

**Analysis of the content of "the chemistry book for the third intermediate grade" according to cognitive agility**

تحليل محتوى كتاب "الكيمياء للصف الثالث المتوسط" على وفق الرشاقة المعرفية

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**Abstract:**

The current research aims to analyze the content of the book "Chemistry for the Third Intermediate Grade" according to cognitive agility. To achieve the goal of the research, the two researchers built a content analysis tool for cognitive agility. The tool included three dimensions, namely (cognitive openness, cognitive flexibility, and focus of attention), and then derived 30 indicators from them, to be sure. To ensure the validity of the tool, it was presented to a number of experts in the field of teaching methods, measurement and evaluation, and curricula.

To achieve the goal of the research, the two researchers followed the descriptive approach. The population and sample for the research were from the book "Chemistry for the Third Intermediate Grade" for the academic year (2022-2023), then they were used. The analysis tool was prepared based on the idea (explicit and implicit), as a unit for recording, repetition, and enumeration for content analysis.

To extract the validity of the analysis, a model was randomly selected from the analyzed material and presented to the experts who agreed on the validity of the analysis process. The stability of the analysis was calculated using the Holiste equation and the results were as follows. Content analysis included 82 repetitions in the book, distributed unevenly across the three dimensions. Accordingly, the two researchers presented a set of recommendations and a number of proposals in accordance with the results. reached by the two researchers.

**Keywords:** cognitive agility ; content analysis ; textbook

البحث الحالي يهدف الى تحليل محتوى كتاب "الكيمياء للصف الثالث المتوسط" على وفق الرشاقة المعرفية ولتحقيق هدف البحث قامت الباحثتان ببناء أداة تحليل المحتوى للرشاقة المعرفية وتضمنت الأداة ثلاث ابعاد وهي ( الانفتاح المعرفي، المرونة المعرفية، تركيز الانتباه ) ثم اشتقت منها ٣٠ مؤشر، وللتأكد من صدق الاداة تم عرضها على عدد من الخبراء في تخصص طرائق التدريس ، والقياس والتقويم، والمناهج، ولتحقيق هدف البحث اتبعت الباحثتان المنهج الوصفي، وكان مجتمع وعينة البحث من كتاب "الكيمياء للصف الثالث المتوسط" للعام الدراسي ( ٢٠٢٢-٢٠٢٣ ) م، ثم استخدمتا أداة التحليل المعدة بالاعتماد على الفكرة (الصريحة، والضمنية)، كوحدة للتسجيل والتكرار والتعداد لتحليل المحتوى، وللاستخراج صدق التحليل تم اختيار انموذج بصورة عشوائية من المادة المحللة وعرضها على الخبراء الذين اتفقوا على صلاح عملية التحليل، وتم حساب ثبات التحليل باستخدام معادلة Holiste ، وجاءت نتائج تحليل المحتوى بتضمين الكتاب ٨٢ تكراراً توزعت بصورة متفاوتة على الابعاد الثلاث، وبناء على ذلك تقدمت الباحثتان بمجموعة من التوصيات وعدد من المقترحات وفقاً للنتائج التي توصلت اليها الباحثتان.

الكلمات المفتاحية: الرشاقة المعرفية؛ تحليل المحتوى؛ الكتاب المدرسي

## **Introduction :**

The process of reforming the content of chemistry courses aims to develop them in a way that is commensurate with the scientific progress that the world is witnessing, and the practical reality that we live in today has forced us to remain in a state of continuous struggle, and in a constant need to have an open mind that not only accepts the new, but also seeks it. Students should be trained and their efficiency increased by adapting to changes and provided with the necessary tools to ensure scientific success by diversifying academic content and educational sources to suit the thinking patterns of future generations by employing technology in their daily lives .

The two researchers believe that the success of academic courses begins with developing adjustment skills, flexibility, a sense of responsibility and focusing attention, which are vital in order to achieve the goals of the learning process. To improve the reality of teaching chemistry, it is necessary to exercise the educational role and choose strategies that include reaching the concepts in their correct sense and developing students in a way that achieves Their desires and needs, and prepares them to deal with the requirements of contemporary life, by developing the mental structures of learners that are appropriate to the changes of this century and in a way that helps them solve their scientific and life problems.

Several changes have been made to the chemistry and science curricula by the Ministry of Education, for several years, in order to keep pace with modern developments, and to take into account the

applied and functional aspects of the curriculum, by implementing a series of new chemistry and science curricula for the intermediate stage. Therefore, the process of reforming textbooks involves identifying The extent to which they keep pace with educational developments, as the two researchers conducted interviews with a number of supervisors, male and female teachers, and presented a survey questionnaire to a group of male and female teachers who have experience in the field of teaching, which included the following questions:

- Does the content of "the chemistry book for the third intermediate grade" include the dimensions of cognitive agility?
- Do teachers encourage students to search online to keep up with developments in chemistry topics?
- 90% of chemistry teachers, male and female, agreed not to include the dimensions of cognitive agility in "the chemistry textbook for the third intermediate grade".
- 85% of male and female teachers agreed that students should not be encouraged to search online to keep up with developments in chemistry topics.

It is clear from the results of the survey questionnaire that the opinions of male and female teachers agree that the chemistry textbook suffers from a clear deficiency in the dimensions of cognitive agility. This resulted in the following question:

**What are the dimensions of cognitive agility included in the chemistry book for the third intermediate grade?**

**research aims:**

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The current research worked to achieve the following aim:

Analysis of the content of "the chemistry book for the third intermediate grade" according to the dimensions of cognitive agility.

### **Research Methodology:**

The two researchers followed the analytical method in revealing the cognitive agility included in "the chemistry book for the third intermediate grade", as it is one of the methods used to reveal the extent of interest in the content of the book..

### **search limits:**

Time limits: The study was conducted in 2022-2023 AD

Objective limits: 1- Content of "the chemistry book for the third intermediate grade", edition (10) of the year (2021), provided by the Iraqi Ministry of Education.

2- Cognitive agility, which is represented by the three areas and includes (cognitive openness, cognitive flexibility, and focus of attention).

### **Method**

#### **Research Design(research importance) :**

The world we live in today has become its predominant characteristic of change, and there is a constant need to have an open mind that seeks change (Ali Jaber, 2009: 292-293), and changes in the environment require students to be highly flexible and adjustment in order to be able to keep pace with the renewed changes. As shown by (Anderson & Diamond, 2006, 205), cognitive flexibility plays an important role in changing situations through which new ideas and alternatives are generated. It also enables students to build knowledge

and move between those changing situational environments (Ahmed Kishar, 2018: 30), and from this standpoint The researchers believe that it works to improve decision-making skills based on uncertain data due to the dynamism of the situation they are experiencing. It also represents a means through which new information can be processed by linking it to previous knowledge to form facts and information related to new learning. Accordingly, the teacher He represents an individual who needs to adapt his performance every moment given that the learning environment in which he studies is a changing environment. Therefore, he must make decisions in multiple environments characterized by uncertainty, certainty, and information overload (Abd Rabbo, 2020: 825). Based on the above, The two researchers summarize the importance of the research thus:

- 1- The scarcity of Arab and foreign research within the limits of what the researcher reviewed.
- 2- The current research is one of the contemporary approaches to the field of cognitive psychology.
- 3- It may be a solution to the problems facing students through their dealings with complex knowledge through which students can transfer it to new situations to solve their problems.
- 4- Preparing a new measurement tool for cognitive agility skills may be useful in the future to expand its use to other groups.
- 5- This research may provide an approximate picture for workers in this field about individual differences in cognitive agility skills in order to develop and build a useful database for researchers to prepare training programs to eliminate these differences.

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6- Providing a theoretical framework of reference for cognitive agility as it is a modern and contemporary variable.

7- Drawing the attention of those in charge of the educational process to the importance and necessity of the dimensions of cognitive agility.

**Search terms:**

1 -Cognitive agility (Good, 2009)

“It is a complex cognitive formation that reflects the extent to which three cognitive abilities of an individual fit together while working in environments that include dynamic tasks, enabling him to adapt his performance to every level of response requirements to such tasks(Good, 2009:19).

2 -Cognitive agility defined it (Erozkan, 2013)

It is a multi-dimensional mental structure that combines cognitive openness, cognitive flexibility, and focus of attention, as cognitive levels increase student performance, which varies from one student to another depending on many factors such as their mental abilities and skills .(Erozkan, 2013:739)

3 -Cognitive agility defined it (Hutton & Tuner, 2019)

“It is the extent of the individual’s ability to work flexibly between cognitive openness and focused attention, and it appears in the degree of his openness to all the alternatives available in the task and the degree of his flexibility in responding to them. He is able to flexibly change the focus of his attention between broad and narrow directions

during attempts to analyze the content of the task". (Hutton & Tuner, 2019: 2).

**Operational definition:**

Agility is defined as “the agility of students in moving the mind with all smoothness and flexibility between the three abilities, so that his focused attention does not miss the opportunity to notice any new information, provided by his cognitive openness, and he fails to integrate it into his processing processes, by focusing on the information presented to him, Get distracted by processing information that is not relevant to the task.

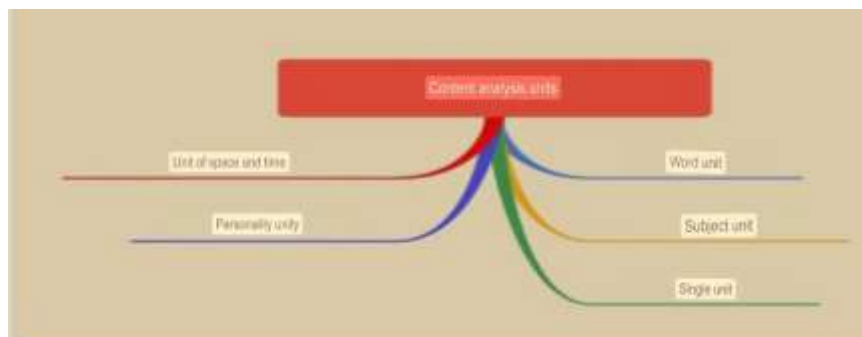
**A historical overview of content analysis :**

Researchers use the content analysis method in several areas, including: First - to describe the material to be analyzed in terms of content and form, and second - to meet the needs of the research. The analysis also includes scientific concepts and facts by specifying the topic and the research community, whose content will be studied and analyzed. (Chabita, 2016: 23)

This does not negate the fact that content analysis is of great importance, especially in this century in which a massive revolution of information and multiple types of knowledge has accumulated, which requires judging the extent to which it takes into account the principles and standards on which it is developed by judging its elements and components and describing it qualitatively and quantitatively. (Mohamed and Reem, 2012: 15).



## Content analysis units



### Uses of content analysis

The content analysis method is used in several fields, including:

- Textbooks, newspapers and magazines
- Stories, radio and television programmes.
- Discourse (political, religious, cultural,.....)
- A lecture, a discussion group, a conversation between two people, or a symposium...) (Al-Tamimi, 2011: 276).

### The importance of content analysis in the educational field

Content analysis is one of the main pillars in the educational field for several reasons, including:

- Determining the availability of scientific standards in academic courses
- Identifies the strengths and weaknesses in the courses to work on addressing the weaknesses and enhancing the strengths
- It works to provide solutions found by research and studies to those responsible for developing curricula and modifying them in line with the requirements of the times and the needs of society. (Al-Mutlaq and Yahya, 2014: 28).

## **Textbook**

-The textbook is considered one of the main pillars of the educational process. Moreover, it represents one of the important means expressing the objectives and contents of the curriculum because of its fundamental educational role in raising the individual and his success in the learning process. (Al-Khawaldeh, 2004: 300)

-The book is also considered the first main source for the teacher and the learner to provide them with the necessary information in the learning process, as it provides facts, information and concepts that work together to achieve the desired goal of transmitting the culture of society and the peoples to the learners and sets a general framework.

- Establish the textbook according to specific objectives. (Abdul Haq, 2008: 164)

### **The importance of the textbook**

The school book is important because of its features:

- It contributes to transferring the culture of society to students.
- It is the first scientific reference for the teacher and student.
- It includes a group of diverse educational aids, including pictures, shapes, and maps, that work to enrich the educational process. (Al-Zwaini et al., 2013: 103)

### **Objectives of using the textbook**

The textbook plays a role in the educational process by achieving the following goals:

- 1-It enriches and enhances students' learning.

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2-It helps students acquire appropriate study habits.

3-Develops students' ability to think at all types and levels.

4-It meets the educational and scientific needs of students. (Al-Hasani 2011: 346)

### **The role of the textbook in the educational process**

The textbook has an effective role in the educational process because it presents organized learning resources full of facts and rich with carefully selected information. It explains the following:

-It is considered one of the most important tools that the teacher relies on in the learning process to achieve the goals and the document that is referred to in public exams.

- It is considered the goal that embodies the cognitive, humanitarian, personal and national dimensions.

- It has an influential role in the teaching behavior of teachers through the teaching plans that the teacher draws in light of the content of the book's material and its objectives.(Al-Hashemi and Mohsen, 2014, 80)

### **The concept of chemistry**

Chemistry represents one of the sciences that has an important positive role in the scientific revolution that the world is witnessing at the present time, whether in industry, agriculture, or medicine (Al-Saadi, 1987: 27) by clarifying scientific and technological applications and their role in society by helping students in solving problems. Which directs him to use chemical concepts and make appropriate and important decisions in daily life because they have an explicit connection to the science of chemistry, such as

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pesticides, agricultural fertilizers, and cosmetics.  
(Mahjaz, 2012: 25).

### **Cognitive agility:**

Cognitive agility reflects the extent of students' ability to use all of their cognitive processes in harmony and harmony and to adapt them to changing learning environments, as it contributes to flexible control of their focused attention and cognitive openness through self-regulation of their thoughts and reactions. (Faraj 2022:8).

It also represents cognitive agility a cognitive structure that reflects the extent to which three cognitive abilities of an individual are in harmony together by working in environments that include diverse, dynamic tasks, enabling him to adapt to the diverse requirements of those tasks. It is self-evident to know how agile students are in moving their minds smoothly and flexibly, not to mention their intelligence. Yesterday is not like the intelligence of today. This conviction was born in us as a result of successive changes in all the tasks of life, and the reality that imposes on us the necessity of dealing with these changes with new mechanisms and plans that keep pace with their requirements. The reality that we live in today has become characterized by change and there is a constant need to have an open mind that accepts the new and seeks it, ( Ali Jaber, 2009: 292), as it turns out that it represents a cognitive ability that leads to greater performance in diverse contexts, and it also reflects a series of adaptations in dynamic contexts (46 2009: Pisapia).

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Cognitive agility is also an effective element that contributes to processing information and problems facing students, whether inside or outside educational institutions, and adapting to information and scientific developments, as it enables them to communicate with others to resolve conflicts by arriving at creative solutions to problems, as it works to improve cognitive processing processes. (Faraj, 2022: 5)

#### The second axis: The importance of cognitive agility:

Cognitive agility is one of the requirements of the current era and the knowledge society, as it contributes to the development and solution of society's problems and how to deal with them with an open mind that facilitates understanding others despite differences in opinions, beliefs and ideas, and dealing with new information by benefiting from previous experiences (Faraj, 2022, p. 8).

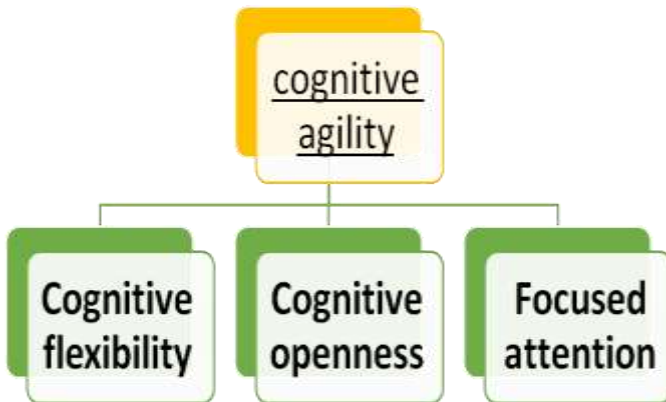
It is defined as the desire and ability to learn from previous experience and apply it in new situations in creative and unique ways (Lombardo & Eichinger, 2010). The researchers also believe that it represents the students' ability to use all of his cognitive processes in harmony in order to achieve his goals in diverse environments. This skill is also indispensable in life. The process in which problems increase day after day by interacting with others and finding creative solutions to problems.

As explained by (Mohamed Abdel Raouf, 2021: 844) "It is the extent of the individual's agility in moving his mind smoothly and flexibly back and forth between his focused attention and his cognitive openness so that his cognitive openness does not deprive him of the opportunity to focus on only the task-related information that his

focused attention would have provided him.” She agrees with him (Afaf Saeed, 2021: 202) and indicated that cognitive agility is the students’ ability to be agile and adapt quickly and efficiently, cognitive openness, and focused attention, as it requires that they be a medium between openness and focused attention, all interconnected with each other, so that their focused attention does not prevent them from being open to everything new.

The third axis: Dimensions of cognitive agility:

It represents three cognitive dimensions, as explained by (Good, 2014: 718):



### **1-Focused attention:**

(Good & Yeganeh, 2012) stated that focused attention represents the extent of the student’s ability to oppose any distractions during learning by employing all his skills in perceptual attention, by focusing all the senses on specific information. It is known by several names, including selective attention, sustained attention, It is also known as “the appropriate allocation of processing resources to relevant stimuli,” as focusing attention is more general and comprehensive than selective attention. (Good & Yeganeh, 2012; 15)

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Studies also indicate that attention is a cognitive process that leads to specific and different functions, the impact of which is represented by several levels of perception, learning, thinking, and memory. The most important of these functions are the following:

- It regulates the surrounding environment to prevent the accumulation of sensory stimuli
- It directs the senses towards stimuli that serve the process of perception, as attention is a continuous process to continue the process of learning and perception.
- It works to isolate stimuli that hinder the learning process.

(Al-Afoun&Wasan Maher, 2013: 108)

The researchers also believe that focused attention is represented by the ability of students to resist distractions that arise during the lesson, select the stimuli they want, focus on them, and direct attention to processing relevant information and ideas.

### **2- Cognitive openness:**

It represents the extent of an individual's ability to notice and search for information in various environments by expanding both the field of conceptual and perceptual attention and obtaining new information, through linking which he can obtain new information that he can integrate into his processing processes. Good & Yeganeh, 2012; 15)) It is associated with several terms, including mental alertness, creativity, openness, and curiosity. It also indicates receptivity to good ideas and points of view, the frequent need to expand and experience experience, breadth and depth of awareness, and engaging in exploratory behavior. Its individuals are also characterized by

acceptance of ideas, experiences, and dimensions, and the exploration of good creative solutions. (Salamah. 2021: 23)

Openness also refers to observing and searching for new information in the environment, as it is linked to the individual's cognitive interest in taking new steps in order to obtain data, represented by curiosity, creativity, and alertness (Faraj and Safaa: 2022: 801), as (Ibrahim bin Muhammad, 2009, 107) pointed out that "Open-mindedness is making decisions based on evidence, evaluating the evidence, challenging personal ideas and decisions, being willing to challenge the acceptance of others, and accepting the possibility that personal ideas may be incorrect. A person with this characteristic is characterized by listening without bias and the desire to change his ideas if sufficient evidence is available to do so."

### **3- Cognitive flexibility:**

(Abd Rabbo, 2020) stated that cognitive flexibility represents "the extent of an individual's ability to shift the direction of his mental activity towards the information most relevant to the task he is working on despite the constant modification and change in its parts" by not fixing the use of a single mental strategy except with the rest of the familiar parts of the task.

That mission (Abd Rabbo, 2020: 838). The mind must be reconfigured quickly when moving between tasks. It also refers to the ability to change strategies when the environment changes, and to go beyond dominant or fixed responses (Braem, Egner, 2018; 2). In this regard, it plays an important role in the degree of students' adjustment to changing situations. As it enables him to rebuild his



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knowledge automatically, he works to generate new ideas and alternatives that work to help students adapt to the changing circumstances of the environment of the tasks he undertakes, which requires him to move to changing environments for the events he faces, as cognitive flexibility works to help students make decisions. At the appropriate times (Abd Rabbo, 2020: 826).

Naturally, the researcher believes that cognitive flexibility works to understand and improve active learning strategies, as it works to improve the learner's way of thinking and also works to provide him with new cognitive skills by linking information and concepts to realistic examples from their lives.

Spiro, Coulson, Feltovich and Anderson (1988) and Frantiska, 2001 also agree; Carvalho and Moreira, 2005 ; Rhodes and Rozell (2017) on several basics of cognitive flexibility, including:

- 1- Linking concepts with realistic examples to achieve the highest possible level of understanding and knowledge.
- 2- Emphasis on building knowledge and not just conveying information and facts.
- 3- Avoid simplification in the learning process, but rather use diverse representations in it.

As explained by Ozell & Rhodes (2017), "it is the ability to absorb previously learned concepts and facts to generate new solutions to new problems." (Rhodes & Ozell, 2017: 375).

Based on the above, cognitive flexibility is represented by the individual's ability to generate a set of responses that show familiar

uses for something other than money by moving from one stream of thought to another. (ShaheenRaslan, 2010: 138).

### **Previous studies**

1- Study (Abdul Aziz, 2022): This study aimed to identify “cognitive agility and its relationship to academic well-being among university students.” The sample included (293) male and female students (1000 males - 193 females) and specialization (scientific - literary) with an average age of (9-20) and a standard deviation of (0.753). They were chosen randomly, and the researcher used the descriptive, correlational approach, as she prepared two tools, the first tool includes a measure of cognitive agility and the second tool a measure of academic well-being. The results showed that there were differences in the level of cognitive agility due to age, gender, and specialization. The results also revealed that There is a statistically significant correlation between academic well-being and cognitive agility. Abdel Aziz's study relied on the descriptive, correlational approach.

None of the studies dealt with analyzing books according to cognitive agility skills, as analyzing books is one of the most important aspects that must be considered in order to raise the intellectual and skill level of students by considering the school curricula, which are the basis for intellectual development and facing the challenges they face and the difficulties of life.

2- Study (Abd Rabbo. 2020): This study aimed to identify “the role of cognitive agility in responding to reverse feedback during dynamic decision-making tasks among teachers.” The sample included (124)

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male and female teachers who were chosen randomly, and the researcher used two scales in order to achieve the goals. His studies are (a scale prepared by the researcher consisting of 20 items, a scale, and an updated computer version of the Flanker task), and using the SPSS program, the results showed that there are differences in the level of cognitive agility due to age, gender, and specialization.

3- Study (Elephant, 2020): This study aimed to identify “the effectiveness of the challenge-based model in improving the development mentality and cognitive agility among students of the Faculty of Specific Education, Alexandria University.” The sample included (62 male and female students in the fourth year at the Faculty of Specific Education, Alexandria University) and the researcher used In order to achieve the objectives of his study, there are two measures: (the development mindset measure, the cognitive agility measure, the sequential matrices test, and the enrichment program based on the challenge-based learning model) using the t-test equation, the Mann-Whitney test, and the effect size Eta square. The results showed that there were statistically significant differences between the control and experimental groups in the measurement. The dimension of development mindset and cognitive agility in favor of the dimensional measurement.

There are no previous studies within the knowledge of the two researchers that sought to analyze chemistry books according to the variable of cognitive agility. Therefore, the current research came for the purpose of demonstrating the importance of including the

dimensions of cognitive agility in the chemistry textbook courses for the third intermediate grade.

### **Population and Sample**

#### **research Population:**

The current research population consisted of the content of "the chemistry book for the third intermediate grade", edition (10) of the year (2021), which consists of (152) pages for the academic year 2022-2023.

#### **The research sample:**

"It is a segment or part of the research community chosen by the researcher in a scientific manner and in a way that represents the research community and achieves its objectives". (Abu Samra, Muhammad, 2019:48).

They took "the chemistry book for the third intermediate grade" for the academic year (2022-2023) as a sample for their research, which corresponds to the research community itself, excluding all of the chapter fronts, indexes, main titles, lesson review questions, list of contents, and chapter review questions from the content analysis process, as it became The number of excluded pages was 41 pages, representing 26.97%, while the number of analyzed pages was 111 pages, representing 73.03% of the book's total content.

#### **Data collection tool:**

"It is a set of methods and means that the researcher adopts in collecting data and information related to the research problem, so that they can solve it". (Geder, 2015: 28)

The two researchers built a cognitive agility analysis tool that is compatible with the nature of the research.

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The analysis tool consists of three dimensions and 34 indicators. To ensure the validity and reliability of the tool, it was presented to a number of experts and to ensure the suitability of the tool to the content. They agreed on its importance for the intermediate stage, as it obtained a high agreement rate (more than 80%), and this percentage is Accepted according to what was stated by (Al-Zamili, et al., 2009: 243), they recommended deleting the indicators (10, 11) from the first dimension and deleting the indicators (11, 12) from the second dimension for repetition.

The two researchers deleted the indicators, so the analysis tool remained consisting of three dimensions, but the number of indicators became 26 indicators distributed over the three dimensions:

**The first dimension:** cognitive openness, which includes 10 indicators

**The second dimension:** cognitive flexibility, which includes 13 indicators

**The third dimension:** focus of attention and includes 7 indicators

After the researchers modified the cognitive agility analysis tool that was intended to be present in the content of the book, the researchers thus answered the research question:

**What dimensions of cognitive agility are available in "the content of the chemistry book for the third intermediate grade"?**

#### **Data Analysis**

##### **(Analysis mechanism):**

**1-theHonesty:** To ensure honesty, two wonderful papers were selected from the content that was analyzed, extending to the third and seventh chapters of the book's content, and distributed them to a

number of experts to state their opinions on high paragraphs, and they were surprised by their validity in a percentage, and this is what the two researchers prepared in order to be honest for the analysis, because an agreement of 80% or more is considered a good percentage. Based on previous studies. (Abu Samra, 2019: 67)

**2- the Stability:** It means obtaining the same results if the analysis is repeated again for the same substance and under the same conditions, depending on the analyzer and time. (Al-Tamimi, 2011: 278)

Two research methods have extracted it from:

The first method: The researchers returned to the analysis at the level of tourism agility thirty days after the first analysis, with the strength of the resistance continuing to be 98% using the Holisti equation, which is a high percentage. According to previous literature, a resistance percentage of more than 80% is considered good. (Abdul Hadi, 2016: 388), and the second method is through an external analyzer that the two researchers used, but the third method is also through a second external analyzer that the researchers used for the high stability resistance value. Table (1) shows the value of the stability ability

**Determine the proportions spoken:**

The estimated percentages of cognitive agility were determined for the purpose of comparing the results reached by the two researchers and due to the absence of any previous literature indicating this, so the two researchers presented a questionnaire to a group of experts in the field of measurement and evaluation to answer the question:

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A percentage that includes the content of the chemistry book and the dimensions of cognitive agility? Their answers were varied. The two researchers calculated the average percentages suggested by the experts. The percentages spoken for each dimension in the content of the book were as follows:

**The first dimension:** cognitive openness 33.3%

**The second dimension:** cognitive flexibility 33.4%

**The third dimension:** focus of attention 33.3%

#### **Findings**

Analysis results for each dimension of cognitive agility, as shown in Table (2):

It is clear from the table (2) that the content of the book achieved 13 indicators, representing 43.33% of the total of 30 indicators of the dimensions of cognitive agility. This percentage does not indicate the inclusion of the dimensions of cognitive agility in a balanced manner, and the focus on them in the content because not all of the indicators appear and the number of repetitions is very small. In the content of the book.

When comparing the results of the content analysis reached by the two researchers with the spoken percentages determined by arbitrators and experts, it was found that the percentage of the first dimension, cognitive openness, was 70.73%, which is much higher than the spoken percentage of 33.3%, and the percentage of the third dimension, concentration of attention, was 24.39%, which is lower than The spoken percentage is 33.3%, while the percentage of the second dimension, cognitive flexibility, is 4.88%, which is much lower (weak) and did not reach the spoken percentage. This indicates

the lack of inclusion of the dimensions of cognitive agility, which reflects the weak interest of the content in including the dimensions of cognitive agility. Therefore, the content of the chemistry book was not as required and therefore needs more enrichment about the dimensions of cognitive agility, due to its importance in giving students the ability to solve complex problems and build effective concepts that have a positive nature towards the environment in which they live and seek to collect concepts and develop them so that they have a great degree of flexibility. And adaptive performance. This is consistent with the study (Al-Rubaie, 2023: 24), which emphasized the role of cognitive agility in developing students' thinking in all its patterns and having an open mind that seeks to keep pace with renewable changes.

## **Discussion**

### **(Presentation and interpretation of results):**

After the two researchers analyzed the content of the 111-page chemistry book after excluding all of the chapter fronts, indexes, main titles, lesson review questions, list of contents, and chapter review questions from the analysis process, the three dimensions of cognitive agility were present in varying proportions in the content, as the dimension gained The first, cognitive openness, ranked first with 58 occurrences, at a rate of 70.73%. The largest share of occurrences was for the indicator (encourages the acquisition of new knowledge). received 23 occurrences, while the indicator (It directs the improvement of their self-regulation in a way that benefits them in quickly completing the tasks assigned to them) received 18 repetitions, the indicator (emphasizes the desire to engage in exploratory behavior) received 10 repetitions, and the indicator (highlights ideas and



### **Analysis of the content of "the chemistry book for the third intermediate grade" according to cognitive agility**

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experiences) received 5 repetitions. Repetitions: As for the two indicators (directs the acceptance of new ideas and viewpoints) and (seeks to make the learner more flexible and able to perform different maneuvers while dealing with work tasks) they received only one repetition, while the rest of the indicators did not receive any repetition.

As for the third dimension, focus of attention, it ranked second, with 20 recurrences, at a rate of 24.39%, distributed between the indicator (focused on cognitive diversity), which received 14 recurrences, the indicator (focuses on filtering information), and the indicator (developing greater ability to concentrate), which received 3 recurrences. As for the rest of the indicators, they did not receive any repetition. As for the second dimension, cognitive flexibility, it ranked third, having 4 repetitions, at a rate of 4.88%. The indicator (directed to produce new, multiple, non-automatic responses) had two repetitions, while the two indicators (motivated to adapt to the changing demands of his environment) and (encouraged to create integration and synthesis of concepts) received only one repetition, while the rest of the indicators did not receive any repetition.

#### **Conclusions:**

Conclusions reached by the researchers:

- 1- The book's content lacks attention to the dimensions of cognitive agility.
- 2- The dominance of the first dimension, cognitive openness over the rest of the dimensions.

#### **Suggestions:**

1- Conducting a similar analytical study that deals with including the dimensions of cognitive agility in the content of physics and chemistry textbooks for the secondary stage.

2- Conduct a study to evaluate the dimensions of cognitive agility among learners at all educational levels.

**Limitation:**

1- Emphasis on including the dimensions of cognitive agility in chemistry textbooks in close proportions.

2- The necessity of reviewing "the chemistry textbook for the third intermediate grade" and including the dimensions of cognitive agility.

3- Strengthening the content of the chemistry book with more research and experimental activities that achieve the three dimensions of cognitive agility.

4- Employing the dimensions of cognitive agility in important educational applications, and in the field of education in particular.

**Table (1) Reliability coefficients**

Consistency over time	Between the two researchers after thirty days	98%
Consistency between analysts	Between the first analyst and the first researcher	90%
	Between the second researcher and the second analyst	87%
	Between the second analyst and the first analyst	91%

**Table(2) Analysis results for each dimension of cognitive agility**

Dimensions	Duplicates	Verified paragraphs	percentage
The first is cognitive openness	58	64	70.73%
The second is cognitive flexibility	4	4	4.88%
The third is focus of attention	20	3	24.39%
the total	82	13	100%

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