Academic Laboratory Skills For Chemistry Students at the College of Education For Pure Sciences -Ibn Al Haitham

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Research Abstract:

The current research aims to find out the extent to which students of the Faculty of Education for Pure Sciences\/Ibn al-Haitham have owned laboratory academic skills, the researcher adopted a descriptive research approach to conform to the goal of the research, the research sample consisted of 140 students from the Department of Chemistry Phase II, The research tool, which consisted of a measure of laboratory academic skills, which consisted of seven skills and consisted of 28 paragraphs (four paragraphs per field), was prepared and the pent-up scale was chosen because the selected sample were university students, and the results showed the ownership of students' skills of laboratory academic skills other than skill The use of the library and the superiority of female students over students in the skill of time management and the skill of thinking and lectures and follow-up and reading skill, the percentage of the possession of female students for the skills of the laboratory academic skills was 86.74% while the students were 57.89%.

The problem of research: - This era is characterized by cognitive and technological progress, which led to the transfer of education from the old strategies in education to modern strategies based on theoretical teaching related to work and teaching students how to learn subjectively.

In most cases, we focus on developing the laboratory skills of the learner from how to use tools and devices and deal with laboratory materials, forgetting the laboratory academic skills that we must develop for them such as recording observations, using scientific thinking skills, time management skills and others, which lead to the achievement of the goals of science and access to effective education. Hence the problem of research, which is the following question:

The extent to which students in the Chemistry Department have laboratory academic skills at the Faculty of Pure Sciences\/Ibn al-Haytham?

The importance of research:-

Scientists in the world have a different view of science, some of whom believe that science is based on the structured cognitive aspect, and there are those who emphasize the intellectual and methodological aspect through thinking and research in order to reach and develop knowledge.

In light of the changing perception of education from the old ways of preservation, indoctrination and repetition to teaching learners how to learn for themselves and how to search for knowledge and seek to discover and develop it to serve the community. (Atallah,329:2010) because of its importance in the development of academic mental skills of reading and understanding the scientific material, listening, listening, recording observations, asking questions appropriately, interpreting the results and developing inference thinking, i.e. moving from general to private, and learning in the way of in-exasperating thinking, i.e. moving from part to all, and the ability to draw up mental lying and developing the learner's ability to write scientific research. (Al-Huwaidi, 75:2005)

And that the scientific knowledge obtained by the learner because of the use of the laboratory is characterized by permanence, because he retains that knowledge for a long time, the experience is the means of understanding and applying the surveys. (Atallah, 60:2010)

Through most of the previous studies that I had access to, it was found that the development of the skills of students helps to raise their level of academic achievement as a study (Zidan,2005), which aimed to determine the role of therapeutic education in the development of the skill of using microscope supposition in the biology department at Al Quds University and the study (Hadabi and Al-Makhlafi, 2009), which aimed to identify the extent to which students of the Faculty of Education Sana'a University have the skills of laboratory skills in the department of physics.

Hence, the research is important as:

1. Gives a profile of laboratory academic skills.

2. Gives an overview of the skills that a teacher must possess in the laboratory.

3- Building the laboratory academic skills scale, which is the first in Arabic and locally, according to the researcher' knowledge.

Research objectives: -

The current research aims to verify:

Laboratory academic skills of chemistry students at the Faculty of Pure Sciences/Ibn al-Haytham.

To verify the purpose of the research, the following questions were formulated:

1- Do the students of the Chemistry Department of the Faculty of Pure Sciences/Ibn al-Haitham have laboratory academic skills?

2. Do male students in the Chemistry Department of the Faculty of Pure Sciences/Ibn al-Haytham have laboratory academic skills?

3- Do female students have the chemistry department at the Faculty of Pure Sciences/Ibn al-Haitham?

4. What are the statistically significant differences at the level of (0.05) with laboratory academic skills according to gender (students, students) in the chemistry department of the Faculty of Pure Sciences/Ibn al-Haytham?

5- What is the percentage of laboratory academic skills among the students of the Chemistry Department in the Faculty of Pure Sciences/Ibn al-Haytham?

Research limits: -

- Spatial boundaries: Baghdad University- Faculty of Pure Sciences\/Ibn al-Haitham.
- Time limits: school year 2019-2020.
- Human Boundaries: Third-Stage Students - Chemistry Department.

Theoretical framework:- Laboratory

academic skills:

Academic skills represent the basic learning skills set associated with subjects. (Ahmed et al., 569:2017)

The difference in the education system between the university and secondary school is a challenge for students due to the transition to self-learning and the ability to manage time, the large quantity and quality of university duties and the quality of the tests that reveal understanding and understanding and how to use the sources of learning. (Nassar, 3:2005)

The development of academic skills increases the level of motivation and increases the level of attention, and the development of the level of academic achievement. (Rice,Keefer and Elam,1991:73)

The effective teaching of various sciences in general and chemistry, especially with the presence of the laboratory, and the laboratory academic skills are:

1- Scientific research skills.

2- Effective study.

3- Time management.

4- Use the library.

5- Lectures and follow-up.

6. Thinking skills.

7. Reading skills. (Olives, 160:2005-162)

The numbers of teachers who are able to develop the laboratory academic skills of students help them to understand clearly the nature of science. (Zembal and others,2002:444) increases the effectiveness and ability to translate practical content into practical activities, and achieve the desired objectives of the educational process. (Hakimi, 31:2003)

Teacher qualities in the laboratory:-

1. Be able to achieve learning goals in the light of the possibilities available. (Olives,177:2001)

2- To have the ability to recognize the student's achievement and skills abilities by teaching him and thus identifying appropriate teaching methods to raise his level of achievement and skills.

3- To have the skill to choose the appropriate educational means for the subject of the lesson, to present them in a timely manner and to be interesting and arouse the attention of the learners.

4- Have the skill to use reinforcement.

5- To have the skill of mastering the scientific material, this checks his ability to review concepts, facts and information in a sequential and interesting way. (Ali,88:2005-91)

6- The teacher should have the ability to keep up with the times using modern methods and methods. (Agent, 190:2000)

7. To have the skill to provoke the motivation of the learners by linking the subject of the experience to the daily life of the learners and the possibility of using it in everyday life.

8. Be able to arouse the curiosity of learners by asking thought-provoking questions and motivating them to integrate through the involvement of the greatest educated.

9. To have the ability to encourage social relations between the learners and each other and between him and the learners because this will enhance their motivation for learning because if they like the teacher of the subject they will love the course they are studying. (Al-Tanawi,150:2011-151)

It became necessary to gain the learner various academic skills, especially at the university level, and therefore the numbers of the teacher should be good to live up to the fact that the teacher is primarily responsible for guiding laboratory work towards achieving his goals. (Attia, 42:1998)

The importance of laboratory academic skills to learners:

1. Laboratory academic skills help to give the learner basic and integrated science processes, such as observation, forecasting, classification, measurement, inference and experimentation.

2- Develop ing the scientific thinking of the learner in the survey of scientific knowledge, identifying the problem, solving problems, analyzing information and working conclusions.

3- Develop the skills of asking and selecting questions, writing reports, criticism and translating information, so teaching will be effective. (Al-Afula and AlFatlawi,191:2012)

- The ability to manage time optimally and thus develop creative skills of planning, installation and design.

5- Continuous search for scientific knowledge.

6- Search for information, data and the meanings of each through the use of the library or search engines on the Internet. (Nashwan, 338:2001)

7. Helping to overcome the difficulties of reading because reading is an emotional mental process and is not just an acquisition of knowledge and a means of communication, but a linguistic art and an intellectual way of solving problems.

8- The development of laboratory academic skills helps learners to take notes, compare and schedule, thus helping them to understand and memorize lectures. (Blanket et al., 131:2007)

Research Method: - The researcher adopted the descriptive research method to conform to the goal and problem of the research.

Research procedures:

- Research community and its appointed: - The research community consisted of students of Baghdad University - Faculty of Education for Pure Sciences \/ Ibn alHaitham - Department of Chemistry Phase II and number (200) students, and the size of the sample (140) students, the members of each of the higher and lower groups 38 students and 27% per group, indicated (Al-Jabri,2011) that descriptive studies are taken from a relatively small community (hundreds or less)

Research tools:

The current research is made up of a single tool, the measure of laboratory academic skills and the numbers of the scale, which has been taken into account the following things:

1- Review educational research and see foreign and Arab educational standards within the limits of what is available.

2- Review solid educational journals. Educational messages and segments that have to do with research variables.

3- Taking the opinions of experts specialized in chemistry and methods of teaching chemistry.

4- Taking into account the community as well as the sample to which the scale was applied.

The tool is: -

Laboratory Academic Skills Scale: - Within the limits of the research methodology, the researcher will adopt laboratory academic skills compatible with the age and scientific level of the research sample, which included in the current research seven skills:

1- Scientific research skills

Effective study

3- Time Management

4. Thinking skills

5- Library uses

6- Lectures and follow-up

Reading skills

The scale consisted of (28) paragraphs divided equally on the seven skills, (four paragraphs per field) and in order above, the five-point scale was chosen and the grades were given (1,2,3,4,5) for each positive paragraph and a score was given (5,4,3,2,1) for the negative paragraphs and the number of five paragraphs represented by paragraphs The following (26,19,15,12,7), the scale was applied to a sample of students amounting to (140) students, the members of each upper

group (38) as well as members of the lower group (38) students and 63% for each group, the following seikometric characteristics were confirmed:

Believe the scale.

The apparent honesty of the scale was confirmed by presenting it to a group of experts and specialists in this field, as the honesty of the building was confirmed by the following indicators.

A- The association of paragraphs with the total degree of the scale

B- The link of the paragraphs to the area to which they belong

A- The link of the vertebrae to the total degree of the scale:-

The correlation of the paragraph was calculated by the total degree of the laboratory academic skills scale using the Pearson equation of 140 students and the result was that all paragraphs are an honest function because the calculated value is greater than the scheduled value, knowing that the scheduled value is equal to
(0,174) at the level of indication 0.05 And 138Table No. (1) **Table**

(1)

The link of paragraphs to the overall degree

Paragraph correlation coefficient values by full score for field	Paragraph number	Paragraph correlation coefficient values by full score for field	Paragraph number	Paragraph correlation coefficient values by full score for field	Paragraph number
0,373	21	0,331	11	0,267	1
0,360	22	0,270	12	0,347	2
0,301	23	0,329	13	0,246	3
0,317	24	0,323	14	0,290	4
0,307	25	0,237	15	0,322	5
0,306	26	0,346	16	0,226	6

0,386	27	0,381	17	0,251	7
0,332	28	0,320	18	0,261	8
		0,339	19	0,237	9
		0,368	20	0,303	10

B. The link between the vertebrae and the skill to which they belong

Extracted using the Pearson equation, the scale consisted of seven skills per fourparagraph skill, and all the paragraphs were an honest function valued greater than the scheduled value of 0.174 at the 0.05 degree of 138.2. **Table (2)**

The link of paragraphs to the skill to which they belong

Paragraph correlation coefficient values by full score for field	Paragraph number	Number of paragraph	Skill	Skill number
0,484	1	4	Scientific research skills	1
0,601	2			
0,666	3			
0,547	4			
0,413	5	4	Effective study Time management	2
0,472	6			
0,444	7			
0.401	8			
0,537	9	4	Thinking skills Library uses	3
0,536	10			

0,631	11			
0,546	12			
0,557	13	4	Lectures and follow-up	4
0,646	14			
0.622	15			
0,521	16			
0,567	17	4	Skill Scientific research skills	5
0,645	18			
0,688	19			
0,645	20			
0,587	21	4	Effective study Time management	6
0.626	22			
0,704	23			
0,627	24			
0,632	25	4	Thinking skills Library uses	7
0,753	26			
0,761	27			
0,588	28			

The distinction of paragraphs: the distinction of paragraphs was confirmed using the T-test equation of two separate samples and the result was that all paragraphs are a characteristic function because the calculated value is greater than the scheduled value, knowing that the scheduled value is equal to (2) at the level of the indication of 0.05 and the degree of freedom of 74

Meter stability: The stability was extracted in two ways, the first retesting using the Pearson equation of a sample of size (20) and the second method using the Vakronbach equation for a sample of its size (20) and each of the seven skills according to table number (3)

Table (3)

Scale stability

Stability coefficient in a way		Academic skills
Vakronbach	Retesting	
0,72	0,70	Scientific research skills
0,73	0,71	Effective study
0,74	0,72	Time management
0,74	0,72	Thinking skills
0,73	0,71	Library uses
0,75	0,73	Lectures and follow-up
0,72	0,70	Reading skills

Statistical means: The researcher used the appropriate statistical means for the current research using

Statistical program (spssis:

- T-test for two independent samples
- T-test for one sample
- Pearson Correlation Coefficient Equation
- The Vakronbach equation View results

The first question is: Do chemistry students in the Faculty of Education have laboratory academic skills? To answer this question, the T test was used for one sample and the result was that all the skills are a function of any possessed by the students except the skill (library uses) was a function in favor of the hypothetical medium i.e. not owned by the students, knowing that the hypothetical medium reached (12) table (4)

Table (4)

One sample T test for laboratory academic skills for all students

The significatio n	T value		Standar d deviatio n	Arithmeti c mean	The number	The gende r	Academic skills
	Tabula r	**Calculate d**					
Sign		9,790		3,2114 3	14,657 1		Scientific research
Sign		8,803		3,4947 0	14,600 0		Effective study
Sign	**1.96**	3,742	**12**	3,2749 6	13,035 7	**140**	Time managemen t
Sign		4,174		3,6649 2	13,292 9		Thinking skills
Sign for the hypothetic al		-5,854		2,8587 5	10,585 7		Library uses
Sign		2,185		3,8688 7	12,714 3		Lectures and followup
Sign		2,255		4,3480 6	12,828 6		Reading skills

*Table T value equals 1.96 at 0.05 degree suppleading 139

From the table above it turns out that the result was a function of all the laboratory skills academic laboratory laboratory laboratory laboratory except the skill of the use of the library was not functioning, and can arrange the skills according to the mathematical averages as follows:

First: Scientific research skills

Second: Effective study

Third: Thinking Skills

Fourth: Time Management

Fifth: Reading skills

Sixth: Lectures and follow-up

Seventh: Library uses

The second question: Do the chemistry students in the Faculty of Education Ibn al-Haytham have laboratory academic skills?

To answer this question, the hypothetical middle test of the scale of 12 has been adopted, and therefore each student who receives a higher score than (12) is a achiever and each student receives a score (12) and less is not achieved, knowing that the number of males was (57) students and therefore the results were as shown in table 5.

Table (5)

One sample T test for laboratory academic skills for students (male)

The signification	T value		Standard deviation	Arithmetic mean	The number	The gender	Academic skills
	Tabular	Calculated					
Sign	2	4,387	12	3,32125	13,9298	57	Scientific research
Sign		2,821		3,66271	13,3684		Effective study
No Sign		0,041		3,19314	12,0175		Time management
No Sign		0,314		3,79751	12,1579		Thinking skills
Sign for the hypothetical		4,250-		3,08525	10,2632		Library uses
No Sign		0,897-		3,39569	11,5965		Lectures and follow-up
No Sign		1,392-		4,37704	11,1930		Reading skills

*T-table value equals 2 at 0.05 degree suppleading 56

From the table above the result appears as follows

1- Students have the skills of scientific research and effective study

2- Students do not have the skill of library uses

3- Students possess an acceptable or intermediate degree skills (time management, thinking skills, lectures and follow-up, reading skills)

The third question: Do the female chemistry students at the Faculty of Education Have the laboratory academic skills?

To answer this question, the hypothetical middle test of the scale of 12 has been adopted, and therefore each student receives a higher score than (12) is achieved and each student receives a score (12) and the least is not achieved, knowing that the number of females was (83) female students and therefore the results were as described in table 6.

Table (6)

One sample T test for female female synosk skills

The signification	T value		Standard deviation	Arithmetic mean	The number	The gender	Academic skills
	Tabular	**Calculated**					
Sign		**9,416**		**3,05431**	**15,1566**		Scientific research
Sign		**10,047**		**3,12446**	**15,3358**		Effective study
Sign		**4,998**		**3,16260**	**13,7349**		Time management
Sign		**5,589**		**3,37777**	**14,0723**		Thinking skills
Sign for the hypothetical	**2**	**4,041-**	**12**	**2,68899**	**10,8072**	**83**	Library uses
Sign		**3,372**		**4,00415**	**13,4819**		Lectures and follow-up
Sign		**4,470**		**3,97831**	**13,9518**		Reading skills

*T-table value equals 2 at 0.05 degree suppleading 82

From the table above, the following result appears:

Female students have all the laboratory academic skills except office uses.

Question 4: What are the differences of statistical significance at the level of 0.05 for laboratory academic skills in the students of the chemistry department according to gender (male and female)

To answer this question, the T-test was used for two independent samples, and the result was

- All laboratory academic skills are functioning and for the benefit of females, except for the skill of office uses is not functioning
- There are no statistically significant differences between males and females in the skill of office uses and according to table no. 7)

Table (7)

T-test for two independent samples of laboratory academic skills for students

The signification	T value		Standard deviation	Arithmetic mean	The number	The gender	Academic skills
	tabular	Calculated					
Sign fo female	**1.96**	**2,253-**	3,32125	13,9298	57	Male	Scientific Research
			3,05431	15,1566	83	Female	
Sign fo female	**1.96**	**3,601-**	3,66271	13,3684	57	Male	Effective study
			3,12446	15,4458	83	Female	
Sign fo female	**1.96**	**3,144-**	3,19314	12,0175	57	Male	Time management
			3,16260	13,7349	83	Female	
Sign fo			3,79751	12,1579	57	Male	Thinking skills

female	**1.96**	**3,131-**	3,37777	14,0723	83	Female	
No sign	**1.96**	**1,107-**	3,08525	10,2632	57	Male	Library uses
			2,68899	10,8072	83	Female	
Sign fo female	**1.96**	**2,908-**	3,39569	11,5965	57	Male	Lectures and follow-up
			4,00415	13,4819	83	Female	
Sign fo female	**1.96**	**3,869-**	4,37704	11,1930	57	Male	Reading skills Academic skills
			3,97831	13,9518	83	Female	

* Table T value equals (1.96) at level (0.05) and freedom (138)

The fifth question: - What is the percentage of laboratory academic skills among students in the chemistry department in the Faculty of Education Ibn al-Haitham.

To answer the last question above and to return to the 28-paragraph laboratory academic skills scale and five alternatives to positive paragraphs (1,2,3,4,5) the hypothetical medium of this is (84),

Anyone with a score higher than 84 is involved in the achievement of laboratory academic skills in general and therefore

Males: Those with a score higher than 84 were (33) students, so the prevalence of their laboratory academic skills was 57.89% according to table number (8)

Table (8)

Prevalence of academic skills among males

Degree	Iteration
51	**1**
52	**2**
56	**1**
57	**1**

60	1
62	1
65	1
66	1
69	4
70	1
71	1
74	1
76	1
79	1
81	2
82	1
83	2
84	1
85	1
87	6
88	4
89	2
90	2
99	3

100	4
101	4
102	1
103	2
113	2
114	2
The total	57

Females: Those who received a score higher than 84 are (72) students, so the prevalence of their laboratory academic skills was equal to 86.74% according to table number (9)

Table (9)

Prevalence of academic skills among females

The degree	Iteration
74	1
78	3
80	2
81	1
83	1
84	3
85	5
86	6
87	9
88	3
89	1
90	2

98	2
99	4
101	10
102	4
105	1
106	1
107	1
109	2
110	2
111	1
112	2
113	1
115	2
116	1
117	2
120	3
124	1
125	1
127	2
129	1
130	2
Total	8

Discuss results: -

The results showed the ownership of students in the chemistry department in the Faculty of Education for Pure Sciences\/ Ibn al-Haytham for laboratory academic skills except the skill of the use of the library and the superiority of female students over students in time management skills and skills of thinking and lectures and follow-up and reading skills may be due to: -

1- Relying university students to get information on websites for ease and time.

2- Most students are busy with the work assigned to him by the parents or working outside the home to secure the requirements of the study, while the students focus most of their interests in studying.

Conclusions: -

1- Students in the Chemistry Department of the Faculty of Pure Sciences\/Ibn al-Haytham have laboratory academic skills other than the library's uses skills.

2- Students outperform students with skills (time management, thinking, lectures and follow-up, reading).

3. There are no statistically significant differences between males and females in the skill of library uses.

4- The prevalence of laboratory academic skills among students is 57.89%.

5- The prevalence of laboratory academic skills among female students is 86.74%.

Recommendations and proposals:

1- Encourage students to use the library.

2- Spreading awareness of the laboratory academic skills of students through the holding of seminars and workshops because of their importance in the success of the educational process and raising their level of achievement.

3- Entrusting the task of making laboratory reports to encourage students to develop their academic skills.

To complete the research, I suggest: conduct further research on the subject of the current research and other stages of study or other departments and universities.

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Appendices:

Laboratory Academic Skills Scale

the gender .....

Never, I don't agree	Don't agree	Neutral	agree	Full agree	Paragraph	T
					Apply the scientific research approach in the writing of the report	1
					I take into account the ethics of scientific research when my teacher assigns me to write reports and laboratory research.	2
					Collect information and data related to the search problem (experiment)	3

					I wonder about the information and the steps that are not clear in the experiment.	**4**
					Use colored pens to mark important points in the material	**5**
					Take care to draw mental and mental mapping to help her study.	**6**

					1- I dedicate my in-depth study to all laboratory experiments on the night of the exam	***7**
					Identify experiments that require more effort and time to review	**8**
					Make a to-do list in the lab and devote the necessary time to each task.	**9**
					Stay away from stalling and playing when making the test steps	**10**
					I realize what I can't do to authorize others to do it to avoid waste of time.	**11**
					Use the reports of previous years when writing the report assigned to it in order to gain time	***12**
					Take notes and sort things out while my teacher explains the experience.	**13**
					Identify possible obstacles and mistakes before you start the experiment	**14**
					I don't think it's necessary to link theoretical and practical when I study the subject.	***15**
					Distinguish information and knowledge related to the subject of the experiment from those that are not related to it	**16**
					Check the most useful sources for writing the report.	**17**
					Buy CDs from electronic libraries to increase scientific knowledge	**18**
					I find it difficult to use card indexes in paper libraries.	***19**
					Use theoretical book indexes to find the title of my experience in writing their own report.	**20**
					I understand the lecture first and then I save it.	**21**

					I believe in self-fertilization to make it easier to memorize the lecture.	**22**
					I follow the styles and tone of my teacher's voice while he's doing the lecture.	**23**
					Enjoy the presence of educational means in the lecture	**24**
					I practice fast reading (browsing) to get an overview of the experience	**25**
					It bothers me to put questions and keywords while reading.	***26**
					Use my own words to summarize the article and make sure it's true.	**27**
					I prefer to read in SQ3R, which means \"explore, ask, read, recite, review\"	**28**