

The Extent to Which Science Teachers Use the School Laboratory in Linking Knowledge to Life Among Students from the Point of View of Their Teachers in the Directorate of Education in Madaba

ASSMA MUSABH KHALAF ALBWAREED
JORDANIAN MINISTRY OF EDUCATION
EMAIL ID: BAWAREEDA @yahoo.com

ABSTRACT

This study aimed to reveal the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education. and the study concluded that the degree to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education came to a medium degree. The results also showed that there were no statistically significant differences at the significance level ($\alpha = 0.05$), the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education due to the gender variable, and there are differences in years of experience in favor of a group of They are more than (11) years old.

KEYWORDS: SCIENCE LABORATORIES, SCIENCE TEACHERS.

DOI: 10.7176/JEP/13-19-22

Publication date: June 30th 2022

INTRODUCTION

The educational arena is witnessing at the present time, at the local and global levels, a tremendous development in order to keep pace with scientific and technological progress, and this development derives its origins from the optimal use of education laboratories, as the teaching of science does not come to fruition except through the understanding and correct application of educational techniques in our schools.

The school laboratory in our time is one of the most prominent areas that help transform the abstract into constants of mind, and raise the level of expertise of both the teacher and the learner alike, in addition to being an integral part of the educational process, and one of the most important pillars of modern science curricula, which is indispensable in Teaching it about the use of the school laboratory, where its use leads to the provision of multiple and varied sensory experiences that are the basis for understanding many facts, information and scientific applications, in addition to the fact that using the laboratory helps students to acquire skills and information and to form trends and tendencies that serve the goals of teaching science, as it gives realism to information and ideas. The theory that the student hears or reads, which leads to a better understanding of the nature of science and the importance of practical experiment, and contributes to the consolidation of the information that the student learns for a long time compared to the information learned by the theory of Jamel (2000).

Renewal in teaching methods and diversity in practical activities aimed at learning and acquiring skills is a form of development in the educational process, as the laboratory is an essential part in teaching and science at all educational levels, starting from the basic stage and ending in the secondary stage, and extending to the postgraduate stage. Many scientific concepts are clarified through practical educational activities in the laboratory, as the school laboratory helps transfer information from the theoretical side to the practical side for a student (Abu Galala, 2005).

The laboratory also develops for students a good opportunity for creativity and innovation, whether in terms of proposing new experiments and ideas or improving the experiments they perform, and teaching through the laboratory clarifies many mysterious scientific things and the processes that take place in the laboratory while conducting scientific experiments that provide students with opportunities. Appropriate laboratory work and increase their interaction and become more motivated towards learning science (Abu sdaneh, 1985).

The science subject is also distinguished from other subjects by laboratory work and field scientific activities. If this aspect is neglected, science loses what distinguishes it and becomes a heavy theoretical subject. Hence, we find that researchers in the field of scientific education focus on considering the school laboratory as an essential component in teaching science and not as an integral part or addition to it (Al-Khalili, 1988).

In general, laboratory experiments have a major role in clarifying the scientific material for students. It is also considered one of the systems that are used in solving some contemporary educational problems and works to increase the effectiveness of the curriculum and help learners to understand the scientific material, and increase their acquisition of scientific knowledge and skills, which leads to the integration and development of

their growth. And laboratory experiments are the basis of scientific and educational techniques and do not mean the means, materials and tools, but rather they are more comprehensive and general in work and the way of thinking, organizing, planning, implementing and evaluating (Al-Khalifa, 2000).

The researcher believes that the importance of the laboratory lies in providing an opportunity for students to link the knowledge that they receive in theory to its realistic and practical application in life on the realistic side. Hence, the researcher saw the necessity of conducting this study entitled the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education.

STUDY PROBLEM AND QUESTIONS:

Perhaps the most prominent characteristic of the science lesson from the lessons of other subjects is that the content of the subject is linked to practical activity and experimentation. In order for the student to carry out all activities and conduct experiments, an appropriate place must be available and equipped with all the necessary equipment and requirements. In order to enable the student to be able to link the knowledge he receives in the laboratory in a way. Realistic, which can be linked to life and benefit.

Through the researcher's work as a science teacher in government schools, she noticed that there is a gap in benefiting from the experiments within the scientific laboratories and the extent to which students are able to employ and benefit from them in enabling the student to link knowledge to life. The main study is to answer the following questions:

1. The extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education?
2. Are there statistically significant differences at the level ($\alpha = 0.05$) in the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education due to the variables of gender, experience in education?

PURPOSE OF THE STUDY:

To identify the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Education Directorate of Education?

THE IMPORTANCE OF STUDY:

The importance of the study is due to the importance of the topic it dealt with, as its importance lies in:

- Drawing the attention of science teachers to the importance of implementing the learning activities included in general science books in linking knowledge to life among students.
- Directing the attention of the supervisors to evaluate science teachers to pay attention to the practical aspect of teaching in addition to the theoretical aspect and to hold training courses for them on how to implement the learning activities included in general science books and ways to link knowledge in life to achieve the desired goals.
- Directing the attention of those in charge of the curriculum to take into account the inclusion of curriculum topics for purposeful learning activities that can be implemented, as it gives the learner the opportunity to practice applying the activities in a way that allows the student to link them directly in the real life of the student.

TERMINOLOGY OF STUDY:

Science lab: Al-Nashef (2004, p. 96) defined the science lab as "a special place where devices and tools are available and the opportunity is prepared to conduct the experiment in order to achieve limited practical goals, and the students themselves conduct the experiments".

PROCEDURALLY, SCIENCE LAB MEANS:

It is a dedicated room equipped with the necessary tools to conduct scientific and laboratory activities for the natural sciences, which aim to develop students' mental and skill abilities.

THE LIMITS OF THE STUDY:

- Spatial limit : government schools affiliated to Directorate of Education in Madaba.
- Time limit: 2021/2022 school year.
- Human limit : science teachers (males and females) in public schools in Directorate of Education in Madaba.

THEORETICAL LITERATURE AND PREVIOUS STUDIES:

The scientific activity in science lessons represents the teacher's need to know the way in which the scientific activities he and his students can be evaluated and whether the laboratory and its tools and equipment are sufficient to achieve the goals. In one of his studies, Yaqoub Nashwan has developed a scale for this purpose,

and the teacher can benefit from it in self-evaluation (Al-Khatib, 2003).

SCIENCE LAB CONCEPT:

Al-Ayouni (2001) believes that the concept of the laboratory goes beyond that room designed to conduct experiments, to the possibility of the science teacher and his students to carry out practical experiments anywhere when the necessary tools, materials and devices are available. Because educational laboratories are of great importance in translating theories and laws into tangible reality, they are considered one of the most important components of modern educational technologies as they are considered an indispensable means of teaching science. It is considered as the environment in which the student grows because it helps him to provide multiple and varied sensory experiences that are the basis for understanding many facts, information, concepts and phenomena in his environment.

Shaheen and Khattab (2005) define the laboratory as “the process or group of operations in which the individual clarifies or investigates knowledge through work and may do this work within certain limits such as the laboratory room in the school, garden or any other place.”

TYPES OF SCIENCE LAB:

Al-Khatib (2003) indicated that specialists in practical education and science teaching distinguish between two types of laboratories in terms of performance and implementation:

1. ILLUSTRATIVE LABORATORY:

Emphasizes the implementation of scientific activities and laboratory experiments in an illustrative manner of information previously learned by the student, so this type of laboratory activity is based on the principle of final closed scientific experiments. In which the student implements the instructions given to him and implements them in the literal text of the scientific activity, in order to verify facts and scientific concepts that he learned previously. This type of activity is common in schools and it results in students losing interest in the scientific aspects of learning science, and their low understanding of the nature of science as a material and a way of thinking.

2. INVESTIGATIVE - EXPLORATORY LABORATORY:

Emphasizes scientific activities and laboratory experiments in an investigative-exploratory manner, that is, learning and studying science through investigation, discovery, and problem solving. He did not know it before, thus realizing the teacher's reality, not his name, that is, he studies science as a subject and method, and not as a subject only. This type of activity is based on the final and investigative-oriented open scientific activities for investigative purposes and to discover and solve problems.

And laboratory experiments are an integral part of scientific activities and science education and learning, and it is (the laboratory with its accompanying laboratory activities) the beating heart in teaching science in the different stages of education. Great importance and a prominent role in the teaching of science (Zaytoon, 1994)

SCIENCE LAB OBJECTIVES:

Atta (2005) reported that the laboratory achieves the following objectives:

1. Proving the validity of information and scientific knowledge in its forms that the student was learning at an earlier time.
2. Implementing scientific concepts that the student has previously learned in new situations.
3. Achieving the principle of learning by doing.
4. Acquisition of scientific trends and tendencies.
5. Develop some new skills and science processes for the student.
6. The student obtains honest and certain scientific knowledge.
7. It is used to implement and reinforce previously learned objectives.

IMPORTANCE OF A SCIENCE LAB:

The importance of the science lab lies in considering it an effective way to clarify concepts and treat scientific processes because it provides the learner with direct sensory experience through dealing with material and tools. It also has an important role in developing scientific, cognitive and practical capabilities and developing desirable scientific tendencies and trends. Scientific experiments give the learner appropriate opportunities to discover and verify scientific relationships and provide them with an understanding of facts, phenomena and concepts (Atta, 2005).

The importance of the laboratory and practical activities lies and that the modern trends of science teaching confirm this and pay attention to it because of its prominent role in the success of science programs and curricula. The modern view of the laboratory focuses on the process, not the place or time in which practical activities take place.

In this regard, Shaheen and Hattab (2005) emphasized the importance of the laboratory in teaching science

because of its impact on the formation of attitudes and tendencies and the acquisition of skills and information among students. The benefits of the science laboratory are summarized in several aspects, including:

1. The laboratory work helps to understand the nature of science and the importance of experimentation.
2. Adding realism to some of the theoretical information and ideas that the student learns.
3. The use of the senses during laboratory work and the opportunity for direct sensory experience.
4. Training the student on how to use the main laboratory equipment and how to maintain it, take care of it and learn about its design and installation.
5. Training on how to overcome the scientific difficulties required by laboratory work.
6. Training the student on the precautions that must be followed during the experiment to obtain accurate results.

PREVIOUS STUDIES:

(Yildiz, E. Acinar, et al 2006) conducted a study that aimed to know the attitudes of science teachers towards the use of the laboratory in teaching science in North America. The sample consisted of (72) science teachers, and concluded that they believe that teaching using the laboratory is more Effectiveness in teaching science, but considering the reality of teaching these teachers, it became clear that 41% of them use the laboratory in teaching science, as 59% of them explain that the reason for not using the laboratory in teaching science is due to their lack of teaching competencies for laboratories and their lack of university preparation before teaching.

Sweeney, A.E(2004), & Paradise conducted a study that aimed to determine the attitudes of biology teachers towards anatomy as a strategy for teaching biology, and to determine the use of anatomy in teaching. The results showed that teachers' attitudes were positive towards anatomy as a strategy for teaching biology, and that (79%) of teachers use it in teaching biology, and (72%) of them believed that anatomy is an important part of the curriculum, (96) % of them They considered anatomy an important teaching activity.

Suleiman (2000) conducted a study aimed at identifying the activation of school laboratories in the educational process and its impact on the acquisition of science processes, appropriate practical skills and attitudes towards laboratory work in physics among secondary school students in Abha city. The study sought to reveal the effectiveness of school laboratories in imparting science processes and practical skills. The study sample included one experimental group and the number of its students (90) students, and the researcher used the experimental method known as the one-group approach, and the study indicated a number of results, among which there are statistically significant differences between the averages of The grades of first-year secondary students on testing some science processes, acquiring some practical skills, and the trend towards laboratory work, before and after activating school laboratories, in favor of the post-application degrees of the test, observation card, and scale.

Al-Jabr (2009) conducted a study aimed at revealing the obstacles to using the laboratory in teaching science from the point of view of secondary stage natural science teachers in Riyadh, Kingdom of Saudi Arabia. The researcher followed the descriptive analytical approach in the implementation of this study using the questionnaire as a tool for collecting information, and the study sample included (140) teachers, representing 23% of the original community. With the appropriate number of students per grade in addition to the large number of classrooms in light of the lack of laboratories and their lack of maintenance, cleanliness and financial support, in addition to neglecting the teaching load of teachers of natural sciences during the week. The results of the study also indicated the presence of statistically significant differences in determining the obstacles to the use of the laboratory in teaching natural sciences. Between the rented and governmental building in relation to the study axes related to materials, tools and devices Laboratory environment and equipment.

COMMENTING ON PREVIOUS STUDIES:

From the previous presentation of previous research and studies related to the topic of the current research, the following becomes clear:

-The consensus of these studies on the need to pay attention to school laboratories, as they gave an idea about the reality of using school laboratories in some Arab countries and how to use them to benefit from them in linking knowledge in life.

-Forming a comprehensive conception of the subject of the study with its theoretical, field and methodological aspects, which helped to conduct the study.

- Supporting the theoretical framework of the research topic, and guiding the researcher to some relevant educational references and academic studies.

-Choosing the appropriate methodology and procedures for this study, identifying how to design and prepare the current study tool (the questionnaire), how to determine the appropriate statistical methods, and how to analyze statistical data.

-Knowing the most important findings of previous studies, and knowing the most important recommendations and suggestions made by the researchers, and working on linking them with the results of the current study.

METHOD AND PROCEDURE:

STUDY APPROACH:

The researcher used the descriptive survey method to find out the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education, due to its suitability for this type of studies.

STUDY COMMUNITY:

The study population consisted of all science teachers in public schools in Madaba Directorate of Education, who numbered (126) male and female teachers, by (73) female and (53) male teachers.

THE STUDY SAMPLE:

The study sample consisted of (36) male and female science teachers in public schools in Madaba Directorate of Education, and it was selected in a way that was available from the total population of the study according to the following variables (gender, experience in education) and Table No. (1) Shows the characteristics of the demographic sample:

TABLE (1): CHARACTERISTICS OF THE DEMOGRAPHIC SAMPLE

Variable	Level	Repetition
Gender	Male	11
	Female	25
	Total	36
Experience in education	less than 5 years	9
	6 to 11 years old	9
	More than 11 years	18
	Total	36

STUDY TOOL:

The researcher built the first study tool to know the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education.

VALIDITY OF THE STUDY TOOL:

The validity of the study tool was verified by presenting it to a group of specialized arbitrators, who made some observations about it, and accordingly the questionnaire was taken out in its current form. On the one hand, and on the other hand, the validity of the tool was also verified by calculating the Pearson correlation coefficient for the study items.

STUDY VARIABLES:

The study included the following variables:

- Gender: male, female

- Years of service: Less than 5 Years, From 6-11 Years, More than 11 years

Dependent variables: the extent to which science teachers use the school laboratory in linking knowledge to life.

STATISTICAL PROCESSING:

The necessary statistical treatment of the data was carried out using the Statistical Package for Social Sciences (SPSS) program, where the arithmetic means and standard deviations were calculated, in addition to the Correlation Pearson coefficient, using the t-test for independent samples, the ANOVA way test, and Cronbach's alpha stability coefficient.

AS SHOWN IN TABLE (2): THE RESEARCHER USED THE CORRECTION KEY TO READ THE ARITHMETIC AVERAGES OF THE STUDY TOOL ITEMS:

Arithmetic average	Degree
2.33 and below	Low
2.34-3.67	Medium
3.68 and more	High

PRESENTATION AND DISCUSSION OF THE RESULTS:

First: the results related to the first question, which reads: "To what extent do science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education?"

To answer this question, the arithmetic averages and standard deviations were extracted to the extent that

science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education, and Table (3) illustrates this.

TABLE (3) : ARITHMETIC AVERAGES, STANDARD DEVIATIONS, AND THE EXTENT TO WHICH SCIENCE TEACHERS USE THE SCHOOL LABORATORY IN LINKING KNOWLEDGE TO LIFE AMONG STUDENTS FROM THE POINT OF VIEW OF THEIR TEACHERS IN MADABA DIRECTORATE OF EDUCATION.

Rank	Number	Paragraphs	Arithmetic averages	standard deviations	Level
1	3	The teacher is keen to give each student the opportunity to follow up on the experiment	3.84	1.198	Medium
2	4	The teacher prepares for the experiment by talking about the materials used in the experiment	3.38	1.169	Medium
3	5	The teacher provides educational opportunities for all students	3.30	1.125	Medium
4	14	The teacher marks part of the laboratory report mark on the total mark in the science subject	3.27	1.037	medium
5	15	The teacher is careful to observe the safety rules	3.26	1.197	Medium
6	16	Mark while performing the experiment	3.23	1.173	Medium
7	17	The teacher is keen to carry out the experiments included in the textbook	3.22	1.117	Medium
8	13	The teacher asks the students to write worksheets about the experiment	3.12	1.160	Medium
9	1	The teacher plans the experiment before performing it.	3.09	1.211	Medium
10	9	The teacher provides the opportunity for all students to extract the results of the experiment	3.08	1.185	Medium
11	18	The teacher is keen on frequent use of the laboratory	3.07	1.190	Medium
12	19	The teacher is keen to use what is available in the environment	3.05	1.042	Medium
13	20	The teacher performs the experiments collectively	2.98	1.207	Medium
14	10	The teacher discusses the results of the experiment and how to implement it after its completion	2.98	1.114	Medium
15	11	The teacher distributes worksheets that we use during lab experiments and corrects these papers	2.76	1.139	Medium
16	12	The teacher asks the students to write worksheets about the experiment that was carried out	2.65	.748	Medium
17	8	The teacher conducts experiments in groups to overcome the problem of the large number of students	2.63	.996	Medium
18	2	The teacher continues to conduct experiments in the laboratory as required	2.59	.954	Medium
19	3	The teacher is keen to give each student the opportunity to follow up on the experiment	2.65	.988	Medium
20	4	The teacher prepares for the experiment by talking about the materials used in the experiment	2.61	.969	Medium
		Total score	3.15	.748	Medium

Table (3) shows that the arithmetic averages ranged between (3.08-2.61), where came paragraph No. (9), which states that “the teacher provides the opportunity for all students to extract the results of the experiment” in the first place, with an average of (3.08), and they attributed The researcher indicated that the student is the focus of the educational process, and whenever he conducts the experiment himself inside the laboratory, it helps him to learn and consolidate the concept of learning by doing, and this deepens his abstract concept to the concept applied on the ground. While paragraph No. (4) and its text “The teacher prepares for the experiment by talking about the materials used in the experiment” came in the last rank with an average of (2.16), and the researcher attributes this to the fact that the time allocated for the class session is not enough to prepare for a lesson, so there is no way to waste the time allotted for the class in preparing the work To study, but to directly enter into the practical experience, and the arithmetic average reached the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education (3.15) at a medium degree.

SECOND, THE RESULTS OF THE SECOND QUESTION:

Results related to the second question: Are there statistically significant differences at the level ($\alpha = 0.05$) in Are there statistically significant differences at the level ($\alpha = 0.05$) in the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education attributed to gender variables, experience in education?

First: the gender variable: the arithmetic averages and standard deviations were calculated, and the "T" test was extracted for independent samples of the answers of the same individuals. The extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education due to gender variables? And Table (4) illustrates this.

TABLE (4): CALCULATION OF ARITHMETIC AVERAGES AND STANDARD DEVIATIONS, AND THE "T" TEST FOR INDEPENDENT SAMPLES WAS EXTRACTED FOR THE ANSWERS OF THE SAME INDIVIDUALS, THE EXTENT TO WHICH SCIENCE TEACHERS USE THE SCHOOL LABORATORY ACCORDING TO THE GENDER VARIABLE

Gender	Number	Arithmetic average	Standard deviation	" T" value	Indication level
Male	11	3.13	.75	.064	.261
Female	25	3.85	.46		

The results in Table (4) indicate that there are no statistically significant differences at the significance level ($\alpha = 0.05$) in the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education according to the gender variable. The researcher attributed the reason In the absence of statistically significant differences, mathematics teachers of both sexes adhere to the same procedures for carrying out scientific experiments, and they receive the same training courses in the field of teacher preparation and development.

ACCORDING TO THE VARIABLE YEARS OF EXPERIENCE

Arithmetic averages and standard deviations were calculated in the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education for the variable years of service, and table (5) shows that:

TABLE (5): ARITHMETIC AVERAGES AND STANDARD DEVIATIONS IN THE EXTENT TO WHICH SCIENCE TEACHERS USE THE SCHOOL LABORATORY IN LINKING KNOWLEDGE TO LIFE AMONG STUDENTS FROM THE POINT OF VIEW OF THEIR TEACHERS IN MADABA DIRECTORATE OF EDUCATION FOR THE VARIABLE YEARS OF SERVICE

	Academic qualification	Number	Arithmetic average	Standard deviation
Responding to the questionnaire paragraphs	Less than 5 years	9	2.78	.94
	6 to 10 years	9	2.71	.97
	More than 10 years	18	2.68	.77
Total degree	Less than 5 years	9	2.64	.54
	6 to 10 years	9	2.61	.87
	More than 10 years	18	2.71	.64

The results in Table (5) indicate that there are apparent differences between the standard arithmetic averages of the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education for the variable years of service. The college had the highest arithmetic mean of (2.71), and to determine whether the differences between the averages were statistically significant at the level ($\alpha = 0.05$), a one-way analysis of variance was applied, and the results of the analysis of variance came as shown in Table (6). The results of the arithmetic one-way analysis of variance test for the standard estimates of the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of Education for the variable years of service.

TABLE (6): THE RESULTS OF THE ARITHMETIC MONO ANALYSIS OF VARIANCE TEST FOR THE STANDARD ESTIMATES OF THE EXTENT TO WHICH SCIENCE TEACHERS USE THE SCHOOL LABORATORY IN LINKING KNOWLEDGE TO LIFE AMONG STUDENTS FROM THE POINT OF VIEW OF THEIR TEACHERS IN MADABA DIRECTORATE OF EDUCATION FOR THE VARIABLE YEARS OF SERVICE.

	Contrast source	Sum of squares	Average squares	The calculated 'F' value	Indication level
Responding to the questionnaire paragraphs	Between groups	.59	.624	2.43	.034
	Inside groups	.45	.414		
	Total	.89			
Total degree	Between groups	2.45	.631	2.67	.053
	Inside groups	46.24	.252		
	Total	67.53			

The results in Table (6) showed that there were no statistically significant differences at the level ($\alpha = 0.05$) of the extent to which science teachers use the school laboratory in linking knowledge to life among students from the point of view of their teachers in Madaba Directorate of the variable years of service. The sciences do not have any moral or material incentive towards developing their professional performance in education, as the teacher repeats himself every year with the same curriculum, and the researcher explains the result that teachers do not receive courses and programs that help them develop their professional performance during the years of service.

RECOMMENDATIONS:

1. Providing modern laboratories for science in all government schools, while providing work to provide suitable laboratories in rented buildings.
2. Paying attention to training courses for science teachers and laboratory preparers during their service in the field of using science laboratories.
3. Photographing model lessons inside science laboratories and distributing them to new science teachers to benefit from them.
4. Work to reduce the teacher's quorum in order to give the laboratory more attention.

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