

# The Role of Jordanian Universities in Applying Fourth Industrial Revolution Principles

Dr. Najwan Sonna<sup>1</sup> Professor Mohammad Saleem Al Zboon<sup>2</sup>

1.Student in Faculty of Education/The University of Jordan

2.The University of Jordan /Faculty of Education

## Abstract

This study aimed to define the degree of applying the Jordanian universities of the Fourth Industrial Revolution from the faculty point of view. To achieve the goal of this study a developed questionnaire established consisting of (46) items distributed to the faculty members numbered (332) in the Jordanian public universities (The University of Jordan, Yarmouk University, and Mutah University). The findings of this study shows that the reality applying the Jordanian universities the Fourth Industrial Revolution from the faculty point of view came as follows: The reality knowledge systems in Jordanian universities from the faculty members point of view was moderate, also reality technical systems in Jordanian universities from faculty members point of view was moderate, and as for the role of Jordanian universities in applying Fourth Revolution principles from the faculty members point of view, the study showed that the role of the faculty member and the role of university administration in Jordanian universities in applying the Fourth Industrial Revolution principles from the faculty member point of view was moderate degree, based on The results of the study, it recommends that the Jordanian universities are to take an approach that supports the requirements of the information age time limit and the digital revolution in order to contribute in increasing the competence and ability of faculty members to meet the needs of students information and knowledge.

**Keywords:** Jordanian universities, faculty members, Fourth industrial revolution.

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## 1.0 Introduction

The world is living a series of rapid developments that are ravaging people in various fields and sectors, which leads to direct repercussions on countries, most notably the industrial revolution at different levels, hence the beginning of a new era of time represented by the emergence of the fourth industrial revolution in which universities face a challenge related to how to deal with this revolution, Its overall change in the various sectors, which requires adaptation to achieve the desired goals, which require institutions of higher education to have a vision of the Fourth Industrial Revolution, which in turn will reshape most aspects of life, so it may be useful to understand the impact of the Fourth Industrial Revolution on society and individuals in terms of communication, work and life in general.

The second millennium is the beginning of world entry into the fourth industrial revolution or the so-called digital revolution, where the world witnessed a set of developments which are represented by increased social communication, and the transfer, storage and circulation of information and data became open without borders. The evolution of the virtual world in amazing details, became clear from children's games to classrooms and virtual laboratories, and to space, besides smart systems and robotics have taken a leading position in the industry to the extent that many businesses and products have become implemented through robots, and smart systems, from architectural designs to the study of space and the deep sea, artificial intelligence began to replace humans in many businesses, and industries and industrial relationships based on these data have evolved (Bavel, 2010).

The fourth industrial revolution constitutes an unprecedented set of impacts, and its effects are outweighed by the previous Three evolutions because of its characteristics, this revolution is going in a double geometric sequence, not a linear mathematical follow-up, and the magnitude of the impact of the fourth industrial revolution on all areas of life is wide and deep, whether on societies, individuals, workers or governments, the fourth industrial revolution would overshadow all areas of Political, Economic, and Social life, and the way in which the major forces deal with small countries, and the way governments deal with their citizens, and companies with their employees and customers, and as well as this revolution will affect the structure of society, its environment, and layers, because of the nature of the structural changes that will occur in the creation of new jobs and the elimination of existing jobs, and requires understanding the developments and challenges posed by the fourth industrial revolution whether governments, companies or civil society organizations or even academic who can understand the mechanism of action of these developments technology and the challenges of the consequences of that revolution. Therefore, it's necessary for all humanity to join hands in order to develop common values, standards and objectives for all (Egyptian National Planning Institute, 2019).

The environment and curricula have been affected by this digital revolution, sometimes going beyond the

traditional method and nature of education, which requires students and teachers to go to study on specific dates, so that students can receive educational programs, lectures and pass exams from anywhere, in what is known as distance learning, which is expected to change the current perception of learning places, components and the nature of the educational situation. Communication and interaction will also shift from close-up synchronization to remote or non-synchronization, and this issue has already happened in some countries in the so-called virtual schools and virtual universities, which are schools and universities without buildings but provide their educational services through reliance on internet services (Peters,2017).

Since universities are one of the most important drivers of change and progress in society and play an important role in society development and progress at the national level in the areas of economic, political, social and cultural transformation, it is imperative to constantly develop in all aspects through work to create an integrated system that works to identify the current reality in its positive and negative aspects, while demonstrating strengths and weaknesses, and exploring unique experiences. Distinguished development of distinct universities to form some of the assumptions that can be a guide to the processes of development and modernization, and work to build a holistic vision of development processes reflecting its philosophy through the integration of the components of the internal and external education system, focusing on the priorities of development, namely human resources, and the use of information and communication technologies that the Fourth Industrial Revolution brought in its future vision (Ali, 2019).

In light of the external challenges facing universities related to the amount of economic, political transformation and scientific, technological progress, and the internal challenges they face, which imposes a set of internal challenges posed by these developments, which makes it an urgent need to reformulate the elements and components of educational work in a way that keeps pace with contemporary developments, and benefit from them in a practical way for both students and the local community.

## **1.2 Statement of the Problem and the Study's questions:**

In the late Twentieth century and the beginning of this century, the world witnessed a development in the concept of scientific and technological progress, which resulted in the doubling and accumulation of human knowledge, particularly in the field of scientific and technological knowledge, and technological progress became the most important link in economic progress, resulting in the transformation of the world economy into an economy based on scientific knowledge or economic knowledge based on the knowledge produces civil and technological researches. The ability of each country to be measured by its knowledge, and thus universities have to take on a new roles because of the speed with which economic changes and this change occurs as a challenge even for the developed countries themselves, in addition to the great role of science and technology in the development of societies, and thus determines the problem of the stud, know the importance of implementing the principles of Fourth Industrial Revolution at the Jordanian universities, and the following questions emerge from this problem:

- **What is the role of Jordanian universities in applying the principles of the Fourth Industrial Revolution from the point of view of faculty members?**

## **2.0 Objectives of the Study:**

This study aims to learn about the role of Jordanian universities in applying the Fourth Industrial Revolution principles from faculty members point of view.

## **2.1 Study's Significance:**

The importance of the study is that; it is a role that addresses Jordanian universities in applying the Fourth Industrial Revolution principles from faculty members point of view. Highlighting the prominent role of Jordanian universities and faculty members in providing a community with human competencies capable of proceeding the sustainable development in the light of the repercussions of the fourth industrial revolution.

The importance of the study lies on its expected results, as it is hoped that the results of the study will benefit decision makers in universities and this is done by taking advantage of the results of the study in finding decisions that contribute to the development of the university, and future political planners in the Ministry of Higher Education by highlighting On the roles assigned to universities to provide students with different skills to develop his human capital, also working to develop those skills in continuous educational courses, besides researchers in this field by opening the door for researchers and those who are interested in conducting and developing studies in the same field.

## **2.2 Study terms:**

The current study contains terms that will be defined conventionally and procedurally as follows:

**The Fourth Industrial Revolution – Idiomatically:** The Digital Revolution, in which technology is an integral part of society and a link between the physical, digital and biological world, and is characterized by the use of

advanced technology in various fields to improve efficiency, promote developments and growth (Cain, 2018:46). Schwab (2016,23) defined it as "the revolution of cyber physical systems, the era of global communications and the Internet revolution, where the speed of technological progress has no historical precedent in connecting billions of people through mobile devices that have unprecedented processing power, and unlimited access to knowledge storage, and these possibilities will be multiplied by emerging technology breakthroughs in areas such as Artificial Intelligence."

It is known **procedurally**: it is the capability of universities to benefit from the requirements of technical and technological development and to employ them in the educational framework in the Jordanian universities in order to achieve a kind of balance between the needs of students and of the local community.

### 2.3 Study limits:

The study is determined by the following limits:

- Objective limitations: Know the degree of the role of Jordanian universities in applying the Fourth Industrial Revolution principles from faculty members point of view.
- Human Limitations: The study was limited to a sample of faculty members at Jordanian universities (The University of Jordan, Yarmouk University, and Mutah University).
- Time limitations: The study was implemented in the 2019/2020 academic year.
- Geographic Limitations: The study was limited to a sample of faculty members at Jordanian state universities distributed in the Three regions of the Hashemite Kingdom of Jordan.

### 2.4 Previous studies:

The following is a demonstration of the previous studies with relevance to the current study subject, and that are reached in order, according to their timeline, from oldest to newest:

Al-Sharif (2018) conducted a study to measure and determine the extent of awareness of digital and smart educational techniques for faculty members in Saudi universities and their attitudes towards them, the study followed the descriptive method. the sample of the study consisted of (15) faculty members in Three Saudi universities, and the study found that the degree of awareness of digital and smart educational techniques for faculty members in universities of Saudi Arabia and their trends towards it came to a medium degree, also showed that there is no statistically significant differences in the degree of awareness of the faculty members in Saudi universities of digital and smart educational techniques due to sex, and scientific degree variable and the existence of statistically significant differences in the degree of awareness of the faculty members in Saudi universities of digital and smart educational techniques due to the scientific degree variable and of the associate professor.

Also (Ali & Raza, Qazi, and Puah, 2018) conducted a study aimed at identifying the degree of acceptance of smart e-learning systems in Pakistan by university students through the web and models associated with students' acceptance of technology in education, and focused on the need to take advantage of the theories associated with psychology and education in the design of educational websites. The study followed the descriptive method, and the sample study members were (424) of university students in Pakistan. Study results showed the high acceptance of digital and smart e-learning systems by university students, and recommended the need to employ advanced teaching techniques in universities because of its impact on the quality of scientific life at the university, as well as on academics and faculty at universities to conduct more research that promotes the acceptance of e-learning among students.

Both (Bojlar & Shepherd, 2018) conducted a study aimed at identifying the trends of university students towards employing digital and smart devices to study outside classrooms (e.g. in parks), and to establish this in the light of the theories of naturalists and psychologists. The study followed the descriptive method, and the tools of that study were represented in a number of questionnaires and surveys about Learning using technical devices outside the classroom, study sample members were (95) students enrolled in eight study programs at the University of Wyoming at the united states of America, who has reported the high positive trends among the participants in the study sample towards engaging in learning through technical and smart devices connected to the Internet outside the classroom, and employing them in communication with others of different ages as well.

Skik (2019) conducted a study aimed at developing an alternative future for developing the Palestinian graduate systems, the researcher followed a two complex parts methodology consisting of: the first part following the method of environmental analysis survey, and the second part is the descriptive method, study population consists of all universities that contain graduate studies in Gaza, the West Bank, and Some Universities of Egypt. Study findings were the need of universities to follow new methodological techniques and methods, including comprehensive quality and strategic planning through the redesign of the general policy of universities at the level of objectives, programs, evaluation, faculty, and others, which will benefit the economic situation in light of the developments of the Fourth Industrial Revolution.

Furthermore, Al-Omari and Al-Shangiti (2019) conducted a study aimed at identifying the effectiveness of

Gamification technique in the electronic learning environment to develop the skills of producing digital materials and creative thinking for graduate students. The research was based on the semi-experimental method, sample of research were (60) students was selected in a random manner, and the sample was divided into two groups: experimental and controlled, each group consists of (30) student, applied two tools, the first: the digital material production evaluation card, and the second: creative thinking scale. Results of the research showed the effectiveness of Gamification technique in the electronic learning environment in developing skills of digital materials in graduate students, also showed the effectiveness of Gamification technique in the e-learning environment that develop the creative thinking in the graduate students of the Faculty of Education in Medina, Saudi Arabia.

In the light of reviewing previous studies, we had benefited in writing the literature the development of the tool, and the current study differs from previous studies that dealt with the Fourth Industrial Revolution principles directly, also lightened on the importance of applying these principals at universities. This study distinguishes from other previous studies, as far as the researchers know, is one of the first studies that dealt with the role of Jordanian universities in applying the principles of the Fourth Industrial Revolution from the point of faculty view.

### 3.0 Methodology of the study

In order to achieve the objectives of the study, the survey method was used

#### 3.1 Community and Sample of the Study

The community of the study consisted of all faculty members in Jordanian public universities for the academic year of 2019/2020, which are (7239) of faculty members. (332) of faculty members were chosen according to the table of random samples for a known population.

#### 3.2 Tool of the study

The study tool was developed by reference to theoretical literature and previous studies that dealt with the Fourth Industrial Revolution with the aim of developing the study tool in its initial form to know the importance of applying the principles of Fourth Industrial Revolution from the faculty point of view. The items of the tool are (46), and was designed on Likert scale.

#### 3.3 Validity of study tool

To examine the validity of study tool, it had been distributed to the faculty members of Jordanian universities, experienced and competent, in order to have their opinions and commentary on the paragraphs of study, in addition to any modifications or additions they recommend, which will all be taken into consideration at the average of (80%) of arbitrator's perspectives.

#### 3.4 Stability of the tool

The stability of the study tool was verified using two methods: (Test – Retest) method, where the tool was applied to (20) members of the study community and outside its sample, and reapplied to them after two weeks, after which the stability coefficient will be calculated using the Pearson correlation coefficient between the results of the two applications, and the second method was done by internal consistency using the equation of Cronbach- Alpha) and table No. (1) shows this.

**Consistency coefficient values for study tool areas in internal consistency**

**Table No (1)**

Number	Areas	Number of items	Stability Factor Alfa
1	Knowledge systems	11	0.85
2	Technical systems	13	0.83
3	Faculty member	12	0.83
4	University Administration	10	0.84

#### 3.5 Statistical standard:

The importance degree of implementing the Fourth Industrial Revolution principles by the study sample was determined by the response of the study sample on the Likert scale (5 dimensions) by giving each of its paragraphs one score out of five (strongly agree - five degrees, agree- four degrees, agree somewhat - three degrees, disagree: two degrees, strongly disagree: one degree), represented digitally (5, 4, 3, 2, 1) respectively, and the criterion of judging the averages of the study tool was determined by dividing it into three grades: low, medium, high, according to the following equation:

Class length = upper value of the alternative - minimum value of the alternative / number of levels

$$= (5 - 1)/3 = 1.33$$

The following criterion will therefore be used for the purpose of judging the degrees of importance and difficulties as follows:

- Low score less than 2.33
- Average score from 2.34 to 3.67.
- High score from 3.68 to 5.00.

### 3.6 Statistical treatment

Statistical data processors were conducted in this study using the Social Science Statistical Package (SPSS).

### 4.0 Discussion of Study results

Study results will be discussed as per its question and as follows

*Discussing the results of the study question: What is the role of Jordanian universities in applying the Fourth Industrial Revolution principles from the point of faculty members view?*

To answer this question, averages and standard deviations of the reality role of Jordanian universities in applying the Fourth Industrial Revolution principles have been extracted, as follows and according to the areas of the tool:

- 1) The field of cognitive systems: averages and standard deviations of the reality of cognitive systems in Jordanian universities were extracted from the point of view of faculty members, and table No (2) shows this:

**Table No. (2)**

averages and standard deviations from the reality of knowledge systems in Jordanian universities from the point of view of faculty members

No.	cognitive systems	Average	Standard deviation	Rank	Score
3	University contributes in providing knowledge engines to enhance communication with beneficiaries of its services.	3.78	0.97	1	High
8	University relies on sharing knowledge Standards as one of the pillars in the selection process choosing elite employees.	3.60	1.09	2	Medium
7	University participate in various events that help to gain knowledge.	3.54	1.15	3	Medium
4	University seeks to attract talented employees from outside to help generate knowledge.	3.42	1.10	4	Medium
6	The University promotes the philosophy of teamwork to exchange (ideas and experiences) among its employees.	3.36	1.22	5	Medium
1	The university's collaborative relationships provide an opportunity to share (experiences and information) with other universities.	3.24	1.08	6	Medium
5	The university provides methods for continuous updating of information by reviewing the latest developments	3.18	1.15	7	Medium
2	The University uses scientific research to generate knowledge about achieving its overall goals.	3.15	1.10	8	Medium
10	The University provides continuous learning and development opportunities for employees.	3.13	1.25	9	Medium
11	The University supports participation in scientific conferences (local and international).	3.13	1.24	9	Medium
9	The university motivates students to develop their skills to translate them into creative ideas.	3.03	1.24	11	Medium
	<b>Total</b>	3.32	0.70		Medium

It is clear from the data in the previous table that the reality of the knowledge systems in Jordanian universities from the faculty point of view was moderate, with averages between (3.78 to 3.03), and with regard to the total score was average, in terms of the average of (3.32). This may be due to universities goals in building capacities and developing effective tool to contribute in sustainable development for the transition to digital and knowledge economy, that will provide students the opportunity to use information and communications technology as an effective tool for community service, in order to develop manpower and acquire skills and ability to keep pace with the current developments.

This may also be due to faculty members acquisition in the need for universities to adopt ways and means to support the existence of knowledge engines that contribute to promote qualifications and enable them to start

their career to launch the job market with a set of skills that help them to work in accordance with future developments through programs implemented by knowledge stations using training courses and electronic services.

This is also due to universities keenness to support faculty member in scientific conferences and forums so that the faculty member acquires intellectual and practical skills and is able to see the summary and results of scientific research.

This may also be due to universities keenness to take advantage of educational development data in which the educational process depends on students as a central point of this process so that students will gain skills to help them using higher order thinking and lead them towards creativity.

### 2) Technical systems:

Averages and standard deviations of the reality of technical systems in Jordanian universities were extracted from the faculty member point of view and table No. (3) shows this:

**Table No. (3)**  
**Averages and standard deviations from the reality of technical systems in Jordanian universities from the faculty members point of view.**

No.	Technical Systems	Average	Standard deviation	Rank	Score
1	The university provides database systems for students.	3.46	1.16	1	Medium
2	The university provides an internal network to access databases.	3.30	1.06	2	Medium
8	The university website is accessible to everyone as needed.	3.26	1.19	3	Medium
7	The University e-library allows everyone to benefit from it.	3.25	1.25	4	Medium
11	The university provides career guidance service for its graduates.	3.21	1.21	5	Medium
5	The University provides e- link for each department to explain (its achievements, objectives and skills).	3.20	1.22	6	Medium
13	The university integrates software into its syllabus.	3.16	1.34	7	Medium
10	The university integrates course materials with the Internet.	3.11	1.26	8	Medium
12	The university has the vision for the required disciplines in the near future.	3.09	1.18	9	Medium
6	The University is circulating internet connectivity to all levels.	3.05	1.18	10	Medium
3	The University provides e- methods that help in conducting meetings and transmitting experiences from distance.	3.03	1.21	11	Medium
9	The University provides the software to acquire knowledge in order to share it.	3.02	1.24	12	Medium
4	The University provides specialized e-forums that contribute in (documenting and sharing) knowledge.	2.87	1.22	13	Medium
	<b>Total</b>	<b>3.15</b>	<b>0.72</b>		<b>Medium</b>

It is clear from the data in the previous table that the reality of the technical systems in Jordanian universities from the faculty point of view was moderate, with the average calculation between (2.87-3.46), and with regard to the overall degree was average, in terms of the average of (3.15), This may be due to the important role that universities have, plus their responsibility to meet the needs of students and faculty in terms of scientific and technological development in order to be able to keep pace with progress and development, also to have the capacity to use them to build the pillars of society, furthermore to bring about a qualitative and quantitative shift in order to catch up with developed countries.

This may be due to universities keenness to diversify sources of information through which students have flexible and easy access to knowledge and information that contributes to increase their ability to use modern technologies in the scientific search, plus develops their intellectual and scientific ability.

This may also be due to universities interest in activating modern technologies, also universities keenness to employ network by students which will facilitate their studies, and in order to keep students up with technological developments and provide them with technical methods that help them in the field of their studies.

This may also be due to universities' attempt to benefit from experiences in this issue, which leads to provide technical tools that support the cognitive construction of students and staff, and allow them to share information among themselves in order to achieve some kind of modern learning.

### 3) Faculty members

Averages and standard deviations of the role of faculty members in implementing the Fourth Industrial Revolution principles and Table 4 are extracted:

Table (4)

No.	Phrases	Average	Standard deviation	Rank	Score
	<b>faculty member</b>				
1	I encourage discussion in classroom to spread knowledge among students.	3.89	1.10	1	High
6	I participate in the university's online forums (known and private) to share knowledge with (students, colleagues and community).	3.83	1.05	2	High
9	I employ knowledge to achieve university's goals.	3.66	1.17	3	Medium
3	Guide my students to websites that contain knowledge of interest to them.	3.65	1.04	4	Medium
7	I seek to participate in training programs in knowledge field (implementation & modification).	3.63	1.10	5	Medium
8	I visit the university library to see new books and periodicals.	3.63	1.17	5	Medium
2	I encourage my students to surf the Internet to pursue knowledge posted on global websites.	3.59	1.03	7	Medium
12	Develop students' emotional intelligence through courses.	3.57	1.22	8	Medium
5	I share information on university web site with my fellow faculty.	3.56	1.15	9	Medium
11	I encourage students to participate in scientific conferences.	3.38	1.10	10	Medium
10	I update courses to keep pace with the global changes.	3.37	1.13	11	Medium
4	I reward students who gain knowledge in order to exchange it.	3.29	1.12	12	Medium
	<b>Total</b>	<b>3.59</b>	<b>0.93</b>		<b>Medium</b>

averages and standard deviations of the role of faculty members in implementing the Fourth Industrial Revolution principles.

It is clear from the data in the previous table that the role of faculty members in implementing the Fourth Industrial Revolution came to an average degree, the average arithmetic between (3.29 to 3.89), and with regard to the total degree was average, in terms of average of (3.59).

This may be due to the fact that universities have a knowledge framework that supports faculty members in applying the industrial revolution principles effectively, as well as universities and faculty are keen to follow technical and technological developments in order to be able to find human capital that have scientific and cognitive competence which contributes in nation's renaissance.

This also, may be due to the fact that interaction is effective between faculty and students is a fundamental direction to achieve higher education goals, besides it works to increase communication and exchange of ideas, which leads to develop thinking and ways of expressing their knowledge structures, this helps the faculty to develop its teaching method and increase the vitality of students in the educational situation, plus to get them out of the state of silence to the state of interaction and discussion and exchange point of views among them, which in its entirety enhance confidence between the faculty and students, that achieves a scientific attitude that is effective and dynamic.

#### 4) University management field:

The calculation averages and standard deviations of the role of the university administration in applying the Fourth Industrial Revolution principles, and Table No. (5) is extracted.

Table No. (5)

Arithmetic averages and standard deviations of the role of the university administration in applying the Fourth Industrial Revolution principles,

Number	University Administration	Average	Standard deviation	Rank	Score
1	The university administration compares its knowledge with other universities knowledge.	3.33	1.33	1	Medium
8	University management provides tools leads to fast access to knowledge required by faculty	3.29	1.25	2	Medium
5	The university administration encourages faculty members to go beyond old & traditional methods.	3.24	1.29	3	Medium
2	The university administration determines the new knowledge needed to carry out the work efficiently.	3.23	1.26	4	Medium
10	The university administration provides policies that support scientific research and researchers.	3.21	1.32	5	Medium

Number	University Administration	Average	Standard deviation	Rank	Score
6	The university administration provides valuable scientific databases to be used to spread knowledge at the university.	3.20	1.29	6	Medium
7	The university administration provides a sophisticated technical environment to facilitate the flow of knowledge at the university.	3.16	1.23	7	Medium
9	The university's management is keen to design performance levels based on the integration of knowledge.	3.11	1.26	8	Medium
4	The university administration periodically reviews its cognitive needs according to the latest developments.	3.07	1.26	9	Medium
3	The University Administration has a list of available knowledge and knowledge that should be available.	3.04	1.25	10	Medium
	<b>Total</b>	3.19	0.93		Medium

It is clear from the data in the previous table that the role of the university administration in Jordanian universities in applying the Fourth Industrial Revolution principles from the point of view of its faculty came to an average degree, after and even the arithmetic averages between (3.03 to 3.34), and with regard to the overall degree was average, in terms of the average of (3.19).

This may be due to the extent to which universities are keen to take advantage of the data of technical and technological development and to employ and exploit these technologies in a way that enhances the status of universities and reflects on the performance of faculty members, which leads to build knowledge and scientific concepts among students, and in turn constitutes increasing the ability of students to interact with the needs of society, which works to achieve the requirements of comprehensive development.

This also, may be due to the keenness of universities to evaluate themselves to ensure that they support learning methods according to modern data, and according to the coexistence of international universities.

This may also be due to universities' findings and tools that contribute to increase cognitive competence among faculty and lead to a kind of cognitive and scientific integration that keeps pace with contemporary developments and meets the needs of students.

### 5.0 Recommendations:

Based on the results of the study, the study recommended:

- Jordanian universities need to take an approach that supports the requirements of the information age time line and the digital revolution, in order to increase the competence and ability of faculty members to meet students' information and knowledge needs.
- The need to include technical means in higher education syllables.
- The need to conduct training courses for faculty members on how to use contemporary techniques.
- The need to diversify tools and methods of education using modern techniques.

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