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SCIENCE LABORATORIES IN HIGHER SECONDARY SCHOOLS OF MIZORAM

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ABSTRACT

Science is the basis of most modern technological development. Food and nutritional sciences which are applied sciences depend heavily on a good and solid grounding in science. But Science education, without practical experience is abstract and its deep impact is difficult to understand. Especially at the higher secondary level when students have already made their choice to study science, they deserve to get the best exposure to scientific phenomena. The present research was a University project funded by, Mizoram Science and Technology Innovation Council, an autonomous body of the Government of Mizoram. An exhaustive attempt was made to find out the status of science laboratories in three subjects like physics, chemistry and biology in higher secondary schools of Mizoram. It was found that only 22% of schools had more than 75% of specified apparatus and equipment in physics laboratory and 61% schools had more than 75% of equipment and apparatus in chemistry laboratory. It was also found out that under biology laboratories small 28% only schools had more than 75% apparatus and equipment. Therefore, the study revealed in clarity the robust practical approach science was given in some schools and just how weak science education was in many schools within the state of Mizoram at the time the study was undertaken.

Keyword: Science Laboratories, Science Education, School Education, Higher Secondary Schools, Mizoram

1. INTRODUCTION

There are different branches of knowledge which are all important in their own right. However, it cannot be denied that science has a special place in all branches of knowledge.

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Modern gadgets are based on science. From agriculture to building designs and medicines, there is no area of knowledge where science has no part to play. Therefore, its understanding is crucial if an individual wants to be a part of a growing and fast developing world. However, when science is taught as a theoretical subject like other branches of knowledge, it loses its power to attract the attention of students. It is only through a sound practical activity that science's beauty can be appreciated and understood. That is why the Mizoram Board of School Education (MBSE) has also laid down strict rules regarding science laboratories. If all schools can follow the guidelines of MBSE and install science laboratories, it would be a major move in the right direction. Of course, science laboratories also need regular maintenance. There should be separate personnel to attend to the needs of the science laboratory and also see to the needs of the students regarding the usage of various scientific apparatus, chemicals, charts, reagents or whatever may be inside a science laboratory. Therefore, it is imperative that science laboratories be checked for their maintenance and also to ensure that students are making good use of it. Moreover, it is important that students be given a chance for regular practical training so that their interest is sustained. With a healthy approach to science education, scientific innovations can be made easier because students will then be able to dream. The state, the nation and the world at large can only gain from a solid grounding in science.

2. Rationale of the study

The importance of science education is becoming increasing acknowledged in our world. The vitality of this subject is endless. For proper functioning of science subject, good practical equipment and room is necessary. In science subject theory and practical are two sides of a coin. One cannot successfully work without the combination of the other one. Due to this the present topic was chosen to throw light on the real condition of science laboratories in higher secondary schools of Mizoram. It is hope that the findings can bring to light the real status of science laboratories in higher secondary schools of Mizoram. In short, this research was undertaken so as to motivate even a small advancement of science education in the State of Mizoram.

3. Objectives of the study

1) To find out the status of physics laboratories in higher secondary schools of Mizoram
2) To study the status of chemistry laboratories of higher secondary schools of Mizoram
    - Apparatus and Equipment
    - Chemicals
3) To assess the status of biology laboratories in higher secondary schools of Mizoram
    - Apparatus and Equipment
    - Chemicals
    - Permanent Slides
    - Specimens
    - Charts

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- Furniture

4. Research Methodology

A mixed methods design has been adopted for the present work. The data was collected based on survey. The qualitative and descriptive methods were mainly used.

- Population and Sample: The sample of the present study consisted of 18 higher secondary schools of Mizoram which made up roughly 37 % of the total number of higher secondary schools in Mizoram offering science as a subject which was 49 higher secondary schools.
- Tool: For the present research, separate checklists were made for Physics, Chemistry and Biology laboratories.
- Statistical Treatment of Data: For analysis of the collected data, descriptive statistics like percentages was used. Content analysis was then done in a qualitative manner.

5. Data Analysis and Interpretation:

Interpretation of different data to understand the status of science laboratories of higher secondary schools of Mizoram are as follows:

(1) To find out the status of physics laboratories in higher secondary schools of Mizoram.

Table 1: Availability of Specified Apparatus and Equipment in Physics Laboratory in Sample Higher Secondary Schools (N-18)

Class Intervals (Availability of Apparatus & Equipment)	Frequency(n)	Percentage	Cumulative Frequency	Cumulative Percentage
Above 75%	4	22	18	100
50%-75%	9	50	14	78
25%-50%	4	22	5	28
Below 25%	0	0	0	0
Nil	1	6	1	6

Source: Field Survey

Table 1 shows the availability of science apparatus and equipment in higher secondary schools of Mizoram. There are 4 schools, making up to 22% who had more than 75% of the specified apparatus and equipment. 9 schools, making up to 50% of the sample schools had between 50%-75% of the specified laboratory equipment. Another 4 schools,

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making up to 22% fall within 25%-50% of having laboratory apparatus and equipment. 1 school reported to have no laboratory apparatus and equipment.

2. **To study the status of chemistry laboratories of higher secondary schools of Mizoram**

i. Apparatus and Equipment:

Table 2: Availability of Specified Apparatus and Equipment in Chemistry Laboratory in Sample Higher Secondary Schools (N-18)

Class Intervals (Availability of Apparatus & Equipment)	Frequency(n)	Percentage	Cumulative Frequency	Cumulative Percentage
Above 75%	11	61	18	100
50%-75%	5	27	7	39
25%-50%	1	6	2	12
Below 25%	0	0	0	0
Nil	1	6	1	6

Source: Field Survey

Table – 2 represents the percentages of Specified Apparatus and Equipment present in Chemistry Laboratory in higher secondary schools in Mizoram. There are 11 schools, making up to 61% of the sample schools with more than 75% of equipment and apparatus in their chemistry laboratory. 5 schools, making up to 27% of the sample schools have apparatus and equipment that fall within 50% - 75% of the expected norm. 1 school, making up to 6% of the sample schools have 25% - 50% apparatus and equipment in chemistry laboratory. 1 school reported to have no laboratory apparatus and equipment. Table 4.2.3 shows that 39% of the chemistry laboratory in schools under study has apparatus and equipment less than 75%.

ii. Chemicals:

Table 3: Availability of Specified Chemicals in Chemistry Laboratory in Sample Higher Secondary Schools (N-18)

Class Intervals (Availability of Apparatus & Equipment)	Frequency(n)	Percentage	Cumulative Frequency	Cumulative Percentage
Above 75%	4	22	18	100

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50%-75%	8	44	14	78
25%-50%	4	22	6	34
Below 25%	1	6	2	12
Nil	1	6	1	6

Source: Field Survey

As shown by table – 3 schools, making up to 22% had more than 75% of chemicals in their chemistry laboratory. 8 schools, making up to 44% of the sample schools had 50%-75% chemicals. Another 4 schools, making up to 22% had 25%-50% chemicals. 1 school, making up to 6% of the sample had chemical under 25% of the prescribed norm.1 school, making up to 6% of the sample schools was reported to have no chemicals. 14 schools, making up to 78% of the sample schools are reported as having less than 75% of chemicals in their chemistry laboratory.

3. **To study the status of Biology laboratories of higher secondary schools of Mizoram**

   i. Apparatus and Equipment:

Table 4: Availability of Specified Apparatus and Equipment in Biology Laboratory in Sample Higher Secondary Schools (N-18)

Class Intervals (Availability of Apparatus & Equipment)	Frequency(n)	Percentage	Cumulative Frequency	Cumulative Percentage
Above 75%	5	28	18	100
50%-75%	8	44	13	72
25%-50%	4	22	5	28
Below 25%	0	0	0	0
Nil	1	6	1	6

Source: Field Survey

As seen in the above table – 4, 5 schools, making up to 28% had equipment and apparatus which is more than 75% of the prescribed norm in biology laboratory.8 schools, making up to 44% of the sample schools had 50%-75% apparatus and equipment in their biology laboratory. Another 4 schools, making up to 22% had 25%-50% apparatus and equipmentof the prescribed norm in their biology laboratory. 1 school, making up to 6% reported as having no apparatus and equipment in biology laboratory. 13 schools are reported

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as having apparatus and equipment lower than 75% of the norm in biology laboratory in higher secondary schools of Mizoram.

ii. Chemicals:

Table 5: Availability of Specified Chemicals in Biology Laboratory in Sample Higher Secondary Schools (N-18)

Class Intervals (Availability of Apparatus & Equipment)	Frequency(n)	Percentage	Cumulative Frequency	Cumulative Percentage
Above 75%	5	28	18	100
50%-75%	3	16	13	72
25%-50%	4	22	10	56
Below 25%	5	28	6	34
Nil	1	6	1	6

Source: Field Survey

As seen in table – 5, 5 schools, making up to 28% of the sample are reported to have above 75% of chemicals in their biology laboratory. 3 schools, making up to 16% of the sample schools are reported to have 50% - 75% of chemicals in their biology laboratory. 4 schools, making up to 22% are reported as having 25% - 50% of chemicals in their biology laboratory. 5 schools, making up to 28% of the sample schools, are reported to have below 25% of chemicals in their biology laboratory. 1 school (6%) is reported to have no chemicals. 13 schools, making up to 72% of the sample schools are reported to have less than 75% of chemicals in their biology laboratory.

iii. Permanent Slides:

Table 6: Availability of Specified Permanent slides in Biology Laboratory in Sample Higher Secondary Schools (N-18)

Class Intervals (Availability of Apparatus & Equipment)	Frequency(n)	Percentage	Cumulative Frequency	Cumulative Percentage
Above 75%	8	44	18	100
50%-75%	2	11	10	56
25%-50%	4	23	8	45

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Below 25%	3	16	4	22
Nil	1	6	1	6

Source: Field Survey

As we found in table – 6, 44% of the sample schools consisting of 8 schools are reported to have above 75% of permanent slides in their biology laboratory.2 schools, making up to 11% of the sample are reported to have permanent slides that fall between 50% - 75% of the norm. 4 schools, making up to 23% of the sample schools have permanent slides that fall between 25% - 50% of the norm. 3 schools, making up to 16% of the sample schools are reported to have below 25% of the prescribed permanent slides in their biology laboratory. 1 school reported as having no permanent slides.

iv. Specimens:

Table 7: Availability of Specified Specimens in Biology Laboratory in Sample Higher Secondary Schools (N-18)

Class Intervals (Availability of Apparatus & Equipment)	Frequency(n)	Percentage	Cumulative Frequency	Cumulative Percentage
Above 75%	0	0	0	0
50%-75%	3	16	18	100
25%-50%	5	28	15	84
Below 25%	9	50	10	56
Nil	1	6	1	6

Source: Field Survey

Table - 7 showed that there are no schools having more than 75% specimens in biology laboratory. 3 schools, making up to 16% of the sample schools are reported to have specimen that fall between 50% - 75%. 5 schools, making up to 28% of the sample schools had specimens that fall between 25% - 50% of the norm. 9 schools, making up to 50 % of the sample schools had less than 25% of specimens in biology laboratory. 1 school (6%) had no specimen. It can be seen that no school had more than 75% of specimen.

v. Charts:

Table 8: Availability of Specified Charts in Biology Laboratory in Sample Higher Secondary Schools (N-18)

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Class Intervals (Availability of Apparatus & Equipment)	Frequency(n)	Percentage	Cumulative Frequency	Cumulative Percentage
Above 75%	4	22	18	100
50%-75%	4	22	14	78
25%-50%	3	17	10	56
Below 25%	6	33	7	39
Nil	1	6	1	6

Source: Field Survey

Table – 8 shows that 4 schools, making up to 22% of the sample schools had more than 75% of the prescribed chart in their biology laboratory. Another 4 schools, making up to 22% of the sample schools had 50% - 75% of the prescribed chart in their biology laboratory. 3 schools (17%) are reported to have 25% - 50% of the prescribed chart in their biology laboratory. 6 schools (33%) have less than 25% of the chart in their biology laboratory. 1 school (6%) had no chart at all.

vi. Furniture:

Table 9 : Availability of Specified furniture in Biology Laboratory in Sample Higher Secondary Schools (N-18)

Class Intervals (Availability of Apparatus & Equipment)	Frequency(n)	Percentage	Cumulative Frequency	Cumulative Percentage
Above 75%	9	50	18	100
50%-75%	6	33	9	50
25%-50%	2	11	3	17
Below 25%	0	0	0	0
Nil	1	6	1	6

Source: Field Survey

Table – 9 shows that 9 schools, making up to 50% of the sample schools had more than 75% of furniture in their biology laboratory. 6 schools, making up to 33% of the sample schools had 50% - 75% of furniture in their biology laboratory. 2 schools (11%) had 25% - 50% of the furniture in their biology laboratory. 1 school (6%) had no furniture.

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6. DISCUSSION

It was a bit motivating to see that in a few schools at least, there were more than 75% of the requisites of a science laboratory. However, that some schools simply did not have any supply was disheartening. Care should be taken to see that students are exposed to the practical needs of science education. Without practical experience students are not able to understand the real importance of science in their everyday lives. This has the sad repercussion of killing their interest in science which further negatively impacts their future in science. Moreover, an interest in science can also spurt the students' interest in other subjects besides science as there is a possibility of transfer of knowledge. Therefore, arousing scientific interest shall accomplish two important goals, that of keeping the interest of students in science which has positive national ramifications and that of retaining their interest in other subjects which also has very deep positive impacts.

7. CONCLUSION

To conclude that science education is in a poor state after this minor research work may be too soon. It is important to study other factors that play a big part in the development of a sound science education. Some of these factors are teacher training, funding by government and school administration. All of these have to work in a tandem to see to the development of science education which is crucial for the development and growth of the nation and not just the state of Mizoram in the right direction.

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