

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

Foundation Models in Medical Imaging: A Systematic Review, Taxonomy, and Future Research Agenda

Mohammad Zghair AL-Khafaji
College of Agriculture/ University of AL-Qasim Green / Iraq
Email : mohaalkh359@agre.uoqasim.edu.iq

Abstract. General Background Modern university education requires innovative teaching frameworks to manage individual learning differences and improve student engagement. Specific Background First-year education students frequently face performance declines and diminished optimism in foundational educational psychology courses. Knowledge Gap However, the empirical application of cognitive flow theory within systematic instructional design to address achievement and optimism remains insufficiently explored in higher education. Aims This study evaluates the effectiveness of an instructional design based on cognitive flow strategies in improving achievement and optimistic thinking. Results Quasi-experimental results from 61 students show that the experimental group significantly outperformed the control group in academic achievement and demonstrated marked improvements in optimistic thinking. Novelty A systematic five-stage instructional design integrating task-skill balance and immediate feedback was constructed and tested. Implications Adopting flow-based instructional design creates stimulating learning environments, enhances intrinsic motivation, and fosters positive psychological growth in teacher preparation programs.

Key Findings Highlights

- Implementing cognitive flow instructional design significantly elevates academic achievement in educational psychology.
- Structured challenge levels and immediate feedback foster student optimism and self-directed learning motivation.
- Balancing task difficulty with learner skills creates a stress-free environment that drives positive educational outcomes.

Keywords : Instructional Design, Cognitive Flow Theory, Academic Achievement, Optimistic Thinking, Educational Psychology

Introduction

1-1- The Research Problem

Universities face numerous challenges that compel them to change their nature and traditional methods of operation, whether in administration, education, technology, objectives, assessment methods, or their relationship with society. This change stems from a desire to achieve progress and enhance their positive impact on society. Therefore, every university professor should be aware of the individual differences among students across various aspects, particularly in their learning and knowledge-acquisition abilities. To succeed in their profession, professors must understand the reasons for these differences and how to address and manage them (Masha'leh, 2018: 77).

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo

Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

Educational psychology is a core course in teacher preparation programs at colleges of education. It equips students with the psychological and educational knowledge necessary to understand student behavior and interact effectively with them within the educational environment. However, in recent years, a decline in academic performance among some education students in this course has been observed, along with a decrease in their optimism about learning and their future careers. Some students exhibit negative attitudes toward the course and struggle with concentration and engagement in learning activities, negatively impacting their academic performance and personal and professional development.

Educational psychology is a fundamental course in teacher preparation programs at colleges of education. Hence, the current research problem is defined as an attempt to answer the following main question:

(What is the effectiveness of instructional design based on cognitive flow theory strategies in improving the achievement and optimistic thinking of students in faculties of education in the educational psychology course?)

1-2- The importance of the research:

Instructional design constitutes the appropriate theoretical framework that, if followed, facilitates the activation of the educational process and its various tasks. It is the science that describes the procedures and processes involved in selecting educational materials (tools, materials, programs, curricula) for design, analysis, organization, development, and evaluation. This is done to design educational materials and provide instructors with better, faster strategies, helping them implement the most effective approach in the shortest possible time and with minimal effort. Thus, instructional design is considered one of the techniques that leads to the development of learning environments that enhance educational activities and make them more impactful (Abdul-Moneim, 2019: 26).

Cognitive flow theory strategies are among the most prominent psychological theories that have contributed to understanding human behavior and interpreting the internal motivations that drive students. When this theory is applied in designing the teaching and learning process, it allows for a deeper understanding of the student as a complex psychological entity with unconscious desires and motivations that influence their performance and classroom interactions. This integration of the psychological dimension and academic achievement deepens the educational process while scientifically and comprehensively accounting for students' individual differences (Al-Atawi, 2020: 89).

When applying cognitive flow theory strategies in the educational field, it becomes possible to interpret many educational phenomena more deeply, such as low motivation, resistance to learning, or test anxiety. These behaviors may reflect the student's unconscious internal conflicts or emotional repression. From this perspective, teachers can apply the principles of psychoanalysis to design learning environments that consider students' emotional and unconscious aspects. Providing a safe atmosphere that reduces stress and allows students to express themselves contributes to improved engagement in the educational process and enhanced academic achievement (Mohammed, 2022: 123).

Optimistic thinking is a fundamental element that promotes mental health and positive behavior. It contributes to developing the ability to face challenges and difficulties constructively. Optimistic people often possess mental flexibility, which helps them cope with stress and turn

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo

Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

negative situations into opportunities for learning and growth. This positively impacts their academic, professional, and social performance. Thus, optimism becomes a powerful tool for enhancing intrinsic motivation and achieving personal and professional goals (Aziz, 2019: 88).

Optimistic thinking also plays an important role in promoting social relationships, as it encourages individuals to communicate positively and cooperate with others, and reduces conflicts and tensions resulting from negative behaviors. In addition, optimism contributes to better physical health, as studies have shown that optimistic individuals have stronger immune systems and a better ability to recover from illnesses. From this standpoint, optimistic thinking becomes an educational and psychological necessity that contributes to the development of a balanced personality capable of effectively facing life's challenges (Baqli, 2017:94).

1-3- Research Objectives:

This research aims to achieve the following:

1. To develop an instructional design based on cognitive flow theory strategies to improve the academic achievement and optimistic thinking of students in the faculties of education in the Educational Psychology course.
2. To determine the effectiveness of the instructional-learning design based on cognitive flow theory strategies in:
 - A. The academic achievement of first-year students.
 - B. The optimistic thinking of first-year students.

1-4- Research Hypotheses:

To achieve the second research objective, the researcher formulated the following null hypotheses:

- 1) There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group students studying according to the instructional-learning design based on cognitive flow theory strategies in the Educational Psychology course and the mean scores of the control group students studying the same material using the traditional method in the academic achievement test.
- 2) (There is no statistically significant difference at the 0.05 level of significance between the mean scores of the experimental group students studying according to the instructional-learning design of cognitive flow theory strategies in the Educational Psychology course and the mean scores of the control group students studying the same material using the traditional method on the Optimistic Thinking Scale.)

1-5- Research Limitations

The research limitations are as follows:

- 1) Human Limitations: First-year students.
- 2) Spatial Limitations: Al-Qasim Green University/College of Education.
- 3) Temporal Limitations: The first semester of the academic year (2025-2026).
- 4) Subject Limitations: The Educational Psychology course.

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

1-6- Definition of Terms:

1) Effectiveness is defined by:

- (Ghazi, 2021) as: "The ability to produce an effect, and the effectiveness of something is measured by the effect it has on something else" (Ghazi, 2021: 61).
- Operational Definition: The extent to which the cognitive flow theory influences instructional design for first-year students and their way of thinking depends on the cognitive flow theory as an independent variable (2025-2026).

2) Instructional Design is defined by:

- (Youssef & Adel, 2020) as: "A field of study and research concerned with describing the theoretical principles and practical procedures related to how to prepare educational programs, school curricula, educational projects, lessons, and the entire educational process, in a way that ensures the achievement of the set educational and learning objectives" (Youssef & Adel, 2020: 76).
- Operational Definition: Determining the best procedures for teaching the educational psychology course prescribed for first-year students, by following the following sequential and interconnected stages: (analysis, planning, implementation, evaluation, and feedback), according to the strategies of the cognitive flow theory, to help the researcher and the student achieve the set objectives in terms of time and effort.

3) The Cognitive Flow Theory is defined by:

- (Essam, 2023) States that: "The cognitive flow theory refers to the mental state in which an individual reaches a high level of focus and immersion in an activity, such that the sense of time disappears and their efficiency in processing information and solving problems increases. This theory focuses on the relationship between challenges and skills, where the individual feels satisfaction and motivation when tasks are appropriate to their abilities, thus promoting effective learning and optimistic thinking" (Essam, 2023: 54).
- Operational Definition: This is the basis for instructional design for students in faculties of education, which relies on the principles of psychoanalysis, such as understanding unconscious motives and interpreting behavior through id-superego conflicts. These principles are then used to develop educational activities that consider students' psychological and emotional aspects, aiming to enhance academic achievement in the educational psychology course.

4) Academic Achievement Definition:

- (Al-Fakhri, 2018) defines cognitive flow theory as: "The specific level of student performance or academic achievement and experience gained in the classroom, which is assessed by the professor or through standardized measurement tools and tests" (Al-Fakhri, 2018: 23).

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo

Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

- Operational Definition: The total score obtained by each first-year student on the achievement test for this research.

5) Optimistic Thinking: Definition:

- (Razouqi, 2018) Optimistic thinking is an individual's tendency to view things and events positively and to expect good outcomes even in the face of difficulties. This type of thinking is considered an important element of mental health and self-motivation, as it enhances the ability to cope with stress and difficult situations with confidence and hope. It motivates the individual to strive to achieve their personal, academic, and social goals (Razouqi, 2018: 121).

- Operational Definition: Optimistic thinking among students is the adoption of positive attitudes towards learning and the academic future, and it is measured through pre-assessment questionnaires. After educational programs, it is evident that one expects positive results, responds to challenges, and seeks solutions rather than giving up.

2- Theoretical Framework and Previous Studies

2-1- Theoretical Framework

2-1-1- Instructional Design:

Instructional design is a systematic, organized process comprising a set of interconnected activities aimed at achieving specific objectives that address particular educational problems. This process includes a series of main and sub-steps that ultimately lead to the desired educational outcomes. Since the essence of the educational process lies in the pre-planning and purposeful and systematic organization of learning situations to bring about desired changes in student behavior, the success of education requires the preparation of content that suits students' characteristics, needs, and abilities. From this perspective, the concept of instructional design has become a science concerned with describing the procedures related to selecting, analyzing, organizing, developing, and evaluating educational content, ensuring the efficient and effective achievement of educational objectives. Furthermore, effective instructional design facilitates learning in a more organized and in-depth manner, enabling students to use strategies that yield maximum benefit with minimal effort and time (Youssef, 2021: 23).

2-1-2- Cognitive Flow Theory:

2-1-2-1- Its Concept: Cognitive flow theory refers to the mental state in which a student is fully immersed in a particular activity, reaching the highest levels of focus and absorption. In this state, the student loses track of time and effort, experiencing satisfaction and intrinsic motivation. The theory explains that this state is achieved when the challenges of the task are balanced with the individual's skills, contributing to effective learning, creativity, and complete mental engagement in the activity. Cognitive flow is considered one of the most important psychological concepts for understanding how to motivate and engage individuals in the educational process effectively. It enhances intrinsic motivation and encourages students to face challenges positively (Dakhil & Mamdouh, 2020: 66).

From an educational perspective, the principles of cognitive flow can be applied to design learning situations so that task difficulty aligns with students' abilities and skills. This fosters a sense of accomplishment and self-motivation. This approach helps address educational problems

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).
related to academic weakness, low interest, and low participation by providing a stimulating learning environment that enables students to engage in educational activities fully. Thus, cognitive flow constitutes a theoretical framework that can be relied upon to develop innovative educational strategies to improve academic achievement and develop students' thinking and self-learning skills (Alwan et al., 2023: 47).

2-1-3- Cognitive Flow Theory Strategies:

2-1-3-1- Challenge Level Strategy:

2-1-3-1-1- Concept: The challenge level strategy is a modern educational strategy that aims to create a stimulating learning environment that suits students' abilities and potential. This strategy is based on determining the degree of difficulty of academic tasks to match the student's cognitive level. The activity should not be too easy, causing the student to lose motivation, nor too difficult, leading to feelings of inadequacy and frustration. Rather, it should fall within the optimal challenge zone that motivates them to think and achieve.

2-1-3-1-2- Implementation Steps(Al-Sir et al., 2021: 78-80):

- Conduct an initial assessment of students' skills and subject knowledge.
- Determine the difficulty level of tasks to suit each student's abilities.
- Design progressive learning activities, from easy to difficult, to encourage gradual engagement.
- Provide ongoing feedback to motivate students to improve their performance.
- Adjust the challenge level as students progress to ensure a continuous learning flow.
- Please encourage students to self-assess and monitor their progress to boost confidence and motivation.

2-1-3-2- Project-Based Learning Strategy:

2-1-3-2-1- Concept: The strategy of setting a level of challenge is a modern educational strategy that aims to create a stimulating learning environment that suits students' abilities and potential. This strategy is based on determining the degree of difficulty or challenge of educational tasks based on the student's cognitive level. The activity should not be too easy, causing the student to lose motivation, nor too difficult, leading to feelings of inadequacy and frustration. Rather, it should fall within the optimal challenge zone that motivates them to think and achieve.

2-1-3-2-2- Implementation Steps:

- Select a practical topic related to the learning objectives.
- Dividing the project into clear tasks of increasing difficulty.
- Assigning students individual and group work according to their abilities.
- Providing a supportive and safe learning environment that encourages experimentation and initiative.
- Regularly monitoring students' progress and providing appropriate guidance.
- Providing a comprehensive final assessment that includes achievement, collaboration, and application of acquired skills. (Mohammed, 2022: 125-126).

2-1-3-3- The Strategy of Immediate Feedback and Self-Motivation:

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

2-1-3-3-1- Concept: The strategy of immediate feedback and self-motivation is a modern educational strategy that aims to enhance learning by providing students with immediate feedback on their performance and enabling them to correct their mistakes instantly. This contributes to improved understanding and information retention. This strategy relies on direct and rapid interaction between the teacher and the student, or between the student and the learning material, so that the student receives immediate feedback clarifying the accuracy of their answers or learning steps.

2-1-3-3-2- Implementation Steps: (Al-Safrawi, 2020: 78)

- Design short, immediately evaluable activities such as interactive exercises or questions.
- Provide immediate feedback on performance and guide the student in correcting errors.
 - Motivate the student to set small, achievable goals during the activities.
 - Encourage the use of self-thinking and self-assessment strategies.
 - Provide intangible rewards or acknowledge the student's efforts to motivate them to continue.
- Monitoring the student's personal development and linking feedback to the development of their skills and abilities.

2-1-4- Academic Achievement

The concept of academic achievement is among the most common and fundamental in the field of education, particularly in educational psychology, given its crucial role in measuring and evaluating students' educational performance. It reflects the degree to which a student understands and comprehends the curriculum content and is a key indicator of the efficiency of academic programs and the quality of their outcomes (Al-Jadaani, 2020: 42).

2-1-5- Optimistic Thinking:

2-1-5-1- Its Concept: Optimistic thinking is a positive cognitive approach that focuses on seeing the bright side of life situations and dealing with challenges in a positive way that enhances motivation and adaptability. This thinking pattern aligns with the theories of positive psychology, founded by Martin Seligman, which emphasize that optimism is not merely a mood trait but a mental skill that can be learned and practiced. Optimistic thinking is also seen as an influential factor in mental health, academic achievement, and the development of emotional resilience, as it helps individuals interpret events in ways that reduce frustration and increase determination to succeed. From an educational perspective, this thinking fosters positive attitudes toward learning and enhances students' self-confidence (Al-Aqabi, 2019: 96).

2-1-5-2- Optimistic Thinking Skills:

- a. Positive Reinterpretation of Situations: Viewing difficulties as opportunities for learning and growth.
- b. Expecting Positive Outcomes: The tendency to expect success rather than failure in future situations.

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo

Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

- c. Cognitive flexibility: The ability to modify negative thoughts and replace them with constructive ones.
- b. Self-talk control: Monitoring one's own thoughts and using positive self-talk to boost intrinsic motivation.
- c. Focusing on solutions, not problems: The essence of effective positive thinking in the face of crises.
- d. Perseverance and determination: Believing in the value of continuous effort and work to achieve goals despite difficulties. (Nazzal, 2018: 230-231)

2-2- Previous Studies:

The study "(Building an Instructional Learning Design Based on Infographic Technology in Acquiring Scientific Concepts of Educational Technology and Instructional Technology among Students of Colleges of Education)" (Al-Fallahi and Jassim, University of Wasit, 2025) is one of the recent studies that focused on employing the principles of instructional design in an interactive digital learning environment. The study aimed to develop an instructional design that uses infographic technology to simplify scientific concepts, making them clearer and more engaging for learners by organizing information visually and strengthening connections between ideas. The study adopted the experimental method to measure the effectiveness of the design on a sample of students of colleges of education, and the results showed statistically significant differences in favor of the group that studied according to the infographic design, which indicates a positive effect on developing conceptual understanding and activating cognitive organization processes among students. The study recommended integrating modern instructional design strategies into university curricula to enhance visual thinking, develop self-learning skills, and foster positive interaction within the educational context.

3- Research Methodology and Procedures

3-1- Research Methodology

In the implementation and evaluation phases, the researcher adopted the experimental method as it was the most suitable for the second objective of the research. This method relies on controlling all variables and factors affecting the event, except for one specific and dependent change in the event's circumstances (Al-Jabri, 2011: 307).

3-2- Justifications for Constructing the Instructional Design

After studying several methods for creating instructional designs, the researcher believes that creating an instructional design using the effects theory is most likely achieved through a systematic approach to design and progress, which is then measured and evaluated using appropriate methods.

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

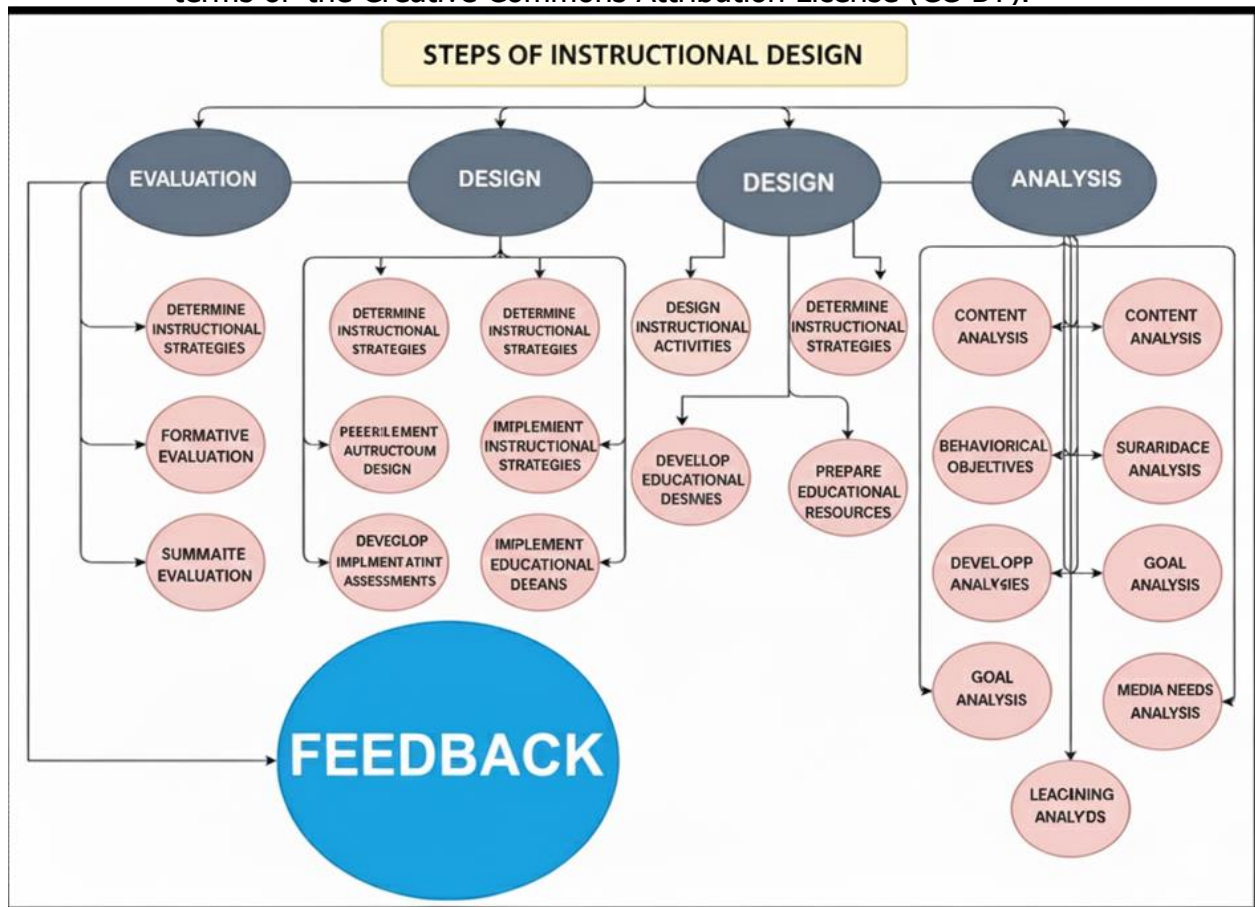


Diagram (1): The different stages of the instructional design proposed by the researcher.

- Stage One: Analysis

This is the first step and the foundation of the process. All other stages can be derived from it. It includes a series of steps:

1) Defining the educational objectives: The researcher believes that a clear purpose is essential for an effective, well-organized instructional design. This design is based on a theoretical framework of influence, achievement, and aligning thought processes, utilizing scientific resources that support the general objectives and ensure the design's consistency with the educational goals.

2) Defining the curriculum content: The following procedural steps were followed:

- Reading the instructional content carefully and scientifically.
- Identifying the key elements (main and subheadings within the content).
- Organizing the preceding sections logically.

3) Analyzing Student Characteristics: This involved matching the two groups in certain variables.

4) Analyzing the Learning Environment: To understand the learning environment in which the proposed instructional design would be implemented, the researcher visited

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo

Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

the selected school after obtaining official permission. The purpose of the visit was to assess the school's current situation and verify the availability of the necessary resources and tools for implementing the learning process. After confirming its readiness, the researcher was permitted to proceed with the study.

5) Assessing Educational Needs: This involved identifying the educational requirements of the research population through the following:

- Assessing Needs from the Students' Perspective: The questionnaire consisted of six sections, each containing 21 questions. After analyzing the survey responses, the data revealed the following, as shown in the table below:

Table (1): Educational Needs Identified by Students

	Educational needs	Percentage		Educational needs	Percentage
1	Teaching methods	71%	4	Assessment methods	60%
2	Organizing the weekly schedule	58%	5	Homework	65%
3	Educational material	86%	6	Teaching resources	85%

- Phase Two: Preparation Phase:

1) Organizing the Course Content: The researcher followed the logical sequence of the Educational Psychology course content, given that it is a scientific course arranged sequentially and continuously for first-year students. To ensure systematic organization, the content was divided into sections in collaboration with the course instructor in the Arabic Language Department, to be taught during the first half of the 2025-2026 academic year.

2) Defining Teaching Strategies for the Flow Theory: This procedure is crucial for designing the educational content. The researcher used the effect theory in the design. For presentation to several different reviewers, the researcher selected strategies that were relevant to the educational objectives, appropriate to the students' characteristics, suitable for the content, applicable to the students' needs and mental age, flexible and versatile, and educationally compatible with the students' chronological age. The strategy was implemented and achieved an agreement of 89% or more, according to the Cooper Agreement formula. The reviewers' names are listed in Chapter Two.

3) Identifying Educational Activities and Resources: The results of the educational needs analysis, conducted during the instructional design phase from the perspectives of course instructors and students, revealed a shortage of academic resources and modern teaching methods needed to teach the Knowledge Flow Theory course. Consequently, the necessary resources were provided for each topic, including educational tools and scientific posters. The researcher also created several educational tools specifically for this phase.

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo

Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

4) Developing Lesson Plans: The researcher designed models for each strategy, including a model for the control group. Minor modifications were then made to the strategy and presented to a larger sample of participants. Based on the results, the final versions of the strategies were implemented.

5) Developing Assessment Tools: Data was collected using measurement tools developed by the researcher. A prior knowledge test was designed and administered to both the experimental and control groups to determine students' prior knowledge, as instructional design is a factor influencing their academic success.

- Phase Three: Implementation Phase: This phase includes the following steps:

1) The researcher implements the instructional design themselves, as they possess the most extensive knowledge and understanding of instructional design and are capable of executing the design in all its steps. 1. Follow the established schedule and attend weekly lessons.

- Phase Four: Evaluation: Based on the above, the researcher used a range of evaluation methods to assess the effectiveness of the proposed instructional design for the first phase.

- Phase Five: Feedback: The importance of feedback lies in encouraging students to continue when they achieve good results, and motivating them to make additional efforts to improve their performance if their performance is low.

3-3- The second axis: Research procedures:

To achieve the second objective of the research and to verify the two hypotheses, the researcher followed these procedures:

First: Choosing the experimental design: The research adopted a quasi-experimental design with two equal groups and a final test to measure success or failure, as this approach is suitable for the study's objectives. The design consists of an experimental group and a control group, where the experimental group is taught using a design grounded in educational learning theory and cognitive flow, with teaching options appropriate to the academic situation. In contrast, the control group receives the expected traditional teaching. Figure 1 shows the independent and dependent variables, along with the methods used to measure them.

	group	Equivalence	Independent variable	Dependent variable:
1	The experimental	1. Students' chronological age, calculated in months. 2. Prior knowledge test	Instructional design – learning based on the knowledge flow theory	Academic achievement
2	The	3. Daneliz Intelligence	Traditional method	+Optimistic

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

	control	Test		thinking
		4. First semester grades		
		5. Optimistic thinking scale		

Figure 1: The Experimental Design Adopted in the Research

The second: The Research Population and Sample

1) The Research Population: The research population consists of the colleges of education in Iraq designated for the academic year (2025-2026). The researcher intentionally selected the College of Education at Al-Qasim Green University. In these institutions, the number of departments designated for first-year students must be at least.

2) To select the research sample from the original population, which the researcher deemed to have an important role in the study, the researcher chose Al-Qasim Green University/College of Education for this research.

3) The Research Sample: The current research sample is divided into two parts:

a. **College Sample:** The researcher intentionally selected the College of Education at Al-Qasim Green University. The researcher intentionally selected the research sample for the following reasons:

- The college and the Department of History administrations expressed their full willingness to cooperate with the researcher in the experimentation.
- To save time, effort, and costs, as the researcher resides in the Babylon Governorate.

b. **Student Sample:** The researcher randomly selected the History Department as the sample for his research. The first stage consisted of (91) male and female students distributed across three sections: A, B, and C. Section (A), consisting of (30) male and female students, was chosen to represent the experimental group, and section (B), consisting of (31) male and female students, was chosen to represent the control group.

Table (2): Number of students in the two research groups before and after elimination.

group	Section	Number of individuals in the sample:	Number of excluded students	final sample size
The experimental	A	30	-	30

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

The control	B	31	-	31
Total		61	61	61

Third: Control Procedures: To control these factors, the researcher divided them into:

1) Variables related to the research population (internal integrity of the research design): as per the following table:

Table (3): Scores of students in the two research groups

Variable	group	numb er	arithme tic mean	standar d deviati on	Drege e of freedo m	T value		Statistica l significan ce
						The schedu le	The schedu le	
Chronologi cal Age	The experimen tal group	30	252.23	5.4	59	0.067	2.000	Not significant
	The control group	31	252.13	6.59				
Prior Informatio n	The experimen tal group	30	15.57	6.36		0.27		
	The control group	31	15.13	6.32				
Intelligenc e Test	The experimen tal group	30	55.1	13.62		0.109		
	The control group	31	54.71	14.22				
First Course Grades	The experimen tal group	30	69.82	7.09		0.256		
	The control group	31	70.29	7.21				
Optimistic Thinking Scale	The experimen tal group	30	9.71	2.96		0.051		
	The control group	31	9.67	3.351				

2) Variables Related to Experimental Procedures and External Variables (External Validity of the Research Design)

Experimental procedures may affect the dependent variable. Therefore, the researcher implemented a set of measures to ensure a high level of validity, including

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo

Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

careful participant selection, monitoring of related events, control for experimental extinction, consideration of maturation processes, and adjustment of measurement instruments and experimental procedures.

Fourth: Research Requirements: Before experimenting, the basic requirements for the Experiment must be prepared, namely:

1) Defining the Scientific Material: The researcher identified the scientific material to be taught to students in the two research groups during the Experiment. This material included topics from the educational psychology course (fundamentals of educational psychology, motivation, memory and forgetting, transfer of learning, theories of transfer of knowledge, feedback, education, learning theories, and learning curves).

2) Formulating Behavioral Objectives: The researcher formulated (200) behavioral objectives based on the vocabulary of the educational psychology course to be taught in the Experiment. These objectives were distributed across the six levels of Bloom's Taxonomy: (knowledge, comprehension, application, analysis, synthesis, and evaluation). To confirm their validity and alignment with the educational psychology curriculum, the researcher presented them to a group of specialists in education and teaching methodologies. After analyzing the reviewers' responses, the results showed that all the behavioral objectives were valid according to the experts' and specialists' opinions. Based on this, the achievement test was also developed.

3) Preparing Lesson Plans: The researcher prepared lesson plans for the educational psychology course to be taught during the Experiment. These plans were based on the course syllabus and the formulated behavioral objectives. They followed the strategies of the cognitive flow theory for the experimental group students, while the control group students used the traditional method. Three of these plans were presented to a group of specialists in education and teaching methodologies to gather their opinions, observations, and suggestions for improving the plans and ensuring their effectiveness in guaranteeing the Experiment's success. Based on the reviewers' feedback, the necessary modifications were made, and the plans were ready for implementation.

Fifth: Research Instruments: To achieve the research objective, the researcher developed a device to measure the dependent variable (achievement). This device was used to determine the degree to which the independent variable (the instructional design based on cognitive flow theory) is represented and affects these variables. The following is a description of the processes involved in creating the instrument:

First: The Achievement Test:

a. **Defining the Test's Objective:** The achievement test aims to measure the achievement of first-year students (the research sample) in the Educational Psychology course scheduled for the academic year (2025-2026).

b. **Determining the Number and Type of Test Items:** The researcher administered objective multiple-choice tests to assess levels of Bloom's Taxonomy (knowledge, comprehension, application, analysis, synthesis, and evaluation). The total achievement score for the multiple-choice component was 40. From the original text,

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).
there are four possible solutions: one is correct, and three are false, taking into account the students' age and the lecture time.

c. **Preparing the Specifications Table:** The researcher prepared a specifications table for the achievement test based on the behavioral objectives of the six levels of Bloom's Taxonomy.

Table (4): Specifications Table for the Achievement Test

Vocabulary	Pages	Relative importance	Percentage of behavioral goals						Total 100 %
			Knowledge	Understanding	Implementation	Analysis	Composition	Evaluation	
			30%	21%	17%	13%	10%	9%	
Fundamentals of Educational Psychology	4	9%	1	1	1	1	0	0	4
Motivation	5	11%	1	1	1	1	0	0	4
Memory and Forgetting	6	13%	2	1	1	1	1	0	6
Transfer of Learning	7	15%	2	1	1	1	1	1	7
Theories of Transfer of Learning	3	7%	1	1	0	0	0	0	2
Feedback	4	9%	1	1	1	0	0	0	3
Learning	5	11%	1	1	1	1	0	0	4
Learning Theories	4	9%	1	1	1	0	0	0	3
Learning Curves	7	16%	2	1	1	1	1	1	7
Total	45	100%	12	9	8	6	3	2	40

Test Scoring:

- a. Scoring of the Objective Test (Multiple Choice):
 - One mark is awarded for each correct answer in the test items.
 - A zero mark is awarded for incorrect or left-unanswered answers, or answers containing more than one correct answer, for each test item.

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo

Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

b. Test Validity: The researcher used two forms of validity to guarantee that the accomplishment test was legitimate:

- **Face Validity:** After verifying the test's face validity, the researcher distributed it to a group of education and teaching methodologists, along with the behavioral objectives and the specifications table, achieving an agreement rate of 80% or more for each item, as determined by Cooper's formula.

c. Content Validity: The test items were constructed based on the table of specifications so that the instrument's test items were representative of the subject matter and behavioral objectives the test was intended to measure; that is, the test content was content valid.

d. Exam Administration: Two pilot groups were administered the accomplishment exam, as previously stated:

- **This application was first used for experimental purposes.** Once its legitimacy was verified, the test was administered to a sample of 30 male and female students from the Arabic Language Department at the University of Kufa as a first exploratory attempt. To ensure clarity regarding the instructions for taking the test and the items on it, students were informed about the alternatives and when to respond to each item.

- Test Time = Time per Question*Number of Questions)
(Shawaheen, 2018: 87)

Test Time = $2640 / 30 = 88$ minutes ~ 90 minutes

- **Second Pilot Application:** Once the researcher ensured that the test instructions and items were clear and the time needed to complete them was determined, the test was administered to a second large sample of 100 first-year students studying in the Arabic Language Department at Al-Mustansiriya University. The researcher himself supervised the test.

- Analyzing Items Statistically: To conduct the subsequent statistical analyses:

- a) Item Difficulty Index: The researcher used the formula $\frac{1}{N} \sum_{i=1}^n X_i$ to determine the difficulty index for each item in the accomplishment exam, with results ranging from 0.42 to 0.71.

- b) Discrimination value: The researcher determined that each test item had a discrimination value ranging from 0.32 to 0.53.

- c) Incorrect Alternatives' Effectiveness: The researcher uncovered a range of (-0.04 to 0.31) for the effectiveness of the alternatives of the test items.

- **Test Reliability: The researcher verified the test's reliability using two methods:**

- a) Split-Half Method: The test's reliability, using Pearson's correlation coefficient, was 0.82; corrected using the Spearman-Brown formula, it was 0.90.

- b) The Kuder-Richardson 20 formula yielded a reliability coefficient of 0.86.

Second: Optimistic Thinking Scale:

Scale Item Formulation: The scale items were formulated to total 48 items, which illustrate the distribution of the scale items. The items were formulated so that the

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo

Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

student could answer them with choices representing the degree to which they applied to the student, namely: (Always applies to me, Often applies to me, To some extent applies to me, Never applies to me). The following considerations were taken into account when formulating the scale items:

Construct Validity (Internal Consistency): The correlation coefficients for each scale item ranged from 0.23 to 0.80. Scale Reliability: Scale reliability means it yields the same results when used repeatedly under the same conditions. There are several methods for calculating scale reliability. Cronbach's Alpha was used to calculate the reliability coefficient:

Cronbach's Alpha Method: This method was used to calculate the scale's reliability coefficient, yielding 0.92, a good value.

Sixth: Statistical Methods: The researcher used SPSS software.

4- Presentation and Interpretation of Results

This chapter presents the research findings and their interpretation, leading to the conclusion that the proposed instructional design is effective, enhances student success in basic education classes in educational psychology, and is compatible with the assumptions. Following this, the researcher determined the statistical significance of the difference between the two groups' mean scores to verify the two null hypotheses.

First: Presentation of Results: The results will be presented according to the research objectives as follows:

1) The first objective states: (There is no statistically significant difference at the 0.05 significance level between the mean scores of the experimental group students studying according to the instructional-learning design of cognitive flow theory strategies in the educational psychology course and the mean scores of the control group students studying the same material using the traditional method in the academic achievement test).

To evaluate the null hypothesis, the researcher combined the mean scores of the students in both research groups. When using a t-test on two separate samples, the results are presented in Table 5.

Table (5): Arithmetic mean, standard deviation, and t-value of the scores of the students in the two research groups in the final achievement test

group	number	arithmetic mean	standard deviation	T value		Degree of freedom	Statistical significance
				Calculated	The schedule		
The experimental group	30	47,066	8,250	5,838	2,000	59	significant
The	31	30,7	12,9				

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

control group		7	50				
---------------	--	---	----	--	--	--	--

• Practically Significant Results:

In addition to identifying the statistical significance of the research variables, the researcher must also consider the practical significance, which indicates the strength of the relationship between them. This is statistically known as "effectiveness," ensuring that the resulting differences are due to the independent research variable and not to chance. To determine the effectiveness of the independent variable, the instructional-learning design of the knowledge flow theory, the researcher used the eta equation, relying on the gradient as a criterion for judging the η^2 coefficient (η^2). Table 6) illustrates this.

Table (6): To determine the effect size of the (η^2) value

The tool used	Impact size		
	weak	middle	big
η^2	0,01	0,06	0,14

(Kiess,1996: 57)

After statistical analysis, the effect size was 0.33, indicating that the instructional design based on the cognitive flow theory has a significant impact on student achievement in the educational psychology course. Table 7 illustrates this.

Table 7: Effectiveness of the Instructional-Learning Design Based on the Cognitive Flow Theory

Dependent variable	value of eta squared	Impact size
Academic achievement	0,32	big

The second objective, which states: "To test the second null hypothesis, which claims: (Students in the educational psychology course who used instructional-learning design strategies based on cognitive flow theory had no statistically significant difference in mean scores compared to those in the control group who used the traditional method to study the same material", on the Optimistic Thinking Scale).

Table (8): Final results of the Optimistic Thinking Scale application

Group	number	arithmetic mean	standard deviation	T value		Degree of freedom	Statistical significance
				Calculated	The schedule		
The experimental group	30	15,067	3,542	8,750	2,000	59	significant
The control group	31	7,484	3,224				

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

Furthermore, I used eta-squared to calculate the effect size (d) of the independent variable, cognitive flow strategies, on the dependent variable (optimistic thinking scale), as shown in Table 8.

Table 9: "Effect magnitude of the independent variable on the optimism scale variable"

Independent variable	Dependent variable	Impact size value d	Impact size
Instructional-learning design of cognitive flow theory strategies	Optimistic thinking	0.76	Average

Table (9) above shows that the value of (d), representing the effect size, was (0.76), "which is a suitable value for interpreting the effect size and represents a moderate effect size for the pedagogical variable of the instructional design of cognitive flow theory tactics on the optimistic thinking scale", favoring the experimental group.

Second: Interpretation of Results:

1) Interpretation of Results Related to the First Null Hypothesis:

- a. The pedagogy involved students in a variety of active-learning activities that promoted inquiry, discussion, and problem-solving. Together, this allowed them to construct their knowledge rather than receive it passively. This interactive experience reinforces the link between fresh and previously acquired knowledge, which is reflected in their greater performance.
- b. The activities, designed based on cognitive flow theory, thoroughly laid out the goals and provided easily understandable guidelines to guide students during face-to-face lectures. One factor that increases goal clarity is that goals help students focus on the learning task, track their progress, lead them to success, and ultimately improve their academic achievement.
- c. The tasks designed enhanced students' sense of empowerment to overcome learning barriers, motivation to learn on their own, and a sense of control over the learning situation. A belief in this ability to succeed led to greater time and persistence invested in learning until success occurred, which accounted for the higher experimental group scores.

2) Results Interpretation Related to the Second Null Hypothesis:

- a. An organized, stimulating, fun, and motivational learning environment with opportunities to feel a sense of accomplishment in the absence of stress and anxiety; this results from the successful application of cognitive flow theory in instructional design. Creating an environment that fosters healthy attitudes toward self, learning, and the future is what optimism is made of.
- b. Two of the foundational principles of the cognitive flow model are the balance between the challenge of the task and the learner's hunger. This helps students feel competent in their success, which creates a positive emotion toward learning and confidence in their ability to succeed, which then creates a positive, optimistic mindset about their educational and life circumstances.

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo

Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

c. Cognitive flow and intrinsic motivation: The cognitive flow activated by the instructional design stimulated the students in terms of intrinsic motivation for learning, since the students felt they were learning for themselves and not just to obtain good grades. Motivating students in this way helps them develop a positive mindset about themselves and the future and reinforces their optimism, because they see that effort leads to success, not failure.

3) Third: Conclusions: Based on the results of the research and after processing the data, the following conclusions can be reached:

a) Abstract. In the articles, the study of study skills of final yr education college students, encompassing performance, from cognitive float techniques design to promote students' achievement through its management mixture and cyclic relationships between balanced group and development in psychological concept.

b. Results showed that cognitive flow strategies promoted positive experiences and feedback and facilitated optimism, self-confidence, and success expectancies among students.

c. Results confirm that the relationship between task difficulty and skill level is a key factor in determining success in instructional design, as it promotes cognitive flow, performance, and achievement.

4) Fourth: Recommendations: Based on the research results, the researcher recommends the following:

a. Adopting cognitive flow theory strategies in designing university courses, particularly in educational disciplines, given their proven effectiveness in developing students' academic achievement and optimistic thinking.

b. How to apply cognitive flow principles and strategies in a college of education to create an energizing, balanced classroom environment and develop corresponding workshops for faculty.

c. Developing e-learning environments based on cognitive flow principles, so that students can learn effectively and continuously in a more engaging manner that increases both achievement and a positive mindset.

5) Fifth: Recommendations: According to the results, the researcher recommends:

a. Future research (similar to the graduate-level study) could be conducted to design instruction using state cognitive flow strategies to determine whether this enhances achievement and design thinking skills.

b. Using cognitive flow theory strategies in different courses (e.g., methods, general psychology, and curriculum) and assessing their effect on achievement and mental processing skills.

c. Preparing training programs aimed at students of faculties of education to introduce them to the principles and strategies of the knowledge flow theory and its application in educational practices within classrooms and field training.

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY).

Originality Statement

The author[s] declare that this article is their own work and to the best of their knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the published of and other published materials, except where due acknowledgement is made in the article. Any contribution made to the research by others, with whom author[s] have work, is explicitly acknowledged in the article.

Conflict of Interest Statement

The author[s] declare that this article was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

- [1] S. G. Al-Aqabi, Thinking Patterns and Levels of Academic Achievement, 1st ed., Amman, Jordan: Dar Al-Yazouri Scientific Publishing and Distribution, 2019.
- [2] S. M. A. Al-Atawi, Learning Theories and Their Applications in E-Learning, 1st ed., Riyadh, Saudi Arabia: King Saud University Press, 2020.
- [3] D. Al-Jadaani, Keys to Improving Academic Achievement Through Textbooks, 1st ed., Jeddah, Saudi Arabia: South Jeddah Office, 2020.
- [4] M. A. Al-Mun'im, Instructional Design and Applied Programs, 1st ed., Amman, Jordan: Dar Al-Rayah for Publishing and Distribution, 2019.
- [5] S. G. T. Al-Safrawi, Active Learning Strategies: Scientific Activities and Applications, 1st ed., Amman, Jordan: De Bono Center for Thinking Skills, 2020.
- [6] K. K. Al-Sir, S. F. Saeed, and K. R. Al-Kalabi, Contemporary Teaching Strategies and Their Practical Applications, 1st ed., Gaza, Palestine: Higher Education Press, 2021.
- [7] Y. F. Alwan, A. K. Al-Jubouri, and S. M. Al-Shammari, Modern Models in Constructivist Theory, 1st ed., Amman, Jordan: Dar Al-Kutub Al-Ilmiya, 2023.
- [8] J. Aziz, Thinking Styles, 1st ed., Amman, Jordan: Al-Radwan Publishing and Distribution House, 2019.
- [9] D. A. H. M. Baqli, Thinking Patterns, 1st ed., Amman, Jordan: Dar Al-Radwan for Publishing and Distribution, 2017.
- [10] S. M. Dakhil Khairallah and M. A. M. Al-Kinani, The Psychology of Education: Between Theory and Practice, 1st ed., Beirut, Lebanon: Dar Al-Nahda Al-Arabiya, 2020.
- [11] D. M. Essam, Learning Theories, 1st ed., Amman, Jordan: Al-Manahij Publishing and

HOUSE OF WISDOM: JOURNAL ON LIBRARY AND INFORMATION SCIENCES

ISSN 3089-6002. Published by Universitas Muhammadiyah Sidoarjo
Copyright © Author(s). This is an open-access article distributed under the
terms of the Creative Commons Attribution License (CC-BY).
Distribution House, 2023.

- [12] H. M. Ghazi, Dictionary of Educational and Psychological Terms, 1st ed., Amman, Jordan: Dar Al-Wifaq Publishing and Distribution, 2021.
- [13] H. O. Kiess, Statistical Concepts for Behavioral Sciences, 3rd ed., London, UK: Allyn and Bacon, 1996.
- [14] M. Mash'aleh, Curriculum Planning: Integrating Multiculturalism, Structuralism, and Educational Reform, 1st ed., Amman, Jordan: Dar Al-Fikr for Publishing and Distribution, 2018.
- [15] J. A. Muhammad, Strategies for Teaching and Enjoyable Learning: Applied Models, 1st ed., Amman, Jordan: Al-Muttahida Publishing and Distribution, 2022.
- [16] H. K. Nazzal, Thinking Skills (Concept, Types, and Measurements), 1st ed., Baghdad, Iraq: Noor Al-Hussein Library for Printing, 2018.
- [17] R. M. Razouqi and N. R. Muhammad, Thinking and Its Patterns, vol. 3, Beirut, Lebanon: Dar Al-Kutub Al-Ilmiya, 2018.
- [18] K. S. Shawahin, Modern Guidelines in Educational Measurement and Evaluation, 1st ed., Amman, Jordan: Modern Book World for Publishing and Distribution, 2018.
- [19] A. Yousef, Instructional Design: Concept, Foundations, and Models, 1st ed., Amman, Jordan: Dar Al-Rayah for Publishing and Distribution, 2021.