



**THE EFFECTIVENESS OF THE MANAGEMENT OF BASIC  
LABORATORY AND INTEGRATED PRACTICAL RESEARCH  
UNIMA USING MODEL CIPP**

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**ABSTRACT**

The laboratory became an important means for the development of the science of MIPATEKS so that the need to continue to be developed for the sake of its existence prior to the development of science. This research aims to know the effectiveness of the implementation of the practical Laboratorium basic and Integrated Research. This research

uses evaluation methods with model Cotex, In put, Proces, and Produc (CIPP). The instruments used in this study using interview techniques, observation, documentation and study of the now. The research results it is recommended that: a. the procedures the implementation of teaching and research in the basic and Integrated Research Laboratorium need to gain an understanding of the use of the laboratory. Basic Laboratory SOP socialization and Integrated Research among UNIMA needs to be done, so that students and professors more knowing. b. the Practical nature of learning can be made by the respective groups of courses according to the purpose of lectures, and should be reported on in charge of Basic Laboratory research and Integrated Research, c. research conducted by the student must create a sheet of collaboration between researchers and the person in charge, to the utilization of tools and materials will be reported. d. research conducted by Professor good for research, or the devotion and enlightenment science must apply on the Manager and the person in charge of laboratory research and Integrated Basis. e. Researchers from outside the College, such as teachers and the general public, can apply for a recommendation inviting establishments of origin. f. need for the addition of a number of tools for the development of science MIPATEKS in the laboratory base and Integrated Research Unima.

**KEYWORDS:** Management of Basic Laboratory Research, Integrated & Socialization SOP for users.

## 1. INTRODUCTION

Practical work is inseparable from the learning sciences, and science. Therefore, learning by theory alone is not enough. Students need practical to solve problems mainly are closely related to our daily lives. This is the reason why the concept is important, there should be described through practical work. Based on the hard lessons, if only explained using theories students will only remember it in a short period of time. On the other hand, other problems will also appear, many students encounter errors of perception in understanding (Sanjaya Wina, 2006).

High School students ability to analyze, evaluate, and synthesize the learning experience of students may need to be taken into account in future study. For example, it is known that students who reflect the often appear to report on this in the form of description and not the evaluation (Joke h. van Velzen, 2017; 6). It is important to remind that the change of concept is usually considered as a process that requires a significant amount of time to succeed. In this perspective, it is interesting to see brief pedagogic treatment (less than 45 minutes) we can create a difference, even if the long development time less secure (Patrice Potvin, \_ Erik Sauriol, and Martin Riopel, 2017: 22.)

The end of the process of learning is the acquisition of a student learning outcomes. The results of student learning in class collected in the set of results of the study class. All the results of the study are the result of an interaction of a follow up study and follow his teachings. The teacher, teaching at the action end with the process of student assessment, whereas the learning outcomes of students, is the end of the episodes and the learning process (Dimiyati and Mudjiono, 2009:3). According to Sudjana Nana (2001), the results of the study are the skills possessed students after he accepted their learning experience. The results of the learning events can appear in a variety of types of change or prove one's behaviour. Wahidmurni, et al. (2010:18) tells us that someone can be said to have succeeded in learning if he is able to show any change in himself. The changes of which in terms of the ability of his thinking, his skill, or his attitude against an object. Hamalik (2006:155), gives an overview of the acquired learning outcomes that can be measured through progress gained students after studying in earnest. The results of the study appear to the occurrence of change

of behavior in the students that can be observed and measured through changes in attitudes and skills. These changes can mean the onset of improvement and development of better compared to before.

Katili, (2013:2) describes the laboratory is a room where the practice of activities or research that is supported by the existence of a set of laboratory instruments and the existence of a complete laboratory infrastructure. Budiyo, (2009:9) is a place where laboratory experiments and investigations carried out. The laboratory can be a place of enclosed space, the room or open space, gardens for example where the experiment took place and doing research. In laboratory students acquire data or information derived from the original object or produced, and process how to learn the IPA as it should be. Katili (2013:2) Lab is a place to experiment and investigation, it can constitute a closed space, rooms, or open space, such as the garden. In terms of limited laboratory is a room where the experiment and investigation. Budiyo (2009:10) Lab the laboratory is a real special place equipped with the tools and materials to conduct real experiments or good teaching physics, chemistry, or biology. Hadi santoso (2008:25) is a real Laboratory for experimental or practical activities that come with the equipment or the real ingredients. Yusnita (2012) real lab is a way of presenting lessons, where students experiment with experience and proves himself something to learn. Learning with the method this experiment students were given the opportunity to experience yourself or do it yourself, follow a process, observing an object, analyze, draw conclusions and prove themselves on an object, the State, or the process of something. Therefore, students are required to experience yourself, find the truth or try to find a law or evidence. So the reason all the branches of the natural sciences (physics, chemistry and biology) rely on laboratory experiments. Students studying natural sciences based on experimentation. So the approach of learning to do in laboratory experiments to improve learning and drawing conclusions or process that had befallen him. (Mehmet Erkol, Mustafa Kisoglu, and Erdogan Buyukkasap, 2010:2310-2314).

Jaya Hendra, (2012:2) the virtual Laboratory is defined as an interactive environment to create and experiment simulation: a playground for experimenting. It consists of domain dependent simulation program, experimental units called objects that include data files, a tool that operates on objects, and reference books. Hadi Santoso (2008:26) virtual labs is a software which is run by the hardware or called by the computer. All the equipment needed by the virtual laboratory in the software. Rani Puspita (2008) virtual Lab is a system that can

be used to support the system practical running conventionally. The virtual laboratory is commonly referred to with the Virtual Laboratory or V-Lab. Improve the skills of creative thinking and problem solving are scientific, developing skills in the field of ICT without neglecting knowledge about laboratories, not have to incur the actual practical equipment, sometimes the price is not affordable, and practical work can be done when only (Putri, 2013:2). Yuniarti, dkk (2012:3) in his research stating that the virtual laboratory is cheaper, safe and suitable use by students who have a visual learning style because students can explore virtual laboratory according speed and his needs. Sukardi 2012). The results showed that there is a problem-based learning, influence through experiments with real and virtual laboratories towards achievement of learning. There is the influence of learning achievement against learning style, and there is no interaction between problem-based learning through experimentation with real and virtual laboratory with learning achievement against learning style, there is interaction.

Naba Hamida (2013). The results of the research show that there are influences learning method using virtual labs and STAD STAD use real lab against the achievements of the student learning material on the cognitive aspects of colloidal systems and there is no influence the learning method using virtual labs and STAD STAD using real laboratory on affective achievement. There is the influence of student's creativity high and low learning achievement of students against the material of cognitive aspects of either colloid or affective. There is no interaction between the learning method using virtual labs and STAD laboratory student creativity with real high and low learning achievement of students against the material of cognitive aspects of either colloid or affective.

The study revealed that students in the two groups study strategy group (STAD and LTM) has a high academic performance mean values compared with students in a group of individual computer instructions. STAD and study with teaching strategies koperatif model were found to be more effective in increasing student academic achievement, motivation, and Retention in physics more individual computer instructions. When hospitality was founded, students are motivated to learn and more confidence to ask questions of each other to better understand the tasks that you are learning. (Gambari Amosa Isiaka, 2015:10).

This research aims to: to know the process management in the laboratory base and Integrated Research associated with Unima Cotex, In put, Proces, and Produc (CIPP).

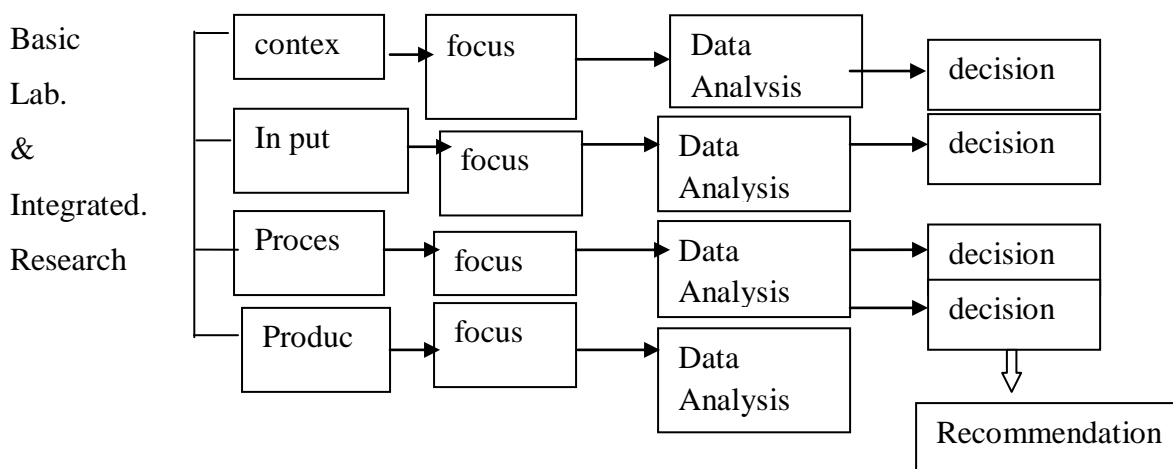
## 2. RESEARCH METHODS

The methods used in this research is a method of evaluation of the program with the qualitative approach. Through evaluation methods are expected to give an assessment of the effectiveness of the program, about the management of the programme, the advantages and limitations of the program being implemented.

Design research is a draft Act to obtain data through to conclusion. This research follows the evaluation model design Stufflebeam i.e.

CIPP model to provide a general overview about the evaluation process from the early stages of the activity to taha alhir activities.

CIPP model can be described as shown in Figure 1.



**Figure 1: Program Evaluation Research Design**

Research instrument is the written guidelines about interviews, observations, or a list of questions, which dipersiapkan to obtain information from the respondent. Responen in this study consists of: a. Implementing practical-activity, Professor b. Technician or energy Institution Laboran education (PLP), c. students.

### Data Analysis Techniques

This evaluation research using qualitative analysis techniques and descriptive analysis. Qualitative analysis technique is done by organizing the data, outlining the data into units, do sistesa, menyusun into patterns, sorting out which ones are essential and that will be studied, and make conclusions which can be submitted to the others. The data in this research is quantitative descriptive analysis will use in the form of a percentage.

### 3. RESULTS AND DISCUSSION

#### Component Context

Results of the study on the components of the context shows that the basic laboratory research and Integrated UNIMA does not yet have all the academic document that should be owned by the laboratory in college. For example, he has not a permanent institutional structure of the leadership of the College until in the laboratory. Haven't owned recruitment mechanism remains the Manager of good teaching units for teaching learning and teaching research. Academic activities in the implementation of practical and research is carried out independently by the course lecturer. Manager of laboratory Education Institution is only 1 person who is skilled, berkualifikasi other 2 people have not followed the training laboratory. The number of PLP with 1 qualifying skilled yet capable of serving all courses that carry out practical work and research.

**Vision:** making the basic Laboratory research and Integrated a superior quality And Unima in organizing the study of the SCIENCES and the development of mathematics, science-technology and Health that can be taken into account both the present national and international level.

**Goals:** 1. Joint majors and programs of study produce a well-educated workforce and undergraduate science expert, skilled, intelligent, independent, dignified as well as professionals in the fields of math and science in both the educational and non-educational competences. 2. Generate a work of research, Science and Technology products and scientific works product learning in mathematics and science. 3. Make Basic Laboratory and research Integrated Service Center of Unima, training, consultation and services in the field of learning and application of mathematics science and science-technology.

**Target:** 1. Basic Laboratory Research and realization of Integrated Unima as higher education institutions accountable in governance is good (good governance), efficient and effective. 2. Implemented the results of the research and study of Berbasis Basic Laboratory research and science development to Integrated Math and science learning devices supported with quality, innovative and research-based. 3. To achieve the institution profile the reputable and accredited UNIMA. 4. Thoroughly in the preparation and service of academic administration of ICT-based (online). 5. Realization of cooperation networks both nationally and internationally. 6. To achieve the role of public services in the areas of math, science and Technology in local, regional, national and international.

## Component Input

### a. Student

Results of the study found that students who use Lab Basic practical and Integrated Research can be grouped as follows: 1. consist of Department of physics, physics education Prodi, Prodi physical science, Physics namely the concentration Geothermal. 2. Chemistry Department consists of Chemical Education Prodi, Prodi and concentration of Pharmaceutical Chemistry, 3. Biology majors consist of Prodi Biology education, biological sciences, and Prodi. The Department of Education and Science.

From the results of research on some of the students have never been followed since Teaching in junior and Senior High School. therefore many students who have the ability or skills that are lacking in carrying out practical work. The complete data on the State of practical experience before College can be seen in Table 1.

**Table 1: Experience Teaching Students since SMA/K.**

No.	Department/Study Program	Number of Students	Ever attended Practicum	Never attended Practicum
1	Chemistry Department			
	A. Chemistry Study Program Education	90	40	50
	B. Chemistry Study Program	25	10	15
2	C. Pharmacy Study Program	30	15	15
3	Physics Department			
	Physics Study Program Education	120	50	70
	Physics Study Program	15	5	10
4	Geothermal Study Program	95	60	30
	Biology Department:			
	Biology Study Program Education	125	75	50
	Biology Study Program	40	25	15

From the results of research, the Sciences admissions process practicum in the laboratory base and Integrated Research can be divided into three categories, namely: a. pass the selection result SMBPTN, b. pass the line of invitations and c. pass the local selection (B2P). Based on the results of this selection should be made kuoata of Sciences admissions. The process of recruitment of students of Sciences should pay attention to the availability of produce educators and infrastructure that support the lectures. In fact students who pass the



selection and invitation SMBPTN more ready to follow lectures both in the lecture hall or Laboratory practical.

### b. Lecturer

Lecturer is a very important part in the process of lectures in college. Principal Lecturer assignment reflected in Act No. 14 of the year 2005. Lecturers are professional educators and scientists with the principal task of transforming, developing and disseminating knowledge, technology and the arts through education, research and community service. Based on the research results obtained data Sciences professors who carry out practical work can be grouped as follows:

**Table 2: Professors who carry out practicum in Laboratorium Basic Research Integrated.**

No	Department	Practicum Lecture /Lesson	Practicum	Notes
1	Chemistry	5	3	S <sub>1</sub> & S <sub>2</sub>
2	Physics	1	-	S <sub>1</sub>
3	Biology	3	2	S <sub>1</sub> & S <sub>2</sub>

Based on data of Table 2. above then look that not many Physics Professor using Basic Laboratory Research & integrated. This situation occurs because most of the equipment in the laboratory teaching of Basic Research on more Integrated & analysis teaching chemistry and biology. Physics lab course is not yet available, if there is the nature of the use of practical Physics integrated with practical chemistry, such as Core Physics topics and for Atomic Physics. This experiment can be used jointly by both Departments of physics and Chemistry Department.

### c. Power Technician (Pranata Labs have)

Workforce Institution Laboran education (PLP) currently amounts to 1 people with education level S1 and Chemical Education backgrounds, so that in the future it would be better if it can be adapted to the development of Basic Laboratory research and integrated, where necessary the PLP power placement in accordance with the mission and vision of the basic Laboratorium and Penelittian research and development on Integrated Science and MIPATEK science, then it needs to be to the fore adoption PLP power behind undergraduate education physics education /Physical Science, Undergraduate Biology Education/Biology. This condition is necessary to meet the needs of teaching of biology majors, and Department of physics. At this point in the Science Faculty and faculty in particular UNIMA Science



Sport (FIK), is in need of practical Laboratory for the development of Sciences and health sciences disciplines.

### **The Contents of the Program**

#### **d. means of infrastructure repair**

Basic Laboratory facility and Integrated Research UNIMA in principle consists of 2 units of 2-storey building. Building A place of research and Practical implementation in the 1st floor, with a student capacity of 75 people. Some seats are available and practical preparation of 1, and a leadership laboratory. Building A 2nd floor there are two lecture hall with power tamping each room of 50 people. On the second floor space currently 2 used as a lecture from the Department of physics, Department of Chemistry and Pharmaceutical Studies Program. Building B 1st floor there are 4 rooms and used the Lecture Hall biology majors, and the Department of Mathematics. On the 2nd floor of building B in use as a Biology lab. Other facilities are each equipped with a number of lecture room seats fit power tamping. All of the rooms are not equipped with air conditioning because air campus was pretty fresh.

#### **e. Management**

Mekanisma the use of a room adapted to the schedule of courses per Department. Most courses use lectures are biology majors, followed by the Department of Chemistry and Pharmaceutical Studies Program. Specifically for the practical every lecturer is responsible for the implementation of practical subjects according dikuliahkan. The mechanism of practical teaching guidelines accordingly arranged. For practical implementation procedure follow the SOP Practical Laboratory research and Integrated Basis.

#### **The components of the process of Planning a.**

The results of the valuation shows a lab practical activities planning basic and Integrated Research planned by the majors and programs of study respectively. The results of this planning and then delivered on practical implementation of the Manager of each Department and of project studies. The results of this planning individual departments and Prodi adjusted to not mutually bertumpukkan with majors and programs of study to another. Almost can say in drafting the plan of praktiukum no problems encountered due to all the team can customize the schedule of activities the use of practical work in the laboratory.

Other things that can be dmenjadi constraint is on the implementation of Scientific research and development. Basic Laboratory development planning and Integrated Research needs to

be done in collaboration between the scientific development interests of Sciences pemamngu science and health. Collaborative preparation of development plans need to be made jointly to determine priorities for research and the application of scientific knowledge. Until the results of the evaluation of the perceptual differences still occur between some courses for scientific development together. Still more dominant partially through the development of programs of study, not to see how the development of collegial scientific groups.

The development plan of the laboratory Sciences and science as in Table 3.

**Table 3: Development S-2 Program Laboratory Sciences and Science Education.**

Number	Laboratory	Capacity (persons)	Spefisikasi Tools	Function
1	Basic Physics	40	The tools of basic Physics teaching at university level covers mechanics, thermodynamics, waves and optics, magnetic, electrical	Serve practical students either in a group or independently.
2	Basic chemistry & cont	40	The tools of basic Chemistry lab course at the University level covers the basics of organic and inorganic and physical chemistry analog or digital	Serve students well in groups as well as practical work independently
3	General Biology	10	Biology teaching tools include Signal Processing analog and digital, microprocessors, sensors, interfacing.	Biology teaching tools include analog and digital Signal Processing, microprocessors, sensors, interfacing.
4	Biomoluculer	30	Biomoluculer teaching tools using magnets, electric waves and optics	Serve students well in groups as well as practical work independently
5	Modern Physics	30	The tools of Modern Physics lab course	Serve students well in groups as well as practical work independently
6	Astronomy and Terrestrial	30	The tools of practical astronomy (Binoculars) and Geophysics (Earth resistivity measurement tool and mapping – Remote Sensing)	Serve the student teaching and research faculty and students well in groups or independently
7	Learning	30	Space lab designed to mikroteaching equipped	Student teaching practice places

Number	Laboratory	Capacity (persons)	Spesifikasi Tools	Function
			with media studied physics school for all topics and teaching aids like OHPS and LCD are installed permanently.	teaching, and research on learning models
8	Computer	30	40 computer accompanied server equipped with the internet network	Serve practical students, where the student menyelesaikan the tasks learning computer-based media.
9	<i>Workshop</i>	40	Tools-workshop for the manufacture of the media learning MIPATEK its not a computer-based	Workplace professors and students to develop media learning MIPATEK
10	Material physics – chemistry of Microscopic & materials		Tools materials science laboratory-scale research (list attached)	The means of research faculty and students

In addition to laboratory MIPATEKS and educational Sciences at the top, Base and research laboratory of UNIMA, UNIMA has a Department of physics physics laboratory that strongly support the research for the control level in the field of the study of physics. Physics laboratory that there is currently a computational physics laboratory, laboratory of Physics of the Earth, electronic and Instrumentation Laboratory, physics laboratory material. Some of the main equipment owned by the physics laboratory among other things is; 1) X-RF (x-ray Fluorescent) Minipal-4 series of PAN-Analytical capability analysis of elements Na to Uranium, 2) space laboratory Integrated UNIMA & Basis including the equipment located in the complex of Engineering UNIMA. UNIMA-run in coordination of Engineering Dean UNIMA. The existence of integrated laboratory with adequate number of managers, their use of proper laboratory equipment will strongly support the holding of S-2 Program of Sciences Education & MIPATEKS.

### **b. Implementation**

Based on the results of the evaluation of the nature of the planning component authors have partially, then the impact is the process of the implementation of the activities also still partial. This raises the interest of easy arrogance courses that feel is most dominant in the use of tools or materials teaching as well as research. Schedule the implementation of practical activities of the lectures can be implemented respectively Prodi, but the use of facilities and materials can be a togetherness so that the tools used would be a shared responsibility.

Evaluation results showed that Prodi chemical education and the Chemical Sciences more dominant using Basic Laboratory research and Integrated. Other courses that use of Basic Laboratory research and more Integrated in the teaching in the first year. Some of the praktikum tool can be used to research level thesis, thesis even dissertation. For the use of the research thesis, thesis and dissertation setting it should be through the responsible Laboratory base and Integrated Research.

### **c. Assessment**

The assessment process conducted in the lecture activities can be divided into two things. The first assessment of the learning outcomes students carry out practical work, and second, the assessment of research or thesis students. Assessment of student learning outcomes-based practical-it is recommended to use some aspects of assessment such as performance assessment, an assessment of the project, the assessment of the written test and the portfolio. Performance assessment is carried out in order to measure the work done by the students through the stages of the process of the practical work done. This assessment allows students showed the work to its full potential.

How that is done in a real laboratory associated with the assessment of performance. Performance assessment process has several advantages that are relevant to the physics concept, such as planting experiment, observe, analyse and report on the results of the analysis. (Ferdy Dungus 2015) Portfolio assessment is done so that the students can gather all the learning activities in the form of a well-ordered reports, starting from the beginning of the practical activities to complete. Assessment assessment includes a quiz that was intended when practical, data collection, reporting and final report of activities of the teaching. A written assessment was intended to be able to tell from the beginning student activities which includes knowledge until completion is done through a written test.

### **Results of the Component**

The evaluation on landscape shows that student learning outcomes in particular which using Basic laboratory research and Integrated in accordance with what is expected in the practical work. There are some notes in a review of practical completion students between the implementation of the electronic systems in the process of the service administrasi in the laboratory. (Anastasia Papanthymou1 & Maria Darra1, 2018; 12) For administrative staff and Faculty of the University of the Aegean showing the dimensions of electronic administration

services that are essential and effective and satisfying or create problems for students. Thus, it is possible to set priorities and take measures and action to address the weaknesses, improve the quality of services provided and to improve student satisfaction.

#### 4. CONCLUSIONS

Pay attention to the results of the evaluation then it can be inferred that the holding of practical Laboratory research and Integrated Basis are as follows: a. the procedures the implementation of teaching and research in the basic and Integrated Research Laboratory need gain an understanding of the users of the lab. Basic Laboratory SOP socialization and Integrated Research among UNIMA needs to be done, so that students and professors more knowing.

b. the Practical nature of learning can be made by the respective groups of courses in accordance with the objectives and associated matakuliah. Planning activities to the implementation of activities and reporting should be reported on in charge of Basic Laboratory research and Integrated.

c. research conducted by the student must create a sheet of collaboration between researchers and the person in charge, to allow good utilization of tools and materials will be accountable. The complete reference to the Standard Operational procedure for the utilization of Basic Laboratory research and Integrated.

d. research conducted by Professor good for research, or the devotion and enlightenment science must apply on the Manager and the person in charge of laboratory research and Integrated Basis.

e. Researchers from outside the College, such as teachers and the general public, can apply with the inclusion of recommendation instasi of origin.

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