Research Article

Awareness Of The Concepts Of Green Economy Among The Student-Teacher At The College Of Education For Pure Sciences - Ibn Al-Haytham In Iraq

[1]Asst. Nisreen Abdel Qader Ahmed, [2]Dr.Basma Mohamed Ahmed, [3]Dr.Taghreed Hashem Alnoor

[1]nisreenalmolky3@gmail.com
[2]basma.m.a@ihcoedu.uobaghdad.edu.iq
[3]mailto:taghreed.h.j@ihcoedu.uobaghdad.edu.iq
[1,2,3] University of Baghdad / College of Education for Pure Sciences - Ibn Al-Haytham
Chemistry department

Article History: Received: 11 January 2021; Revised: 12 February 2021; Accepted: 27 March 2021; Published online: 16 April 2021

Abstract / Research Objective To identify the degree of awareness of the concepts of green economy among the student-teacher in the College of Education for Pure Sciences, descriptive research methodology was adopted in this research and the research sample consisted of (116) students from the College of Education for Pure Sciences / Ibn al-Haytham - University of Baghdad from The Department of Chemistry (fourth stage), i.e. 54% of the research community, were chosen randomly, the research tool was prepared, represented by the measure of awareness of green economy concepts from (52) paragraphs, the results showed a weak degree of awareness of economics concepts among the student-teacher and the statistical bag for social sciences was adopted (SPSS) to address the research results and in light of the results, the research recommended holding conferences or introductory seminars for students to make them aware of the concept of the green economy and its sectors.

Keywords / awareness, green economy, pre-service teacher preparation, college of education.

Research problem: In light of contemporary trends in the teaching of chemistry in general and pre-service teacher numbers programs in particular, which call for interest in keeping pace with scientific developments and developments at all academic levels, and keeping pace with all new scientific concepts, With the need to work on linking educational institutions with these scientific developments taking place in the world, the problem arises of the lack of interest in the concepts of green economy among students, especially that the College of Education prepares educational staff to teach in secondary schools, and it has to prepare the teacher in high academic numbers, which requires him to be familiar with the concepts that are emerging in His field of specialization is constantly reflected in its impact on his teaching performance, as it is his responsibility to teach chemistry and related contemporary concepts related to sustainability in chemistry, Among the interviews conducted with students of the Chemistry Department at the College of Education for Pure Sciences / Ibn Al-Haytham and the exchange of views with them, as well as a survey of random sample views of the teaching staff of the College of Education for Pure Sciences / Ibn Al-Haytham in the Department of Chemistry for the academic year (2020-2021), the lack of interest of the faculty With the concepts of green economy, this research came to allow a deeper look at the reality of student-teacher pre-service numbers in Iraq by answering the following question: "What is the degree of awareness of green economy concepts among the student-teacher at the College of Education for Pure Sciences / Ibn Al-Haytham in Iraq?"

Importance of research: One of the goals of scientific education in the twenty-first century is the prepairing of scientifically educated students by providing them with scientific experiences, including knowledge, skills and attitudes (Ali and Ibrahim, 2007: 19). Through scientific culture, the student can determine the knowledge he acquired and the beliefs in which he believes, and the values that it adopts and that it overcomes the problems facing it with the scientific method (Khawaldeh, 2012: 45). Scientific culture is one of the fundamentals of education and is closely related to human development, and it is a characteristic of development (Hammoudi, 2016: 12).

In this regard, (Trowbridge et al. 2004) pointed out "The changes in the scientific education will be undertaken by those who will join the teaching profession should be a teacher to be aware of the current situation of science and the scientific community and education" (Trowbridge et al., 2004: 59), the teacher is the main element in any educational renewal, because his role in the educational process has become more directive and stimulating than he is an indoctrination of knowledge (Al-Mafrej et al., 2007: 17). Therefore, interest has increased in the issue of developing teacher numbers and qualifying them during the pre-service numbers years through the specialized educational institution to provide him with modern knowledge and concepts to deal with the educational environment to face the challenges of the present and the future (Al-Ansari, 2019: 236). The issue of preparing the

teacher before service is an educational system that seeks to form the student-teacher with its four components represented in general culture, professional and academic specialization and practical education, and from the operations of this system the techniques and methods of teaching in order to prepare it in a sound scientific and practical terms (Saeed 2016: 18), The university educational process is one of the means that positively affect students' behavior, integrate them into society, and invest their potential to rise and overcome the economic, social and environmental crises facing societies, by achieving civilized communication for the human race and transferring experience, skills and ideas across successive generations (Al-Amayrah, 2019: 1) Among the concepts that have emerged recently is the concept of the green economy, which is considered a means to preserve the integrity of the environment, and it is one of the important tools for achieving sustainable development, enhancing the ability to manage natural resources in a sustainable manner, increasing their efficiency, reducing waste, and limiting the negative effects of development on the environment (El Feqi, 2014: 6-7), it leads to achieving social justice while taking care of economic prosperity (Jamal Al-Din, 2017: 9) that the green economy aims to promote green growth, generate employment, eliminate poverty, provide food security, protect health from types of pollution while stimulating sustainable industry, and improving patterns Production and consumption, addressing climate change, protecting ecosystems, and enhancing energy security. (Khaled et al., 2018: 4) It also aims to adopt projects concerned with sustainability, such as clean production, renewable energy, consumption, organic agriculture, waste recycling, and increased private sector investment. (Jamal al-Din, 2017: 9). Therefore, the green economy is considered a means to preserve the safety of the environment and people, and that the goals of the green economy are in line with the goals of sustainable development by linking the economy and the environment, which increases the possibility of societies reaching a safe and clean environment by reducing carbon emissions, reducing the depletion of natural resources and achieving food security and seeks to build A sustainable future for its present and future generations. Therefore, the educational process must have a role in creating awareness among students about the concepts of the green economy and teaching and learning its purposes and the way to achieve it. The thinking about the transition to a green economy came because of the remarkable decline in environmental resources, the economic and financial crises, and the collapse of the market, the transition to a green economy requires starting with the highest political legislation to the participation of the masses and their interaction to achieve it (Al-Amayrah, 2019: 2), based on this, the importance of investing in education and capacity-building to improve skills to prepare the workforce for the transition to a green economy and educate university students to achieve its requirements, which is necessary to achieve sustainable development, awareness of the concepts of green economy and its transformation into an environmentally friendly process limits the depletion of its resources. The importance of moving to a green economy is a matter and necessary that all international and local organizations and civil society organizations advocate, leading to a sound relationship between development and technological development and preserving the integrity of the environment that achieves the goal of environmental sustainability and contributes to its achievement so that it can apply what the learner has learned about sustainable development issues in chemistry to address environmental problems. This means that "the concept of the green economy is necessary to achieve sustainable development and awareness of this concept requires attention to teaching and learning the goals of the green economy, its purposes and the method of achieving it" (Jamal al-Din, 2017: 4). "And that the transition to a green economy requires raising awareness in society about the benefits of implementing the regulations of the green economy program and its importance in addressing the problems of environmental pollution and global climate changes" (Al-Amayrah, 2019: 15), which requires developing educational programs and highlighting the role of universities by integrating green requirements into content Study materials for many academic disciplines to provide the necessary qualifications for jobs that contribute to the formation of the green economy, as well as the establishment of training centers to develop students' knowledge and professional skills in the field of green sectors and the formation of committees to follow up their progress and the amount of information gained about these fields (Jamal al-Din et al., 2014: 46), The concept of green economy is a new term that began to be used in environmental literature a few years ago. Therefore, previous studies that have dealt with it related to education and within the limits of researchers 'knowledge are rare, including the study (Mahmoud, 2018) that was conducted in Egypt and aimed at" conducting a descriptive and analytical study of the relationship between University education and green economy in light of sustainable development "One of the most prominent recommendations made by the study was the necessity to focus on harmonizing the university outputs with the needs and requirements of the green economy to meet the needs and ensure that graduates have the appropriate job opportunities for their specializations, and to expand the opening of departments related to green jobs. (Mahmoud, 2018: 233), As for the study (Al-Amayrah, 2019), which was conducted in Amman - Jordan, in one of its axes, it aimed to reveal the correlation between the degree of inclusion of green economy concepts in the content of the courses in the College of Engineering and the degree of environmental awareness among students from the point of view of the faculty members and students themselves, the correlational descriptive approach was followed and questionnaires were adopted to collect

information. The results showed a statistically significant relationship between the degree to which the College of Engineering courses included the requirements of green economy and the degree of environmental awareness among students. (Amayreh, 2019: 55).

The research acquires theoretical and scientific importance as: -
1- It is considered the first attempt in Iraq (within our knowledge) concerned with identifying awareness of green economy concepts in pre-service teacher numbers programs.
2- It presents a clear vision of the concept of the green economy and its sectors and its role in addressing the problems of environmental pollution and global climate changes, and highlights the role of awareness of its concepts as a basis for achieving sustainable development at the level of education.

The research acquires the importance of an applied process as:
1- It has an applied benefit. One of the most important inputs to the educational system, which is preparing the teacher before service, is being studied and calls for more research to be conducted and to benefit from it in developing the pre-service teacher numbers systems in the colleges of education in the Republic of Iraq.
2- The faculty members of the university see the necessity of continuous development of the content of the academic subjects in order to adapt to the continuous changes, the needs of the labor market and the new learning patterns.
3- It is hoped that its results will benefit the supervision and evaluation apparatus in the Ministry of Higher Education and Scientific Research to direct the evaluation of the content of the curricula and the inclusion of green economy in the specialty of chemistry in the Faculties of Education for Pure Sciences.
4- Contributes to the preparation of a measure of awareness of the concepts of green economy, useful for detection by the student-teacher, College of Education for Pure Sciences.
Research objective: The research aims to verify the degree of awareness of green economy concepts among students of the College of Education for Pure Sciences / Ibn Al-Haytham in Iraq.
Research limits: The search is determined by:
1- College of Education for Pure Sciences / Ibn Al-Haytham at the University of Baghdad.
2- Students of the Department of Chemistry - Fourth Stage (Morning Governmental Study).
3- Academic year (2020-2021).

Define terminology
The green economy was defined by:
- (United Nations Program, UNEP, 2011: ("An economy that results in an improvement in human well-being and social equality while significantly reducing environmental risks and scarcity of ecological resources." (United Nations Program, UNEP, 2011: 1)
- (Economic and Social Commission for Asia and the Pacific, 2013): "Economic growth that supports environmentally sustainable, socially inclusive and low-carbon development" (United Nations, 2013: 3)
- (Negati, 2014): "An economy that depends on green development and is based on respect for the environment and rationalization of the use of natural resources it uses resources and energies optimally and does not produce unjustly, but in a manner that harmonizes and preserves the environment without any contribution to emissions that negatively affect the environment and people and enhance Job opportunities and sustainable development. (Negati, 2014: 18).
Defines awareness of green economy concepts as a process: a state of mind that consists of students-teachers from the fourth stage / Department of Chemistry from the College of Education for Pure Sciences / Ibn Al-Haytham enables them to understand facts, ideas, views and concepts as well as behavior towards reducing environmental risks and understanding the problems related to the sectors of the economy Green building (green building, green education, green jobs, green energy, sustainable transportation, water, waste recycling, sustainable agriculture, and green products to achieve sustainable development without leading to a state of environmental degradation, and the degree that students obtain is measured by the scale prepared for this. the purpose.

Theoretical background:
Green economy indicators: Green economy indicators include three types:
1- Economic indicators, which include the share of sectoral or aggregate investments that contribute to the efficiency of resource and energy use and the reduction of pollution and waste, as well as the share of sectoral or aggregate output or employment that meet the established criteria regarding sustainability. (Jamal al-Din et al. 2014: 439)

2- Environmental indicators related to economic activity: such as the efficiency of resource use or the level of pollution, either at the sectoral economic level or the macroeconomic level. These indicators can be expressed, for example, by the amount of energy or water used to produce a unit of GDP. (Negati, 2014: 26)
3- Aggregate indicators on the path of progress and social well-being: for example, the macroeconomic aggregates that express the consumption of natural capital, including the indicators proposed in frameworks for environmental and economic accounting, or proposed within the initiative called "Beyond the Gross Domestic Product", which can be It expresses the health dimension and various other dimensions of special and social well-being. (United Nations Environment Program UNEP, 2011: 8)

Sectors of the green economy: The green economy includes many sectors and can be presented as follows:

Green building: This term refers to (green buildings, green architecture, environmentally friendly buildings, sustainable buildings, sustainable architecture, sustainable building) and green buildings are "that achieve a balance between the biosphere and the inhabitants of the building where the building is designed and implemented within and these renewable buildings are invested." Like solar energy, and it depends on ventilation and natural lighting to reduce energy consumption and reduce pollution (Mahmoud, 2018: 209).

Green education: One of its names is the term "green school, sustainable education, green university, environmental education" and it means "education that helps clarify and understand the meaning of sustainability and encourages students to actively participate in promoting lifestyles that coordinate with the fair and sustainable use of resources" (Jamal al-Din, 2017: 6), so green education is the process that instills in students' awareness and knowledge about the environment and its resources and the importance of preserving it, and this education contributes to preparing graduates who pursue green jobs and have a degree and awareness of the importance of protecting natural resources and investing them well in the interest of the environment (Mahmoud, 2018 : 211-210).

Green jobs: They are a type of jobs that play a vital role in greening enterprises and economies. Green jobs are decent jobs that contribute to preserving or restoring the quality of the environment in the fields of "agriculture, industry, services and administration." These jobs, in practical terms, reduce energy consumption and raw materials and limit greenhouse gas emissions. It reduces pollution and waste and protects ecosystems (International Labor Office, 2013: 22).

Green energy: The term green energy is given to the energies that are generated by renewable energy sources such as wind energy, solar energy, biomass energy, subsoil energy and others (El Feqi, 2014: 10)

Sustainable transportation: It represents non-mechanical transportation such as walking, cycling, collective mechanical transport, environmentally friendly, green vehicles and car sharing (Abbas and Yahya, 2016: 188). Sustainable transportation, as between the American Institute of Transportation, is "achieving transportation and basic access to meet development needs without affecting the quality of life for the suffix generations so that it is safe, healthy, inexpensive and limited in production in the production of pollution and the use of renewable and non-renewable resources so that it meets the needs of the present without affecting or damaging the environmental harmony of the society in the long term "(Al-Mashhadani, 2019: 225).

Water: The need for water is important to create and maintain employment opportunities across all sectors of the economy, and nearly half of the global workforce is employed in eight sectors that depend on water and natural resources, namely: agriculture, fisheries, energy, manufacturing, resource-intensive, recycling, construction, and transportation, (United Nations Educational, Scientific and Cultural Organization, 2016: 2)

Recycling of waste: "It is the re-use of waste to produce other products of lesser quality than the original product." It also means "recovering some types of waste such as paper, glass, metals, and plastics and preparing them through industrial processes to be reused as raw materials for the manufacture of new products" (Basha and Fawzia, 2018: 25).

Sustainable Agriculture: "An integrated system of plant and animal production practices that seek self-sufficiency, that is, dependence on local and renewable resources as much as possible and not produce pollutants" (Dagher and Rita, 2015: 4). The green economy is based on the adoption of organic agriculture, which is agriculture supported by the local community. Where people are most closely connected to their food sources (Kato, 2010: 308).

Green products: a green product is defined as "a product that takes into account environmental considerations with regard to the method of its manufacture using the minimum amount of energy and raw materials and avoiding polluting or toxic materials, as well as the method of use and the ease of safe disposal in it by self-decomposition or by recycling for reuse again" (Moussa and Shaima 2012: 51-52)

The aforementioned sectors such as green building, green education, green jobs, green energy, sustainable transport, water, waste recycling, sustainable agriculture, and green products are taken into account in this research when preparing the green economy awareness scale in its cognitive, behavioral and sentimental domains.

Research community: The research community consisted of all students of the Department of Chemistry in the College of Education for Pure Sciences / Ibn Al-Haytham - the fourth stage of the morning study, as it reached (216) by (104) male students and (112) female students distributed over (4) classes for the academic year (2020 -2021).

The research sample: was the selection of a sample of students from the Department of Chemistry, fourth stage / morning study from the College of Education for Pure Sciences / Ibn Al-Haytham - University of Baghdad. It consisted of (116) male and female students randomly, i.e. 54% of the research community

The research tool: was to prepare a measure of awareness of green economy concepts for undergraduate students in the major of chemistry and the aim of the scale was to measure students 'perceptions. The research sample of the fourth stage / Department of Chemistry from the College of Education for Pure Sciences / Ibn al-Haytham of facts, ideas, viewpoints and concepts as well as behavior towards the limit From environmental risks and understanding the problems related to the sectors of the green economy, which were nine sectors for each of the fields (knowledge, skill, and emotional), it was verified for its validity by presenting it to a group of referees specialized in chemistry, teaching methods, measurement, evaluation and psychology.

The psychometric properties of the search tool: The strength of characterizing the paragraphs was extracted using the T test (T test) for two independent samples the calculated T value for the distinctive paragraphs ranged (17.353 - 2.520) it was considered an indicator through its balance with the tabular T value (1.960) at a level of significance (0.05) and with a degree of freedom (52) It was found that (8) paragraphs the computed T value was smaller than the tabular T value, i.e. it was not distinct, As for the validity of the construct, it was verified by extracting (the relationship of the degree of each paragraph to the total score of the scale) (and the correlation coefficient of the total score of the field with the total score of the scale) and (the relationship of the score of the paragraph with the field to which it belongs). Awareness of the concepts of green economy (internal linkage matrix), by applying the Pearson correlation coefficient, all the values of the correlation coefficients were statistically significant when compared to the tabular values (0,196) at the level of significance (05, 0) and the degree of freedom (98) this means that all fields are homogeneous with each other in measuring awareness of the concepts of green economy, except for paragraphs (8)) Was not statistically significant.

Stability of the scale: Two methods were adopted to calculate the stability of the scale, one of which was by the Cronbach-Alpha method and the value of the stability of the scale in this method was (0.780) and the other by the half-segmentation method by adopting the correlation coefficient between the two halves by the method (Pearson) whose value was (0.672) the correlation coefficient using the (Spearman-Brown) equation reached its value (0.802), which is good stability.

Description of the scale in its final form: The scale consisted of nine sectors, represented by (green building, green education, green jobs, green energy, sustainable transportation, water, waste recycling, sustainable agriculture, and green products) in the fields (knowledge, skills, and affective) as follows :

The first field: student-teacher information on concepts of green economy and includes (17) paragraphs of which (10) are positive and (7) negative.

The second area: student-teacher behavior towards concepts of green economy and includes (18) paragraphs of which (10) are positive and (8) negative.

The third field: the student-teacher attitude towards the concepts of green economy and includes (17) paragraphs of which (11) are positive and (6) negative.

The number of paragraphs of the awareness measure on green economy concepts became in its final form (52) paragraphs, in addition to that two revealing paragraphs were added for the purpose of revealing the sincerity of the response, as it was excluded statistically, and for each paragraph of the scale five alternatives were put (very agree, agree, disagree) (Sure, Reject, Reject completely), and the grades (5, 3, 2, and 1) were given respectively for the positive paragraphs, and the scores (1, 2, 3, 4, and 5) respectively for the negative paragraphs, so the total score of the scale is at its upper limit (260 degrees, with a minimum (52) degrees and a hypothetical average (156) degrees, thus the scale is ready for application to the research sample.

Presentation of the results: To verify the aim of the research, to identify the degree of awareness of the concepts of green economy among the student-teacher at the College of Education for Pure Sciences / Ibn Al-Haytham, and after calculating the scores obtained by the students in the scale of awareness of the concepts of green economy, the T-test was adopted. For one sample, Table (1)

Table (1) The arithmetic mean, standard deviation, and T-value of the scores of the scale of awareness of green economy concepts for student-teacher

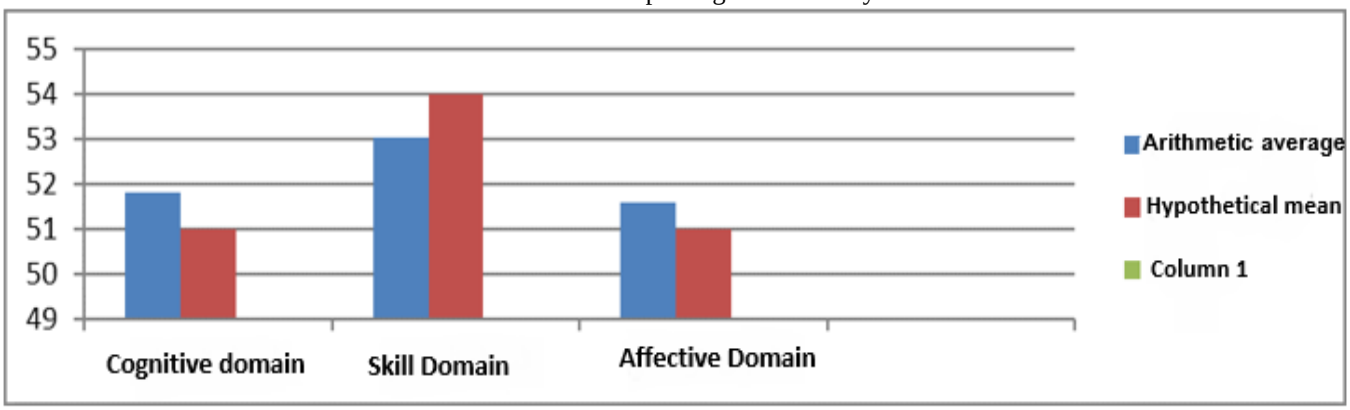
variable	Number	The arithmetic mean of the sample	standard deviation	The hypothetical mean of the scale	T-value		Indication level	Indication of the difference
					Calculated	Tabular		

Awareness of green economy concepts	116	156.482	16.869	156	0.308	1.96	0.05	Not a function

It can be seen from Table (1) that the calculated T value amounted to (0.308), which is smaller than the tabular T value (1.96), therefore, it is considered not statistically significant at the level of (0.05) and with a degree of freedom (115), and when comparing the arithmetic mean of the students 'grades of (156,482) and a standard deviation (16,869), with the hypothetical average of the scale of (156) degrees, it was found that there is no statistically significant difference between the mean, the arithmetic of the sample and the hypothetical mean of the scale, meaning that students of the College of Pure Sciences have a weak awareness of green economy concepts.

Figure (1) shows the mean scores for the scale of awareness of green economy concepts compared to the hypothetical average of the student-teacher for each field of awareness of green economy concepts for the student-teacher.

Figure (1): The arithmetic average of the scores compared to the student-teacher hypothetical average for each field of awareness of the concepts of green economy



It can be seen from figure (1) that the arithmetic mean of the (cognitive) domain was the highest, as the arithmetic mean was (51,836) compared to the hypothetical average of the domain (51), meaning that the field was achieved weak, followed by the (emotional) domain, as the arithmetic mean reached (51,594) compared to the hypothetical average of the domain. (51) In other words, the affective domain is verified and weak, and the lowest field was the skill field, as the arithmetic mean reached (53,051) compared to the hypothetical average (54), meaning that it is not achieved.

Discussing the results: The results showed that students - teachers from the Department of Chemistry at the College of Education for Pure Sciences (Ibn Al-Haytham) had a weakness in awareness of the concepts of green economy in all its cognitive, skill and emotional fields, and that the awareness of the student-teacher in the College of Education for Pure Sciences / Ibn Al-Haytham / University of Baghdad was The highest in the cognitive domain is followed by the affective domain and finally the skill field, and these results are interpreted as follows:

- When referring to the scale of awareness of green economy concepts in the knowledge field, it was found that 88% of students did not understand the meaning of the green economy and believed that a green building is a building painted in a green color, which indicates their lack of awareness of green buildings, and that 82% of students were not aware that Recycling glass does not require the same energy when making glass from sand, and in the emotional field, it was found that 83% of students did not realize the importance of using a mobile phone to save energy instead of computers in education, While 81% of students showed that they do not have awareness that the use of walking and cycling to move is one of the principles of sustainable transportation, while 80% of the students showed that they do not know the principles of sustainable agriculture, and in the skill field, 84% of the students were found not to realize that using the Edmodo educational platform It is the philosophy of green education, and this indicates the lack of awareness of the green education sector, and 86% of students were not aware of the green agriculture sector and did not realize that no-till agriculture reduces global warming, While 77% of students were not aware of the benefits of recycling, including the preservation of natural resources and energy, this is due to the lack of emphasis of faculty members in the College of Education for Pure Sciences on the element of advanced knowledge

and contemporary concepts represented in the concept of green economy and the lack of opportunity for students to participate in the activities of sustainability issues and link them with life experience in order to enhance their knowledge, attitudes and skills, the Mediterranean Strategy for Education for Sustainable Development in this regard emphasized "the need to focus on enabling learning experiences aimed at encouraging sustainable behavior, including educational institutions" **(Mediterranean Strategy for Education for Sustainable Development, 2014: 53-54)**

Conclusions: It was concluded that

- The degree of awareness of the concepts of green economy among the student - the teacher in the College of Education for Pure Sciences / Ibn Al-Haytham was weak in all areas of knowledge, skills and affection.
- The degree of awareness of the student-teacher in the College of Education for Pure Sciences / Ibn Al-Haytham / University of Baghdad was the highest in the cognitive domain, followed by the emotional domain and finally the skill domain.

Recommendations and proposals

-Integration of green requirements into the content of chemistry courses in the Faculties of Education for Pure Sciences.

- Paying attention to developing teacher numbers and rehabilitating them during the pre-service numbers years in the Faculties of Education to provide him with knowledge and concepts related to the green economy.

-Holding introductory conferences or seminars for students of colleges of education to make them aware of the concept of the green economy and its sectors and converting it into an environmentally friendly practical practice that limits the depletion of its resources.

-Organizing courses and seminars for faculty members in the Faculties of Education for Pure Sciences to inform them of the goals of the green economy and how to achieve it.

-Utilizing the awareness measure of green economy concepts as a tool for its detection among university students.

To complete the research, it is suggested:

- Conducting a study dealing with the green economy culture among chemistry teachers.
- Conducting similar studies dealing with awareness of the concepts of green economy depending on the gender variable.
- Conducting similar studies dealing with awareness of green economy concepts and its relationship to environmental awareness.

sources

1. Abbas, Sanaa Sata'a and Yahya Tayeh Omran (2016): Sustainable Transportation and Urban Form, Iraqi Journal of Architecture, Issue 1, March, pp. 187-206.
2. Abdul Redha, Mowafak Abdel Zahra (2017): Analysis of the content of chemistry textbooks for the third intermediate grade according to the dimensions of sustainable development, Journal of Educational and Psychological Research, No. 54, pp.
3. Al-Ansari, Muhammad Badr (2000): Measuring Character, Dar Al-Kutub Al-Hadith, Kuwait
4. Al-Ansari, Samer Muhammad (2019): Teacher preparation and professional development in light of some global experiences, The Arab Journal of Scientific Publishing, Issue Fourteenth, pp. 233-255.
   Al-Feqi, Mohamed Abdel-Qader (2014): The Green Economy, the Regional Organization for the Protection of the Marine Environment, The Marine Environment Series.
5. Ali, Muhammad Al-Sayed, and Ibrahim Bassiouni Amira, (2007): Scientific Education and Science Teaching, 2nd Edition, Dar Al-Masirah, Amman.
6. Aliouh, Nariman Hassan and Muhammad Hassan Al-Sabarini, (2017): "The level of science teachers' understanding of the level of multidimensional scientific culture "Journal of Educational and Psychology Sciences (Islamic University of Gaza), 25 (4), pp 504-520).
7. Al-Mashhadani, Ban Ali Hussain (2019): The role of sustainable transport and smart transportation in alleviating transport problems in the Emirate of Dubai, the tenth international scientific conference under the title of geophysical, social, human and natural challenges in a changing environment for the period from 25-26 July 2019, Istanbul.
8. Al-Mufarj, Badriya, Afaf Al-Mutairi, and Muhammad Hamadeh (2007): Contemporary trends in teacher preparation and professional development, Ministry of Education, Educational Research and Curriculum Sector, Kuwait.
9. Al-Nabhan, Musa (2004): "Basics of Measurement in the Behavioral Sciences", Edition 1, Dar Al-Shorouk, Amman.

10. Al-Tamimi, Abdul Rahman bin Ibrahim Al-Fraih (2018): The level of awareness of nanotechnology concepts among male and female students enrolled in the educational diploma at the University of Hail, Arab Gulf Message, No. 148, pp. 41-57.
11. Amayreh, Tasnim Ali Falah (2019): The degree of including the requirements of green economy in the curricula of the College of Engineering and its relationship to the degree of environmental awareness among its students, a master's thesis, Middle East University, College of Educational Sciences.
12. Bakkar, Abdel-Karim (2000): Renewing Awareness, First Edition, Dar Al-Qalam, Damascus, Al-Dar Al-Shamiya, Beirut.
13. Dagher, Amani and Rita El-Khawand (2015): A Guide to Sustainable Agriculture for Farms and Farmers, Tarab Association for Environmental Education, Lebanon
14. Hakim, Areej Youssef (2018): An analytical study of the content of social and national studies for the second intermediate grade in light of the Y Project to redirect the curriculum towards sustainable development and citizenship development, the second international scientific conference entitled (Contemporary Education and Citizenship), organized by the Jordanian Society for Social and National Education in cooperation With the Higher Institute for Applied Studies in the Humanities of Mahdia - Monastir University - Tunis, pp. 205-221.
15. Hammoudi, Alaa Fayeq Habib, (2016): Building a training program for education for sustainable development for biology teachers and its impact on their scientific culture and environmental awareness of their students, PhD thesis, College of Education for Pure Sciences, Ibn al-Haytham, University of Baghdad
16. Ibn Manzoor (Bla): Lisan Al Arab, Dar Al Maaref, Cairo.
17. International Labor Office (2013): Sustainable development, decent work and green jobs, International Labor Conference, 102nd Session, Geneva.
18. Jamal al-Din, Najwa Youssef (2017): Education for a green economy and global transformations in economy and education, Journal of Educational and Psychological Sciences, Issue 4, Part 1, pp. 3-44.
19. Jamal al-Din, Najwa Youssef, Samir Akram Ahmed and Muhammad Hanafi Hassan (2014): Green Economy .... The concept and requirements in education, Journal of Educational Sciences, Issue 3, Part 1, pp. 428-453.
20. Kato, Molly Scott (2010): Green Economy ..... An Introduction to Theory, Policy and Practice, 1st Edition, The Nile Arab Group, Cairo.
21. Khaled, Ben Jalloul, Bakhakhsha Mussa and Bidyaf Abdel Malik (2018): The transition to a green economy is an activity to alleviate poverty and achieve sustainable development, an analytical study of transition and impact policies in light of some international experiences, the International Forum on: Algeria and the imperative of moving towards a green economy to achieve development Sustainable, College of Economics - Business and Management Sciences.
22. Khanfar, Ayed Rady (2014): Environmental Economics "Green Economy," Assiut Journal of Environmental Studies, Issue thirty-ninth, pp. 53-63.
23. Khawaldeh, Salem Abdel Aziz, (2012): "The level of scientific culture among first-year undergraduate students and its relationship to some variables," Journal of Educational and Psychological Sciences, Al-Bayt University. Volume 13, Issue 3, Amman, pp. 41-69.
24. Mediterranean Strategy for Education for Sustainable Development (2014): "The Horizon 2020 initiative aims to eliminate pollution from the Mediterranean by 2020", the Mediterranean Environment Program, European Union, Athens.
25. Mussa, Kasra Antar Abdullah and Shaima Muhammad Naguib Jamil (2012): The impact of green product trends on the economic environment in light of globalization in selected developing countries for the period (1995-2010), College of Management and Economics, Tikrit University, Tikrit Journal of Administrative and Economic Sciences, Volume 8 25, pp. 49-62.
26. Nagati, Hossam El-Din (2014): The Green Economy and its Role in Sustainable Development, Series of Planning and Development Issues No. 251, National Planning Institute, Cairo
27. Odeh, Ahmad Suleiman and Fathi Hassan Malkawi (1992): Fundamentals of Scientific Research in Education and Human Sciences, 2nd Edition, Al-Kanani Library, Irbid.
28. Pasha, Faten and Fawzia Bersooli (2018): Recycling as a Green Economy Trend, Journal of Legal and Economic Research, Volume 1, Issue 2, pp. 16-34.
29. Saad, Abdel-Rahman (1997): Psychometrics, Dar Al-Fikr Al-Arabi, Cairo.
30. Saeed, Chuan Farag (2016): A training program for chemistry teachers according to the strategies of the two sides of the brain and its effect on their teaching practices, achievement and thinking patterns of their students, PhD thesis. College of Education for Pure Sciences, Ibn al-Haytham, University of Baghdad.

31. Sayed, Ezz Syed Muhammad (2016): Building and codifying the cultural awareness measure for primary school pupils in basic education, Journal of Educational and Social Studies - Egypt, Volume 22, Issue 1, pp.
32. Shehata, Hassan and Zainab Al-Najjar (2003): Dictionary of Educational and Psychological Terms, 1st Edition, Dar Al-Masria Al-Lebnani, Cairo.
33. Taha, Mahmoud Ibrahim Abdel Aziz (2014): The awareness of students, teachers, Division of Agricultural Sciences, Faculties of Education, of the concepts of nanotechnology and its multiple applications, "Diagnostic Study" Journal of Educational and Psychological Sciences, Volume 15, Issue 3, pp.
34. Trowbridge, Leslie, Rodger Baby and Janet Powell (2004): "Teaching Science in Secondary Schools (Strategies for Developing Scientific Culture)", translated by Abdel Moneim Abdel Hamid, Nader Al-Sanhouri and Hasan Terab, Dar Al-Kitab Al- Jamiey, Al-Ain.
35. United Nations (2013): Monitoring the Transition to a Green Economy in the Arab Region: Small and Medium Enterprises, New York
36. United Nations Educational, Scientific and Cultural Organization (2016): Water Resources and Jobs. Executive Summary, United Nations Report, Office of the United Nations World Water Assessment Program, Department of Water Sciences.
37. United Nations Environment Program (2011): Towards a green economy: pathways to sustainable development and poverty eradication - a reference for policymakers, UNEP publications.
38. Zayer, Saad Ali, Ehwoed Sami Hashem and Alaa Abdul-Khaleq Al-Mandalawi (2016) Sustainable Development, Educational Applications, 1st Edition, Dar Al-Wadah, Amman, Tigris Library, Baghdad.
39. Nhamo, Godwell(2014): Reviewing Some Implications of the Green Economy for Higher and Further Education Institutions, Southern African Journal of Environmental Education, Vol. 30,p79-95.