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Inclusion of 21st Century Skills in Biology Textbook for the ninth grade

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Abstract- This study aimed to investigate the degree of inclusion of 21st century skills - which represents the core of this study-of biology textbook for the ninth grade for the scholastic year 2020/2021.researcher used the analytical descriptive approach that represented content analysis method, The sample Consisted of the Biology textbook for 9th Grade for both semesters the first and the second, A content analysis card was built and improved including the main and sub-skills of 21st century and to verify its psychometric properties validity and reliability. Descriptive statistics through the number of occurrences was used, with their total, percentages, and percentages of agreement between analysts.The results showed that the degree of inclusion for the 21st century main and sub-skills for the 9th Grade Biology textbook in first and second semesters was low, and none of these main or sub-skills have reached the 40% levels. The results showed that the main skill that was mostly included in the book was the critical thinking and problem solving by (38.9%) including the sub-skills. The two parts of the book were permissible from any productive skills and questioning with (0%) results.The skill of making judgments and decisions came in with the highest percentage among the sub-skills, despite the low inclusion of all other sub-skills which have reached only (12%). The results also concluded that there is a clear lack of balance in presenting the twenty-first century skills in the main and sub-skills in the book alike

Keywords: critical thinking, problem solving, creativity, science education.

I. INTRODUCTION

The present data and its realities of the steadyfast changes in various fields require specialists, academics and researchers in the educational field to pay special attention to drawing plans and preparing effective educational programs to prepare students to cope with the accelerating scientific and technological challenges by providing them with the skills, experiences and knowledge necessary to enable them to succeed in the present and in the future. Perhaps building and developing curricula in general, as well as the science curricula in particular is the most effective way to achieve this.

The importance of the curriculum as the focus of the educational system stems from its content as to what students must learn, the ways to learn, and how to achieve the maximum benefit from it. The development of societies is closely related to their reform and continuous development of their curricula in accordance with new global trends. Perhaps the development of science curricula is the most important in this context because of their direct interaction with the continuous scientific and technological changes, including social, cultural and economic aspects, which necessitated the existence of educational trends and reform currents that sought to develop and improve these curricula (Kilbane&Milman, 2014; Zaitoun, 2010).

The skills of the twenty-first century are among the most important and recent educational trends that are consistent with the acceleration of scientific development, technological progress and knowledge, which prompted educators to include and integrate them in the science curricula because they were formulated and developed to prepare individuals appropriately to ensure their ability to succeed in life and work. Indeed, some specialists believe that integrating the twenty-first century skills effectively and accurately in the science curriculum will ensure the achievement of goals that the different educational trends have failed to achieve for many years, justifying this by the characteristics of these skills. They are both pivotal, diverse and interactive at the same time (Kay, 2010).

On the basis of the importance of the twenty-first century skills in providing students in schools and universities with the tools and keys to success in this century, several American and international bodies and institutions have sought to formulate and propose general frameworks and definitions for these skills and how to include them in educational curricula and programs, and from these institutions. Partnership

for 21st. Century Skills (P21), The Organization for Economic Cooperation and Development (OECD), the North Central Regional Educational Laboratory (NCREL) and The American Association of Colleges and Universities (Danielle, Salloum, Khishfe&BouJaoude, 2013; Shunn, 2008).

The Partnership for Skills of the Twenty-first Century (P21), which includes more than forty scientific, educational and technological institutions and bodies, has directed educators to benefit from the skills they have identified through their integration into the educational systems, specifically in curriculum building and development. In response to the P21 directives, the National Science Teachers Association (NSTA) conducted a series of studies on it to conclude that the skills formulated by (P21) are the most structured, applicable, comprehensive, accurate and relevant to reality among the frameworks proposed by other institutions (Danielle et , 2013; Trilling &Fadel, 2012).

In light of this, NSTA (2013) has called for the need to include these skills in curricula and teaching strategies, considering it a need not a luxury. This is what Kay (2010) explained that scientific investigation-based curricula enable students to learn the twenty-first century skills through practicing his steps and the use of technology tools in that, which broadens their perceptions and strengthens their belonging to their communities, so they seek to solve its problems through critical thinking and the search for valuable knowledge.

Based on the above, (P21) has shown that students 'ability to succeed in life is closely related to their possession of the twenty-first century skills and their ability to employ them. These skills have been classified into three basic axes, under each of which a number of basic skills fall, and the main skills are divided into several sub-skills (P21, 2009; Trilling &Fadel, 2012):

First: Learning and innovation skills; It expresses the skills that are distinguished by students prepared for life in the twentieth century from others, as they are responsible for developing their capabilities that are necessary to ensure their scientific, personal and professional success in the twenty-first century, and it consists of the following skills (Shunn, 2008; Bybee, 2010; Trilling &Fadel, 2012):

1- Critical thinking and problem solving: Real problems are both a key to thinking and a justification for scientific research, as solving them requires several skills such as analysis, criticism, understanding the essence, diagnosing causes, comparing, proposing solutions and making decisions, and this is why specialists consider critical thinking and problem solving among the features of scientific thinking as the individual practices through them effective thinking skills by employing different types of inductive and deductive thinking to suit the situation, and systemic thinking that enables the individual to analyze the interaction between parts to form a total product in a complex system. (Shunn, 2008).

2- Creativity and innovation: Al-Tamimi (2016) describes creativity as the ability to use knowledge to create an unfamiliar pattern of thinking with solutions to the problems it faces; This contributes to the development of important scientific and technological innovations, which necessitates the integration of creativity in scientific curricula in order to prepare students for better future. Creativity and innovation included, as skills for the twenty-first century as reported by Kay, Trilling and Fadel (Kay, 2010; Trilling &Fadel, 2012) sub-skills are; use of wide- range of patterns for generating, analyzing, and evaluating ideas, inferring, analyzing, and constructing, and innovative work with others through the development and implementation of original creative ideas and turning them into tools and inventions, understanding the surrounding reality and adapting to its determinants, and communicating openly with other people's ideas and perspectives in solving general problems.

3- Cooperation and Communication: Zaitoun (2010) demonstrates that science by its nature is cooperative and has a social dimension, and that the scholars' activities whose results are spread internationally is nothing but a joint effort between them. In this, Trilling &Fadel (2012) describe cooperation as working with others effectively, flexibly, and showing respect in achieving goals. Effective communication, on the other hand, must take place in different ways to ensure that ideas are clearly expressed, data is interpreted verbally or non-verbally, processed efficiently, and modern technology is utilized.

Second: Information, Media and Technology Literacy; The twenty-first century is characterized by several features that strengthened its differences from previous centuries combined, perhaps the most important of which is the momentum of renewed knowledge, the rapid development of technology, and the comprehensive changes that are taking place daily in various fields, whether within the choice of man or

outside of his control, and perhaps what the *Covid-19* pandemic has brought about in less than one year of changes, is a best evidence of this.

In order to ensure the ability to continue in light of all of these variables, it is inevitable for the individual to possess skills that enable him/her to communicate with others and interact with any changes that may occur when responding to difficulties and challenges in the best manner. Among these skills is what falls within the information and media Literacy and Technology (Bybee, 2010; Lever-Duffy & McDonald, 2017; Trilling &Fadel, 2012):

1- Information Literacy: It is represented in how to deal with the huge amount of information flowing in, in a way that guarantees the achievement of the individual's benefit, by determining what is required of information and how to access it, verify it, review it, and evaluate it in order to use it. It includes a set of sub-skills such as: accessing information effectively and efficiently in the shortest possible time and from the most accurate sources, then evaluate it, and use it correctly and clearly, managing multi-source information flows, and understanding the legal and ethical issues associated with it all (P21, 2009).

2- Media Literacy: Trilling and Fadel (2012) show in this context that the importance of this skill resulted from the existence of differences in understanding scientific information between scientific and non-scientific societies when it was presented in the media, which necessitated the development of analysis and critical thinking skills in order to reach good scientific understanding of what is being presented, and the distinction between the opinions of media professionals and the scientific facts which they present. The media subLiteracy skills include understanding the justifications for media messages and their backgrounds, perspectives, and goals they may contain political or economic dimensions, understanding and applying ethical and legal issues in this context, and the use of media tools and interpretations with the most efficient and appropriate ways for creating meaningful scientific media production.

3- Information and Communication Technology Literacy: It expresses the use of technology as a tool to access, understand, organize, evaluate and share knowledge with others, and it includes effectively employing technology to access knowledge that has taken on a digital character and this requires the individual to possess research, analysis, organization and evaluation skills, as well as the application of laws. It also requires taking into account the ethics related to accessing and using digital knowledge (Bybee, 2010).

Third: Life and Career Skills; Bybee (2010) stated that global labor markets are no longer satisfied with individuals possessing knowledge and thinking skills, but rather they have gone beyond that to require their own ability to self-qualification, continuous learning orientation, ability to adapt to new developments, flexibility in dealing with emergencies and work independently and lead teams to achieve the desired goals. This is all summed up in life and work skills, which include the following skills:

1- Initiative and self-direction: It is expressed by Shunn (2008) as the ability to define a learning goal and plan to achieve it, self-management, prioritization, effort and time organization, coordination of work between goals and objectives, self-motivation and the desire to acquire practical skills and experience and the ability to do so.

2- Leadership and responsibility: It is represented in providing individuals with the ability to place the public interest at the top of the hierarchy of priorities, and directing others by example, integrity and ethical dimensions to work positively, assume responsibility, achieve goals, and employ personal skills to serve society (Trilling &Fadel, 2012).

3- Social skills and understanding of multiple Literacys: These skills describe awareness of the existence of differences between people and respect for them, dealing openly and rationally with ideas and values rather than individuals and affiliations, and engaging in group work without focusing on backgrounds, beliefs and affiliations, and positive interaction with others and investing their capabilities and skills in a way that meets the needs of society It satisfies the desires of its members (P21, 2009).

4- Flexibility and Adaptation: Flexibility is represented in the ability to respond effectively to variables and interact positively with success and failure and understand points of view. As for adaptation, it includes devising new methods for solving problems, dealing with developments, and performing multiple roles within different contexts and adjusting the order of priorities according to what the interest

requires. Flexibility and adaptation are important in scientific education, as Trilling &Fadel (2012) indicate, because scientific thinking based on arguments and evidence is subject to modification and development in light of new evidence that is more accurate and stable than its predecessor.

5- Productivity and accountability: Productivity is closely related to a series of skills that include setting goals, priorities, planning and managing oneself in light of the available means. It is represented by the ability to perform tasks and innovate products through these skills, while accountability essentially expresses the responsibility for the actions taken to achieve a goal. Productivity and responsibility share in their ability to push individuals to acquire knowledge and skills that enable them to innovate as they include the ability to perform several tasks, face pressures professionally, work in a team spirit, and bear responsibility for results (Kay, 2010)

Based on what has been evident from the comprehensiveness and breadth of the twenty-first century skills, and the importance they seem to have in providing students with the ability to coexist and interact with developments in the steadily changing reality, the need to adopt and integrate it in the educational curricula has become a necessity because it provides students with the ability to learn, understand, perceive, and effectively employ what they learn in their lives, rather than simply storing knowledge in minds.

For that purpose, (P21) stated the necessity of integrating these skills in academic courses and providing educational opportunities to apply them through the terms of knowledge content, in order to form a unified understanding of common issues and cross-concepts of topics related to the topics of the twenty-first century, allowing students to integrate with the real world and get to know more closely its' problems and seeking to solve them as a result of their sense of responsibility towards the general public interest, both societal and global (Shunn, 2008).

Therefore, (NSTA), in cooperation with (P21), sought to integrate the twenty-first century skills in science curricula for all educational stages through special maps in which it included learning outcomes for each skill, indicating how to achieve these outcomes by focusing on experiments and scientific activities based on investigation, design, and employing habits of mind, be it in the classroom or outside, emphasizing the consistency and conformity of these maps in their basic structure with the National Scientific Education Standards (NSES) and the 2061 Reform Project (NSTA, 2013).

The interest in the skills of the twenty-first century was evident in the field of research, in conjunction with its integration into scientific curricula at the global level. In this context, many studies have sought to investigate the degree to which curricula in general and science curricula in particular include twenty-first century skills, and among these studies is the study of Al-Mughrabi (2019), which aimed to determine the degree to which biology book for the tenth grade basic includes twenty-first century skills. In Jordan, the content analysis method is adopted, through a content analysis card that includes twenty-first century skills. The results showed that the degree of inclusion in the bilogytextbook for the tenth grade of basic skills in the twenty-first century is low, and that the skill of critical thinking and problem solving has achieved the highest percentage included in the book, while the lowest percentage was for each of the skills of innovation, communication and cooperation, and the results showed that the book was free from Media literacy skills, social skills, flexibility, adaptability, productivity, multi-cultural understanding, accountability, leadership and responsibility.

Chalkiadaki (2018) conducted a study in which he analyzed samples from 40 educational researches concerned with twenty-first century skills in basic education between 2003 and 2017, and had met the criteria for inclusion of the twenty-first century skills in accordance with the proposed global frameworks adopted by researchers in their studies, depending on their research questions, using the method of content analysis, the results showed an interest in Information Technology skills, communication, and globalization and the need for innovation, and the researcher recommended conducting studies on twenty-first century skills in the context of basic education specifically because it is the least in research interest in this field.

The study of Hajjah (2018) aimed to investigate the extent to which science textbooks for the basic schools of grades seven, eight and nine in Palestine include twenty-first century skills, by using a content analysis form that included indicators for these skills in the goals, paragraphs, activities and questions, and calculating their percentage from the total list of indicators received in the analysis questionnaire. The results showed that science books do not include the twenty-first century skills in general, and do not include the skills of using technology, leadership and responsibility, initiative and self-direction.

Al-Mansour (2018) conducted a study through which it sought to investigate the degree to which the content of science books for the basic education stage in Jordan included the twenty-first century skills, and the study sample consisted of basic science books for the fifth, sixth and seventh grades, and the instrument represented a list of the twenty-first century skills proposed to be included in the science books. The results showed an average rating for the inclusion of these science textbooks.

The study of Al-Haroun (2016) focused on identifying the basic competencies of media Literacy that should be included in the science curricula in the preparatory stage in Egypt, and the degree of their effectiveness in developing the skills of the twenty-first century. The study sample consist of (68) students in the second year of middle school, and used the twenty-first scale for the skill set, adopting the quasi-experimental approach. The results showed that the media literacy competencies that must be included in science curricula are awareness, understanding, analyzing, and evaluating media messages, the ability to produce them. The results also showed that there are statistically significant differences between the mean scores of the students in favor of the experimental group.

While Subhi's study (2016) aimed to determine the extent to which twenty-first century skills are included in the science curricula developed for the first intermediate grade in basic education in Saudi Arabia, through adopting content analysis and using an analysis instrument consisting of seven main areas representing the twenty-first century skills that were proposed to be included in science curricula, the results showed a low level of inclusion of these skills in the content of science curricula for the study sample by (22.86%), while the curricula themselves dealt with some valuable life skills were (0%).

As for Shalaby (2014), her study aimed to identify the twenty-first century skills that could be incorporated into the science curricula for the basic education stage in Egypt, and to evaluate the content of science books based on these skills, and the study adopted the descriptive and analytical approach to build a basic list of twenty-first century skills according to the Delphi method through distribution of specialized questionnaires to (15) experts in science curricula, and analyzing the content of the six basic education science books. The study concluded with the construction of a proposed framework that includes three main groups of skills: learning and creativity skills, technology and information skills, life and profession skills. The results showed that the level of science textbooks that had incorporating twenty-first century skills was low.

Danielle, Salloum, Khishfe&BouJaoude (2013) conducted a study in which the framework prepared by the Partnership for Twenty-First Century Skills was employed in building an tool for analyzing science curriculum standards and determining their suitability for twenty-first century skills. The content, skills, and additional components of the curriculum were tested in Ohio, New York, Qatar and Lebanon, and the results showed that the inclusion of the skills of the twenty-first century was not at the required level.

In the same context, Hiung& Osman (2013) proposed in their study a conceptual framework for integrating twenty-first century skills in biology education in Malaysia through a multidisciplinary curriculum that includes biology, technology, engineering and mathematics. The study adopted teaching and learning strategies appropriate for biology, engineering and mathematics, namely inquiry and problem-based learning, data analysis and design. The results showed a high level of digital literacy skills, creative thinking, effective communication, high productivity, and the spirituality and noble values of Malaysian students when employing these strategies.

By reviewing previous studies, it can be concluded that the number of studies that dealt with the inclusion of twenty-first century skills in the curricula is small compared to the number of content analysis studies in the research field in general. In most of the studies, the results showed a low degree of inclusion of twenty-first century skills in general science textbooks for different classes in the primary stage, such as: studies of (Hajjah, 2018; Al-Mansour, 2018; Al-Haroun, 2016; Subhi, 2016; Danielle et, 2013), while studies that specifically dealt with biology books were scarce and were limited to my studies (Al-Mughrabi, 2019; Hiong& Osman, 2013), with some difference between them in some data, such as the methodology, environment and time of the study. The researcher benefited from previous studies in refining and forming the study background, methodology and developing its instrument , and based on what was reviewed and viewed from previous studies. Within the limits of the researcher's knowledge, no study has been conducted before that aims to determine the degree of inclusion of the biology of the ninth grade basic" in Jordan for twenty-first century skills, which is what the current study sought in an attempt to bridge the research gap in this framework.

The researcher's study problem was formed through multiple given data, the most prominent of which was her practical experience in the Ministry of Education in teaching biology for more than ten years, during which the scientific curricula were developed and modified in line with international educational trends more than once. As the textbook is an applied translation of the curriculum that adopt these trends, it is also an important reference for students to refine their scientific personalities in providing them with the skills of science, its processes, and the skills of the twenty-first century alike. This study aims to examine the degree of inclusion of these skills in biology textbook.

The researcher also noticed that there is a global research interest in the twenty-first century skills from various aspects and with several methodologies, but the studies of content analysis related to these skills for biology textbooks in particular were the least despite the consensus of specialized educators on the importance of the role that the textbook plays in providing students with these skills. From here it was necessary to reveal the degree to which biology textbook for the ninth grade basic includes the skills of the twenty-first century and its suitability to the needs of students in this context, and the study sought to answer the following two questions:

1- To what degree does the ninth grade biology textbook include key twenty-first century skills?

2- To what degree does the ninth grade biology textbook include sub-skills of the twenty-first century?

II. METHODOLOGY

Research Design: The study adopted the descriptive and analytical method, in which its suitability, nature, and its ability to achieve its goals is measured.

Research Sample: The study population is represented by its sample that was intentionally chosen, which is biology book for the ninth basic grade, with its first and second parts approved for teaching for the scholastic year 2020/2021. Table (1) shows the specifications of the biology book for the ninth basic grade.

Table (1): biology textbook specifications for the ninth grade

	First Semester					Second Semester								Grand Total
No.	First Unit	Second Unit			Total	Fourth Unit							Total	
	F1	F1	F2	F3		F1	F2	F3	F4	F5	F6	F7		
Pages	11	16	8	15	50	4	10	7	9	9	14	13	65	114
Outcomes	3	4	2	2	11	4	4	4	3	4	3	3	25	36
Activities	0	2	2	2	6	0	1	0	1	1	0	0	3	9
Diagrams	5	20	9	9	43	2	6	4	4	5	10	4	35	78
Meditate	0	0	0	0	0	0	1	0	0	0	1	0	2	2
Think	1	6	1	3	11	0	3	2	0	2	0	0	7	18
Research Case	0	0	0	3	3	0	1	0	0	1	3	0	5	8

Table (2) shows: the number of items of analysis distributed among the units of the book.

	First Semester					Second Semester								Grand Total
No.	First Unit	Second Unit			Total	Fourth Unit							Total	
	F1	F1	F2	F3		F1	F2	F3	F4	F5	F6	F7		
Pages	11	16	8	15	50	4	10	7	9	9	14	13	65	114
Vocabulary Analysis	48	93	59	87	287	14	53	31	41	44	60	52	295	582

Table (2): The number of items of analysis distributed among the units of the book.

Research Instruments and Procedures:

The study instrument was represented in an analysis card that was built and developed with reference to the educational literature which is closely related to the subject of the study such as (Trilling &Fadel, 2012; Kay, 2010; NSTA, 2013), and previous studies such as (Al-Mughrabi, 2019; Hajjah, 2018) Shalaby, 2014 Danielle et, 2013;) by identifying the main and secondary twenty-first century skills that must be included in the biology book for the ninth grade.

The validity of the instrument was verified by presenting it to (10) arbitrators who are specialists in science curricula, methods of teaching it, measurement and evaluation, and those with expertise in this field, to express their views on the clarity of the instrument 's items, the integrity of their linguistic formulation, their appropriatenessand consistency with the skills of the twenty-first century.

The Reliability of the instrument was also verified through the internal Reliability (over time), as it was used in the analysis of one unit of study from biology textbook for the tenth grade (outside the study sample). The analysis was repeated after three weeks for the same unit and the compatibility ratio between the two analysis was calculated using the *Holste equation*, where the Reliability coefficient reached (91%). The external Reliability was also verified (across individuals), as the researcher and another analyst specialized in science curricula and teaching methods analyzed biology textbook for the ninth grade basic (each separately) and the value of the Reliability coefficient was according to *Holste* was (89%), which means that the instrument is suitable for the purpose of the study.

Concerning study procedure, The objective of the analysis has been determined and that is to reveal the degree to which the twenty-first century biology textbook includes twenty-first century skills.Determining the analysis sample and its categories, as the sample was represented in the biology book for the ninth grade, with its first and second parts approved for teaching in the 2020/2021 scholastic year, and the analysis categories were represented in the main and sub-skills and the indicators emanating from each of them in a list specially prepared for that.Defining the unit of analysis and adopting the term that carries content related to the twenty-first century skills as the most appropriate to the nature of the study (Al-Jadiri, 2016); So the goal was adopted as a unit for analyzing the objectives, the paragraph as a unit for analyzing content and activity, the question as a unit for analyzing questions, a thought item and a reflection item, and the shape was a unit for analyzing figures, drawings and images.Controlling the analysis process by determining the presence of twenty-first century skills in the biology book for the ninth grade basic according to what each of the objectives, content, activities, figures, drawings, pictures, questions, research issues indicate, and a reflection item and a reflection item from the indicators included in the analysis card used to indicate the existence of these skills. Exclusions were made to the introduction pages of the book, the cover of each unit of study, the introduction of each chapter, the glossary of terms, the index, and what the ministry had deleted from the book's topics from the scholastic year 2018/2019 until the moment of preparing the study and everything associated with it (represented in separate subheadings of the lessons in addition to the full third unit).Verifying the psychometric properties of the instrument , and the stability of the analysis process, unloading the duplicates, and conducting the appropriate statistical treatment to come up with the results and discussing them.

Data Analysis: Descriptive statistics through the number of occurrences was used, with their total, percentages, and percentages of agreement between analysts.

III. RESULTS

To determinethe degree to which the biology textbook for the ninth grade included twenty-first century skills, the frequencies of each of the main skill, their totals, and percentages were extracted for each of them. Table (3) shows the frequencies and percentages of the degree of inclusion of the main twenty-first century skills in biology book for the ninth grade.

Table (3): Frequencies and percentages of inclusion of key twenty-first century skills in biology textbook for the ninth grade

Twenty first century skills	First part		Second part		Total	Total
	Frequency	Percentage	Frequency	Percentage	frequency	percentages
Critical thinking and problem solving	90	31.4%	136	46.1%	226	38.9%
Communication and collaboration	37	12.9%	24	8.1%	61	10.5%
Innovation and creativity	58	20.2%	40	13.6%	98	16.8%

Informational Literacy	35	12.2%	39	13.2%	74	12.7%
Information and communication Literacy	9	3.1%	6	2%	15	2.6%
Adaptability and flexibility	11	3.8%	5	1.7%	16	2.7%
Initiative and self-direction	27	9.5%	24	8.2%	51	8.9%
Social skills and multi-cultural understanding	11	3.8%	5	1.7%	16	2.7%
Productivity and accountability	0	0%	0	0%	0	0%
Leadership and responsibility	9	3.1%	16	5.4%	25	4.2%
Total	287	100%	295	100%	582	100%

It is noted from the table that the percentage of inclusion of the skill of thinking and problem solving in both parts of the book was (38.9%), which is the highest percentage among the skills of the twenty-first century, while the book was free of any skills in productivity and accountability, where the percentage was (0%). The table also shows the results of a relative convergence characterized by a clear decline in the degree to which the book includes in its two parts for the nine out of 10 skills of the main twenty-first century skills-set, where the percentage ranged between (0-16.8%), while the disparity appeared clearly between all of these skills and the skill of critical thinking and problem solving.

Thus, the degree of inclusion of biology book for the ninth grade in its first and second parts is low, as none of them exceeded (40%), and thus is consistent with the studies (Al-Baz, 2013) (Subhi, 2016) (Hajjah, 2018) (Al-Mughrabi, 2019) and confirms what was reported by Bybee (2010) that science curricula are no longer able to prepare students for the current century.

Also, to determine the degree to which the biology textbook for the ninth grade included twenty-first century sub-skills, the occurrences of each of the sub-skills, their totals, and percentages were extracted for each of them. Table (4) shows the frequencies and percentages of the degree of inclusion of the sub-skills of the twenty-first century in the biology book for the ninth grade.

Table (4) Frequencies and percentages of the degree to which the twenty-first century sub-skills are included in biology textbook for the ninth grade

Main twenty first century skills	Sub-skills of the twenty first century	First part		Second part		Total frequ e-ncy	Percent-age
		Frequencies	Percentage	Frequencies	Percentage		
Critical thinking and problem solving	Effective inference	18	6.3%	19	6.4%	37	6.4%
	Use of holistic thinking	29	10.1%	37	12.6%	66	11.4%
	Rendering judgments and making decisions	22	7.7%	48	16.3%	70	12%
	Problem Solving	21	7.4%	32	10.8%	53	9.1%
Communication and collaboration	Communicate clearly	21	7.4%	13	4.4%	32	5.5%
	Cooperation	16	5.6%	11	3.7%	27	4.6%
Innovation and creativity	innovative thinking	23	8%	26	8.8%	49	8.4%
	Creative work with others	25	8.7%	12	4.1%	37	6.4%
	Implementation of the innovations	10	3.5%	2	0.7%	12	2.1%
InformationLiteracy	Access to information and its evaluation	17	5.9%	25	8.5%	42	7.2%

	Information use and management	18	6.3%	14	4.7%	30	5.5%
	Effective use of technology	9	3.1%	6	2%	15	2.6%
Flexibility and adaptability	Adapting to change	3	1%	2	0.7%	5	0.9%
	Flexibility	8	2.8%	3	1%	11	2%
Initiative and self-direction	Managing goals	3	1%	2	0.7%	5	0.9%
	Work independently	24	8.4%	22	7.5%	46	7.9%
Social and cross-cultural skills	Interact with others effectively	7	2.4%	1	0.3%	8	1.4%
	Work effectively in a team	4	1.4%	4	1.4%	8	1.4%
Productivity and accountability	Project management	0	0%	0	0%	0	0%
	Show results	0	0%	0	0%	0	0%
Leadership and responsibility	Leading and directing others	3	1%	3	1%	6	1%
	Taking responsibility for others	6	2%	13	4.4%	19	3.3%
	Total	287	100%	295	100%	582	100%

It is noted from the table that there is a clear decline in the degree of the book's inclusion of sub-skills for the twenty-first century, as it reached the highest percentage for the inclusion of sub-skills (12%) and was for the skill of making judgments and making decisions, followed by the skill of using macro thinking at a percentage of (11.4%), Then problem-solving skill at a rate of (9.1%), while 11 sub-skills out of 22 ranged between (0-3%), and the remaining skills were not in a better condition, except for the skill of making judgments and making decisions, and the skill of using total thinking which did not exceed the percentage of any of the skills (10%) of the book.

IV. Discussion, Conclusions, Recommendation :

The researcher attributes this decline and the failure of these books to prepare students and qualify them to keep up with the developments of life to several reasons, including: The humility of the knowledge of curriculum planners and authors of the details of the twenty-first century skills in science education and their importance in building the student's personality on one hand, and developing his scientific capabilities on the other hand because of the relatively newness of this topic when compared to other standards for building scientific curricula that have been adopted and relied upon for long periods. As a result, these skills were absent from the foundations and standards for building biology curricula, so their inclusion was low, random, and unbalanced.

This result can also be explained by looking at the style of presenting the content of the book, which focuses on presenting scientific knowledge, including the concepts and facts it contains in the first place, without providing real opportunities for the student to search for or form information, whether through contemplation, thinking and analysis, or through activities given that the number of activities is very few in the content of the book. It still

follows a traditional approach in presenting the activity through specific steps and available instrument s that limit the student's thinking and restrict him from creativity and innovation. As for the book's questions, they came from its objectives at their limited levels in the field of knowledge and consistent with its low focus on twenty-first century skills.

Also, the nature of biology subject, if compared to physics, for example in terms of monotony of experiences and activities, the diminishing potential for innovation and opportunities to develop various skills through it, in addition to the focus of biology curriculum in general on cognitive goals clearly, which,

despite their levels of complexity, are lacking to activate some skills such as flexibility, productivity, accountability, and others.

Although the book's inclusion of the skill of thinking and problem solving is the highest among the skills, the inclusion of this skill was not clearly linked to the skill of communication, cooperation and the skill of creativity and innovation despite the fact that these skills together form the focus of learning, which showed the book in an unbalanced way in presenting the skills of the twenty-first century in an unbalanced and an unjustified manner.

The low degree of inclusion in the study sample of twenty-first century sub-skills can be explained by the low inclusion of core twenty-first century skills. This makes the causes of decline for each of them to some extent, taking into account that the nature of some sub-skills prevents the ability to include them clearly in specialized scientific books such as biology, in project management skills, demonstrating results and adapting to change. However, the nature of biology subject allows a higher degree to include other skills which are not included to the appropriate extent in the book, such as taking responsibility towards others, inferring effectively, and using technology, which clearly showed the book's need for balance and a clear methodology in containing these skills. And perhaps the details of these sub-skills were not clear-cut in the minds of curriculum developers and the developers who spent time writing in the same traditional way. In addition to the number of classes scheduled for biology subject which is very limited at the rate of one session per week after some titles, lessons and activities have been removed from the book, although before deletion is not in a better condition, which may make curriculum authors more interested in preserving the scientific content of knowledge more than skills. This had negative consequences for students in particular, as both (P21,2009), Trilling and Fadel (2012) and (Bybee, 2010) and NSTA (2013) emphasized the necessity of integrating twenty-first century skills in science education because of their positive repercussions on students at both the scientific and personal levels.

The importance of the study stems from the importance of the twenty-first century skills in enabling students to achieve global competitiveness in the present and the future, as it is one of the latest global trends in education. This study provides important implications for researchers as a theoretical addition to educational literature within the framework of twenty-first century skills, and it paves the way for similar studies in other studies for different academic levels. Furthermore, this study provides data to policymakers, curriculum developers, supervisors and teachers on the degree to which biology textbook includes the skills of the twenty-first century, which should contribute to improving and developing scientific curricula and enriching them with realistic learning activities and practices for students related to the twenty-first century skills.

This study is limited in several aspects. First, the sample is limited to the biology textbook for the ninth grade basic (with its two parts) that was approved for teaching for the 2020/2021 scholastic year, as the analysis is limited to objectives, scientific content (explanations), scientific activities and questions, excluding the cover pages for each unit of study, a glossary of terms, besides whatever the Ministry of Education had removed from the book's topics and everything related to it in terms of objectives, activities and questions.

In conclusion, this study recommends adoption the twenty-first century skills when building and developing science curricula, especially in biology curricula. and Carrying out specialized studies to diagnose the level of Jordanian students in the twenty-first century skills and the impact of the curricula in that.

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