Nanotechnology Issues Included in the Subjects of the Department of Biology in the Colleges of Education

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Abstract

This research aimed to: Recognize how much including in content of subjects in the Department of Biology College of Education in accordance with the Nanotechnology Issues. To achieve this aim, the researchers built a standard for the Nanotechnology Issues, were verified validity by presentation to a group of arbitrators specialists in the methods of teaching the Biology , and that standard is finalized be from (8) Nanotechnology Issues and emerged of them (90) sub- Issues, then the researchers analyzed the content of subjects of the Department of Biology in Colleges of Education for the academic year (2018-2019) in the light of this criterion as the number of analyst was (12201) page, and it adopted the explicit idea and implicit idea as units for registration and repetition unit of the census, The results were : weakness of subjects in the Department of Biology in Colleges of Education to contain Nanotechnology Issues compared with the ratio based on the opinions of experts (20%), (16) only of 90 terms were achieved , that was equal of (17.77%)

Keywords: *Nanotechnology - Nanotechnology Issues - Understanding Students*

Introduction

In the midst of rapid and successive developments in most fields of science and knowledge, university institutions and research centers are undertaking these developments as an important tributary to them and a rich resource for their productions in the invention [1], discovery or development, and therefore university education adopts those developments learning and education at the very least, and perhaps the most important science that split its path to global scientific interest is nanotechnology because of the science it has enormous applied fields in various sciences, including Biology, and the first to be the outcome of this science is abundant and based on university students, including students [2] of Biology departments in the colleges of to be educators in the future and need to develop their understanding and awareness of scientific knowledge achievements and provide the latest science and cognitive transformations [3]. Technological Despite its many applications, importance, challenges and gravity, it did not receive the required attention from the thought and educational research in Iraq, as it notes the weakness of educational institutions in keeping with the amazing development in this field through its programs and plans [4]. Through the information obtained by the researchers from the exploratory questionnaire distributed to a group of teaching specialists in the departments of Biology in the colleges of education and the number (9) include a question on the importance of nanotechnology and the most important issues related to the content of subjects in the departments Biology in the colleges of education, the researchers found that there is a certain desire and urgency of the teachers to address the topics and issues related to nanotechnology because of its global interest in scientific institutions and research centers, and its impact on the intention of the cognitive process for students and their lives, and the above is determined by the following research problem by asking:

Second: The Importance of Research:

Human societies are striving to pay attention to future science in order to face the challenges and developments of the times. Today, our world is witnessing rapid and successive changes as a result of major technological and scientific developments in all fields of life and at all levels. Humanity, and

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education, and educational practices allow the learner to take advantage of technological innovations in the development of achievement and skills. Among the technological innovations are nanotechnology which takes care of the study and characterization of nanotechnology materials and their properties at a size less than (100 nm), and precise control of the interaction of molecules and rearrange the atoms and place them in order to produce new materials unprecedented, so that it is possible to design smaller robots from the head of a pin can enter and movement in the blood vessels and be able to perform accurate operations within them and treat blood clots tumors and incurable diseases. [6]

Given the importance of nanotechnology in education, many conferences have been held, most notably one, Nanotechnology organized by the University of Jordan in Amman from 10-13 / 10/2008, in cooperation with the University of Illinois at Urbana-Shampeen, under the name of "developed nanomaterials" (14) In Iraq initiatives have emerged related to nanoscience and technology in light of the national education strategy and education that started work formulated and organized since (2009) and launched in (2013) for (10) years, and in this regard published the University of Technology (128) research in the field of nano, and the University of Baghdad with (120) research {15} and given all the above interest in technology Nano and its issues in all fields have emerged many studies and research, including the study Ahmed and others (2015) that sought to investigate the impact of an educational program - learning according to the concepts of renewable energy and know its impact on technological enlightenment in the Department of Chemistry, and showed results the program assists students in acquiring knowledge and concepts related to nanoscience and technology and in technological development. [1]

Nano materials:

Hijazi defines nanomaterials as "very small materials that are prepared in the laboratory or already present in nature and whose measurements of lengths or diameters of granules range from 0.1 to 100 nanometers." [2]

Forms of nanomaterials: nanomaterials are prepared in various forms including:

The Fullerene: nanoparticles composed of triple bonded carbon atoms, which give the shape of pellets that have a structure similar to graphite, but instead of containing pure hexagonal form, they contain pentagonal forms and potentially sevenfold carbon atoms, [9]

Thin Films: a thin layer of a specific material, less than 100 nanometers thick, and their length and width may be in micrometers. These thin layers are used in the field of semiconductors such as silicon and gold bars.

Nanofibres

Perhaps the most famous nanofibers are those made of polymer atoms because the ratio of surface area to volume is large in the case of nanofibers, and this gains those fibers characteristic mechanical properties such as rigidity and tensile strength and others, which can be used in biomedicine, and in organ transplantation such as joints, and transport of medicines.

Nanoballs:

One of the most important carbon nanoparticles, which ends in the class of Foloreinat, of the material C60, but they differ slightly from the composition as they are multiple crust. [11]

Second: Field Applications in Pharmacy:

Nanotechnology is one of the most important scientific fields that scientists rely on in the development of drug mutations that change the concepts of treatment and medication for many diseases, and perhaps the most important applications of nanotechnology in pharmacy:

1- Nano-biotics: compounds that have the ability to identify bacteria and viruses, and then eliminate them without exposure to any other cell

2 - delivery of the drug to tissues: It depends on the manufacture of nanomaterials that work to improve the bioavailability of the drug (Bioavailability) This means the presence of drug molecules in the target place of the body [7] Nanotechnology can offer drug delivery solutions in the following areas:

a- Drug Coating: Using pharmaceutical packaging materials such as liposomes and polymers (such as polylactide –PLA, and lactide combined with PLGA glycolide)

b- Drug carriers:Another type of drug delivery system, nanotechnology offers important, manageable solutions to link with the drug, the target and the imaging material, [18]

Research Approach

The researchers adopted the descriptive analytical approach for the analysis of subjects in the Department of Biology in the Colleges of Education.

Search procedures

First: Research Community (Community of Subjects)

The community of subjects covered represents all subjects for the four stages of the Biology department in the Colleges of education

Second: Research sample (sample content of subjects): The analysis process included the content of subjects in the Department of Biology in the College of Education, as the number of analyzed subjects (15) of the 35 articles, or 43% of the total community. The total analyzed pages are (12201) pages, (1689) pages of the first stage materials, (2291) pages of the second stage materials, (4367) pages of the third stage materials and (3854) pages of the fourth stage materials. The scientific, drawings, tables and charts after the indexes and glossary of terms for the analyzed materials were excluded.

Analysis of the content of the subjects of the Department of Biology

The researchers relied on the explicit idea and the implicit idea as the two recording units because the subjects in the Department of Biology are scientific materials and expressions are often clear and explicit, but their use of the idea implicit, because some topics can suggest ideas that reflect the issues or sub-issues of the standard nanotechnology.

Validity of the analysis

To ensure the validity of the analysis conducted by the researchers were hired two experts * in the methods of teaching Biology and presented to them three subjects (cytology, biology, algae) with the standard of nanotechnology issues that were built and ideas extracted from the content of analyzes to make sure The analysis was valid, and they unanimously agreed on the validity of the analysis, which was prepared by the researchers in truth to the analysis he conducted.

Stability of analysis

In order to be objective analysis and to obtain acceptable stability, the researchers used two types of stability:

1- Agreement over time

To calculate the stability coefficient in this way, the researchers re-analysis after thirty days as the value of the coefficient of stability calculated (0.98) using the Holste equation, a very high value and reflect a high degree of stability.

2- Agreement between analysts

The researchers used external analysts to analyze the content *. This was done by selecting a random sample of the total analyzed content of (12201) pages. The proportion of the stability sample represented about (20%) (2790 pages), which included books (cell biology, biology, algae) and using the equation (Holsti) was extracted the stability coefficients calculated in this way and was equal to (0.82)For the researcher with the first analyst and 0.80) For the researcher with the second analyst (0.83) between the first and second analyst, and thus the coefficient of stability is good, and some studies have indicated that the acceptable stability ranges between (0.50 or 0, 60) and above [12] as in Table 1

Table (1) values of stability factors

Agreement through time	**Researchers after 30 days**	**0.98**
Agreement between analysts	Between the researchers and the first analyst	0.82
	Between the researchers and the second analyst	0.80
	Between the first and second analyst	0.83

Determine the spoken ratio to compare the results of the analysis

Depend that the percentage (20%) to be a hypothetical ratio to compare the results of the analysis based on the agreement of the arbitrators and experts on this ratio, the researchers presented a questionnaire to find out the ratio (2). The agreement was (80%) of the experts and arbitrators on this ratio.

The results will be presented according to the research objective and discussed as follows:

Identify the extent to which the content of subjects is included in the Department of Biology, College of Education for Nanotechnology Issues.

After the subjects were subjected to the four stages, the pages subjected to analysis included (12201) pages and the results were as shown in Table (2).

Table (2) Frequencies and Percentages of Nanotechnology Issues in the Subjects of Biology Departments

No	**Subjects**	**Total iterations of major and minor issues**	**Percentage of Origin (16) element of a case Sub- extracted**	**Order**	**percentage For the subject Realized% of Origin (90) element Issue by standard**	**percentage Realized from all the subjects Tuition**
1	Materials of the first stage	4	25%	second	4.44%	17.77%
2	Materials of the second stage	1	6.25%	Third	1.11%	
3	Materials of the third stage	11	68.75%	First	12.22%	
4	Materials of the fourth stage	0	0%	Fourth	0%	
Total		16	100%		17.77%	

From the data recorded in Table (5) it is clear that the subjects in the third stage were the most interested in the contents and issues of nanotechnology, where it obtained 68.75% of the percentage out of (16) elements of the sub-issue extracted, followed by the first stage by 25% and the second by 6.25% and then the fourth by (0%) and the researchers attribute this to the algae materials and practical environment and educational laboratory In the third stage, it received the most attention, followed by the first stage, which was the theoretical and practical biology and theoretical cell which focused on the issues of nanotechnology and microscopes. Then the second stage materials represented theoretical histology material while the fourth stage materials were weaker and poorest as it did not get any repetition despite the importance of the fourth stage materials in the formation of specialization for students of the Department of Biology in the colleges of education and this is a take on the materials of that stage, which was expected to the strongest of the four stages because the first stage represents the beginning of specialization and the second and third stages represent a transitional stage to the end of the specialization of the fourth stage.

As for the issues, the diversity of interest in the main and sub-issues and their components, as in Table (3).

Table 3: Frequencies and percentages of paragraphs achieved from the Nanotechnology Standard

No	The main issues	Repeat paragraphs	Percentages
1	Introductory issues of nanotechnology	11	68.75%
2	Agricultural issues	1	6.25%
3	Environmental issues	2	12.5%
4	Issues related to the dangers of nanotechnology	1	6.25%
5	Future issues	1	6.25%
6	Medical and health issues	0	0
7	Industrial and economic issues	0	0
8	Food issues	0	0
Total		16	100%

Through Table (3) we note that the issues in general did not get sufficient attention in the subjects of the four stages, which indicates the weakness of keeping up with these materials to the developments of science and its applications, including nanotechnology, but when looking at the same table we note that the identification issues of nanotechnology have been obtained more interest of the subjects has obtained (11) repetitions out of (16) recorded for all subjects and the rate of (68.75%) and the researchers attribute this to the fact that most of the study material deals with these tariff issues as an introduction to nanotechnology as well as the standards and microscopes that adopt this technique

Conclusions

Through the results of the research, the researchers reached the following conclusions: The subjects of the Department of Biology in the colleges of education were weak in their inclusion of nanotechnology issues. The subjects of the third stage in the Department of Biology got the highest frequency, followed by the first stage and then the second stage, while the fourth stage did not receive any repetition. The nanotechnology knowledge issues with the greatest interest in the content of the subjects were the four stages.

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Conflict of Interest: None to declare.

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