

The teacher's preparation and roles in light of digital technological development and the artificial intelligence revolution

Ahmed Dahmani
University of Ahmed Zabana Relizane (Algeria)
ahmad.dhm@gmail.com

Received : 26/10/2024

accepted:23/03/2025

Abstract:

The teacher is an active party in achieving the goals of education and building educational curricula, therefore , it is essential to prepare them for effective performance in this process. Teacher's tasks are no longer limited to merely transferring knowledge especially in light of digitisation and current technological advancements, and he is also no longer the sole owner of knowledge in light of the technological revolution sweeping the various aspects of life. From the perspective of contemporary educational curricula, the teacher is a researcher, designer of educational experiences, guide, evaluator and leader of the educational process in general; these tasks require a preliminary industry for the teacher or what is known as teacher preparation aimed at keeping pace with new developments, and taking advantage of modern technologies and the artificial intelligence specifically to implement various educational programmes, which is the subject of our study and what we seek to research by highlighting these modern technologies and their role in preparing educational content and this requires programmes and curricula accompanying contemporary technologies to perform the profession in more easy and easy conditions, or thereby enabling the profession to be carried out more efficiently and effectively.

Keywords: Teacher; curricula; roles; technologies; digitalisation; the artificial intelligence.

Introduction :

Technology has swept through the daily life of modern man, including education, and modern pedagogical approaches have emerged based on : Information and communication technologies (ICT) the information and communication technologies (ICTE) in education, which has become one of the fundamentals of building modern educational curricula and has an effective impact in the educational field, taking different forms that intersect in one concept, which is the employment of modern technologies in education, and artificial intelligence (AI) is one of its forms, as artificial intelligence (AI) has received a great deal of attention in academic research in recent years. Artificial Intelligence (AI) in academic research has received great attention in recent years, after this transformative technology supported by machine learning algorithms and data analytics revolutionised the scientific and academic research scene, enabling researchers to process huge amounts of data, thus accelerating the pace of scientific discovery and improving the quality of research results.

If we consider that the educational situation is based on three pillars of teacher, learner and curriculum, the curriculum is the link between the two pillars of the educational process, the teacher and the learner, and an important tool for raising the cultural and scientific level,

keeping pace with the rapid global events and their changes, and keeping pace with advanced nations and translating their sciences and innovations in all fields and crystallising them in the school curricula.

Since the teacher is an essential party to the educational curricula as an implementer of them, he was the focus of our attention in this intervention, which came under the title: (Teacher preparation and roles in light of the digital technological development and the artificial intelligence revolution) What is the role of artificial intelligence in the preparation of curricula and what are the roles and tasks of the teacher implementing these curricula in light of these modern strategies and preparing him to undertake this task?

To address this issue, we chose a number of hypotheses and research elements, most notably the definition of the concept of educational curricula, the teacher and his roles as a key pillar in building the curriculum, then artificial intelligence, its images, forms, employment and its positive features through what this scientific revolution has achieved in the development of pedagogical practice and the teaching-learning act and the use of new terminology in the educational field such as digital learning, smart learning and others.

2. Educational curricula and the construction of the modern curriculum:

The curriculum is defined in multiple ways, sometimes it is related to the sum of experiences, or the cumulative knowledge found in the study subjects, and sometimes we find it related to the methods of thinking; and because the word Curriculum means the racetrack, it is accordingly a racetrack governed by laws, namely its content, objectives, evaluation methods, experiences (educational activities) and teaching methods to implement the curriculum.

The definition of what a curriculum is has undergone positive shifts from a narrow traditional concept to a more comprehensive modern concept; it was initially built on the basis of the theory of knowledge, its nature and its relationship to behaviour raised by philosophers¹, Considering that knowledge is an image or depiction of what is going on in the world of facts and events, and a tool for practical behaviour for pragmatists, and its nature for empiricists is sensory experience and its means is the senses, the efforts of the old curriculum in its traditional concept are focused on knowledge, which is the most important fruits of human experience, and it followed that the curriculum became synonymous in its concept with the curriculum and the textbook, and the role of the teacher under this concept was limited to being a carrier of knowledge, explaining and explaining, and with this concept of the curriculum the book became the only source of knowledge and took over the triad of: (indoctrination-memorisation-retrieval) dominated the educational process in the traditional curriculum.

However, this traditional concept proved to be ineffective and did not cover the basic needs that the modern school is betting on in building the personality of the learner and guiding his behaviour because it was limited to the cognitive aspect and neglected the psychological, behavioural and skill aspects and the ability to solve problems and isolate the school from life.

Because the conditions of society and ways of life have changed in light of scientific and technological development and the development of educational and psychological research, many social concepts, the objectives of education, the function of the school, and even the needs of society in the modern era require the necessity of linking the school to the environment, it is necessary to adopt a modern concept of the curriculum that can keep pace with these developments, characterised by appropriateness (appropriateness)²; that is: contents and activities that contain significance, based on personal experiences and expertise, refer to reality in its various manifestations, and respond to its needs and requirements.

In light of the above, the curriculum is ‘an integrated system of fixed human facts, standards and values and changing human knowledge, experiences and skills that any educational institution provides, prepares or guides its learners with the purpose of bringing about learning, modification or change in their behaviours and achieving their comprehensive and integrated development in accordance with the objectives of education in their society’³, meaning that the comprehensive and integrated growth of the individual in knowledge, experiences and skills must be consistent with the educational ends in society, because the curriculum is the whole life, as Harold Spears says⁴: ‘The curriculum is the whole life of the school’.

The curriculum with these specifications takes on a global dimension, as some studies have conducted a description of Western curricula, especially the United States of America, and the adoption of a comprehensive curriculum that provides students with basic subjects with the status that prepares them to face life and enter higher scientific institutions, as well as promoting this curriculum as the main tool for preparing the future workforce of the nation that enables the United States to meet the demand for a high level of thinking and extensive knowledge of mathematical sciences and technology⁵.

Modern technology and artificial intelligence provide advanced and innovative tools to develop educational curricula and facilitate the learning process.

Through the use of smart technology, teachers can provide diverse and interesting educational content using AI, and students can benefit from AI-powered educational applications and tools, making the learning process more interactive and interesting.

Thanks to smart technology, learning becomes a uniquely personalised experience for each student. AI can assess students' abilities, strengths and weaknesses, and then provide the necessary resources and learning materials. This helps to enhance students' academic understanding and achievement, giving them new skills and in-depth knowledge in the subjects they study.

In short, it can be said that AI has a great impact on the development of education curricula. AI enhances the learning process and contributes to improving the academic performance of students. As technological developments continue, the role of AI in education will be even more important and effective in the future⁶.

Curriculum construction and development is based on (raising new challenges) both internal challenges related to improving the quality of the quality of the learner and the quality of the curriculum, while external challenges are centred on three elements: Globalisation, the information and communication technologies (ITC), and the new scientific and technological revolution, such as computer and smart software.

The image of curricula in the light of artificial intelligence entails several concepts such as development, quality and adaptation. Development is defined as a set of procedures that are carried out with the intention of qualitatively changing one, some or all of the components of the curriculum, with the intention of increasing the effectiveness of this curriculum in achieving the desired objectives of it to make it in line with some changes and developments in a society, or with some global developments, and this development may be total and comprehensive and is called total development, or this development may be gradual⁷.

Perhaps one of the reasons and considerations related to curriculum change and development is the ambition to establish a comprehensive curriculum that responds to the aspirations and needs of learners and the needs of society in general, and to adapt the curriculum to the local context, and because change in curricula also takes the meaning of innovation and development.

Because the-quality is leadership and excellence, it is inevitable to take advantage of the artificial intelligence technologies that have become essential in building contemporary curricula, and the curricula and their quality are one of the important aspects that should be

focused on in educational systems, as Shawky Mahmoud Hassan believes; ‘The relationship between educational goals and curricula is a strong correlation, as educational goals are the main guide for curricula, and the most prominent foundations on which the curriculum is based in its modern concept are the student, information, experiences, activities, society and environment’⁸.

3. The role of artificial intelligence (AI) in building curricula:

Artificial intelligence is a name given to a set of new methods and methods in programming accounting systems that can be used to develop systems that mimic some elements of human intelligence and allow it to make inferences about facts and laws that are represented in computer memory⁹.

Artificial intelligence¹⁰: is defined as ‘a machine or computer program that uses human intelligence to complete a task, through planning, learning, understanding, reasoning, justifying, solving problems, and predicting’.

It is also defined as the use of machine learning technology, software and algorithms to perform tasks and make rules or predictions based on available data and instructions. Artificial intelligence is a constantly evolving technological revolution that mimics the human capabilities of researchers in the academic research sector to a great degree, making it capable of carrying out scientific and academic research tasks that require high degrees of accuracy and critical and analytical thinking.

According to the Qorrect blog, artificial intelligence is a branch of modern science and technology that aims to implant human intelligence in manufactured machines, so that these machines are able to perform the assigned functions more efficiently and intelligently¹¹, and its concept in the educational field is: a new and advanced technology that gives educational systems a huge ability to develop and achieve goals, reach all those wishing to learn and provide the required information and knowledge in high quality without heavy material costs or great physical effort, as the role of artificial intelligence in education is like a link between the knowledge and information stored and those wishing to learn.

Accordingly, artificial intelligence is an important field that has attracted the attention of many scientists and researchers, as this field has witnessed continuous developments that have achieved important effects on the future of humanity at all levels due to its focus on human participation and assistance in various daily tasks that affect human beings in their practical, social and health lives. With the rapid pace of development of artificial intelligence, which has provided different performance in organisations of all kinds, it has become a powerful engine of change due to its transformative effects on daily life, including supercomputers that can contribute to the development of many areas of life and help in the progress and prosperity of cognitive educational systems¹².

Artificial intelligence has revolutionised education because of its many benefits and its ability to increase the efficiency and effectiveness of teachers if it is used in a proper way, because it has the ability to understand information better, and increase their awareness and culture¹³.

Many studies¹⁴ have shown the importance of employing AI applications in educational curricula in general, for different stages of education, as digitisation and multiple applications may play an effective role and can achieve many outcomes, most notably:

Promoting innovation and creativity: In terms of helping students develop critical thinking, problem-solving and creativity skills by providing them with new tools and technologies. For example, AI can be used to create programmes and applications that allow students to experiment with new technologies and create new art forms.

Improve teaching efficiency: AI can help teachers improve teaching efficiency by providing tools and techniques that can analyse student data and provide personalised

feedback. For example, AI can be used to create systems that track students' progress and identify their strengths and weaknesses.

4. Technological and their applications in education:

By technological technologies, we mean the modern means used in the education process, also called educational aids because of the help they provide to the learner in the process of understanding or means of clarification because of the role they play in what the teacher is explaining.

They have been categorised according to several criteria, including: according to the method of access, according to the quality of presentation, according to addressing the senses, and according to expertise:

-Depending on how they are obtained: They may be ready-made (animated films, maps that are not produced by students but by specialised companies), or they may be manufactured materials made by the teacher or students (drawings, slides, data maps).

-Depending on the type of presentation: Optical projection (films, tapes, etc.), non-optical projection (models, maps, etc.).

-According to the senses: Auditory, visual, audiovisual, tactile.

-According to the experiences: Edgar Dale developed a cone in which he arranged the teaching aids from the base to the top¹⁵, at the base we find a direct experience closer to understanding, then the difficulty of understanding progresses towards the top of the cone because it depends on abstract verbal symbols (as represented in Figure 1) and the division of the cone came as follows:

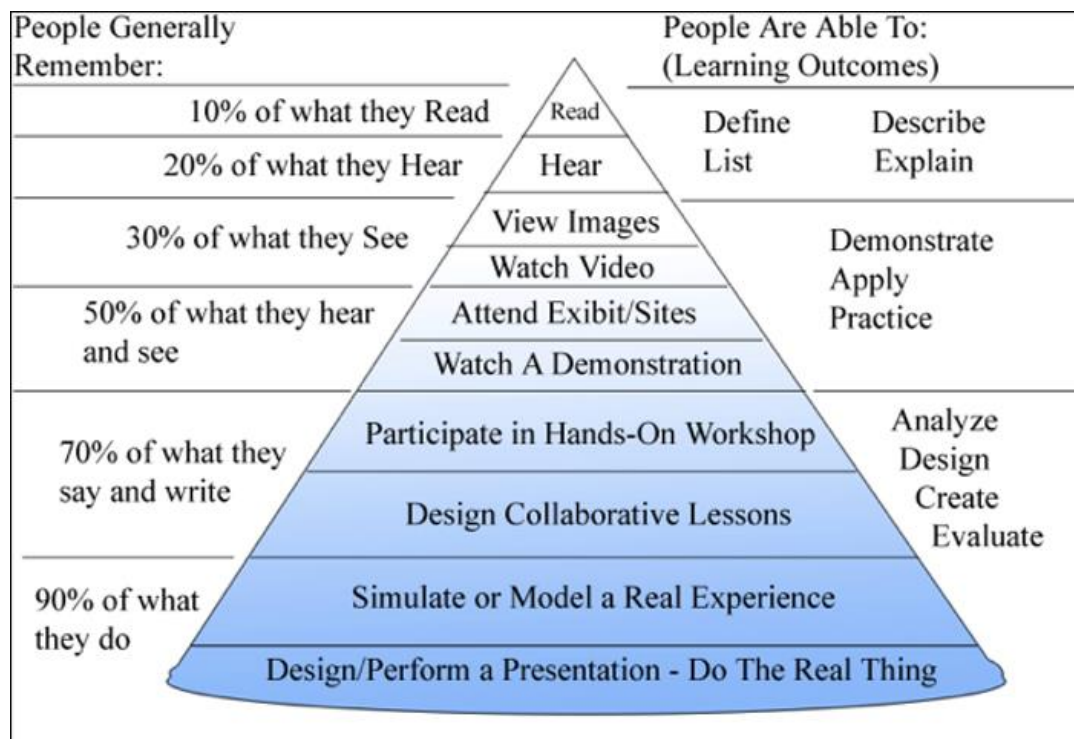


Figure : (01) Edgar Dale's Cone of experience¹⁶

1/Verbal symbols.

2/Visual symbols.

3/Audio recordings.

4/Motion pictures/Films.

5/Exhibitions/Museums.

6/Field studies/Trips.

7/Scientific presentations.

8/Represented experiences.

9/Modified experiences.

10/Direct experiences (real-life practice)

Edgar Dale, in his book (Audio-visual Methods in Teaching)¹⁷, classified the teaching aids based on the experiences that the aids provide in the form of a cone called the Cone-of-Experience. E.Dale is considered one of the educators who made major contributions to the development of modern educational technology; because of its inclusion of learning theories and audiovisual communication, and this was in 1964.

He developed the Cone of Expertise, which presents a visual analogy of the concrete and abstract levels of teaching methods and teaching aids, and is the first attempt to build a rationale for the selection of teaching aids.

Dale believed that abstract symbols and ideas could be more easily understood and remembered by the learner if they were based on concrete experiences. He placed at the top of the cone abstract experiences such as verbal and visual symbols, and at the base of the cone tangible experiences.

These modern technologies have proven their effectiveness in the educational environment because they have achieved many benefits in the educational process, the most important of which are¹⁸ :

-Providing alternative experiences

-Correctly forming perceptions: For example, showing a film about the giraffe animal creates a correct image of the perception in the minds of learners more than the traditional explanation and description

-Meeting the increasing number of learners, where the largest number of students can benefit from modern teaching methods and their advantages in terms of attracting the attention of learners and saving time.

4. Roles of the teacher in light of technological development and the digital revolution:

The teacher is an active party in achieving the goals of education, and therefore it is necessary to prepare him in order to perform his profession well and carry out the burden of raising generations, as the tasks of the teacher are no longer limited to the transfer of knowledge, but is responsible for many roles as a researcher, designer of educational and technological experiences, guide, evaluator, and leader of the educational process in general.

All these roles are in order to provide educational services to learners at all stages, so there is an urgent need to raise the efficiency and performance of the teacher and this can only be achieved by using modern and innovative strategies and approaches.

Some educational research¹⁹ has categorised teacher preparation into two types: Pre-service preparation and in-service preparation. The latter phase (in-service) comes after the completion of academic training in teacher training institutions, and it is a purposeful activity based on training to complement the deficiencies in the teacher preparation stage in the institutions as supplementary training, and there is remedial training to address deficiencies or weaknesses in one of the competencies, while renewal training aims to keep pace with new developments and developments, especially in the educational scene in general from the sweep of modern technologies in life.

In-service teacher training aims to keep pace with development and renewal; the development of educational curricula, renewal of educational plans, addressing deficiencies

during the preparation period, improving teacher performance, professional growth and promotion.

Preparation is a preliminary industry for the teacher to practice the teaching profession, and it essentially aims to achieve educational goals that can be summarised as follows:

- To equip the student teacher - i.e. the trainee teacher - with the necessary skills to teach in his/her field of specialisation.
- Preparing student teachers psychologically and educationally to fulfil their professional responsibilities after graduation.
- Practical application of the theoretical foundations studied in the educational preparation courses.
- To provide the student teacher with basic and advanced expertise in classroom management (*gestion-de-la-clase*).
- To bring about positive changes in the personality of the student teacher.
- Active participation in various school activities.

While the selection of a teacher is subject to a selective process with specific controls and criteria, it is obvious that the teacher must have mental, physical, emotional, psychological, social and professional development skills (Boudjellal, 2017, page 266), as well as a university degree, in addition to these characteristics, a set of roles that cannot be fulfilled together, including²⁰ :

A. Educational role: Communication, self-education, access to all new developments in the educational field, mastery of the taught subject (*savoir-enseignée*), deepening in the learned subject (*s.savant*), and mastery of modern technologies and their applications so as not to feel the boredom caused by traditional teaching.

B-Professional role: We mean that the teacher reaches the stage of spontaneity in teaching, and the ability to face situations, no matter how complex and difficult, whether with the learner or the educational curricula.

C-Active role: Active-learning is learning that meets the individual needs of learners and stimulates their motivation to learn through appropriate strategies used by the teacher to meet learners' individual needs.

D-Role of the researcher: The teacher engages students in the process of research and discovery by collecting data, information, etc.

E-Social role: The teacher is a social leader who contributes to the development and progress of society through education and instilling social values in learners.

F-Role of the beneficiary of modern technologies: Information and communication technologies are one of the most important modern trends in teacher preparation through the equipment provided by its technologies to implement programmes such as data-show projectors, computers and Internet networks, which encourage teachers to teach in modern ways and methods and use technology to implement programmes more easily and conveniently.

In addition, there are other roles that do not concern us in this research, such as the democratic role by creating a friendly atmosphere between him and his students and the students themselves through dialogue, discussion and respect for opinions, which means the participation of students in a positive and effective way in various educational activities and encouraging the spirit of participation among students, and the developmental role where the teacher is the first source of civilizational, economic and social construction of nations through his real contributions in building human beings, as expressed in the human-capital theory (human-capital).

Its idea goes back to Adam Smith in the eighteenth century. In his book (*The Revolution of Nations*) as human capital is the knowledge that can be converted into profits²¹, as the elevation of the human revolution contributes greatly to the achievement of development and

this cannot be achieved without education as education is the basis for the accumulation of human capital, as the more the teacher succeeds in raising the level of education, the higher the levels of knowledge and thus improving the characteristics of human capital (HC) that provides a service to economic and social development.

The development of the theory of capital goes back to all the studies and research presented by Becker, Schultz and others, the latter (Schultz) as one of the poles of human capital focused his attention on the process of education as a form of investment for the development of human resources, as education is a form of capital as long as it achieves a valuable productive service.

The teacher's tasks, work and roles are analysed to determine the required competencies to increase control over the educational process, and his roles include directing the educational activity, transmitting knowledge, managing his class, and other roles, and the Faculty of Education at the University of Pittsburgh in America (University of Pittsburgh) has adopted a model for this reference, which is limited to six areas of competencies under each of them a number of sub-competencies, we only mention the areas without addressing the sub-competencies under each area²² :

- First domain: The teacher is a transmitter of knowledge
- Domain II: The teacher is a manager of educational activity
- Domain III: The teacher is the designer and source of the educational training process.
- Domain IV: The teacher is a designer and manager of teaching tasks
- Fifth domain: The teacher is a mentor
- Sixth domain: The teacher and his interaction with others

At the forefront of these roles is the role of the beneficiary of modern technologies such as digital education and artificial intelligence, which entered the world of education, when computers were first used in classrooms, and initially artificial intelligence was used for educational administrative tasks such as record keeping, educational assessments and scheduling. As technology advanced, educators were interested in researching the possibility of introducing it into the educational process on a large scale, so that it becomes a necessary partner in the educational process.

Artificial intelligence constituted a qualitative leap at the level of educational and educational work, especially in relation to the work of the teacher and his multiple functions in the educational and educational process, as these changes affected the following aspects²³ :

- Towards achieving better teaching methods: Artificial intelligence can provide multiple options for teachers in contributing to the identification of the most appropriate educational methods, or presenting options that the teacher can select the one he prefers to follow in the course of achieving the planned educational goals.

- Achieving pleasure and saving effort by providing some support that is compatible with the preferences and trends of learners, and the options available to them, and thus the technologies used in artificial intelligence save a lot of time and effort for teachers, and provide more time in teaching and guidance for learners.

- Improving and facilitating the assessment and evaluation process for learners: Many smart software programmes have the ability to facilitate the process of following up the evaluation of learners, identifying their shortcomings accurately, and the path of progress or regression for each learner, or for all learners, which makes it much easier for the teacher to identify weaknesses and defects for treatment, or to know the strengths of learners to enhance them and work on their development.

- Prepare lessons and place them in an organised format that suits learners' abilities and learning styles.

- Counting the number of learners present and absent: One of the burdens and administrative tasks in the classroom that used to burden the teacher was distinguishing the

attendance of learners and their absence from classes, and now with the development and popularity of modern technologies, artificial intelligence has provided many technologies that can contribute to solving this issue. For example, the attendance system application (zoho people), which detects the personal photo and matches it with the file, i.e. the attendance application with facial recognition technology using artificial intelligence, which has become popular in administrations, public institutions and universities.

- Programming multiple educational applications: Artificial intelligence can allow the teacher or learners to develop multiple application options for the scientific issues raised in many scientific activities, such as mathematics, natural sciences, chemistry and other educational activities.

- Measuring the level of effectiveness of learners' participation in education: This is a helpful input in determining the level of their effectiveness and participation, and the extent of their motivation and learning vitality, and this is what the teacher needs during the course of his educational work, and takes time from him, which AI can provide according to the technical software that has become available to him.

- Providing the requirements of the educational process and monitoring the educational differences of learners: AI can have a significant impact on education. It can identify learners' levels and individual differences that need to be taken into account in modern teaching methods and can even provide immediate feedback. The function of identifying educational needs is one of the most important functions required of the teacher during his educational function, through the evaluation and assessment questions and tests he conducts, or through direct contact with learners, in order to conduct an evaluation or development process for these needs and address them at the educational level, as artificial intelligence, through several software programmes, is responsible for monitoring these needs for each learner separately, and then identifying the overall educational gap for learners, and this also facilitates the curriculum designers, preparers and implementers to carry out the necessary development or reform of the curriculum and re-treatment of the learner's education.

Conclusion:

At the conclusion of this study, we can conclude that building educational curricula in light of the digital revolution and artificial intelligence requires the necessity of preparing future generations and empowering them with technology applications that have become an integral part of their daily reality, and artificial intelligence is considered one of the most important fields on which modern technologies are betting. Many educational studies have indicated the importance of including artificial intelligence technologies in curricula because of their role in developing learners' abilities and skills and preparing them for the future by empowering them with the skills of innovation, redesign, failure treatment, problem solving, and computational thinking to achieve learning based on a solid foundation that enables students to Dealing with artificial intelligence tools and applications, and developing some cognitive aspects related to it.

The use of artificial intelligence in scientific research is a qualitative shift and development in research methodologies and a gradual transition from traditional teaching methods to contemporary strategies; The latter has achieved development in educational outcomes, enhancing the ability of researchers to use and analyze huge amounts of data in various sciences, achieving better and faster results, and thus accelerating the pace of scientific progress. All of this makes artificial intelligence an essential tool in enhancing scientific research by enabling researchers to reach new levels of analysis and understanding in various academic disciplines.

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