



## Technical Feasibility of Integrated Laboratory in Faculty of Sports Science Universitas Negeri Semarang

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### Abstract

This research aim was to analyze the requirements of technical integrated laboratory Sports Science Faculty Universitas Negeri Semarang (SSF UNNES) in improving sports achievement in Central Java Province, Indonesia. Research method used in this research was qualitative descriptive, with evaluation approach, the instrument used document analysis, observation, interview and inquiry. Data analysis was using Miles and Huberman interactive cycle then the pattern tendency was explained, qualitative analysis was initiated by describing reality happened in narration form then it was interpreted by a guidebook with ISO 17025 or SNI 17025 standard in laboratory. The result shows that the requirements of technical integrated laboratory SSF UNNES was quite maximum to contribute in improving sports achievement in Central Java Province, Indonesia, it was based on the technical standard from equipment, personnel, accommodation and environment condition, finding of test and measurement, quality assurance of measurement and test result, and reporting of result conducted based on ISO 17025 or SNI 17025 standard.

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## INTRODUCTION

University is expected to be able to encourage the mastery of knowledge and technology through education, research and community service. Through university's Tri Dharma, it is expected that university can be innovator and dynamist to respond various changes in society. Various problems faced in the universities, can be briefly elaborated as follows, first, equity, expansion of opportunities in giving services to society in age group 19-24 years to get higher education, among others are: 1) the limitation of opportunity for potential students candidates in regions to get good education, and 2) the limitation of actors of development with good human resources. Second, relevance and quality, it is a common issue across all institutional, Human Resource, student developmental program. Third, the actors of system effectivity in institutional as well as the efficiency of implementation, it needs well system management, and the handle is related to autonomy of development, accountability, and public imaging (source: <http://kelembagaan.ristekdikti.go.id/index.php/tag/permasalahan-di-perguruan-tinggi/> accessed on 13/04/2017. 22.24).

Based on these problems and challenges, the strategy of Sports Science Faculty (SSF) development, Universitas Negeri Semarang (UNNES) was implemented synergistically and directly to 3 (three) main pillars they were equity and expansion of education access, quality improvement, relevance and competitiveness, as well as governance management reinforcement. To set the direction of development, then strategic plan is needed in order to make direction of management not to be out of proportion and can be reached in stages, steady and effective. Monitoring and evaluation system is the main part that can be separated from the implementation of strategy plans of SSF UNNES 2015-2019. Monitoring and evaluation system aims to find out the level of achievement and conformity between fixed plan in strategy plans SSF UNNES 2015-1029 with the result based on implemented regulation through activity and/or program in faculty and department periodically.

Based on the monitoring and evaluation in facilities and infrastructures in SSF UNNES, it was obtained that the improvement of sports and health laboratory function was needed. With certified sports and health laboratory it would be superior in university and Central Java in general. According to Indonesia national law No. 3 Year 2005 on National Sports System the scope of national sports development referred to athlete's

character building. In principle how Central Java athlete can compete, is able to supply national athletes, so that Indonesia is considered in various sports which are competed in world.

There are two big challenges related to opportunity and potential. First, accommodation of macro challenge about sports development nationally and second, substantial aspect of regional sports regulation. The challenges including the high public demand toward achievement along with the decrease of national achievement, it made sports as the development instrument which must direct to the result of development which was expanded and reinforced the decentralization of sports development. Macro of sports developmental at present and future needed to be concerned by central of regional government.

In Article 33 UU No 3 Year 2005 on National Sports System it explains about the authority of province government in managing sportsmanship. Province government does sports, planning, coordination, management, development, determination of standardization, resource development, and supervision regulation. Kristiyanto (2012) says that the measurement of sport development index (SDI) for Sports Human Resource indicators will be the strong foundation in sustaining the great sports achievement pillar, sports education, and sports recreation simultaneously. With more adequate facilities to sports development in Central Java particularly and national spots generally.

One of the strategies to develop the improvement of quality, relevance and competition is by improving facilities and infrastructures, improving quality of services and the accurate of laboratory equipment. One of the ways which is the best is providing laboratory that assure the quality and accurate the test result data and to improve the confidence of practitioners is through laboratory accreditation program. Laboratory accreditation gives some technical and competition assurances of a laboratory to do some product testing based on ISO (International Organization for Standardization) standard which defines accreditation as formal recognition toward a tester laboratory which has compensation to do particular testing or special testing.

Accreditation of laboratory means that it can do testing with particular right and accurate method and procedure. So that accreditation gives laboratory ability assurance only on testing ability in a scope of accreditation. One of the main and important basic determinant factors for a laboratory which is accredited is technical ability which is documented including openness that

gives trust and honesty of laboratory profession. Requirements as tester laboratory are based on the guidance of BSN No. 101 or ISO Guide 25 which is changed into ISO 17025 or SNI 17025. Because of that a documentation review which is done to evaluate how efficient the technical requirements is in an integrated laboratory SSF UNNES is need in giving contribution to improve achievement of spots in Central Java.

## METHOD

This research was qualitative research, with evaluation approach. Evaluation approach aims to review the implementation of regulation and fix that implementation (Creswell, 2016, p.247). Through this evaluation approach would be found the image of implementation, obstacles, and strategies for improvement. In this case, the main point was to find out the technical feasibility requirements of integrated laboratory SSF UNNES in improving sports achievement in Central Java Province, Indonesia.

Source of data was obtained from this research are 1) document, the document was data had by integrated laboratory in SSF UNNES, 2) activity and reality, activity and reality was the entire activities happened related to integrated laboratory SSF UNNES in improving sports achievement in Central Java Province, Indonesia consisted of test and measurement process toward athletes, while the informant in this research including the chiefs of institutions in SSF UNNES, the chief of sports observer (such as, the manager of Komite Olah Raga Nasional Indonesia (KONI) of Central Java, Dinas Pemuda dan Olah Raga (Dinpora) of Central Java, and Disospora in Semarang City), as well as the coach of PON 2016 who was related to laboratory users and development team of integrated laboratory SSF UNNES.

Data collecting techniques used in this research were 1) document analysis, document review was used by the researcher to collect data and investigate written data about design and preparation of integrated laboratory SSF UNNES, 2) observation, in this research observation of category system was used to observe factors in research object, then it was categorized into certain category to categorize factors which were determined at the certain time, and 3) the data was also obtained from interview that given by respondents toward questions of the draft of interview, there were indicators of technical requirements in laboratory. Interview was conducted for respondents who had been participated in activities in laboratory they were the manager of

KONI of Central Java, Dinpora of Central Java, and Disospora in Semarang City, and Coach.

Data analysis in this research used descriptive analysis with Miles and Huberman cycle. In this analysis, qualitative analysis was initiated by describing reality happened with narration form. Then, the data was categorized based on design, implementation, and obstruction criteria. The third analysis activity was making conclusion and verification, the first step in making conclusion and verification was initiated by making temporary result of the research. Making conclusion could be defined as describing the result of the research through theory that was expanded, from the finding then theoretic making conclusion was done (Sugiyono, 2015, p.334). Then the conclusion needed to be verified in order to make it steady enough and could be responsible, however, if the conclusion was not steady yet, then the researcher could do data collecting process and verification, as the foundation of making final conclusion

## RESULT AND DISCUSSION

Integrated laboratory SSF UNNES was one of the laboratories of sportsmanship had by SSF UNNES that could not stop to do develop and reform, as what we knew in improving the relevance and contribution of laboratory toward society's needs it must be supported by some aspects which were facilities and infrastructures and stakeholder. Integrated laboratory always concerned about those aspects. Besides the aspects the physical condition of laboratory was also be concerned for users' safety and comfort, based on the observation and document searching of physical condition provided in integrated laboratory SSF UNNES it has some specification as follows:

Surface area: .7.641.58 m<sup>2</sup> with the details as follows:

Public access zone	: 685 m <sup>2</sup>
Sports Lab	: 3.818 m <sup>2</sup>
Physical Examination Lab	: 882.72 m <sup>2</sup>
Public Health Lab.	: 895.68 m <sup>2</sup>
ICT Center	: 815.18 m <sup>2</sup>
Calibration Lab.	: 545 m <sup>2</sup>

From the physical condition of integrated laboratory SSF UNNES described above it were the things which could support the activity process in a laboratory, it was based on the standard of open space which adopted by Olympiad Committee (in Kristiyanto, 2012) that everyone could do activity related to sports in order to feel comfort that was 3,5 m<sup>2</sup>/person. However, based on the interview with sports coaches and observers it

was explained that the movement space in integrated laboratory SSF UNNES was still not wide enough and asked the manager to expand and develop the room to be wider so that the athletes' movement space when they were doing test and measurement could be freely.

Then, based on observation and document analysis in implementing quality system in integrated laboratory SSF UNNES, factors determined that laboratory could give contribution for athletes' achievement in Central Java which was one covered the technical requirements in laboratory based on the standard including: 1) Equipment, 2) Personnel, 3) Condition of Accommodation and Environment, 4) Finding of Test and Measurement, 5) Quality Assurance of Test and Measurement Result, and 6) Reporting of Result. Integrated laboratory SSF UNNES followed the factors above in developing quality which used to give safety and comfort for users.

From aspect of equipment of integrated laboratory SSF UNNES had 36 equipment for test and measurement for athletes, including having good capability, needed improvement, and dysfunction/broken, most of the testing and measurement still had good function. Equipment that had by a laboratory must be able to facilitate and accommodate athletes' needs to find out their potentials based on the written on ISO 17025 or SNI 17025 standard. To find out the development of each athlete, athlete must have ten components of fitness and there were norms or capability limit in each athlete of every sports field. Based on the observation the equipment had by integrated laboratory SSF UNNES in measuring the development of athlete in each sports field had fulfilled the criteria, but the number of equipment had not been in ISO 17025 or SNI 17025 standard, it was based on the equipment had by integrated laboratory SSF UNNES could measure 10 components of fitness in each athlete. However based on the interview with coaches and sports observer it was explained that the equipment had by integrated laboratory SSF UNNES in order to be fixed or even added and still concerned the quantity and quality to minimize the queue when the test and measurement was held and to make it more efficient in using that equipment. It could not be separated from the norms of athletes' capability which had to be fulfilled, each athlete's measurement should be completed with SOP (Standard Operating Procedures) to make users feel easier in using equipment and giving safety and comfort. Based on the observer toward equipment in integrated laboratory SSF UNNES had SOP in its equipment.

As what was written in manual book of ISO 17025 or SNI 17025 standard in giving assurance for customer service needed to have testing in each laboratory and should have HR (Human Resource) which had the competence in his own field, it was done to be able to give excellence service for customer and minimize error. Integrated laboratory SSF UNNES in giving maximum contribution for athletes in Central Java had to make sure the personnel's competence that did certain task had particular qualification based on their own task. Integrated laboratory SSF UNNES prepared, formulated, and did appropriate education and training which was appropriate externally and internally, it was made each year by contributing in each activity.

The implementation of personnel education and training was done based on the applied criteria. In every used personnel that had been contracted, competence evaluation and supervision was done based on the laboratory management. In integrated laboratory SSF UNNES letter of assignment to personnel for each activity based on their own task referred to Personnel's Work Instruction. Personnel who was given the right of authority and recorded activity that was done in integrated laboratory SSF UNNES, that authority including, 1) Testing, 2) Giving opinion and interpretation, 3) Qualification of education and professionalism, 4) Training, capability and experience, it could be concluded that technical requirement in personnel in integrated laboratory SSF UNNES the mechanism was appropriate with ISO 17025 or SNI 17025 standard.

To give good service for users of integrated laboratory should look at condition of accommodation and environment as well, design and lay-out which was not appropriate and the facility of laboratory was still not good enough it would reduce the quality of measurement the environment parameter quality result data, operational activity, whereas the maintenance of condition and good environment, beside to reach the valid quality it could also protect the personnel from the danger of chemical, fire, and other dangers.

The condition of accommodation and environment applied in integrated laboratory FIK had facilities which could facilitate the validity of work testing including: 1) public access zone, 2) Sports Lab., 3) Physical Examination Lab., 4) Public Health Lab., 5) ICT Center, 6) Calibration Lab., 7) Equipment of measurement and calibration, and 8) Sources of energy.

Integrated laboratory SSF UNNES concerned the condition of environment based on the relevant specification, methods and procedu-

res and did the recording of environment and if the condition of environment broke the quality of measurement result, then the testing was stopped. Special room which was separated with the other rooms was used for different activity in activity implementation. The household in integrated laboratory SSF UNNES and the provided equipment was Technical Manager's responsibility and it was done by particular people. It could be concluded that integrated laboratory SSF UNNES was based on ISO 17025 or SNI 17025 standard.

Testing and measurement toward athletes was a complicated task because there were many things that should be concerned to make the obtained data was truly valid. It needed capability and conscientiousness in examining the test and measurement result. The athletes' physical and psychological conditions were also needed to be concerned because it could also influence the test and measurement results. It was related to the finding of test and measurement in integrated laboratory SSF UNNES, based on the observation and document searching when the test and measurement was conducted toward athletes in integrated laboratory SSF UNNES the concept paid attention to the condition of environment, equipment and validity of test and measurement result.

For the condition of environment when the test and measurement was conducted the space layout to equipment was given with ideal distance which was 10-20 from each item for test and measurement that would be held in each item and given the restriction and names of the items, it made the athletes' movement when they were doing test and measurement would be free and it did not bother other activities in each item and they would understand the activity they were doing. Then for equipment in each item before test and measurement was held all of the personnel should check them by testing the equipment, it was done to minimize dysfunction when it was used. For the validity test and measurement result was used validity based on the criteria and validity, the obtained criteria was based on regulated norms in the world. Then the validity of content was done to estimate by using testing and measuring the content with rational analysis or with professional judgment done by stakeholder which was appropriate with the disciplines. It can be concluded that the technical requirement in finding of test and measurement applied in integrated laboratory SSF UNNES was in line with what was in manual book of ISO 17025 or SNI 17025 standard.

Refers to the quality of test and measure-

ment data obtained from sports laboratory, it can be presented as indication of development or decreasing in athletes as well as the proof in making design and evaluation for athletes and coaches. Therefore, to get accurate validity of test data, the parameter of test and measurement quality could be responsible based on the expected purpose, then one of the requirements that had to be fulfilled by sports laboratory was planning and applying quality assurance based on ISO 17025 or SNI 17025 standard it was in each laboratory should have procedure of quality control to monitor the validity of testing. The obtained data should be recorded so that all tendencies could be detected and if it was possible the technical statistic should be applied on result and discussion.

Integrated laboratory SSF UNNES had planning to keep the quality assurance of test and measurement, 1) Statistical process control and 2) Checking periodically by using standard measurement and equipment which the condition was kept to detect the change of test and measurement. Integrated laboratory SSF UNNES collected the quality control data which was planned and reviewed, recorded to detect tendencies and applied the next statistical technique to analyze test and result data toward quality control and corrected the problems and prevented wrong reporting data, then proficiency test was done at laboratory that was tested the standardization. From the process which was done to assure the result of laboratory data, SSF UNNES had done the procedures based on ISO 17025 or SNI 17025 standards on quality assurance of test result.

After giving quality assurance of test result, the reporting of test result should be arrange systematically in order to give image to customers the result in each test or test order conducted in laboratory should be reported accurately, clearly, not confusing and objectively, and based on the specific instruction in testing method. All of the information should cover what was asked by customer and it needed to be interpreted the test result and all of the information which was required by used methods.

Integrated laboratory SSF UNNES in reporting test and measurement result the mechanism was as follows:

Integrated laboratory SSF UNNES would give all of the relevant information to be reported to customers and would be documented if the reported result in simpler format.

Integrated laboratory UNNES published the test and measurement result which consisted of:

1. Title

2. Laboratory's name and address
3. The location of test and measurement which was done if the process was in the different place with laboratory's name and address
4. The identity of report in each page
5. Environment condition of the place of testing
6. The result of unsure measurement and the statement of conformity with certain specification
7. Statement of finding of test to certain reference
8. Customer's name and address
9. Method identification which was used in testing process
10. There was unique description, condition, and identification from equipment that would be tested
11. Date of receiving contract sign to keep the validity
12. Date of testing process implementation
13. Planning of data collection and the procedures used for it
14. Complete test result with unit of measurement
15. Names, function, sign or identification from personnel who were related to item which would be tested to athletes
16. Statement that the result of measurement was only related to item which would be tested to athletes
17. Clear identification toward subcontract
18. Reporting contract

Did interpretation of test result which covered:

1. Deviation or added item of test process to athletes
2. Information about specific condition
3. Statement of unsure measurement and test process to athletes
4. Had opinion and interpretation toward test and measurement process for athletes
5. Had added information which was asked by customer

Integrated laboratory SSF UNNES maintained the recording of statement result based on a specification and ignored the measurement and the unsure, then the unsure measurement would be considered if there was conformity statement and would be reported the calibration result before and after improvement

Documented the basic of opinion and interpretation that was made. Integrated laboratory SSF UNNES would give information of test result via Faximile or phone if there was a demand

from customer

Based on the analysis of finding of document in integrated laboratory SSF UNNES, then it can be concluded that the technical requirement in reporting result of integrated laboratory SSF UNNES was appropriate with ISO 17025 or SNI 17025 standard, because the report of that result was made systematically and clearly and described clearly in documentation had by integrated laboratory SSF UNNES.

Discussion that can be stated based on the result of the research it that as one of the center of excellence in each region, university is expected to encourage the mastery of knowledge and technology through education, research, and public service.

Based on the result of the research integrated laboratory SSF UNNES had given its **Quite Maximum** role toward the improvement of athletes' achievement in monitoring and evaluating athletes' capabilities through test and measurement and human resource (HR). basically according to Assidiq (2008, p. 391) Laboratory is a special work room to nature examinations equipped with certain equipment, so a laboratory has important role in improving quality and system of education. But in this research context, laboratory was not only a room for teaching and learning but also a place to test a hypothesis which to be had solved the facts, to give an evaluation from effects that was or would be known.

Based on the result of observation and document analysis had by integrated laboratory SSF UNNES, there was quite good technical system of integrated laboratory SSF UNNES, almost all of the implementation was based on the ISO 17025 or SNI 17025 standard of laboratory and based on the interview it was obtained the positive response toward the existence of integrated laboratory SSF UNNES, integrated laboratory SSF UNNES in Central Java could facilitate athletes and coaches to monitor and evaluate its training program periodically to develop its skills so that it could improve athletes' achievement, all of the management system and the system. However, integrated laboratory SSF UNNES still had some weaknesses especially from its financial, quality of equipment and expansion of room.

In manual book of ISO 17025 or SNI 17025 standard on laboratory, the development in management system, generally had improved the needs to make sure that laboratory was a part of bigger organization or organization which offered other services that could operate management system which could be seen to fulfill the requirements. It also influenced the management

of national sports, based on the Law No 3 Year 2005 on National Sportsmanship, the scope of sports management referred to athletes' character building. Principally how Central Java athletes could compete, Central Java could be a supplier of national athletes, so that Indonesia was taken into account in various sport fields competition in the world. The government of Central Java knew exactly the development of sports in its region, and the parties which were competence could see the opportunity and potential had by them.

## CONCLUSION

Based on the result of the research and discussion described above, so it can be concluded that the technical feasibility of integrated laboratory SSF UNNES in improving sports achievement in Central Java, Indonesia could be said that it had given quite maximum contribution for athletes in Central Java, with the existence of integrated laboratory SSF UNNES athletes in Central Java did not need to go far if they wanted to find out the effect of their trainings. The first problem faced by integrated laboratory SSF UNNES was it needed to improve its room management, second from the equipment there was still some dysfunction equipment and other testing and measuring equipment seen from the observation, interview, were still not complete and it caused the lack of efficiency and effectiveness for optimal test and measurement activity. The suggestions given to institution of SSF UNNES is to improve the quantity and quality of equipment with newer test and measurement equipment, expand rooms to give freedom to athletes and develop its potential of environment around the laboratory with safety and comfort by giving participation of related parties, plant more trees to make the air fresher and give shady condition, with those kinds of potentials it will make healthy condition by providing O<sub>2</sub> (oxygen), sunshine, green and clean environment, so that athletes can maintain their physical condition to be stab-

le in doing test and measurement as well as to keep their mental and social consistency, it can be done by asking opinion from civil engineering field to develop the room in integrated laboratory SSF UNNES, because the alignment between multi-disciplines can give the best solution seen from every discipline. MoU with supplier of institution developmental fund that has the same vision and mission and study comparative study between laboratories both in Indonesia and international needs to be intensively done to sustain its development. For institution of observer and developer either in region or Indonesia, such as Dinpora and Kemenpora should always give support both materially and financially for development of sports laboratory which has potential to improve sports achievement in Indonesia.

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