Adaptive E-learning Environment To Improve Creative Thinking Learning Process

*Hanan Etaher Dagez[1], Hassan Al Sari[2]

[1]Department of Software Engineering-Faculty of Information Technology-University of Tripoli, Libya

[2]Information Technology Department, School of Applied Sciences, Academy of Graduate Studies, Tripoli

*Corresponding author: h.dagez@uot.edu.ly

Abstract E-learning plays an important role in the spread of knowledge because of the great development in information technology and the spread of the Internet. Recent years have seen the attention of information technology smart systems in the development of the concept of e-learning and despite the efficiency of computer-based training systems CBT and Computer Assisted Instruction CAI in helping learners, However, they do not offer individual attention to the student as in face to face learning system. This paper present adaptive e-learning system to support creative thinking learner.

Keyword: Index e-learning strategy, talented learner, creative thinking.

كيف بيئة التعليم الالكتروني لدعم عملية التعليم لدى المبدعين والمفكرين

*حنان الطاهر الداقيز1 و حسن ضو الساري2

1قسم هندسة–البرمجيات–كلية تقنية المعلومات–جامعة طرابلس، ليبيا

2قسم تقنية المعلومات–مدرسة العلوم التطبيقية–أكاديمية الدراسات العليا جنزور

*للمراسلة: h.dagez@uot.edu.ly

الملخص شهدت السنوات الأخيرة تطور الأنظمة الذكية لتكنولوجيا المعلومات في تطوير مفهوم التعلم الإلكتروني وعلى الرغم من كفاءة أنظمة التدريب المعتمدة على الكمبيوتر في مساعدة المتعلمين الا إنها لا تقدم الاهتمام الفردي الي الطالب كما في نظام التعلم وجها لوجه. فهذه الورقة تقدم نظام لتكييف التعليم الالكتروني لدعم المبدعين والموهوبين في تحسين قدراتهم على التعلم بكفاءة وفي أسرع وقت ممكن في بيئة التعليم الالكتروني.

الكلمات المفتاحية: لتعليم الالكتروني، التفكير الابداعي، واستراتيجيات التعليم الالكتروني.

I. INTRODUCTION

E-learning plays a major role in the dissemination of knowledge because of the great development in information technology and the spread of the Internet. Recent years have seen the attention of information technology smart systems in the development of the concept of e-learning. Although computer-based training systems (CBT) and computer-aided learning systems (CAI) are helpful in helping learners, they do not provide individual attention to the student as the natural teacher does. Attention to creators and innovators and identify their identity and their characteristics in an era where innovations and inventions become a developmental issue for societies. Developing the abilities of innovators and creators can gain the required knowledge efficiently in the shortest possible time. Moreover, providing the appropriate tools for the category of creators helps to develop their abilities and increase their creativity competence in solving issues and learning, in addition to the diversity strategies for difference creators may suit different e-learning techniques. It was necessary to build a smart system adapted to the needs of the student and make a quantum leap in the educational environment in all respects.

Artificial intelligence has played an important role in the field of computer-based learning systems to enable the movement of the learning process to produce tangible and measurable improvement in the learning process.

I. Creative thinking and e-learning strategies

A) Attention has been given to the study of Creative Thinking since Guilford, 1950, in his opening speech at the annual conference of the American Psychiatric Association (1950), in which he presented his model of the structure of the human mind, in which he distinguished between two types of thinking [1]:

- Convergent thinking, which is measured by traditional intelligence tests
- Divergent thinking, which is measured by creative thinking tests

B) Scientific research has shown that between 2-5% of the individuals are gifted and talented

C) The majority of researchers and researchers agree in the field of creativity and creative thinking that this type of thinking includes

three main skills (fluency, flexibility, originality).

II. Creative Thinking Skills

- Fluency:- Is the ability to produce as many creative ideas in a certain period of time.
- Flexibility:-Is the ability to quickly produce ideas that belong to different aspects and are related to a particular situation.
- Originality:-Is the uncommon production that no one has ever seen.
- Sensitivity of Problems :-And is the ability to recognize weaknesses or lack of dramatic position.
- Elaboration:-This creative ability involves providing multiple details of specific objects, such as broadening the idea of a summary or elaborating a vague theme.
- Preserving the direction: - It means the ability to focus with long-term attention to a particular goal[2].

E-LEARNING STRATEGIES

The teaching and learning process is based on a range of modern strategies such as interactive education strategy, indirect education and self-education, as well as the development of a traditional strategy based on direct education[3].

GILFORD THEORY

Gilford's theory refers to two types of thinking [4]:

- A convergent thinking that represents the intelligence used to find one correct solution to the problem.
- Divergent thinking that is used to find multiple solutions to a single problem.

Gilford's theory suggests that the creative process is multi-faceted, the most important of which is fluency, flexibility and originality.

Gilford matrix model triple classification are as shown in Figure 1:

- First after content:
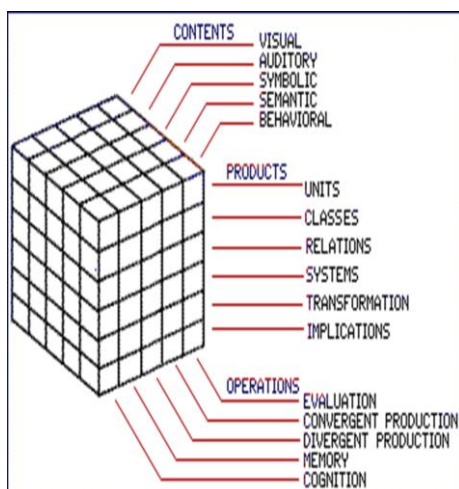- Second: After operations:
- Third: After outputs

Fig. 1. Model of the matrix for GILFORD

TORRANCE THEORY

Torrance has defined creativity as [5]:

- Sensitivity to gaps and puzzling or missing elements.
- Formulate, test and deliver their findings.
- Ability to modify and re-test.

Torrance confirms the following:

- Creative personality characteristics, such as sensitivity to problems, and gaps in knowledge related to a particular topic.
- The creative process that has its steps beginning to feel the problem and look for evidence associated with it
- It should be borne in mind that the higher creative people fall into the following two groups:
  - People with average intelligence.
  - People with high intelligence

THE DIFFERENCE BETWEEN THE (INTELLIGENT) AND TALENTED (CREATIVE)

There is agreement among the majority of scientists that individuals who are less intelligent than the average will not be creative, but individuals who are in the level of intelligence of ordinary or higher can be creative or not, and that determines their creativity or not is the availability of other personal and emotional factors Table (1) shown the difference between the intelligent and the talented [5].

TABLE 1: The Difference between the intelligent and talented

Talented	Intelligent
1. Ask questions	1. Know answers
2. His curiosity is intense	2. Interested in currency
3. A lot of playing with it gets a great score	3. Engages his attention
4. Inquire about the answers	4. Works hard and perseverance
5. prefer older or older than him	5. Answer the questions
6. Good guessing	6. Enjoy with peers in age
7. The length of the period, because he knows the answer	7. Good conservation
8. The banner and feelings are strong	8. Easy to learn
9. very critical of himself	9. Good listening

VI. E-LEARNING STRATEGY ACCORDING TO THE CHARACTERISTICS OF CREATIVE THINKING

The characteristics for creative person depends on measuring the following:

- Mental characteristics: (include sensitivity to deal with problems, fluency, flexibility, originality, intelligence).
- Psychological characteristics: (trust, strength, determination, tendencies, intolerance)
- Characteristics behavioral and social: (exploration, debate).

Figure (2) shows the appropriate strategy for each category and Table (2) shows the characteristics that cope with the appropriate learning strategy .
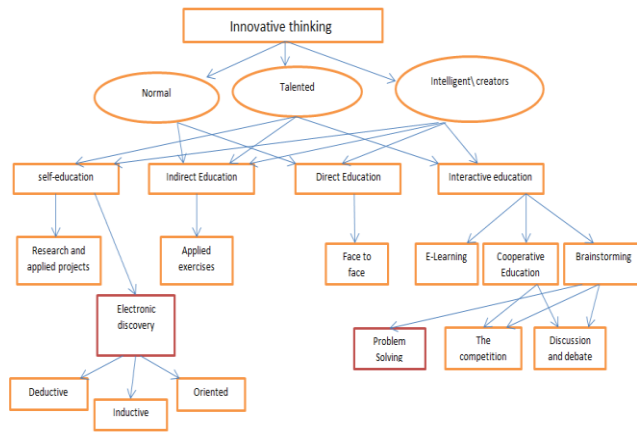
Fig. 2. appropriate strategies for each target group

THE PROPOSED SYSTEM ALGORITHM

Artificial Intelligence (AI) utilizes programming algorithms to simulate thought processes and reasoning that produce behavior similar to humans [6,7]. The following are the main steps for the proposed system using Neural Network technique where, Feed forward Propagation have been used Figure 3 represent the NN output:-

1. START
2. THE STUDENT FILL IN THE QUESTIONNAIRE ONCE ONLY AT REGISTRATION TO IDENTIFY THE STUDENT TYPE.
3. USING NEURAL NETWORK TO DETERMINE THE STRATEGY THAT SUITS THE STUDENT TYPE.
4. THE SYSTEM PRESENTS THE CURRICULUM ACCORDING TO THE PROPOSED STRATEGY.
5. THE STUDENT CAN CHANGE THE STRATEGY IF IT IS NOT DESIRABLE.
6. FOLLOW UP THE PERFORMANCE OF THE STUDENT IN THE STRATEGY GRANTED AND MONITOR ITS PERFORMANCE AND UPDATE ITS DATA
7. END

The mentioned questioner in step2 shown in Table (2)is to determine what type of person is and what is the e-learning appropriate strategy that can suit him to develop his ability in learning and teaching process. This is represented in Table (3). Table (4) represent the matrix build for Neural network.
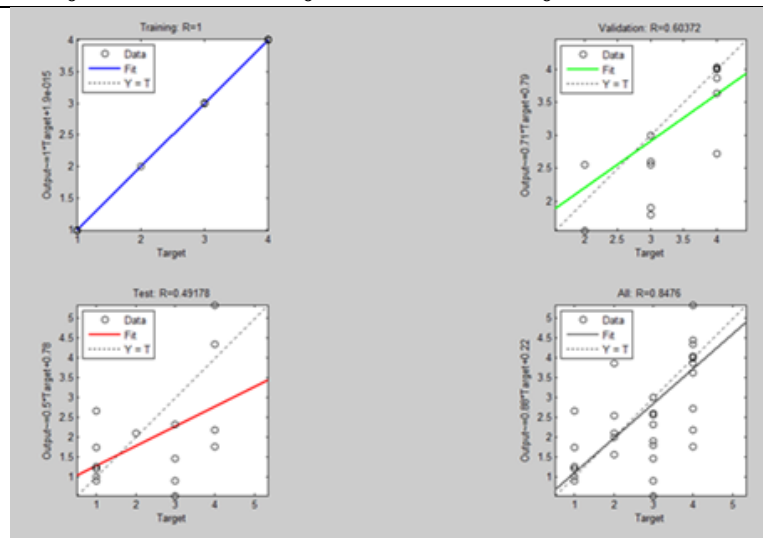
TABLE 2: THE CHARACTERISTICS OF THE LEARNER TYPE

	Description
Mental Model	POSSESSING A WIDE AND DEEP KNOWLEDGE BACKGROUND IN VARIOUS SCIENTIFIC, LITERARY, LINGUISTIC, ARTISTIC AND READING AND READING FIELDS
	MY THINKING IS MORE FLEXIBLE THAN THE OTHERS AND GIVING MANY STRANGE ALTERNATIVES TO ONE IDEA
	MY CONCLUSIONS ARE MORE ACCURATE AND I COME TO THEM MORE QUICKLY THAN MOST PEOPLE AND I FIND WAYS TO SOLVE PROBLEMS AND THE ABILITY TO
	VERSATILITY, CAPACITY AND KNOW-HOW
PSYCHO LOGICA ,	I AM VERY CRITICAL OF MYSELF
	DO NOT LEAN TO RISK AND RISK
	I DO NOT TEND TO JOY AND HUMOR
	I LOVE TRAVELING A LOT AND I LOVE CHANGING THE ROUTINE
behavior al	ANSWER THE QUESTIONS DIRECTLY ACCORDING TO THE INFORMATION I KNOW
	I DO NOT TEND TO WORK ALONE AND I DO NOT TEND TO ISOLATIONISM AND INTROVERSION
	WHEN I DISAGREE WITH OTHERS I AM LESS VIOLENT AND AGGRESSIVE
	I DO NOT INCLINATION INTO CHAOS AND LACK OF SYSTEM
Social	DO NOT TEND TO SIT WITH ADULTS
	I LOVE EDUCATION BY A TEACHER UNDERSTANDING THE MATERIAL EVEN IF HIS BEHAVIOR IS NOT GOOD
	COMPARED TO OTHERS, I FIND MYSELF MORE INTERESTED IN SOCIAL RELATIONS AND THE DESIRE FOR SOCIAL INTERACTION
	I'M THINKING OF LEAVING THE IMPRESSION ON OTHERS

TABLE 3: THE PROPOSED MATRIX FOR TALENTED AND THE SUITABLE E-LEARNING STRATEGIES

Critters	characteristics	Type personality	Strategy	Output(NN)
A	mental	Smart gifted	Interactive education	1
B	Psychological	The talented Medium	Self-education	2
C	Different	Normal	Indirect education	3
D		Weak	Direct education	4

TABLE 4:NN INPUT OUTPUT MATRIX

Inputs				Output
A	B	C	D	
3	0	0	0	1
4	0	0	0	1
0	3	0	0	2
0	4	0	0	2
0	0	3	0	3
0	0	4	0	3
0	0	0	3	4
0	0	0	4	4

0	0	0	0	4

Fig. 3. NN Feed forward Propagation

CONCLUSION

Creative thinking as a process that goes beyond familiar frameworks and boundaries, organizes old elements in new ways, and produces new perceptions and new things. The lack of interest and attention of this type of people who earned creative thinking is the main research concern in this study, which depends on the personality factors and characteristics that contribute on the gaining information. Therefore, this paper present research study focus on determine the characteristic of innovative creative personality according to Gulliver and Torrance theories to improve the learning and teaching process. By providing automated tool and neural network technique to provide the individual by appropriate e-learning strategy .

References

[1]- Dow, G.(2010). Torrance tests of creative thinking . Indiana University. inddiana.edu.Retrieved:25-5-2010.

[2]- Dagdilelis, V. (2008). Principles of Educational Software design, In Rahman, S.(Ed).Multimedia Technologies: Concepts, Methodologies, Tools, and Applications. Volume II , Hershey . New York , InformatIon ScIence reference.

[3]- Abdel-Hamid Hassan Abdel-Hamid Shaheen (2010): - Advanced teaching strategies and learning strategies and learning patterns

[4]- H.R Pal, A. Pal, and A Tourain, Theories of intelligence, Everyman's science, Vol 3, August—September'04.

[5]- Mark A. Runco, Garnet Millar, , Selcuk Acar and Bonnie Cramond, Torrance Tests of Creative Thinking as Predictors of Personal and Public Achievement: A Fifty-Year FollowU, Article in Creativity Research Journal · October 2010 . file:///C:/Users/ASUS-PC/Downloads/201050 yearlongitudinalTTCT.pdf. Last visited 28/3/2019.

[6]- Rana Khudhair Abbas Ahmed, Applications of Artificial Neural Networks in E-Learning, International Journal of Computer Applications (0975 – 8887), Volume 158 – No 2, January 2017.

[7]- Mohammed Al-Ritimi (2016) Artificial intelligence in education Intelligent learning systems. Libyan Society for Artificial Intelligence, University of April 7, Libya, Zawia