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The level of predictive thinking among students of the Department of life sciences

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Abstract---The current research aims to identify predictive thinking among students of the Department of Biology, and the research was limited to students of the third and fourth stage, Department of Life Sciences in the Colleges of Education Karbala and Qadisiyah (2021-2022). The descriptive correlative approach was adopted, and the sample size was (100) male and female students who were chosen randomly. To achieve the objectives of the research, the researcher prepared the research tool, which is the predictive thinking scale, which in its final form consisted of (36) paragraphs by (6) paragraphs for each skill, which is (the skill of anticipation, visualization, reflection, adaptation, planning, evaluation) and the following results were that the students of the Department of Life Sciences possess a high level of predictive thinking.

Keywords---thinking, predictive thinking.

Introduction

There has been a noticeable increase in global interest in the subject of thinking, and this interest was reflected in many modes of thinking, training programs, research and studies, and unanimity in promoting and developing this important field. Because thinking is the highest form of human mental activity (Abu Jadwa and Nofal, 2007, 25). The technological development of mankind, the explosion of knowledge, and the openness to the world, which is the result of thinking and ideas of creators, and this era requires us to speed up the development of mindsets capable of solving problems and making appropriate decisions, and the students' self-reliance in facing life's problems (Al-Kubaisi after thinking is one of the features that distinguishes man. It is a concept with many dimensions and perspectives that reflects the complexity of human thought and its work. Experience contemplation and carefully thinking about the components of a situation or personal experience associated with it. Through thinking the

individual deals with the things that surround him in his environment as he deals with situations facing him. The individual (Mustafa, 2013, 7): (109, 2007,

1- Thinking is a cognitive process, and it is an essential element of the psychological and cognitive structure possessed by humans, and it has social characteristics. What distinguishes thinking from all other cognitive processes is that it is more complex and able to delve into things. and phenomena and situations and their containment that enable them to process information and generate and reproduce new knowledge and information that are objective, accurate and comprehensive (Al-Afoon. Abdel-Saheb, 2012, 17) and that thinking plays an important role in the success of the educational learning process, which requires encouraging individuals to reach the application of cognitive processes, and also helps to Developing the experience of individuals and increasing the ability to perceive the learning process (Sa'ada, 2015, 96) and Qatami (2007) believes that prediction represents the creative skills that individuals seek to create and develop as one of the goals of science, as all sciences stem from understanding their phenomena and events, and controlling those Phenomena, prediction of future events and processes. Thinking training. It helps to see things in new ways, improve incomplete knowledge, find new solutions to previously unsolved problems, or create new relationships between knowledge. Training the mind to develop its processes and transfer those ideas to new learning and living environments. (Qatami, 2007 referred to in Abu Zaid, 2010, 7)

These thinking skills are important for finding the inferred relationships between concepts and principles, and for forming the basis for solving problems and generating thinking through practice and application of problems that train learners to search for reasons behind known information and discover ways to Problem solving ability. Searching for ideas and other possibilities and providing opportunities for learners to develop their ability to identify the problems they need when facing situations that require information translation and the development of new information and concepts during deductive and predictive exercises (Sorour, 2005, referenced in Tabbaa, 2017, 7) and the need for predictive thinking stems From our advanced needs and new and innovative solutions, and our perspective extends to the previous research to explain the present, but the need for predictive thinking appears in new ways in several areas, the most important of which is prediction helps to develop education as well as helps to reach the best solutions to their problems in a real way, predictions make people love to discover new things themselves. Anticipation leads to being open to new ideas, responding effectively to them, and adapting to situations

New and positively changing, thinking helps to develop individual inclinations and talents, and develops learning styles and patterns to become more effective (Abu Zaid, 2010 referred to Zaki, 2020, 7) Predictive thinking is still in the human mind, as a window to intelligence, imagination and emotion that can be Very successful in reading what education will be like in 30 years. And the manifestations of predictive thinking of the manifestations surrounding the human being. It is focused in specific directions. Astronomers can predict the exact time of the eclipse years, and weather scientists can predict weather conditions with great success. Predictive thinking is one of the tools for focusing

on the moment. It is also a mental effort to understand the present and transcend to reach new things based on the information available to the individual. This selection process is not intermittent or inevitable. Rather, it depends on the way in which the thinker is committed. How a person thinks today determines his path in (Abu Zaid, 2010, 7) the future. The individual performs the process of predictive thinking when he comes to know what will happen in the future using the help of his previous information, for example, if you notice that the weather during the previous days was overcast and that the temperature is low, you are predicting rain, so the prediction process is an extrapolation of what will happen in The future is through observations or introductions, which show specific trends from the given data or observations, and then use them to reach potential predictions or predictions. (Zaytoun, 2006, 26). Predictive thinking is the thinking in which a person links symbols and signs to infer a new idea close to the truth. (Tabba, 2017, 2). And the prediction process is closely related to the process of assumption, as it represents the output produced by assumption and prediction "it is a mental process in which the learner relies on the information and previous experiences he has and the extent of his understanding and interpretation of the factors and reasons for the phenomena to predict the likely outcome or the occurrence of other phenomena in the future" (Al-Khazraji, 2011, 50). Prediction is the expectation that something will happen in the future, and it is one of the important things that are advised and encouraged by children, because prediction prepares the child's mind for the idea of possibilities. (Al-Harithi, 2009, 143).

Predictive thinking aims to use what can be obtained from the processes or results of the phenomenon that caused the occurrence of the phenomenon, which means that predictive thinking helps us to increase our understanding of psychological phenomena because it is a test of the validity of hypotheses and information about phenomena. (Abu Ghazal, 2015, 45). Predictive thinking is an important component of the process of putting forward hypotheses or solutions to specific problems or discussing the issues raised. Predictive thinking is used to come up with more solutions. Predictive thinking is also important for determining the causal relationships of various natural and human phenomena. (Sa'ada, 2009, 563) For example, if we drop a coin from top to bottom, what is the probability on which way it will fall?. The student's ability to predict events based on previous information, whether observations or conclusions drawn from certain experiences. (Hussain, 2009, 175). Forecasting is one of the important processes in thinking, which means enabling the individual to anticipate events in a particular context, as it requires the individual to do the process of linking previous information with new information and trying to develop hypotheses for the purpose of reaching the results. (Abdullah, 2014, 207). That is, predictive thinking means the process of evaluating certain results from certain circumstances or situations based on the previous information that the student has, and the feedback related to that information. Forecasting is complementary to comprehension strategies. And that the student's practice of prediction leads to providing him with the ability to control the surrounding phenomena and deal with them easily based on previous information and expectations reached by (Razuki, Abdel Karim, 2015, 413). Predictive thinking works by understanding reality and the surrounding conditions, and putting the conditions, their data and their relationships in a hypothetical equation that explains cause and effect,

which can be added to explain the phenomena here. Interpretation of events, and the extent to which they understand the elements of those events and phenomena, this relationship helps in solving many problems. problems and start with these solutions to understand, analyze and clarify the biggest problems facing society. (Abu Zaid, 2010, 6)

General Features of Forecasting

- Forecasting methods and methods generally assume that the basic factors that existed in the past will continue in the future, which represents the tendency of phenomena to recur in the future.
- Forecasts are rarely complete, and actual results often differ from estimates or predictions. The inability to predict accurately is due to the multiplicity and richness of influencing variables or the influence of random factors, so put the variance limit and the degree of bias with these factors in mind.
- As long as the forecast time horizon is long, the forecast accuracy will decrease. In general, short term forecasts are more accurate than long term forecasts because the former is less certain than the latter. (Razuki, Muhammad, 2019, 304) The researcher believes that the skill of prediction and the development of this skill has become one of the most important goals of modern education. The skill appears in the students through the expectation of certain results based on certain situations or circumstances. The prediction is made in the light of previous experiences that the person may have created. Therefore, teachers are advised to have previous experiences related to prediction until the necessary understanding of this skill is formed. (Abu Jadwa, Nofal, 2007, and that the prediction skill “is a mental process of thinking about the future that enables the individual to predict or anticipate what will be in the future” (Atiya, 2015, 93). (Saada, 2015) believes that the prediction skill has a set of objectives represented in The most important of them are:
 - The student is able to predict a result by doing a set of activities and readings
 - The student imagines a solution to a problem or issue
 - To apply the steps of the prediction skill
 - To judge the effectiveness of the prediction skill in The light of its application (Sa’ada, 2015, 156) that the student’s ability to predict is one of the necessary skills for all areas of life, and the possibility of using previous experiences, information and knowledge in order to reach suitable choices and accurate plans for the future.(Saada, 2009, 561) D is (time, place, sample and society) and one (2007, 234). (101

Prediction steps: The most important steps of forecasting can be summarized as follows:

- Gathering information about a specific topic and linking it with previous experiences.
- Analyzing data and information on the subject.

- Predicting the expected results from the information and data that have been classified.
- Applying skill steps with high accuracy

Judging the works on which the prediction skill was applied in light of three questions:

- What has been done so far.
- What has not been done yet
- What can be done with the remaining things in different and new ways.

Predictive thinking skills:

The skill of meditation: The researcher believes that meditation is as in the saying of the Almighty, "Say: Look what is in the heavens and the earth" (Surat Yunus 101). The meditation skill is one of the skills that help the individual to read himself and direct his life, analyze and draw results in the light of conclusions, and the meditation skill is part of the idea of reflective teaching that seeks to build the personality of the learner who is able to plan and self-monitor and acquire the ability to modify his style in the processes and steps that he takes. Taken by the individual about a problem. (Abdullah, 2014, 93) The skill of meditation leads to thinking and helps to deep understanding, and is a distinctive way to clear the mind and focus attention. The practice of meditation eliminates stress and anxiety. (Fohmann, 2010, 333). Students acquire the skill of reflecting on the work they do, which leads to a better understanding of the information and the ways it is being dealt with. (The Postal Service, Al-Hosania, 2019, 66). Meditation Elements: Reflective Skill. There are two basic elements in meditation:

- Focus: focusing on the smallest details increases efficiency, so meditation leads to developing and maintaining focus
- Awareness: It is important to understand everything you notice in your life, meaning that meditation helps you develop your awareness Al-Ghazali says, "The fruit of thinking (contemplation) appears in the increase of knowledge and the expansion of knowledge and knowledge, as it gathers in the human being and arranges the results of another knowledge, because knowledge is the production of knowledge. 333-334 2- The Expectation Skill: It is the skill that a person performs when he does not have enough information, i.e. it is trying to guess some issues that a person is going through (Hussain, 2009, 135) The ability to anticipate an event before it happens And that prediction depends on the data as well as on previous experiences.(Al-Qawasma, Abu Ghazla, 2013, 137) The anticipation skill can be described as a skill that combines the skill of critical thinking and the skill of creative thinking. a For a human being to control and control the unpredictable world in most cases (Buckett, 154, 2008) and knows it (Atiya, 2015) "It is what is represented in the individual's ability to make judgments and guesses when he does not have sufficient information." (Atia, 2015, 97). Forecasting skill is "that skill that an individual uses to predict the consequences of actions, the appearance of things, and the

formation of an image of the course and outcome of future events on the basis of past experience.

Students: - Know the difference between observations and conclusions

Giving students the opportunity to record information about the phenomenon to be studied. (Hafez, 2015, Objectives of teaching the skill of anticipation: The skill of anticipation seeks to achieve educational goals and educational and life goals, which are that the learner, after performing the various activities, is able to anticipate a result, imagine appropriate solutions to a situation or a particular issue, and apply the steps of anticipation And to judge the effectiveness of this skill (Hafez, 2015, 195) The importance of teaching the skill of forecasting: 1- It is an essential skill for all areas of life 2- The possibility of using or exploiting past experiences, information and knowledge to make smart predictions 3- Making accurate and reliable plans for the future At the same time, defining the starting point for drawing the desired picture of the future (Razuqi, Muhammad, 2019, 316) 3- Visualization skill: The visualization skill is the process that forms integrated pictures of events in a future period (Hafez, 2015, 125). Building his mental image of the future, i.e. extracting images from the past to invent new things, and transcending the truth and reality through imagination (Hussain, 2009, 186) The visualization is a picture of material things that are printed and recorded in the memory of the individual, and each sensory image is a large number of cursing The existing ones are in a certain similarity and consistency relationship, and they are characterized by the generality of the principle through their temporal and spatial arrangement. Imagining images about a specific experience or phenomenon is one of the thinking tools that the individual generates an imaginary image that refers to certain topics. (Nawfal, and visualization is one of the means by which the mind evokes the image of the past when it is not present in the subconscious mind, the mental image will replace something, and the image is one of the tools (194 (28, 2010) Speculation skill

Remembering, which means that we can form the unity of our lives, and that the transition from imagination to thinking is not surprising, but it is a very important intermediate stage in this transition process. (Al-Maghazi, 2015, 52) The importance of visualization skills: 1- It motivates learners to search for an environment that contains situations that will help achieve the expected future goals. 2- It stimulates and activates the mental processes of the learner, which makes the learner feel as if he is on the path of achievement and self-realization. 3- It helps us to consolidate fragile, irrelevant thoughts, and this in turn helps us shift the positions of previous stimuli into building a greater degree of rationality by reorganizing and integrating some of them. 4- What we learn through imagination techniques is like real life experience that will remain in our memory. 5- This is an effective way to bring creative ideas to learners because it allows them to explore their feelings and thoughts in a risk-free environment and is a useful opportunity to write creativity and come up with solutions. (Razuqi, Muhammad, 315, 2019) 4- Adjustment skill: The adaptation skill represents "the individual's ability to modify his behavior and thinking patterns according to the requirements of the new situation.(Atiya, 2015, 97). New, where the good student can modify this skill, develop it, or add changes to it to suit the student's ability to accurately judge the performance of others (Al-Hilah, 2014, 105).It also

specializes in directing the behavior of individuals to adapt to their environment and includes adaptation to natural changes such as harsh conditions. and the nature of the land (Khanfar, 2016: 168) Individuals must be ready to adapt constantly, and they will need to acquire new skills, attitudes and even new moral values for successful adaptation in society, because civilization will undergo rapid and continuous collective change, that adaptation helps people understand What the future holds, give them a perspective

That change is a natural process that must be expected, and making the future an exciting and important field of study in research, making individuals more optimistic and confident, a field of self (Hafez, 2015, 74) Determinants of adaptation: Just as there are personal determinants of the individual, there are also determinants and factors that affect the process of adaptation. Divide these determinants into two categories: a biological determinants 2 cultural determinants. Biological determinants of adaptation mean that each individual has a unique genetic structure from a biological point of view, meaning that each individual is different from the other individual, regardless of the degree of his relationship to him. As for the cultural determinants of adaptation, they are of great importance because they allow the individual to achieve adaptation within the frameworks of behavioral standards and values. We can clarify the most important cultural determinants of adaptation: - family building - school education - social system and others. (Al-Tahhan, 2014, 2) 5- Planning skill: This skill means setting educational and learning plans and objectives and identifying primary sources before starting the learning process. It refers to the different activities that the planning skill includes identifying the goal or feeling the problem and addressing it, testing a specific strategy to implement the solution of the problem. A sequence of specific steps for the problem to implement the solution, identifying potential difficulties and errors before predicting the expected outcome. (Sa'ada, 2015, 99) The planning skill is the individual's ability to draw up a plan for a specific operation based on certain criteria, as happens in the drawing of an operations room and a plan statement for the movement of forces. (Atia, 2015, 87).

Planning Skill

Planning represents a comprehensive and conscious view of the elements of the administrative process in which officials make multiple decisions, including methodologies related to student education and educational decisions related to educational experiences available in the classroom. Planning educational activities is one of the basic tasks. (Al-Awadi. 2021, 66) This skill includes the existence of a specific goal for the individual, bad by the individual himself or by others, and that planning includes many questions that the individual asks himself. (Abu Jadwa, Nawfal, 2007, 351). Types of planning: 1- Short-term planning, such as planning for a single lesson. 2- Medium-term planning is planning for a semester. 3- Long-term planning, i.e. planning for several years to implement a specific programme. (Elias, Mortada, 2015, 266) 6- Assessment skill, which is the skill that evaluates current knowledge, sets goals and selects resources, and includes asking personal questions such as whether I have achieved my goals? And what worked for me? And what did I not do? (Beyer, 2003) suggested a set of procedures for assessment skill: 1- Assessing the extent

to which the objectives have been achieved. 2- Judging the accuracy and adequacy of the results. 3- Estimating the extent to which errors or obstacles have been resolved. 4- Judging the adequacy of the plan and its implementation. (Abu Jadwa, Nofal, 2007, 352)

The evaluation skill is one of the necessary and useful skills that contribute to evaluating the achievement of objectives, the appropriateness of the strategies and steps used, evaluating methods of confronting errors and difficulties, and evaluating the success and effectiveness of the thinking plan and its implementation (Mahmoud, 2006, 182). It is appropriate to achieve the objectives of the research, as it includes collecting accurate scientific descriptions of the studied phenomena, describing and explaining the current situation, as well as defining common practices and identifying the opinions, beliefs and trends of individuals and groups and their systematic growth and development, and also aims at the existing relationships between research phenomena (Al-Abadi, 2015 and the descriptive relational approach). It does not stop at the limits of describing the phenomenon, but goes beyond it to analyze, explain, compare and evaluate in order to obtain meaningful evaluations, with the aim of gaining insight into the phenomenon (Al-Azzawi, 97, 2008). The variables and their numerical representation through the correlation coefficients between the variables. It is also concerned with determining the type of correlation and determining the strength of the correlation. Abbas et al., 2014, 77), which is useful in finding relationships between variables and using this relationship in predictions. Usually, the variables that are not strongly correlated are removed, as for the highly correlated variables, it is suggested to conduct studies around them to identify the nature of the relationship between them. (Guarantor, 135, 2007) Second: The research community and its sample: 1- The research community: Research Population The research community represents a group of clearly defined people or things. Which the researcher seeks to study and generalize the findings of the study. And that the research community depends on the nature of the research and its objectives. (El Bassiouni , 2013 , 309) (76 Research Population And Sample 4

The community in the current research includes the students of the Department of Life Sciences in the College of Education at the Universities of Qadisiyah and Karbala, the morning study only for the academic year 2021-2022, and their number is (501) male and female students. The sample represents a part of the original study population, chosen by the researcher using different methods. So that it is truly representative of the study community. (Al-Omrani, 2013, 93) as the sample represents an important step because it reduces the time and cost of research studies, as well as provides us with faster results than if we studied the entire community. (Guarantor, 2007, 162) The researcher chose a simple random sample consisting of (100) male and female students from the Department of Life Sciences, the third and fourth stages, in the College of Education, University of Al-Qadisiyah. First: View the results: View results The goal is to identify the level of predictive thinking among the students of the Department of Life Sciences: For the purpose of identifying the predictive thinking among the members of the research sample, the arithmetic mean and standard deviation were calculated for all sample members, who numbered (100) students on the predictive thinking scale. After calculating the t-value for one sample to find out the significance of the differences between the hypothetical mean and the arithmetic average of the

students' grades, it was found that the calculated t-value amounted to (9.813) which is greater than the tabular t-value (1.98) at the significance level and with a degree of freedom (99). Life with a high level of predictive thinking, and as in the table

Table 6
Results of the t-test for one sample to calculate the significance of the differences between the hypothetical mean and the arithmetic mean of the scores of the sample members in the predictive thinking scale

variable name		Sample volume		individual average		standard deviation		t. value			The sign of 0.05	
								calculated		tabular		
	Predictive thinking	100	108	126.6900	19.04630	9.813	1.98		function			

Interpretation of Results

Interpretation of Results Predictive thinking

As for the goal that seeks to identify the level of predictive thinking among students of the Department of Life Sciences at the College of Education, University of Al-Qadisiyah, it is noted in Table (6) that the arithmetic mean is (126.69) which is higher than the hypothetical average (108) and that the calculated T value is which It is greater than the tabular value of (1.98), which is a statistical function. This means that the students of the Department of Life Sciences have a high level of predictive thinking. The researcher believes that this result can be attributed to the fact that the students in the Department of Life Sciences have maturity and the ability to think abstractly, think, logically, and control activities. Knowledge, monitoring, evaluating it, and using appropriate strategies at the right time, i.e. (according to the scientific situation). In this section, most of the experiments are of the individual type, and the individual experiments develop the students' scientific thinking more than the presentation experiments. Also, reaching the result is not the final goal, but rather discussing the results and finding logical and justifications for them is the ultimate goal of the experiment. This result agreed with the study (Al Tabbaa, 2014), which indicated the effect of teaching biology with scientific activities and computer simulation on predictive thinking among the ninth primary students in Amman Governorate in Jordan (9.813).

References

- H. Abu Zaid, Nevin Muhammad (2010): The effectiveness of an educational program based on a learning theory based on brain function in developing predictive thinking among female students of university colleges in Jordan, Amman Arab University
- H. Abu Jadwa, Saleh Muhammad Ali, Nofal, Muhammad Bakr (2007).: Teaching Thinking, Theory and Practice, Edition 1, Dar Al Masirah for Publishing and Distribution, Amman

- H. Abu Ghazal, Muawiya Mahmoud (2015): General Psychology, Edition 2, Dar Wael for Publishing and Distribution,
- Al Baridiya, Azza bint Saif, Al Hosania, Huda Bint Ali (2019), 12, Al-Masira House for Publishing and Distribution, Amman H. Al-Basiouni, Muhammad Swailem (2013): The basics of scientific induction, I, Dar Al-Fikr Al-Arabi. Cairo H. Bouquet, Stephen, translated by Zakaria Al-Qadi (2008): 100 Ideas for Teaching Thinking Skills, 1st Edition, Dar Al-Masria Al-Lebanese, H. Jarwan, Fathi Abdel-Rahman (2007): Teaching thinking, concepts and applications. I 3, Dar Al-Fikr, The Hashemite Kingdom of Jordan, Amman, Al-Harthy, Ibrahim bin Ahmed (2009): Teaching Thinking, Taha, Dar Al-Maqased for Publishing and Distribution, International Links for Publishing and Distribution, Cairo, Egypt.
- Hafez, Emad (2015): Forward thinking (concept, skills, strategies), Dar Al Uloom for Publishing and Distribution, Cairo.
- Hussein, Thaer Ghazi (2009): Teaching Thinking in the School Curriculum, Wael House for Publishing and Distribution, Amman H. Janfar, Asmaa Radhi, Hanfar, Ayed Radhi (2016): Environmental Education and Environmental Awareness i. Dar Al-Hamid for Publishing and Distribution, Jordan, The trick, Muhammad Mahmoud (2014): Classroom Teaching Skills, Taha, Dar Al-Masira for Publishing and Distribution, Amman. Al-Khazraji, Salim (2011): Contemporary Methods in Teaching Science, Osama Publishing House, Amman.
- Razzooqi, Raad Mahdi, Abdel Karim, Suha Ibrahim (2015): Thinking and its patterns (deductive thinking, creative thinking, systemic thinking, visual thinking), 1st Edition, Dar Al Masirah for Publishing and Distribution, Amman
- Razouki, Raad Mahdi, Muhammad, Nabil Rafeeq (2019): Thinking and its patterns 12.5, Dar al-Kutub al-Ilmiyya, Beirut, Zaki, full conclusion (2020): The effect of an educational program based on cognitive strategies in developing predictive thinking among middle school students. Tikrit, Iraq, Zaytoun,
- Hassan Hussein (2006): Teaching thinking (an applied vision in developing thinking minds), 2nd edition, Alam Al-Kutub for Publishing and Distribution, Cairo
- Sorour, Nadia (2005): Teaching thinking in the school curriculum, Wael House for Publishing and Distribution, Amman H. Saadeh, Jawdat Ahmed (2015): Thinking and Learning Skills, Edition 1, Dar Al Masirah for Publishing and Distribution, Amman
- H. Saadeh, Jawdat Ahmed (2009): Teaching thinking skills (with hundreds of applied examples), 1, Dar Al-Shorouk for Publishing and Distribution, Amman, Jordan H. Al-Daman, Munther (2007): The Basics of Scientific Research, 1st Edition, Dar Al Masirah for Publishing and Distribution. Amman .
- Al-Tabbaa, Rana Kamel (2017): The effect of teaching biology with scientific activities and computer simulation on predictive thinking among the ninth primary students in Amman Governorate in Jordan, Volume One, Issue One, Journal of Educational and Psychological Sciences.
- Al-Tahhan, Muhammad Khaled (2014): Principles of Mental Health Abbas, Muhammad Khalil, Nofal, Muhammad Bakr, Al-Absi, Muhammad Mustafa, Abu Oud, Feryal Muhammad (2014): An introduction to research methods in education and psychology, 5th floor, Dar Al Masirah Ammaan Jordan

- H. Al-Abadi, Haider Abdul-Razzaq Kazem (2015): The basics of writing scientific research in physical education and sports sciences, 1st ed., Al-Wa'i Library, Iraq. Egyptian Lebanese .
- Al-Azzawi, Rahim Younes Crowe (2008): An Introduction to the Scientific Research Methodology, 1st Edition, Dar Degla.
- The Hashemite Kingdom of Jordan, Mohsen Ali, Mohsen Ali (2015): Thinking: its types, skills, and teaching strategies, Edition 1, Dar Safaa for Publishing and Distribution, Amman
- Al-Afoun, Nadia Hussein, Abdel-Sahib, Muntaha Mutashar (2012): Thinking: its patterns, theories, and methods of teaching and learning, 12 Dar Safaa for Publishing and Distribution, Amman
- H. Al-Amrani, Abdul-Ghani Muhammad Ismail (2013): Basics of Educational Research, 1st Edition, Dar Al-Kitab Al-Jami - Sana'a, Al-Awadi, Mortada Raad Radi Al-Khayat (2021): Foundations of Education, Edition 1, Dar Al-Salam Library Publications Legal, Najaf, Iraq
- Qatami, Youssef (2007): Teaching Thinking for All Children, Edition 1, Dar Al Masirah for Publishing and Distribution, Jordan
- H. Al-Qawasmeh, Ahmad Hassan, Abu Ghazla, Muhammad Ahmad (2013): Developing learning, thinking and research skills. , Dar Safaa for publishing and distribution. Amman
- Al-Kubaisi, Abdul Wahed Hamid (2007): Developing thinking in interesting ways, 1st Edition, Debono for printing, publishing and distribution, Amman
- H. Kawafha, Taysir Mufleh (2010): Measurement and evaluation, 3rd edition, Dar Al-Masira, Amman Mahmoud, Salah Al-Din Arafa (2006).): Thinking without Borders, Helwan University,
- Mustafa H. Nemer, Mustafa (2013): Developing thinking skills, 1st Edition, Dar Al-Bedaya Publishers and Distributors, Amman H. Al-Maghazi, Ibrahim Muhammad (2015): In the psychology of creativity, 1st Edition, Alam Al-Kutub, Cairo. .
- Nofal H, Muhammad Bakr (2010): Practical applications in developing thinking using habits of mind. I, 2nd floor, Al-Masira House for Publishing and Distribution, Amman.
- H. Hoffman, Robert (2010): Bahij's supervision: mental skill, 2nd floor, Al-Hilal Library for Publishing and Distribution, Cairo Elias, Asma Jeries, Mortada, Salwa Muhammad Ali (2015): Modern trends in designing and developing curricula in kindergartens, 1st ed. Dar Al-Assar Al-Alami for Publishing and Distribution, Amman, Jordan.
- Suryasa, I. W., Rodriguez-Gámez, M., & Koldoris, T. (2021). The COVID-19 pandemic. *International Journal of Health Sciences*, 5(2), vi-ix. <https://doi.org/10.53730/ijhs.v5n2.2937>
- Suryasa, I. W., Rodriguez-Gámez, M., & Koldoris, T. (2022). Post-pandemic health and its sustainability: Educational situation. *International Journal of Health Sciences*, 6(1), i-v. <https://doi.org/10.53730/ijhs.v6n1.5949>
- Herman, H., Ardani, I. G. A. I., Aryani, L. N. A., Windiani, I. G. A. T., Adnyana, I. G. N. S., & Setiawati, Y. (2022). Signs and symptoms of depression in children and adolescents with type 1 diabetes mellitus: A case report. *International Journal of Health & Medical Sciences*, 5(1), 150-153. <https://doi.org/10.21744/ijhms.v5n1.1861>