A Study of Availability and Utilization of Science Laboratories for Teaching-Learning Science in Secondary Schools of Bhopal

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Declaration

I hereby declare that the dissertation titled **"A Study of Availability and Utilization of Science Laboratories for Teaching-Learning Science in Secondary Schools of Bhopal"** was conducted by me during the academic year 2022–2025 under the guidance of **Dr. Saurabh Kumar,** Associate Professor**,** Department of Education, Regional Institute of Education, Bhopal, Madhya Pradesh.

I confirm that this research work is original and authentic, and it does not include any part of the work that has been submitted for the award of any degree at Barkatullah University or any other university, except where due citation has been provided.

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CERTIFICATE

This is to certify that the thesis entitled 'A Study of Availability and Utilization of Science Laboratories for Teaching-Learning Science in Secondary Schools of Bhopal' submitted by Digvijay Yadav, Enrolment No. R230664070011, in partial fulfillment of the requirements for the award of the degree of Master of Education (Int. B.Ed-M.Ed) from Barkatullah University, Bhopal, has not been previously submitted for the award of any degree or diploma of this or any other university or institution, and it is his/her original work.

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LIST OF ABBREVIATIONS

S. No.	Abbreviation	Description
1.	AR/VR	Augmented Reality/Virtual Reality
2.	CSIR	Council of Scientific and Industrial Research
3.	DMS	Demonstration Multipurpose School
4.	HSS	Higher Secondary School
5.	JNV	Jawahar Navodaya Vidyalaya
6.	KCSE	Kenya Certificate of Secondary Education
7.	LRC	Learning Resource Centre
8.	NAAC	National Assessment and Accreditation Council
9.	NCERT	National Council of Educational Research and Training
10.	NCTE	National Council for Teacher Education
11.	NEP	National Education Policy (2020)
12.	NSF	National Science Foundation
13.	PM Shri	Prime Minister's Schools for Rising India
14.	RIE	Regional Institute of Education
15.	RMSA	Rashtriya Madhyamik Shiksha Abhiyan
16.	UNESCO	United Nations Educational, Scientific and Cultural Organization
17.	WHO	World Health Organization

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Introduction

1.1 Introduction

Science is the blueprint of life. It is the systematic study of the behavior and structure of the physical and natural worlds through observation and experimentation. Science has played a major role in human culture and world civilization with its ability to liberate man from superstitions and diseases and improve his ways of living.

According to Aristotle, "For the things we have to learn before we can do them, we learn by doing them." Experimentation and observation are the foundation stones to understand the natural and physical world of science. For understanding the cause and effect of science, reading theory and principles from textbooks will not suffice. Practical knowledge imparted through school science laboratories is necessary to fill the gap between theory and its application.

A science school laboratory is a specific room utilized by the students to conduct experiments, study phenomena, and conduct scientific inquiry. These labs contain numerous apparatuses and materials in use to achieve an incredibly broad spectrum of scientific experiments.

By performing experiments, students can directly experience scientific concepts and see the real-life application of theoretical knowledge. This hands-on learning assists in reinforcing their studies and in developing a better understanding of the topic.

Apart from this, participation in lab work increases critical thinking abilities, and the learning is more participative and retentive. The students need to hypothesize, experiment, and conclude, and this will increase their powers of observation, analytical mind, and problem-solving ability and instill a scientific temperament.

For instance, dissecting a frog in biology class can help to understand the anatomy that is far more vivid than textbook images. Similarly, conducting chemical reactions in a chemistry lab helps students understand the formation of different compounds and their reactivity under different conditions.

The Radhakrishnan Commission of 1948-49 provided the foundation of higher education in India, and the emphasis was on the requirement of science education. It suggested the improvement of laboratory facilities and the training of teachers in science to improve the quality of science teaching.