DELMAR INTERNATIONAL

FOR UNDERGRADUATE AND POSTGRADUATE

PROFESSIONAL STUDIES COLLEGELTD

Professional Research PHD Thesis

Digital games and their impact on the higher thinking skills of intermediate school female students.

The Researcher

NGLAA ZENHOM MEHANI MAHMOUD

Supervised by Prof.D

Ashrafe El Adawe

2025

Committee for research and advanced professional studies

Dedication

I dedicate the fruit of my efforts to the source of my pride and gratitude: my beloved father and my beloved mother, to my brothers and sisters in humanity who contributed to the success of this work, to all those whose souls have been devoted to their Creator in defending truth and land, and to myself, who has long resisted despair and frustration and faced formidable obstacles and difficulties,

with sincere thanks to my supervisor Prof. Dr. Ashraf Al-Adawi.

The researcher

Introduction:

Scientists confirmed that any deficiency in the human nervous system or any deficiency in mental abilities and skills affects the learning outcomes and outputs (cognitive – skill-based – affective). , This results in several problems and consequences such as hyperactivity, developmental learning difficulties, and various behavioral problems like aggressive behavior. Behavioral problems can even reach the level of deviations and criminal behavior if not corrected and treated, which affects both society and the individual.

Therefore, science has focused on studying the human mind and its processes, studying its thinking skills, assessing their deficiencies, and how to address them. Ismail Abdel Fattah Al-Kafi (2019) identified the components for teaching thinking skills as a sound and appropriate educational environment, availability of focus and mental safety for the learner, provision of attractive learning methods, provision of reinforcement methods suitable for the learner, active learner, ensuring learning independence for the learner, encouraging the learner for self-learning, guided teacher, respecting the learner and their opinions and listening to them. Meanwhile, Hussein Abdel Moneim (2021) defined thinking skills as deliberate processes for processing data, such as observation, watching, attention, etc., from mental processes. On the other hand, Al-Azab Mohamed Zakhran (2018, pp. 165-168) categorized thinking skills into basic thinking skills, such as observation, and higher-order thinking

skills, like classification, comparison, interpretation, etc., from higher-order thinking skills., Al-Azab (2018, pp. 174-177) pointed out (understanding, comprehension, decision-making, planning, problem-solving, judging things, feeling joy, enjoyment, imagination) as components of thinking, and also emphasized the importance of thinking skills for learning and for the process of applying learning and benefiting from information in individuals' lives (Al-Azab, 2018, pp. 173-174).

Arifka Mahmudi (2020) emphasized the importance of developing thinking skills to achieve the desired learning outcomes, while some researchers presented various methods and strategies for developing thinking skills, such as the study by Madi Al-Harbi and Nuhi Al-Tuwairqi (2025), which confirmed the impact of gamification on developing higher-order thinking skills in the digital skills course for fifth-grade students in Jeddah. At the same time, Khalid Abdul Jalil Dweikat and Hanan Ismail Abu Al-Hasan (2023) recommended the necessity of training teachers to use methods that develop thinking skills along with supportive enrichment materials and activities in the classroom.

From this standpoint, the current study will attempt to address the following research problem.

Research problem:

The study problem lies in the low higher-order thinking skills among some learners, which leads to certain academic issues, such as poor academic achievement, and life problems, such as aggression towards others or weak communication skills among learners.

Sources of the problem

The study problem was identified through

• The researcher's field of work (Observation Card): where it was observed that some learners lacked the skills to produce artistic compositions due to their deficiency in skills of formation, arrangement, and reproducing information in different forms. The researcher applied the observation card to (1001) female students of the preparatory stage to verify the extent to which the higher cognitive objectives of art education (innovation – creativity – composition – analysis – interpretation – comparison and application – reasoning – artistic appreciation) stated in the Ministry of Education's publication for the Art Education subject for the year 2024/2025, prepared based on the content of the publication, were achieved. The card consists of (15) items, (15) skills, as indicated in the Ministry of Education's publication.

Purpose of the card: *To determine the extent of higher-order thinking skills among preparatory stage female students. The observation card results were as follows:*

- ✓ *Percentage of students not interested in the subject (20%)*
- ✓ *Percentage of students who have difficulty remembering what they learned (approximately 30%)*
- ✓ *Percentage of students who have difficulty analyzing what is required of them for tasks and executing them (30%)*
- ✓ *Percentage of students who have difficulty rephrasing drawings of topic elements they have previously learned, such as drawings of people or houses, etc., from elements of art work (30%)*
- ✓ *Percentage of students who have difficulty creating a good artistic composition (30%)*
- ✓ *Percentage of students who have difficulty inventing and creating new artistic motifs from various art elements, whether linear or other forms of art (20%)*
- ✓ *Percentage of students who have the ability to think outside the box and invent new artistic motifs (55%)*
- ✓ *Percentage of students who have the ability to classify colors into different color groups (50%) o Percentage of students who have the ability to harmoniously choose colors (45%), This indicates that the percentage of female students who suffer from problems in analytical and synthetic skills, and in reproducing what they have previously learned from experiences, as well as the ability to make decisions in classifying color groups and their associated colors, and in creating linear artistic motifs or ones inspired by any form of art, exceeds (40%), which is a considerable percentage.*

- Personal InterviewThe researcher conducted personal interviews with 50 teachers (male and female) from the preparatory stage, teaching subjects such as (Art Education – English Language – Arabic Language – Mathematics), to understand students' responses to questions that assess creativity and innovation skills, the ability to reuse their previous experiences, and apply them to other subjects. Additionally, the questions assessed inference, deduction, critical thinking, numerical fluency, and verbal fluency skills. The results were as follows:• Students' responses to cognitive inference questions varied between 30% and 50% depending on the subject

• Students' responses to intellectual inference questions vary between 30% and 50%, depending on the subject.• Students' responses to creativity and innovation questions in practical subjects vary between 50% and 60%.• Students' responses to questions about applying their previous experiences in new educational situations vary between 40% and 60%, depending on the subject.• Students' responses to verbal fluency questions vary between 55% and 70%, depending on the topic under discussion and their background knowledge.• Students' responses to shape drawing fluency questions vary between 35% and 55%, depending on the subject and their background in drawing shapes including composition, dimensions, and other aspects.

This indicates that the proportion of female students suffering from deficiencies in higher-order thinking skills ranges between 40% and 50%, and there is a need to develop these skills in them.

Recommendations of the following conferences:

- *The 45th ANNUAL InternInational Conference On Ciritical Thinking.(3rd-27th July/2025). The Foundtion For Critical Thinking Louisville*

- *Jalt CTSG. Critical Thinking in The Classroom.(August .3rd,2024).Campus.*

- *Developing Minds.(14th february,2025).SFUHARBOUR CENTER. -*

- *Developing thinking skills. (16:14 / 10 / 2022). Jeddah.*

- *The Third Arab Conference on Thinking, Creativity, and Innovation. (22/3/2019). Jordan.*

They pointed out the presence of deficiencies in higher-order thinking skills among some learners and the necessity of addressing this issue, while proposing some educational and technological solutions and strategies to solve it. I recommend several of them using electronic games in assessment and teaching to develop thinking skills

. Recommendations of the study of each of

(Arifka Mahmudi, 2020). Emphasized the necessity for the Indonesian government to use educational strategies that develop higher-order thinking skills among learners and the necessity for teachers to use information and communication technology in developing higher-order thinking skills

- Recommendations from the study (Madi Al-Harmi, Nuha Al-Tuwaireqi, 2025) stressed the need to employ teachers to use gamification techniques in teaching digital skills at all educational levels and the importance of training teachers in designing and using effective gamified learning environments that enhance learners' skills.

- *The study (Yulianita Noursakinah et al., 2023) recommended using digital games in education and highlighted their importance for providing enjoyment to learners, increasing their motivation for learning, engaging them in learning, supporting affective aspects of learning, and contributing to achieving intended learning outcomes.*

Importance of the study:

Thinking skills are considered essential for daily life, which a person performs automatically and unconsciously, whether by calculating expenses or thinking about how to carry out a specific task, including the steps and strategies of that task, such as securing daily food and how to obtain it and the requirements for obtaining it, etc. Any deficiency in thinking skills negatively affects a person. Therefore, the study emphasizes raising awareness among teaching staff about higher-order thinking skills. The research in the field of digital games covers their concept, harms, ways to overcome them, benefits, spread, software and production methods, uses, types, activities, and educational strategies used in their production. It also explores the potential to use these games to develop higher-order thinking skills, provides models for instructional design and educational theories necessary for producing digital games, and keeps up with technological advancement by integrating it into educational systems. This enhances positive attitudes among teaching staff toward using digital games in the

educational process in general and in developing higher-order thinking skills in particular.

Study Objectives:-

To examine the impact of digital games on higher-order thinking skills.

- To present the negative effects of digital games and raise awareness on how to overcome them.

- To educate teaching staff about higher-order thinking skills, their importance, how to identify existing deficiencies in individuals, and how to address them.

- To educate teaching staff about digital games, their benefits, and how to utilize them effectively.

- To foster positive attitudes towards the use of digital games in the educational process and enhance higher-order thinking skills.

- To encourage teaching staff to use educational resources and software available online to practice creating digital educational games that support the educational process in general and boost higher-order thinking skills in particular.

Research Hypotheses and Questions:

The current study will attempt to verify the research hypothesis (Digital games do not affect higher-order thinking skills), By answering the main question

What is the impact of digital games on the development of higher thinking skills?

The following sub-questions:

What are the higher thinking skills?

What are the types of higher thinking skills?

Methods of diagnosing deficiencies in higher thinking skills?

Why is higher thinking skills important?

What are the components of higher thinking skills?

What is the Bloom Higher Thinking Skills Classification?

What are the causes of the lack of higher thinking skills?

What are the methods of treating deficiencies in higher thinking skills?

What are digital games?

What is the educational design of digital games?

What are the steps to produce a digital educational game?

What is digital game production software?

What is the role of the fun of digital games in teaching and learning?

What is the role of digital games in developing thinking skills?

What are the suggested digital activities that are appropriate for the development of thinking skills?

Study Methodology:

To answer the study questions and verify the validity of the hypotheses, the current study will follow:

- Descriptive method to describe the study literature

- Analytical method to facilitate studying the problem, understand its causes, interpret it, evaluate it, and propose a solution to that problemStudy

Boundaries:

- Spatial boundaries: Fayoum Governorate

- Temporal boundaries: from 2007 to 2025

- Human boundaries: Preparatory stage teachers

- Subject boundaries: Study variables

Independent variable: Digital games

Dependent variable: Higher-order thinking skills

Study Tools:

First: Data Collection Tools. - *Observation, Personal Interview*

- *Second: Measurement Tools*

– *Higher Order Thinking Skills Scales*, *used in case of practical application of applied studies if necessary according to the study topic and its objective.*

o Creative Thinking Skills Scale

o Critical Thinking Skills Scale

o Metacognitive Thinking Skills Scale

o Higher Order Thinking Skills Scale for the Intellectually Gifted.

2 – Digital Learning Enjoyment Scale

3 – Digital Game Usability Scale

Previous studies:

Scientists and economic researchers have confirmed that the knowledge economy is currently considered an element of wealth, and technological advancement is a criterion for assessing and elevating societies. Therefore, governments have allocated a dedicated area of attention to it. One of the modern fields in the knowledge economy is digital games, where digital games account for 78% of technology users according to a report. The dictionary (Renzo, Cobillos, 2020, 1) defined digital games as "those games that are practiced through a set of electronic devices, which

are connected to cyberspace." A study (Mahitab Ahmed Al-Tayeb, 2021, 54:60) referred to digital games as a learner-centered learning method or style in which learning is associated with enjoyment and is carried out through the learner's practice of a set of digital activities via digital device environments such as computers or mobile devices using their various technologies, protocols, media, and effects to different degrees, such as sound in its levels, images of various types, and colors. And the degree of its intensity... etc., of effects to convey information to the learner and clarify different concepts and experiences for them in a correct way, achieving their educational purpose within the game environment only. As I mentioned, their effectiveness in teaching and learning for those with difficulties in learning mathematics. The researcher also defines digital games.

In terms of tools and technologies: It involves using modern technology, whether computers or mobile devices such as smartphones and tablets, to present and create technological environments with various technological activities. In terms of learning style: It is a dynamic virtual technological learning environment that provides individual or group learning patterns - in multiple technological forms - centered on the learner. The learner plays either an interactive role or a participant role. It allows the learner to repeat the game multiple times and improve learning outcomes during the game through the media, strategies, and reinforcement methods

it offers. In terms of its use in education: It is the use of modern communication technology media and capabilities to create an enjoyable and easy-to-use learning environment centered on the learner, accessible anytime and anywhere, without requiring high cost. Its production considers the purpose, user characteristics, educational theories, teaching strategies, and appropriate reinforcement and feedback methods suitable for the user and the purpose, given the potential of digital games through digital device protocols and media.

(Amal Hamdan, Firas Tayseer, 2021, 26) classified digital games into games (fun and excitement, educational and educational, intelligence), while (Mahitab Ahmed Al-Tayeb, 2021, 80) divided digital games in terms of their use into games of the invader and warrior for the purpose of achieving pleasure through competition, manager games for the purpose of employing their skills to acquire new skills and experiences, fun and entertainment games, participant games through which the game user participates in the game through characters available within the game "Avatar" and competes and challenges using the character. SOME PEOPLE WERE INTERESTED IN STUDYING DIGITAL GAME PRODUCTION SOFTWARE, AS (DIGITAL STOCK, 2024) POINTED TO A GROUP OF DIGITAL GAME PRODUCTION SOFTWARE, INCLUDING WHAT IS OPEN SOURCE AS AN ENGINE (UNITY-UNREAL ENGINE) AND WHAT IS AN OPEN

SOURCE TOOL (TWINE), AND ONE OF THEM IS AN OPEN-SOURCE PROGRAM WITH CODES FOR GAME PRODUCTION (BLENDER-AUTODESK3DSMAX - MAYA).(AmthaalHadi, 2023,320) ***with the steps of producing a digital game and explaining them in the following steps:***

- ✓ *Determining the field of use of the game (recreational, political, educational, health, cultural, commercial... etc.)*
- ✓ *Define the purpose of the game*
- ✓ *Determine the category of users of that game and their personality traits*
- ✓ *Determine the content of the game on paper*
- ✓ *Determine the activities and strategies that will be used in the game*
- ✓ *Preparing and preparing game content digitally using digital multimedia through the use of production software or through the available online*
- ✓ *Programming the game and converting it into a digital image using codes or using digital game production software available online such as Scrath for the production of digital two-game games.*
- ✓ *Submit it to the competent authorities for evaluation and determine its validity*

- ✓ *In case of its validity and approval for its use through the use of special criteria for that*
- ✓ *Determine how to publish online or in any other way that suits the purpose of that game.*

For an educational digital game to achieve its intended purpose and results, it must follow the methodology of educational systems in terms of selecting the appropriate instructional design and relevant learning theories. A study by (Mona Al-Azmi, 2019; Sarah E. Brandt, 2024; Mostafa Jawdat, 2024 & Hanaa Zayed Al-Omari, 2022; Anya S. Evmenova, et al., 2024; Zhang, Ling; Carter, Richard Allen, Jr.; Basham, James D.; Yang, Sohyun, 2022) indicated the suitability of the Universal Design for Learning (UDL) instructional design and its principles for technological instructional design as mentioned by the CAST Center for Applied Special Technology, which include presentation, engagement, action, and expression.

- Diversity of presentation methods REPRESENTATION

- Diversity of interaction and participation methods within the environment ENGAGEMENT

- Diversity of expression methods EXPRESSION

This confirmed his interest in the individual differences of learners, the use of media and interactive media, and his enjoyment of either individual

or collaborative learning, attention to users' opinions, ease and low costs, accessibility, user data confidentiality, connectivity and communication, along with the availability of continuous assessment and appropriate feedback for each individual according to their abilities and inclinations.

As indicated by the study (Nabil Jad Azmi, 2001, 12:11), the following modern learning theories are used for the production of technological media that are integrated into communication technology tools (constructivist, minimal multimedia boundary model). Meanwhile, the study (Mohamed Saeed Al-Eklebi, 2021, 70:74) pointed to the following learning theories as those relied upon by developers to create their digital games (situated learning, authentic learning, socio-cultural learning). Additionally, the study (Imad Awadboq, 2021; Qasim bin Abdullah, 2023, 201:202) highlighted the connectivism theory as one of the most important modern digital learning theories.

The researcher concluded from the study of (Ingy Khairt, 2020, 1686; Ardiyati & Dasilva, 2020; Nursakinah, et al., 2023, 204-209; Ibrahim Abbas Al-Zuhairi, Ahlam Qutb, 2024) the following positives of digital games.

First, there are health benefits *as it allows the acquisition of skills and valuable information in the field of health and how to maintain it, such as learning some sports skills or proper nutrition systems for diabetic or obese patients, etc.*

Secondly, psychological benefits, *through which certain skills can be developed, such as understanding or perception, and other thinking skills, or addressing some psychological problems such as attention disorder.*

Third, educational benefits *include developing certain language skills, developing motor skills, developing mental abilities, or allowing the user to discover their level in a particular skill or field and track their progress in that skill or field, increasing the user's motivation to learn, and clarifying misconceptions the user may have about the game.*

Fourth, social benefits, *as it can help develop communication and interpersonal skills or teamwork and collaboration through group games.*

Fifth, security benefits *include developing self-defense skills, how to detect and avoid cyber thefts, using simulation and modeling strategies for dangerous or deadly situations or skills such as flying, or knowing information about natural disasters and how to act during them, etc. from various risks.*

However, despite these positives, the researcher concluded from the study of (Lutz et al., 2020; Saad, Neveen, 17, 2023; World Health Organization, 2023; Susan ElShamy, 2023; Youling Li, 2024) the following harms of digital games.

Educational harms *include (disruption of the user's cognitive structure, confusion in the user's conceptual framework, distraction, impairment in the user's thinking skills, impairment in perception of all types, difficulties in the user's problem-solving techniques, disruption in the user's conceptual framework, formation of misconceptions in the user)*

Health and Psychological Safety Damages

Health damages *include (vision problems such as nearsightedness or farsightedness - spinal problems - hand joint or muscle problems - increased adrenaline levels in the body). To address this issue, it is advised not to overuse technology and to educate individuals on proper sitting posture while using the digital devices available to them.*

Psychological damages *include problems resulting from the use of digital games, such as damage to thinking skills, addiction to digital games, neglecting one's personal responsibilities whether they are health-related like personal hygiene and nutrition, or social responsibilities like integrating with the surrounding community. It can lead to introversion that may reach the point of disconnection from the world and even cause psychological disorders, frustration and depression due to exposure to games that surpass the user's level and use high-degree bullying and ridicule methods, addiction to digital games and withdrawal symptoms requiring therapeutic programs, sleep disturbances and anxiety, negativity, development of aggressive behavior in the game user, and acquiring harmful behaviors through the game environment such as learning cheating and theft. To address this problem, parents should monitor their children, advise against using technology for more than three consecutive hours daily, encourage engaging in activities and hobbies, participating in household chores like cleaning the room or personal laundry, socializing, and avoiding introversion through excessive use of technology.*

Security risks *include the lack of confidentiality of user data, exposure of this data to cyber theft or threats, cyberbullying, and online enticement. To address this issue, technology users should be educated on how to deal with these problems by reporting them early or by not responding to them from the start., Which prompted the researcher to study digital games and their impact on the higher-order thinking skills of middle school students.*

The Importance of Digital Games for Education

Sharkel et al.,2023 ;Amal Al-Oufi, Firas Ayasrah, 2022, 21; Nursakinah et al., 2023, 204) indicated that digital game activities have a positive impact on learning outcomes for their users, as they can be used to develop users' psychological skills, such as visual thinking skills. In addition, they have the ability to motivate users and capture their attention to continue playing the game, which helps improve their learning outcomes and achieve a sense of joy and enjoyment, leading to increased academic achievement. Furthermore, they develop other psychological aspects such as self-regulation or responsibility, providing a pleasurable learning experience for the learner, which enhances their motivation to learn due to the rewards, techniques, and media they contain.

For digital games to achieve their purpose, they must meet two conditions: usability and the enjoyment of learning (Naglaa Zeinhom, 2025).

Researchers have also focused on studying the characteristics of digital games, as studies by (Khaled Mamdouh Al-Azi, 2020, pp. 52-53; Andre, F., and All, 2022) pointed to the following characteristics of digital games:-

Interactivity - Accessibility - Connectivity - Feedback - Flexibility and ease of use - Distribution - Feedback - Continuous assessment - User data privacy - Attractiveness - Security - Personalized learning considering individual differences among users - Multi-media and stimuli within a single game - Multiple strategies within a single game - Clear and verifiable objectives - Self or group competition - Positive reinforcement, negative reinforcement with feedback availability - Availability of user instructions. Some also focused on clarifying the components of digital games, as both (Khaled Mamdouh Al-Azzi, 2020, 52:54; Mohamed El-Sayed El-Naggar, 2019, 1232:1233) ***clarified the components of digital games in:***

Fixed and animated graphics and shapes, multimedia, awards and badges, and leaderboards, 2D and 3D interactive graphic screens, data presented through the game, digital activities offered through the game environment for the user to perform while using it or apply in their life or environment after engaging with the game, with Khaled Mohamed El-Ezzy emphasizing technical creativity as a fundamental element and component of digital games. Also, Mahitab Ahmed (2021, 78) enumerated the components of digital games as (graphics, sound, interface, story).

Researchers have focused on studying digital educational activities aimed at developing higher-order thinking skills. According to Amal Hamdan Hammoud and Firas Taysir Ayasrah (2021, 19:24), digital learning activities are defined as a form of directed digital games intentionally prepared by educators, then tested and standardized for their effectiveness and efficiency for the intended purpose, and subsequently guiding users to use them to achieve an educational objective.

As all of them indicated (Youbi Nabila, 2015, pp. 156-157; Najeh Massad Abu Al-Diyar, 2017; Fathi Mostafa Al-Zayat, 2017; Abdel Azim Sabri and Osama Abdel Rahman, 2016, p. 90; Adel Mohamed Al-Adl, 2016, pp. 146-149; Sherine Mohamed Ahmed, 2018, pp. 29-31), activities such as multiple-choice, arrangement and classification, word formation, matching each part with its corresponding elements, completion activities, oral expressions, assigning a title to a piece, summarizing, commenting on a listened or read piece are considered activities to develop mental and thinking skills in addition to probing and open-ended questions, as well as causal and reasoning questions that require deducing and inferring from the provided data. A model illustrating some of these strategies is presented in the third and final chapter of the study.

A study (Iman Saber, Ibtisam Ayed, 2023, 22) confirmed the positive relationship between the use of technology-based media that rely on the learner's senses for receiving information, such as video, text, etc., and the progress and achievement it brings, which creates a sense of enjoyment during and after its use. Additionally, scholars pointed out.

As scholars have pointed out, digital games play a role in developing learners' thinking skills. (Maheetab Ahmed, 2021, p.79) revealed the effectiveness of problem-solving strategies in enhancing the mental skills of students with mathematical learning difficulties by developing their geometric concepts using educational games and their capabilities. The study by Mohamed El-Sayed El-Naggar (2019, p.1227) confirmed the effectiveness of digital game stimuli in developing the cognitive and performance aspects of web design skills and visual thinking skills among preparatory school students. Likewise, the study by (Amal Hamdan Hamoud, Taysir Mohammed Iyasra, 2021) highlighted the effectiveness of digital game activities in improving cognitive achievement and cooperative learning skills in the science curriculum. Based on these results, the study recommended focusing on employing digital game activities designed for teaching sixth-grade female students in the science curriculum, and it also recommended... By creating a digital repository for producing and sharing educational digital game activities in the science curriculum for sixth-grade female students, with free access provided to sixth-grade teachers to benefit from it., The study by Badriya Al-Tuwaiher (2017) confirmed the effectiveness of using paper and electronic educational games on achievement and the growth of creative thinking among fourth-grade students in Hail. Likewise, Madi Al-Harbi and Nuha Al-Tuwaireqi (2025) confirmed the impact of gamification elements in the e-learning environment on developing higher-order thinking skills in the digital skills curriculum for fifth-grade female students in Jeddah. The

research aimed to measure the effect of varying gamification elements (levels) in the e-learning environment and their impact on developing higher-order thinking skills in fifth-grade female students. In the city of Jeddah, the two researchers recommend the need to direct the attention of teachers to employing gamification techniques in teaching digital skills across all educational levels, and to focus on training teachers in designing and using effective gamification-based learning environments that develop learners' skills. A study confirmed the effect of using digital games in developing creative thinking and problem-solving skills among students with mathematics difficulties in Kuwait. The study aimed to test the effectiveness of a games program. Digital games as an approach to improving some creative thinking and problem-solving skills among students with math difficulties. Both (Iman Said Abdel Baqi, 2023, 26-27; Yulianita et al., 2023, 205-208) pointed to the role of digital games in developing learners' thinking, creativity, and analytical skills. Also, a study (Noh Hussein Abdo, 2025) indicated the effectiveness of electronic games based on digital platforms in developing certain grammar thinking skills for fifth-grade elementary students. A study (Imad Abu Sarie Hussain et al., 2025) confirmed the effectiveness of digital games in teaching science to enhance divergent thinking skills among middle school students. Another study (Khaled Khowiled, 2025) confirmed the effectiveness of using internet games in developing critical thinking skills among middle school students in the digital technology course. A study (Ahmed M. Mansor et al., 2021) focused on understanding the importance of Digital games technology in developing higher-order thinking skills among learners, as the study (Bourke, B., 2019) confirmed the effectiveness of using digital gamification in developing higher-order thinking skills.

Researchers have also paid attention to studying the impact of digital games on developing the teaching skills necessary to enhance learners'

higher-order thinking skills. The study by Iman Naif Al-Najadat, Ahed Hani Al-Musayyidin, Amal Adnan Abu Hilalah, Ikhlas Abdullah Krishan, and Maha Aaid Huymel (2024) recommended the importance of focusing on modern technologies and implementing them in the educational process, emphasizing the preparation of training sessions and workshops to enable teachers to utilize them. It also stressed the need to improve the educational environment, allowing all parties involved in the educational process to practice and apply modern educational technologies, as well as the necessity of supporting students to enable them to be creative and excel, which in turn contributes to Achieving educational objectives: The study by (Ingy Mohamed Tawfik, 2011) aimed to equip first-year preparatory students with some critical thinking skills and computer handling skills through the use of educational software based on animated graphics in teaching Chapter Two, which is included in the Windows XP computer book for first-year preparatory students.

As the studyof (ArifkaMahmudi, 2020) recommended by, training individuals and teachers to use modern technology and employ it in education is necessary, in addition to developing books, curricula, and study materials to keep up with the times and its requirements.

Researchers have focused on developing scales to measure higher-order thinking skills. Zainab Shaya Ismail, Mohamed Fouad Abdel Salam, and Tehani Mohamed Osman Muneeb (2024) aimed to construct a higher-order thinking skills scale for intellectually gifted individuals. Safaa Mohamed Khair (2022) provided an Arabic version of the Torrance Creativity Scale, which includes seven subscales measuring three creative thinking skills: fluency in its types, originality, and flexibility. We will also discuss Sabah Ayesh's scale (2021), which is an Arabic translation of the Watson-Glaser Critical Thinking Appraisal based on the modern psychometric theory of Rasch's one-parameter model. The scale includes 34 items divided into five

dimensions that measure critical thinking skills: inference, recognizing assumptions, deduction, interpretation, and evaluation of arguments.

Nasser Al-Anizi (2023) presented an Arabic version of the Metacognitive Thinking Scale, which was reviewed and validated by specialists to measure metacognitive thinking skills. The scale includes three dimensions: knowledge organization, knowledge of knowledge, and knowledge processing. Najla Zainhum (2025) pointed out the role of digital games in developing deep thinking skills. Additionally, a learning enjoyment scale was presented for individuals with attention difficulties.

Iman Saber and Ibtisam Ayed, 2023, 22; Bourke, B., 2019) The effectiveness of digital games in developing higher thinking skills to their advantages, characteristics and capabilities in terms of making them available for the use and display of various media such as text, image of all kinds, video and sound, and different and diverse effects in one game according to pre-prepared educational standards that the developer takes into account during his production of the game, in addition to the use of various reinforcement methods that are subject to and designed according to special conditions and standards that suit the content of the game and the characteristics of its users., Its preparation and production are according to educational and technological learning theories. As noted by (Yulianita et al., 2023, pp. 205-220), games have benefits in the media and strategies used to improve learning outcomes and the personality of the user. They result from stimulating elements and modern technological educational strategies that attract the learner, allowing them to determine their level and weaknesses, how to strengthen them, and to identify what they have achieved and results obtained. They also develop self-confidence, self-reliance, acceptance of winning and losing, the ability to correct mistakes through repeated play,

training in self-organization, and nurturing the enjoyment of learning, which increases motivation to learn.

***Regarding the role** played by higher-order thinking skills in the process of information processing, application, and utilization in an individual's life, many researchers have studied them. Maimun Asha Lubis (2022, p.24) defined them in relation to education as the way learners access information by asking teachers questions about the topics studied. Teachers are considered the benchmark for verifying the purpose of learning in this case, which is the learners' ability to answer the teacher's questions correctly and comprehensively, demonstrating their understanding of the studied information. Furthermore, Zainab Al-Shiyah (2022, p.278) described it as a complex thinking approach that generates a set of solutions. It serves as an umbrella encompassing various thinking skills such as systemic, logical, and creative thinking skills. Zainab Al-Shiyah (2024, p.28) classified them accordingly Higher-order thinking skills include skills such as observation, description, organization, questioning, critical thinking, problem-solving, data loading and modeling, making predictions, categorization, sequencing, application, and evaluation. Meanwhile, a study by LingyUanKong, Xitao, and Robert (2023, 1:3) classified them into skills such as critical thinking, creative thinking, and metacognitive thinking. Al-Azab Muhammad Zahran (2018, pp. 177-183) pointed out strategies to develop higher-order thinking skills through training learners in inquiry, reasoning, accepting the opinions and perspectives of others, teamwork skills, and training the learner to organize their information using questions of all types and guidance models for the learner, Methods to enhance positivity, engaging and attractive methods and media for the learner to receive information and perform cognitive processes on it, in addition to:*

- *Providing learners with the opportunity to consult and discuss a particular problem or idea within school discussion circles using questions about that problem or idea*
- *Giving the learner the opportunity to make decisions.*

The study by Mohamed El-Sayed El-Naggar (2019, 1227) confirmed the relationship between visual thinking skills and higher-order thinking skills and their importance for the full development of higher-order thinking skills, as they are considered a prerequisite for their occurrence.

From the above, the researcher concluded

<u>The following results:-</u>

- ✓ *Excessive use of digital games causes social, psychological, and behavioral problems such as violence, as well as health issues for their users.*
- ✓ *Inadequate parental supervision regarding what their children are exposed to or the games they play online, ensuring they are free from any bullying methods, violations, or the promotion of destructive ideas and behaviors, such as teaching digital fraud and hacking, and free from harmful ideas like the Blue Whale game that led to the suicide of some users.*
- ✓ *The effectiveness of digital games in developing thinking skills.*
- ✓ *The effectiveness of modern technology in raising awareness of higher-order thinking skills and developing digital game production skills for teaching staff.*
- ✓ *The weak scientific skills among some teaching staff regarding higher-order thinking skills and the need to raise their awareness, training them on how to produce and implement digital games that foster the development of higher-order thinking skills in the educational process.*

- ✓ *There is a positive correlation between the use of sensory technological teaching methods, such as text, images, videos, etc., and the development of thinking skills among learners who use technology in education.*

The following recommendations:-

- *Activating the role of digital technology in educating faculty and parents about higher thinking skills, their importance, benefits, types, and requirements for their development among learners.*
- *The use of digital technology through the Internet and the social networking sites available to the faculty in developing their knowledge of the methods of measuring thinking skills, measuring them and ways to treat their deficiencies, in addition to training on the production of digital games to develop the higher thinking skills of their learners.*
- *Using the scientific resources available online by the faculty to learn about the most important educational theories and educational designs needed to produce educational digital games.*
- *The need to develop positive attitudes towards the use of digital games in the learning process among both parents and teaching staff.*
- *The necessity of using digital technology and the social networking sites available to Internet users in raising awareness of the harms of digital technology and how to overcome them, such as how to overcome the health damages resulting from an improper session while using a computer or mobile phone, and clarifying the conditions and how to have a healthy session. etc. of damages and guidelines.*

المراجع :

مراجع عربية :

- العنزي, أ. تهاني ناصر & ,سليمان, أ.د. شاهر خالد. (2023). تطوير مقياس التفكير ما وراء المعرفي وفق نموذج التقدير الجزئي دراسة على عينة من طلبة جامعة تبوك .*دراسات عربية في التربية وعلم النفس*52-23 ,(2)*147* ,

. doi: 10.21608/saep.2023.307681

- منيب, تهاني محمد عثمان, عبد السلام, محمد فؤاد & ,أسماعيل, زينب شياع. (2024). الخصائص السيكومترية لمقياس مهارات التفكير العليا للمتفوقين عقلياً .*مجلة الإرشاد النفسي*309-271 ,(3)*80* ,

Doi: 10.21608/cpc.2024.383199

- عايش & ,صباح. (2021). استخدام نموذج راش في تدريج اختبار التفكير النقدي (اختبار واطسون-جليسر للتفكير الناقد الصورة القصيرة) .*مجلة العلوم النفسية والتربوية*.112-100 ,(3)*7* ,

https://asjp.cerist.dz/en/article/156628

- صفاء محمد خير المنزل & ,اعتدال عبد الله. (2022). الخصائص السيكومترية لاختبار تورانس للتفكير الإبداعي (الصورة اللفظية) لدى عينة من طلبة التعليم الأساسي (حلقة ثانية) في مدينة درعا .*مجلة جامعة دمشق للعلوم التربوية والنفسية*.(4)*38* ,
- الخصائص السيكومترية لاختبار تورانس للتفكير الإبداعي (الصورة اللفظية) لدى عينة من طلبة التعليم الأساسي (حلقة ثانية) في مدينة .(2022) .*مجلة جامعة دمشق للعلوم التربوية والنفسية*(4)*38* ,درعا,

. https://journal.damascusuniversity.edu.sy/index.php/eduj/article/view/7463

- حمزة، انجى خيرت أحمد. (2020). تأثير الألعاب الإلكترونية على سلوك الأطفال في المجتمع المصري: دراسة ميدانية على عينة من أولياء أمور بعض الأطفال في المرحلة العمرية من 6 إلى 12 سنة .*مجلة بحوث كلية الآداب، ج120* ، 1679 .1702 -مسترجع من http://search.mandumah.com/Record/1136049

- إبراهيم عباس الزهيري.(٢٠٢٤).متطلبات الإستخدام الأمن لتكنولوجيا الذكاء الإصطناعي في التعليم ،كتاب أوراق العمل البحثية وملخصات البحوث،جامعة حلوان ،كلية التربية .٢٩ :٤٤.منشور

- شاكر & ,نيفين حسن سعد. (2023). بناء مقياس إدمان الألعاب الإلكترونية لدى المراهقين من طلبة الحلقة الثانية من التعليم الأساسي بمحافظة القاهرة .*مجلة كلية التربية فى العلوم النفسية*-17 ,(1)*47* , 60.
- النجادات, ايمان نايف محمد النجادات, هاني المسعديين, عاهد, عدنان أبو هلاله, امل & ... ,مها. (2024). دور التقنية الحديثة في تطبيق النظرية الاتصالية في التعليم من وجهة نظر أعضاء هيئة التدريس في جامعة البلقاء التطبيقية .*مجلة كلية التربية. بنها* .105-84 ,(140.1)*35* , DOI: 10.21608/jfeb.2024.325249.2011
- مصطفي جودت .(٢٠٢)،مبادئ التصميم الشامل للتعلم UDL. ،بوابة تكنولوجيا التعليم ،جامعة المنصورة https://drgawdat.edutech-portal.net/archives/17872
- صبحي أحمد محمد سليمان, قاسم بن عبدالله العجمي, خالد عبدالعزيز حسن الشنفري & ,رائد عبد الكريم. (2023). فاعلية برنامج تدريبي قائم على النظرية الترابطية في تنمية كفايات التعلم الإلكتروني لدى معلمي التربية الإسلامية بمحافظة ظفار *Journal Of Educational and* . *Psychological Researches*, *20*(77), 198-221

https://doi .org/10.52839/0111-000-077-007

- صفاء محمد خير المنزل & ,اعتدال عبد الله. (2022). الخصائص السيكومترية لاختبار تورانس للتفكير الإبداعي (الصورة اللفظية) لدى عينة من طلبة التعليم الأساسي (حلقة ثانية) في مدينة درعا .*مجلة جامعة دمشق للعلوم التربوية والنفسية*.(4)*38* ,
- العزب محمد زهران. (2018). تدريس الرياضيات وتنمية مهارات التفكير لدى الطلاب *International Journal of Research in Educational Sciences* . *(IJRES)*, *1*(1).
- إبراهيم & ,رشا سعيد. (2022). مهارات التفكير ما وراء المعرفي لدى طالبات الطفولة المبكرة بجامعة الجوف .*المجلة الدولية للعلوم التربوية والنفسية*.311-290 ,(1)*71* ,
- أحمد الطيب & ,ماهيتاب. (2021). الألعاب الرقمية كمدخل لتنمية بعض المفاهيم الهندسية لدى التلاميذ ذوي صعوبات تعلم الرياضيات .*مجلة الطفولة و التربية (جامعة الإسكندرية)*130-49 ,(2)*45* ,

- النجار & ,محمد السيد. (2019). أثر استخدام محفزات الألعاب الرقمية في تنمية مهارات تصميم مواقع الويب ومهارات التفكير البصري لدى تلاميذ الحلقة الإعدادية .*مجلة كلية التربية بالمنصورة*1313-1227 ,(3)*107* ,
- الحويلي ،أحمد الهادي (٢٠٢٣) .أثر استخدام الألعاب الرقمية في تنمية مهارات التفكير الإبداعي وحل المشكلات لدى ذوي صعوبات الرياضيات بدولة الكويت *Dirasat: Human and Social* . *Sciences*, *50*(6), 330-347
- مهني , نجلاء زينهم. (2025). بيئة تعلم جوال قائمة علي الويب الدلالي لتنمية متعة التعلم لتلاميذ التعليم الأساسي ذوي صعوبات الإنتباه .*مجلة جامعة الفيوم للعلوم التربوية والنفسية*.273-212 ,(8) ,*19* ,
- الأكلبي & ,محمد سعيد. (2018). دور نظريات التعلم المعاصرة في تصميم التعلم المتنقل: مراجعة للأدبيات .*مجلة القراءة والمعرفة18* ,(الجزء الثانى202 أغسطس), 86-61.

مراجع أجنبية

- Mahmudi, A. (2020). *التحديات التي تواجه معلمي اللغة العربية في تطبيق مهارات التفكير العليا عند تعليم مهارة الكلام بالمدارس الثانوية الحكومية بمدينة مالانج*(Doctoral dissertation, Universitas Islam Negeri Maulana Malik Ibrahim).
- Torrance, E. Paul. (1968). A longitudinal examination of the fourth- grade slump in creativity. Gifted Child Quarterly, (12) 195- 199.
- Faeeq, H., & Ali, E. G. (2020). Impact of using electronic games on psychological domain of adolescents quality of life in Kirkuk secondary schools. *Mosul Journal of Nursing*, *8*(2).

Doi:10.33899/mJn.2020.167035

- Al-Braizat, H. M. (2021). The impact of electronic games on the Jordanian Basic/Secondary school students during the COVID-19 Pandemic. *مجلة العلوم التربوية و الدراسات الإنسانية*, *6*(15), 593-615.

-AKCAN, C., & ALINCAK, F. 4th Grade Social Studies Textbooks, Games, and Sports Activities. *Fikret ALINCAK, Mustafa ÖZDAL*, 1.

-Evmenova, A. S., Hollingshead, A., Lowrey, K. A., Rao, K., & Williams, L. D. (2024). Designing for Diversity and Inclusion: UDL-Based Strategies for College Courses (Practice Brief). *Journal of Postsecondary Education and Disability*, *37*(1), 81-88.

- Martin, F. (2011). Instructional design and the importance of instructional alignment. *Community College Journal of Research and Practice*, *35*(12), 955-972.

- Play Make Learn Conference.(July 20-21, 2023), Memorial Union | 800 Langdon St. | Madison, WI From: Play Make Learn Conference (cvent.com)
- The Serious Play Conference 2024 – IGDA Toronto, Canada, 12-14th August 2024.related from: The Serious Play Conference 2024 – IGDA
- Yulianita Nursakinah,EkaCahya Prima,Rika Raflikah Agustin.(2023).The Development Of funLABs Androide- Based Application Using UnitySoftware as Learning Media to Explore Students'Motivation On Acid,Base,and SaltTopic.Jornal of since Learning, 6(2).204-215 . DOI:10.17509/jsl.v6i2.50447
- Andre′,F.,Munck,I.,Hâkansson,A., &Claesdotter-knutsson,E.(2022).Game Addiction Scale For Adolescents- Psychometric Analyses Of Gaming Behavior, Gender Differences and ADHD.Frontiers in Psychiatry,13.
- Lutz Wartberga*,Levente Kristonb,Rainer Thomasiuse,(2020). Internet gaming disorder and problematic social media use in a representative sample of German Adolescents: Prevalence estimates, comorbid depressive symptoms and related psychoosocial aspects Journal homepage:www.elsevier.com/Locate/Comphumbeh.
- Güneş, F. (2023). Digital Games and Their Effects. *The Journal of Limitless Education and Research*, *8*(2), 202-228. https://doi.org/10.29250/sead.1317753
- Gui, Y., Cai, Z., Yang, Y., Kong, L., Fan, X., & Tai, R. H. (2023). Effectiveness of digital educational game and game design in STEM learning: a meta-analytic review. *International Journal of STEM Education*, *10*(1), 36. https://link.springer.com/article/10.1186/s40594-023-00424-9
- Alsaleh, N. J. (2020). Teaching Critical Thinking Skills: Literature Review. *Turkish Online Journal of Educational Technology-TOJET*, *19*(1), 21-39. ERIC - EJ1239945 - Teaching Critical Thinking Skills: Literature Review, Turkish Online Journal of Educational Technology - TOJET, 2020-Jan

مواقع ويب

»معلومات الوزراء» حول «الألعاب الإلكترونية»: أكثر من 3 مليارات مستخدم حول العالم بقيمة سوقية 197 مليار دولار - بوابة الأهرام(ahram.org.eg)

https://gate.ahram.org.eg/News/3968774.aspx

https://digital-stock1.com/blogs/news/electronic-game-design-programs

drive.google.com