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Original Article

Research Synthesis of the Effects and Consequences of Using Educational Media Games on the Quality of Students' Learning

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Abstract

The aim of the present study was to investigate the effects and consequences of using educational media games on the quality of students' learning. In this study meta-synthesis method was used and in the first stage, articles which were related to the research topic were collected from valid and reliable databases and journals. In the second stage, using open, axial and selective coding, a mind map was drawn from the coding themes. In general, 5 books, 2 theses, 53 articles and 1 report were studied in this research, of which 34 articles, and 1 report were used as the main samples of the study. Based on the findings, among the collected themes, 5 were identified as the main themes and 27 as the secondary themes. The main themes included the necessity of using educational media games, positive aspects of using educational media games, ways of positive impact of using educational media games on the quality of learning, aspects and ways of negative impact of using educational media games, and solutions to overcome the negative aspects of using educational media games. The data obtained revealed that using educational media games has positive effects on the quality of the students' learning. Therefore, it can be concluded that if a learner has the necessary literacy and knowledge, various solutions will be presented for the efficient implementation of educational media games in the classroom. These solutions included the points which were related to the teachers, learners, parents, solutions in game production to create fluidity, solutions in game production to create flexibility, solutions in game production to create novelty and originality, and solutions to eliminate or reduce students' physical problems.

Keywords

Effects and Consequences, Educational Media Games, Learning Quality, Students.

Introduction

Nowadays, learning is one of the most important fields in psychology and at the same time it is difficult to provide a comprehensive definition for this technical term. Kimble (1961) defined learning as a relatively stable change in potential behavior that occurs as a result of reinforced practice. Becker (2011) stated that learning does not have a clear definition and it is usually defined as a change in behaviors or what is known. Literally, learning means acquiring knowledge, understanding or mastering through experience or study (Sarfi & Venarji, 2014). Learning causes a change in behavior, so there is a close relationship between learning and the principles of choosing educational methods, and these principles should be taken into account while choosing teaching methods (Maleki, 2022). In terms of psychology, learning is the basis of identifying the discussed issues; therefore, learning is considered as one of the important factors that explains personality development (Olson & Ramirez, 2020). Panahi et al., (2017) defined learning as an important part of human life, which has a lot to do with education and training systems. In the realm of learning, it should be noted that choosing the appropriate teaching methods is one of the basic principles of education (Moradi & Maleki, 2015), so getting familiar with different teaching methods to adapt them to the students' needs and meeting learners'

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educational necessities and creating an attractive learning environment is a crucial issue. The use of technology in teaching changes the learning experience. Thus, it is expected that media and technology engage the students in the course materials and provide personalized learning opportunities (Valizadeh et al., 2023).

Along with utilizing suitable teaching methods for experiencing a better learning process, favorable educational facilities have a great impact on the quality of students' leaning. The lack of good educational facilities and educational conditions are usually the factors that cause academic failure and decrease the motivation of the learners. Facilities such as school, classroom, appropriate textbooks and the use of efficient teachers are all factors that influence the quality of learning. Physical and psycho-motor problems, behavioral compromise and emotional-psychological conditions are also problematic factors in the classroom (Zarei Sanderaki, 2019). On the other hand, one of the serious issues which teachers and tutors face is dealing with a large number of students in the classroom. Students who study in the same class have different characteristics and family environments, which all affect the learning rate and its effectiveness. However, in some schools, the same traditional methods are usually used to teach all subject matters. It seems that using teaching methods that create and improve motivation and enthusiasm have an acceptable learning outcome; therefore, focusing on the traditional methods cannot be very useful (Keshani & Abedi Darjeh, 2017). Learners can learn best when they participate in activities that are culturally appropriate and considered useful for their everyday life. Consequently, learning requires that the learners participate actively in the learning/teaching process (Aghazadeh, 2023).

It is worth mentioning that various research studies have been conducted in the field of learning, some of which are mentioned here. Hashemi (2020) in an article titled "The Relationship between Teachers' Attitudes regarding the Use of Electronic Content and Educational Technology with Teachers' Job Satisfaction in Secondary Schools" concluded that electronic content and efficient educational media, teachers' motivation and mastery in using educational media, improve the students' motivation to learn. Fazeli et al. (2021) in an article entitled "Active Teaching with Electronic Education from the Perspective of Elementary Teachers: Methods, Consequences and Challenges" stated that teachers consider it necessary to use new teaching methods to activate students, but due to some problems, they use new teaching methods less. Therefore, for students' participation in the classroom, establishing proper communication with students, giving advice and motivation can be effective. Meanwhile, Zakeri et al. (2012) in a research study titled "Investigation of Teachers' Attitude Towards the Use of Educational Technologies in the Teaching Process" acknowledged that if the attitudes of teachers towards the use of media do not change, this method cannot be used effectively. Also, if facilities and educational platforms are not provided for teaching methods based on new technologies, using these methods wouldn't be efficient. Rahdari and Bazrafshan (2023), in an article entitled "The Role of Technology in Classroom Management", stated that using educational technologies in the classroom provides students with the opportunity to learn and improves the way of classroom management. Fujiati et al. (2018) concluded that educational games facilitate teachers' work in education, because children prefer the learning methods using audio media, animation and images. Degand (2022) in an article titled " I don't fit in anywhere": Undergraduates' experiences with avatars and games in an education course" presented that teachers need to be trained to use video games to teach more effectively. In a study Kerr (2014) stated that games can be used in learning situation to evaluate students' achievement. Ricker (2016) reported that games with adaptability, control and feedback features significantly lead to situations in which children can eagerly participate in activities. Gao et al. (2018) in a study demonstrated that when learners use educational games for learning, their engagement and motivation play an important role in their learning.

By reviewing the related research literature, it is crystal clear that different studies have been

conducted in relation to the topic under investigation, but none of them has explicitly focused on their synthesis and there are still issues to be taken into consideration. The points that made this study more important and were considered as its innovative aspects included the necessity of using educational games, the positive and negative aspects of using educational media games, how media games affect the quality of learning and the solutions provided to eliminate obstacles and the negative aspects of using games in the realm of students' leaning quality. Therefore, the present research synthesis tried to answers the following research questions:

1. Based on the research findings, what are the necessities of using educational media games in students' learning process?
2. According to the studies, what are the positive aspects of using educational media games?
3. How and in what ways do educational media games have a positive impact on the quality of students' learning?
4. How and in what ways do educational media games have a negative impact on the quality of students' learning?
5. What solutions are suggested to solve and overcome the negative aspects of using educational media games?

Methodology

This qualitative research used a meta-synthesis method to analyze the data. The researchers tried to gain new knowledge through the study of research literature which was related to the topic under investigation. This study took place in six stages, and in the first stage, the problem and research questions were proposed. In the second stage, various reliable and valid national and international databases such as SID, Magiran, Google scholar, ERIC and reference books were searched purposefully. In the third stage, a detailed evaluation was done to select the appropriate data as the units of analysis. In this stage, the first level screening was done, and in the next stage, the sources were studied briefly. Therefore, the sources which were not related to the research area were discarded in the second level screening. Then, according to the collected samples, open, axial, and selective coding were done, and in the last stage, the researchers tried to reach a coherent result based on the collected codes.

By searching in the above mentioned valid and reliable national and international databases, 5 books, 2 theses, 53 articles and 1 report were collected as the research population. Among them, 34 articles, and 1 report were used as the main samples of the study. To collect data, the key words such as educational computer games, educational media games, educational media, quality of students' learning, teaching methods, learning process, educational technology, educational games and media, video game-based learning were searched and reference books were studied as well.

Coding procedure was done to analyze the data and to reach a coherent result, the codes were selected according to the research questions. Then the open codes were collected and considering the relationship between the codes, the axial codes were collected and the coding process continued until a stage where no new codes were obtained from the data. In other words, the researchers reached a theoretical saturation and the results were categorized accordingly and a mind map was drawn for a better understanding of coding procedure.

After coding the data, concepts and themes were re-evaluated. The purpose was to re-examine the relationship between the obtained findings and the research questions under investigation. Considering that the samples of the study were selected from reliable and valid databases they had the necessary reliability and validity. To check the reliability of the presented model, four criteria were evaluated (Mohammadpour, 2013). Peer description method was used to achieve the credibility criterion. In this way, the researchers asked 2 colleagues who had used this method before to re-code a part of the data in order to ascertain the correctness of the coding process and the lack of bias in data analysis. For transformability criterion, purposeful and snowball sampling

methods were used, which first the researchers selected a few articles according to the main topic, i.e. educational media games, and through that, other articles were found. For the dependability criterion, consultation with relevant experts and specialists was used regarding the process of conducting the research and obtaining feedback to improve the quality of the study. For the confirmability criterion, the method of taking notes during the process of research was used in order to be used in the stages of reporting the findings of the study.

Table 1. Selected Samples about Using Educational Media Games and Learning Quality

Row	Researcher(s) and Publication Year	Research Title
1	Rahdari and Bazrafshan, 2023	The Role of Technology in Classroom Management
2	Atashi, Ghasemi, and Kooshki, 2023	The Effectiveness of The Computer Training Program on The Anxiety of Primary School Students with Attention Deficit Hyperactivity Disorder
3	Samir and Roshanian Ramin, 2023	Comparison of the Impact of Non-Digital Games, Digital Games, and Traditional Methods on the Mathematics Learning
4	Rajabian Dehzireh, Hosseini, Derakhshi, and Jangi Zehi, 2021	The Effect of Computer-Based Educational Simulation on the Components of Emotional, Psychological and Social Well-Being of Students.
5	Keshavarzi, Jahormi, Khademi, Abdol Vahab, and Zahra Hesampour, 2021	An Analysis of the First Grade Elementary Teachers Experiences from Educational Games Outcomes at the Corona Epidemic
6	Asa, Naderi, and Seif Naraghi, 2021	The Effect of Designing Computer Games Based on Taba Curriculum on Increasing the Factors of Guilford Creativity
7	Tabnak, Rajabi, and Hosseini, 2019	Effectiveness Of Computer Cognitive Games in Reducing Attention Deficit-Hyperactivity Disorder Symptoms and Improving Time Perception in Children
8	Mirani Sargazi, Shafiei Sarostani, Pudineh, and Besharat, 2019	Investigating the Impact of Strategy in Educational Computer Games in the Management of the Creative Thinking in Children Using Interactive Approaches: A Randomized Controlled Clinical Trial Study.
9	Malmmir, Esmaili, and Madadi, 2019	The Effect of The Use of Educational Media on The Academic Achievement and Creativity of The High School Students
10	Soleimani, Makki Ale Agha, and Etemad Ahri, 2019	Investigating the Relationship between Parental Media Literacy and Students' Academic Achievement Motivation
11	Bahadori Khosroshahi, and Barghi, 2018	The Role of Media Literacy for Parents and Social Identity with Media Consumption Students.
12	Mehteri Arani, Rajabian Dehzireh, Baghbani, and Sotoudeh Arani, 2018	The Effect of Computer-based Educational Simulation on Mental Well-being and Lifelong Learning in Students
13	Mazloumian, and Mahighir, 2016	Examining the Positive and Negative Effects of Technology and Mass Media in Education
14	Pourroostaei Ardakani, and Arefi, 2016	The Comparative Study of The Effects of Educational Computer Game and Video on Students' Creativity and Motivation
15	Esmaeeli Gojar, S., Aliabadi, K, and Poorrostaei, 2017	The Effect of Online Multi-user Educational Computer Games on Students' Learning and Motivation
16	Purvand, E., Vasali Mazin, Y., Zafarmand, Z., and Abdi Nasibfar, A., 2015	Investigating the effect of educational software (game) on the level of mathematics learning of first grade elementary school students
17	Tamnaifar, M., and Alizadeh, H., 2014	The effectiveness of computer games on improving short-term and long-term visual memory performance of dyslexic

Row	Researcher(s) and Publication Year	Research Title
		students
18	Shukri, and Shakur, 2013	Essential Principles in Designing Educational Games
19	Azimi, E., Jafari Harandi, R., and Moosavipour, S., 2014	The Effectiveness of Instructional Games on Academic Achievement and Attitude Towards Science Learning
20	Khazaei, K., and Jalilian, N., 2015	The Effect of Educational Computer Games on Primary School Students Achievement and Creativity
21	Dehghanzadeh, H., Norouzi, D., Jafari Nejhad, H., and Dehghanzadeh, H., 2013	The Effectiveness of The Computer Game Numbers on Learning and Retention of First Grade Mathematics
22	Kalani, S., Asghari Nekah, S.M., and Ghanaei Chamanabad, A., 2015	The Effectiveness of Linguistic Play Software Package on Reading Accuracy and Comprehension of Students with Reading Disorder
23	Atashak, M., Baradaran, B., and Ahmadvand, M.A., 2013	The Effect of Educational Computer Games on Students' Social Skill and Their Educational Achievement
24	Vojdani, M. A., Elhani, F., and Mohammad Khan Kermanshahi, S., 2010	The Effect of a Computer-based Educational Package on the Quality of Life of Adolescents with Epilepsy.
25	Islamic Council Research Center., 2008	A Look at the State of Computer Games in Iran and its Impact on Children's Health
26	Chen et al., 2023	A Systematic Review of the Perceptions of Educational Video Games Held by Students, Administrators, Teachers and Parents
27	López-Fernández, D., Gordillo, A., Pérez, J., and Tovar, E, 2023	Learning and Motivational Impact of Game-Based Learning: Comparing Face-to-Face and Online Formats on Computer Science Education
28	Verastegui et al., 2023	"Use of 2D/3D Video Games in Digital Platforms for Basic Education: A Technological and Systematic Review."
29	López-Fernández, D., Gordillo, A., Alarcón, P. P., and Tovar, E., 2021	Comparing Traditional Teaching and Game-Based Learning Using Teacher-Authored Games on Computer Science Education
30	Tuparova, D., Veleva, V., and Tuparov, G., 2019	About some barriers in usage of educational computer games by teachers in STEM.
31	Gabriel, S., 2019	We Make Games. Using Serious Game Design Concepts in Secondary School
32	Xanthopoulos, S., and Xinogalos, S., 2018	Opportunities and challenges of mobile location-based games in education: Exploring the integration of authoring and analytics tools.
33	Coil, D.A., Ettinger, C.L., and Eisen, J.A., 2017	Gut Check: The evolution of an educational board game.
34	Manero, B., Torrente, J., Fernández-Vara, C., and Fernández-Manjón, B., 2017	Investigating the Impact of Gaming Habits, Gender, and Age on the Effectiveness of an Educational Video Game: An Exploratory Study
35	Sung, H. Y., Hwang, G. J., Hung and, C. M., and Huang, I. W., 2012	Effect of Learning Styles on Students' Motivation and Learning Achievement in Digital Game-based Learning

Results

In this section, the research questions are first mentioned and the findings related to each question are presented. In order to identify the themes for the necessities of using educational media games, the information collected from the data analysis was coded and classified in Table 2.

RQ1. What are the necessities of using educational media games in students' learning process?

Table 2. Necessities of Using Educational Media Games

Reference No.	Open coding	Axial coding	Selective coding
16 33 8 20 24	– Changing in the behaviors of learners (first grade elementary learners) in the learning environment – Ease of access to content – Challenging to convince learners – Increasing social skills – Expression of the Emotions – Personality and behavioral – development – Deep and conceptual learning – A practical educational method for – individuals with epilepsy	Necessities for learners	The necessities of using educational media games
16 35 21 4 5	– Appropriate and continuous use – Designing games suitable for different learning styles – An active learning strategy – Educational organization – Evaluation of students' learning in the use of simulation – Evaluating the effectiveness of simulation in achieving educational goals – Using for practical skills – Using as an educational supplement – Ease of teaching for the first-grade elementary students	Necessities for teachers	
21 20 12 25 15 8 3	– Games as homework (first-grade elementary students) – Possibility of teaching complex concepts – Learners' readiness to learn – Good resources for teaching and learning – Active students – An important tool to increase creativity – Improving the learning quality of math lessons	Necessities for teachers and learners	
3 12	– Enhancing well-being and lifelong learning – Consolidation of research-based knowledge – Training for new roles for the future	Necessities for learners' learning skills	

Drawing on the obtained data, themes such as necessities for learners, necessities for teachers, necessities for teachers and learners, necessities for learners' learning skills in the realm of necessities of using educational media games were obtained. To identify the themes for the

positive aspects of using educational media games, the information obtained from the data analysis was coded and classified in Table 3.

RQ2. What are the positive aspects of using educational media games?

Table 3. Positive Aspects of Using Educational Media Games

Reference No.	Open coding	Axial coding	Selective coding
13 20 1 31 35 25 9 21 27 18	– Enhancing individual learning – Acquiring generalized learning strategies – Increasing learners' talents – Improving the quality of learning – Improving problem solving skills – Learning progress – Learners' familiarity with long-term, medium-term and short-term goals – Indirect training of skills in the field of employment – Providing the opportunity to think and evaluate – Improving academic performance – Learning experiences – Positive effects on teaching and learning of addition of numbers – The effects of teacher-authored games on knowledge acquisition – Deep and conceptual learning	Learners' learning skills (normal learners)	Positive aspects of using educational media games
24	– Providing the opportunity to repeat – Providing the opportunity to practice	Learners' learning skills (learners with learning disabilities)	
31 23 9 15 4	– Increasing participation – Increasing social skills – Increasing empathy – Effective communication – Increasing the relevance of learning – Solidarity – Acceptability – Being realistic	Social-communicative well-being	
20 25 5 19 4 12	– Mental and physical development – Improving concentration and accuracy – Increasing intelligence – Improving spatial visualization – Positive attitude towards learning – Reducing psychological problems (first-grade elementary students) – Improving language skills (first - grade elementary students) – Self-acceptance – Purpose of life – Mastery of the environment	Cognitive-physical well-being (normal conditions)	

Reference No.	Open coding	Axial coding	Selective coding
	– Better relationships with others – Cognitive development – Making students aware of other people's roles in life		
7 17	– Improving cognitive functions such as memory – Improving and strengthening short-term and long-term visual skills – Reducing attention deficit – Improving the perception of time – Increasing the self confidence	Cognitive-physical well-being (special conditions)	
9 25 13 15 3 7 12	– Cultural promotion – Saving training time – Suitable for different students' learning styles – Comprehensive familiarity with occupations – Facilitating the job selection process – Self-efficacy of students with attention deficit/hyperactivity disorder – Accelerating learning – Qualification promotion – Promotion of individual competence	Game efficiency	
14 26 20 25 7	– Increasing creativity – Enhancing learning experiences – Autonomy of learners – Improving skills – Improving control skills of students with attention deficit/hyperactivity disorder	Impact on learners' behaviors	
16 31	– Creating attractive learning environment – Increasing motivation	Fun and entertaining aspect	
1 7	– Improving classroom management practices – Understanding the emotions of students with attention deficit/hyperactivity disorder	Impact on teachers' performance	

Based on the obtained data, themes such as learners' learning skills (normal learners), learners' learning skills (students with learning disorders), social-communicative well-being, cognitive-physical well-being (normal conditions), cognitive-physical well-being (special conditions), game efficiency, impact on learners' behaviors, fun and entertaining aspect, and impact on teacher's performance were found as positive aspects of using educational media games. Furthermore, to identify the themes for the ways of positive impact of educational media games on the quality of students' learning, the information obtained from the data analysis was coded and classified in Table 4.

RQ3. How and in what ways do educational media games have a positive impact on the quality of students' learning?

Table 4. Ways of Positive Impact of Using Educational Media Games on the Quality of Learning

Reference No.	Open coding	Axial coding	Selective coding
3 15 7 29 14 2 4 12	– Increasing interest in learning – Freshness of the classroom environment – Intrinsic motivation (learners with attention deficit/hyperactivity) – Increasing self-confidence – Entertaining aspect – Stimulating curiosity – Facing the challenge – Reducing anxiety (hyperactive third and fourth grade students) – Positive emotions – Eliminating fatigue and boredom	Through intrinsic motivational conditions	Ways of positive impact of educational media games on the quality of learning
15 9 22 20	– Ability to be controlled by learners – Reuse with reproducibility – Skill development (learners with learning disorders) – Testability	Through practical conditions	
18 20 16 25 9 12	– Active learning environment – Rich content – Ability to respond to students' needs – Adding reinforcing stimuli to the learning environment – Changeability of the game – Applying learning principles such as practice, repetition, reward, reinforcement and so on – Giving timely and appropriate feedback – Using multiple senses consciously and simultaneously – Creating learning opportunities	Through the conditions of the learning environment	
18 15 20	– Competition feature – Student satisfaction – Interaction with classmates – Student flexibility – Taking advantage of creativity	Through the conditions of the learners	
5	– Reducing student anxiety – Learning enjoyment	Through the conditions and goals of the teacher (first grade elementary teachers)	

According to the obtained information, a number of codes were obtained under components such as intrinsic motivational conditions, practical conditions, learning environment conditions, learners' conditions and teacher's conditions and goals (first-grade elementary teachers) as ways of the positive impact of using educational media games on the quality of learning.

To identify the themes of the negative ways of using educational media games, the information gathered from the data analysis was coded and classified in Table 5.

RQ4. How and in what ways do educational media games have a negative impact on the quality of students' learning?

Table 5. Ways of Negative Impact of Using Educational Media Games

Reference No.	Open coding	Axial coding	Selective coding
3 30 31	– Time limitation – Organizational framework of schools – High cost – Providing games with high quality content – Technical equipment – Additional training needed for teachers – Teachers' less mastery of digital games than non-digital ones	Obstacles of teachers in using games	Ways of negative impact of using educational media games
13 25	– Media addiction – Changing people's attitude towards the nature of themselves and the world	Moral-psychological problems created by the games	
25	– Eye problems and injuries – Skeletal problems and injuries – Central nervous system problems – Obesity and weight gain – Skin damages	Physical problems created by the games	
13 25	– Deterioration of the educational foundation – Social isolation	Through the conditions of the learners	
5	– Reducing student anxiety – Learning enjoyment	Family-social threats created by gaming	
13	– Destruction and decay of written culture	Learning problems created by the game	
4 11 13	– The amount of time used in playing the games – Lack of knowledge of the learners about the rich mechanisms of using technology – Negative emotions	Effective factors from parents/students	
3 6	– The negative mentality of the educational body towards the games – Lack of sufficient knowledge – Severe lack of standard Persian digital games for math education	Other obstacles	

Taking the data obtained, themes such as teachers' obstacles in using the games, moral-psychological problems caused by the games, physical problems caused by the games, family-social threats created by the games, learning problems caused by the games, effective factors from

parents/students and other obstacles were identified as negative ways and aspects of using educational media games. Finally, to identify the themes of solutions to overcome the negative aspects of using educational media games, the data obtained was coded and classified in Table 6.

RQ5. What solutions are suggested to solve and overcome the negative aspects of using educational media games?

Table 6. Solutions to Overcome the Negative Aspects of Using Educational Media Games

Reference No.	Open coding	Axial coding	Selective coding
31 13 9 25 34 4 18 2	– Having sufficient knowledge – Providing teacher training course in the absence of sufficient knowledge – Supporting teachers in the field of gaming – Equipping teachers with media literacy – Designing games by teachers – Attention to individual differences – Knowing the preferences and interests of students to choose the best educational approach – Facilitating the change and dynamics of games for learners – Helping students use simulations – Using the games according to the needs of hyperactive students in game production	Solutions for the teachers	Solutions to overcome the negative aspects of using educational media games
1 10	– Increasing media literacy – Increasing students' awareness and general literacy towards technology and media	Solutions for the learners	
5 10	– Informing parents about the importance of this type of teaching method – Obtaining the cooperation of parents – Being equipped with media literacy - Increasing children's academic motivation – Providing better educational facilities	Solutions for the parents	
6	– Attention to different strategies – Exploring different solutions – Analyzing whether the solutions are correct or wrong – Attention to mental processes – Logical sequence of solutions from simple to complex	Solutions in game production to create fluidity	
6	– Getting learners'preferences – Using geometric shapes to understand mathematical topics – Creating stories and pictures by learners – Creating characters and colors	Solutions in game production to create flexibility	
6	– Simulation of solving problems in real life	Solutions in game	

Reference No.	Open coding	Axial coding	Selective coding
	– Paying attention to the ability of students – Attention to the contents of the textbooks	production to create novelty and originality	
6	– Quick feedback to students – The possibility of self-evaluation of students' activity – Encouragement – Using process and final evaluation	Strategies in game production to create an expansion element	
25	– Observing eye distance from the game board – Using a small computer screen – Resting between two turns of the games – Adjusting the room lighting	Eliminating/reducing physical problems	

Following the data obtained, themes such as solutions for teachers, solutions for learners, solutions for parents, solutions in game production to create fluidity, solutions in game production to create flexibility, solutions in game production to create novelty and originality, solutions for the element of expansion and eliminating/reducing physical problems were extracted as solutions to overcome the negative aspects of using educational media games. Figure 1 showed the mind map of data coding of the effects and consequences of using educational media games on the quality of students' learning.

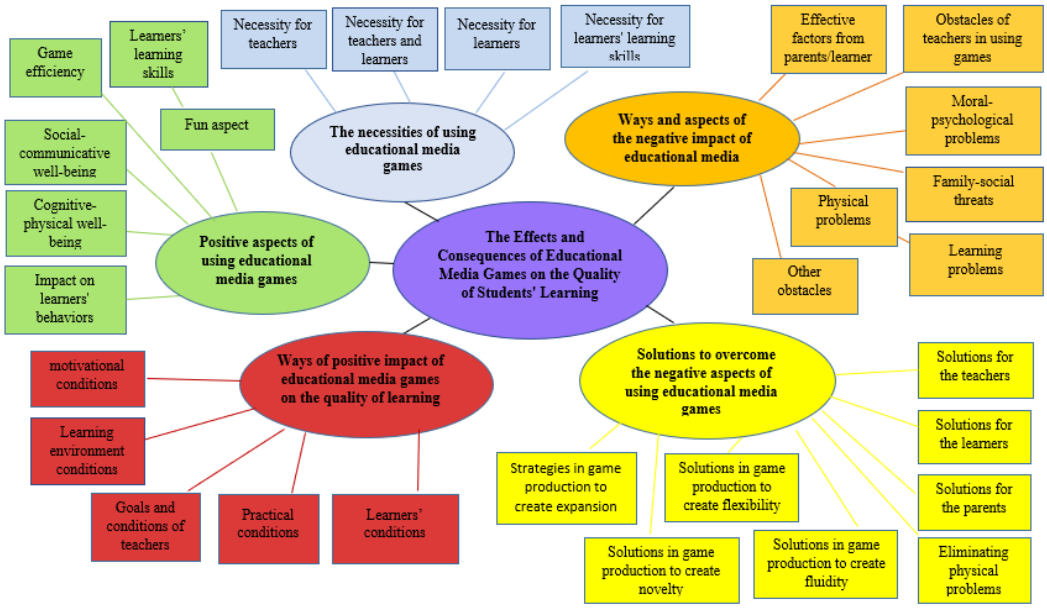

Figure 1. Mind Map of Data Coding of the Effects and Consequences of Educational Media Games on the Quality of Students' Learning

Discussion and Conclusion

One of the most important issues that is worth mentioning is the concept of learning, so that appropriate methods and tools should be used in the process of learning. According to Shabani (2023), the use of media and computers as educational tools is not effective per se, and the given tools must be in accordance with the principles of learning and education to achieve the learning objectives. Games are attractive to the students because of their features and capabilities, and they can be useful in education by improving students' motivation. In addition, educational media

games can be considered as suitable assistants in education (Akhoondi, 2009). By reviewing the related literature, we could find that there were some issues in using educational games such as the necessity of using the teaching methods based on educational media games, how educational games affect the quality of learning and positive and negative aspects of using educational media games. The research findings revealed that if the negative aspects of using educational games are not considered well, different problems such as moral-psychological problems, and family-social threats will create various obstacles for teachers. Taking the mentioned points, a study titled "Research synthesis of the effects and consequences of using educational media games on the quality of students' learning" was conducted by the researchers.

In response to the first research question, it was demonstrated that there are high necessities in using educational media games. For example, the necessity of using games for learners, the necessity of using games for teachers, the necessity of using games for teachers and learners, and the necessity of using games to develop learners' learning skills. Based on the research findings, educational media games cause better learning outcomes and improve learners' learning skills, they make continuous and appropriate teaching process easier for the teachers, and also prepare the students to learn efficiently. These findings are consistent with the study of Jafarkhani et al. (2022). They acknowledged that teaching based on educational digital games, provided effective educational design and appropriate implementation methods, and had an impact on improving students' motivation and learning in mathematics.

According to the findings of the second research question (positive aspects of using educational media games), different codes were collected that were categorized in different themes such as effects on the learning skills of normal learners, effects on the learning skills of learners with learning disorders, effects on social-communication well-being, impacts on cognitive-physical well-being (normal learners), impacts on cognitive-physical well-being (special conditions), game efficiency, impact on learners' behaviors, fun aspects, and impacts on teachers' performance. Therefore, drawing on the data obtained, it can be concluded that using educational games improves students' learning skills and increases the creativity of the learners. Meanwhile, learners' social-communication skills, concentration, accuracy, and self-confidence are improved. It should be noted that the findings of this study are in line with the results of Fazeli et al. (2021). In their study, they showed that teachers consider it necessary to use new teaching methods, motivational activities, and electronic classroom facilities to activate students, and they believed that these factors increase students' self-confidence and learning quality, and make continuous evaluation possible. In line with the results of the present study, Ricker (2016) stated that the effects of different media were not the same and interactive media affect episodic memory of the learners.

In the third research question, the ways of positive impacts of educational media games on the quality of students' learning were investigated. The research findings showed the ways and aspects through which these games might have positive effects on the quality of students' learning. For this purpose, we could refer to intrinsic motivational conditions, practical conditions, learning environments, learners' conditions, and teachers' conditions and goals. For students to feel less anxious and more fun in learning environment, and also be able to do experiment and receive feedback, using educational games brings the satisfaction of the students. Therefore, the findings are in line with the research results of Karimi et al. (2022). In a study, they acknowledged that educational media games increase learners' self-confidence, calmness and certainty, provide entertainment, increase creativity, and objectivity. Based to Eshtakhrian Haghighi (2019), reducing the amount of content, increasing the convenience of learners, increasing the audio-visual appeal, and increasing the interactivity of the content could optimize the audience's relationship with the media content and increase the learning effects in the modern educational system.

The aspects and ways of the negative impacts of using educational media games were also

examined and a number of negative impacts and ways including teachers' obstacles in using games, moral-psychological problems caused by the games, physical problems caused by the games, family threats caused by the games, social-behavioral threats created by the games, learning problems created by the games, effective factors from parents/learners, and other obstacles were identified. In fact, the negative effects such as eye and skeletal problems, media addiction, social isolation, etc., which the games bring when misused, prevent the proper implementation of this method in the educational system. Moreover, obstacles faced by teachers, time limitation, lack of technical equipment, etc. can also reduce the efficiency of this method. The research conducted by Kaveh (2014) is consistent with the present research findings. Kaveh (2014) concluded that the most important obstacles for teachers in using educational media games were as follows: the lack of appropriate educational media games, the limitation of class hours, the lack of educational technology supervisors, lack of valid educational media games, and unfamiliarity with how to use educational media games.

Research synthesis of the effects and consequences of using educational media games on the quality of students' learning demonstrated that the solutions to overcome the negative aspects of employing educational media games include solutions for teachers, solutions for learners, solutions for parents, solutions in game production to create fluidity, solutions in game production to create flexibility, solutions in game production to create novelty and originality, solutions for the element of expansion and solutions to eliminate/reduce students' physical problems. In order to solve these problems, teachers' sufficient knowledge and skills in using these games, teachers' appropriate game designing knowledge, media literacy of teachers, awareness and media literacy of parents and students, and compliance with the principles of physical health were among the basic factors that must be observed. Zakeri et al. (2012) have stated that teachers who have received appropriate training in relation to new technologies have a positive attitude in using them in the classroom and in their professional development. Also, they have been more successful in their teaching process. In this regard, Eshtakhrian Haghigi et al. (2016) reported that using appropriate media in education requires understanding and having the necessary skills to analyze its content.

Therefore, according to the results of this research synthesis, the following suggestions can be made:

1- According to the findings of the first research question, it is suggested that teachers use educational media games for better educational experience and students' learning.

2- Based on the findings about the impact of educational media games, it is suggested that students cooperate with their teachers to improve their social skills and deep learning.

3- In order for students to learn better, it is suggested that parents become equipped with media literacy to provide the tools needed for this method.

4- Drawing on the solutions given, it is suggested to pay attention to different elements (fluidity, flexibility, etc.) in designing games so that the games would have the necessary effects.

5- According to the solutions mentioned, it is also suggested to administer courses for teachers to acquire the necessary skills in this field.

6- Courses should be held for students to acquire the necessary media literacy.

7- In this research, computer games have been investigated. Other researchers may investigate the impacts of other media in students' learning quality.

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