networks - communications and open innovation, reaching (0.390). Accordingly, this hypothesis is rejected and the alternative hypothesis is accepted, which states (there is a statistically significant wave correlation at (a < 0.05) between networks - communications and open innovation).

Table (8): Correlation coefficient between networks - communications and open innovation

	IO	Significant level	Significant
Networks - communications	0.390	0.000	High Significant

3. The third sub-hypothesis arising from the first main hypothesis: which states (there is no statistically significant correlation between software and open innovation). From the results in Table (9), it appears that there is a statistically significant positive correlation (a < 0.05) between networks - communications and open innovation estimated at (0.597). Therefore, this hypothesis is rejected and the alternative hypothesis is accepted, which states (there is a statistically significant wave correlation at (a < 0.05) between software and open innovation).

Table (9): Correlation coefficient between software and open innovation

	IO	Significant level	Significant
Software	0.597	0.000	High Significant

4. The fourth sub-hypothesis arising from the first main hypothesis: which states (there is no statistically significant correlation between training and open innovation). From the results in Table (10), it appears that there is a positive

statistically significant correlation (a < 0.05) between training and open innovation estimated at (0.531). Therefore, this hypothesis is rejected and the alternative hypothesis is accepted, which states (there is a statistically significant wave correlation at (a < 0.05) between training and open innovation).

Table (10): Correlation coefficient between training and open innovation

	IO	Significant level	Significant
Training	0.531	0.000	High Significant

- **Second:** The second main hypothesis which states (there is no statistically significant effect of the educational process on open innovation) The results in Table (11) indicated the answer to this hypothesis after adopting the simple regression analysis, that there is a significant effect of the educational process axis on the open innovation axis, as the calculated F reached 19.87, which is a highly significant value of 0.000, which is smaller than the value of 0.05, and the R2 explained the coefficient of determination with a value of 0.326, which means that 32.6% of the variance in open innovation is due to the educational process, and the remaining percentage of approximately 67.4% is due to other factors that are not currently studied. The B values reached 0.571, which indicates that a change in the educational process by one unit leads to a change in open innovation by 0.571, this was confirmed by the t value (4.457), which is significant at 0.05. The value of C also indicates that the value of open innovation is 6.526 when the educational process is (zero), so this hypothesis is rejected, and the alternative hypothesis is accepted, which states (there is a significant effect of the educational process on open innovation at a statistical significance value (a < 0.05).

Table (11): The impact of the educational process on open innovation

	Open innovation			
	Constant	**B**	**F**	**R^2**
The educational process	6.526 t(2.176)*	0.571 t(4.457)**	19.87 **(0.000)	0.326

The symbols* and * * indicate a high Significantlevel smaller than 0.05.

Several sub-hypotheses emerged from this main hypothesis, as follows:

1- The first sub-hypothesis emerging from the second main hypothesis: which states (there is no statistically significant moral effect of computer programs on open innovation)

From the results of the statistical analysis shown in Table (12), it appears that there is a statistically significant effect of software, confirmed by the F value, which amounted to 11.113, which is significant at (a < 0.05). Also, the R2 value amounted to 0.213, which means that 21% of the variance in open innovation is due to computer programs, and the remaining 79% is due to other factors not included in the study. Also, the B value amounted to 0.462, which means that a change in computer programs by one unit leads to a change in open innovation by 0.462, and this effect is significant according to the t value, which amounted to 4.771, which is significant at 0.05. It is noted that the value of C reached 10.504, which means that the value of open innovation would be this much even if the effect of computer programs was zero, and it is significant at 0.05 and the value of t is 3.33. Therefore, this hypothesis is rejected and the alternative hypothesis is accepted, which states (there is a statistically significant effect of computer programs on open innovation).

Table (12): The impact of computer programs on open innovation

	Open innovation			
	Constant	**B**	**F**	**R^2**
Computer programs	10.504 **(3.733)t	0.462 **(3.334)t	11.113 **(0.000)	0.213

** symbols indicate a high significance level less than 0.05.

2- The second sub-hypothesis arising from the second main hypothesis: which states (there is no significant statistical effect of networks - communications in open innovation) The results shown in Table (13) show the existence of a statistically significant effect of networks - communications in open innovation, and the F value was confirmed for this as it reached 7.348 which is significant at ($a < 0.05$). The R2 value reached 0.152, which means that 15% of the variance in open innovation is responsible for the factor of networks - communications and the remaining 85% is due to other factors not included in the current model. Also, the B value reached 0.390, which means that a change in networks - communications by one unit leads to a change in open innovation by 0.390, and this effect is significant in terms of the t value, which is 2.711, which is significant at 0.05. It is noted that the value of C reached 11.488, which means that even if the effect of networks - communications was zero, the value of open innovation would be at this value, and it is significant at 0.05 since the value of t is 3.715. Therefore, this is rejected and the alternative hypothesis is accepted, which states (there is a statistically significant effect of networks - communications on open innovation).

Table (13): The impact of networks - communications in open innovation

	Open innovation			
	Constant	**B**	**F**	**R^2**
Networks - communications	11.488 **(3.715)t	0.390 **(2.711)t	7.348 **(0.010)	0.152

** symbols indicate a high significance level less than 0.05.

3- The third sub-hypothesis emanating from the second main hypothesis: which states (there is no statistically significant moral effect of software on open innovation) From the results of the statistical analysis shown in Table (14), it appears that there is a statistically significant effect of software, confirmed by the F value which reached 22.763 which is significant at (a < 0.05). Also, the R2 value reached 0.357, which means that 35.7% of the variance in open innovation is responsible for the software factor and the remaining 64.3% is due to other factors not included in the current model. Also, the B value which reached 0.597 which means that a change in software by one unit leads to a change in open innovation by 0.597, and this effect is significant in terms of the t value which is 4.771 which is significant at 0.05. It is noted that the value of C reached 9.176, which means (even if the effect of software was zero, the value of open innovation would be this amount, and it is significant at 0.05 and the value of t is 4.076. Therefore, this is rejected and the alternative hypothesis is accepted, which states (there is a statistically significant effect of software on open innovation).

Table (14): The impact of software on open innovation

	Open innovation			
	Constant	**B**	**F**	**R^2**
software	9.176 **(4.076)t	0.597 **(4.771)t	22.293 **(0.000)	0.357

** symbols indicate a high significance level less than 0.05.

4- The fourth sub-hypothesis emanating from the second main hypothesis: which states (there is no significant statistical effect of training in open innovation) The results appear in Table (15), there is a statistically significant effect of training, this was confirmed by the F value which reached 16.126 which is significant at (a < 0.05). And R2 reached 0.282 which means that 28% of the variance in open innovation is responsible for the training factor and the remaining 82% is due to other factors not included in the study. And the B value which reached 0.531

which means that a change in training by one unit leads to a change in open innovation by 0.531 and this effect is significant in terms of the t value which is 4.016 which is significant at 0.05. It is noted that the value of C reached 10.284, which means that the value of open innovation would be this much even if the training effect was equal to zero, and it is significant at 0.05 and the value of t is 4.293. Therefore, this is rejected and the alternative hypothesis is accepted, which states (there is a statistically significant effect of training on open innovation).

Table (15): The impact of training on open innovation (Source: Prepared by researchers based on SPSS outputs)

	Open innovation			
	Constant	**B**	**F**	**R^2**
Training	10.284 **(4.293)t	0.531 **(4.016)t	16.126 **(0.000)	0.282

** symbols indicate a high significance level less than 0.05.

Conclusions and Recommendations

Conclusions:

1. The study concluded that there is a statistically significant moral effect of the educational process in its various dimensions on the one hand and open innovation on the other hand among employees in the College of Information Technology.
2. The study continued that the application of the study sample college of the educational process requires a lot of effort and work to ensure its continuity with the rest of the other colleges in the same field, since the modern educational process works to support institutions of all kinds.
3. The results of the study indicated through the respondents to the questionnaire that there is a great agreement from the individuals working in the study sample college towards training and other variables and that the college administration

uses many methods in the training process that are characterized by accuracy and objectivity.

Recommendations:

1. The necessity of holding advanced seminars and workshops for the staff working in the study sample college related to the nature of the application of the modern educational process.
2. The necessity of the study sample college using open innovation in communicating with other educational colleges at home and abroad to keep pace with modern educational technology.
3. The necessity for the college of the study sample to provide suitable environmental conditions in addition to moral and material support in order to encourage them to keep pace with the modern educational process.

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