**Training Needs Analysis for Management of Facilities and Infrastructure Learning Automotive Engineering**

**R A P Hardiyanta1, W Suyanto2, Z Arifin3, A Mujaki1, R D A Saputro1**

1Graduate Program of Technology and Vocational Education, Yogyakarta State University, Yogyakarta, Indonesia

2Technology and Vocational Education, Yogyakarta State University, Yogyakarta, Indonesia

3Departement of Automotive Engineering Education, Faculty of Engineering, Yogyakarta State University, Yogyakarta, Indonesia

Email: rendraananta.2019@student.uny.ac.id

**Abstract**. This study aims to: (1) identify problems of management of facilities and infrastructure practices of the automotive engineering department at Muhammadiyah Gamping Vocational School, (2) find the causes of problems management facilities and infrastructure practices of the automotive engineering department at Muhammadiyah Gamping Vocational School, and (3) formulate solutions to solve problems facility management and infrastructure practices majoring in automotive engineering at Muhammadiyah Gamping Vocational School. This research was conducted in March 2020. This research is a descriptive research using questionnaires and interviews to retrieve data. The population in this study were: (1) the principal, (2) the vice principal in the field of facilities and infrastructure, (3) the head of expertise competence, (4) the head of the workshop, and (5) the technician / toolman. Data analysis techniques using descriptive analysis techniques. The results showed that: (1) Problems that exist in the management of facilities and infrastructure practices of the automotive engineering department at Muhammadiyah Gamping Vocational School : (a) lack of motivation to work, (b) facilities and infrastructure are not well organized, (c) taste lacking, (d) low work discipline, and (d) low technical competence; (2) the causes of problems that occur include: (a) educational qualifications that are not appropriate, (b) do not have relevant expertise certificates, (c) there is no education and training that is in line with expectations; (3) an alternative solution that can be held is training of facilities and infrastructure managers in the practice of automotive majors at the Muhammadiyah Gamping Vocational School with competencies: (a) technical competence, (b) communication, and (c) workshop management.

1. **Introduction**

Vocational education is education that prepares students to enter the future workforce [11][12][13][19]. The competencies needed to be able to survive in the era of the industrial revolution 4.0, among othershard skills including highly technical competencies, foreign language skills information technology skills, and aspects of soft skills, especially honesty, discipline, responsibility, health, collaboration, communication, creativity and innovation, and problem solving [15][21]. In order to achieve the objectives of vocational education, quality learning processes and human resources are needed that are able to provide good services, especially in workshops or laboratories in schools. One of the factors that inhibit the learning of teacher practices in schools is the use of facilities (facilities and infrastructure) in schools [21].

Training needs assessment is a systematic study of a change or innovation by collecting data, opinions from various sources in order to make effective decisions [2]. In line with this Roger Kaufman mentions "needs assessment is a process we use to identify gaps between current results and desired ones, place gaps in results (need) in priority orders, select the most important ones to be addressed" [5]. Erni Susiyawati states that need assessment is a process of analyzing data in identifying gaps between current performance and expected performance so data can be obtained regarding training needs [3]. Furthermore Mangkunegara mentions the term Training Needs Analysis (TNA) is a systematic study of a problem by collecting data from various sources to obtain problem solving or suggestions and follow-up plans through training [10].

The objectives of need assessment is to ensure that training is a solution to improve knowledge and skills. Furthermore, the benefits of need assessment are: 1) helping to design training programs, 2) maintaining and increasing motivation, 3) increasing time and cost efficiency, 4) ensuring the causes of problems in the management element (inaccurate work methods, limited available budget, planning undercooked, unstable coordination, etc.) [3]. Jean Barbazette said that another purpose of need assessment are to answer: 1) why there are gap between performance deficiency, 2) who is involved in overcoming performance deficiencies, 3) how to fixed the performance deficiency, 4) what is the best way to get the best result in the job, and 5) when will training take place [6].

The Muhammadiyah Gamping Vocational School is one of the Private Vocational Schools owned by the Muhammadiyah Foundation located in the Sleman area and accredited A. The Gamping Muhammadiyah Vocational School has a vision of being Islamic, superior, and competitive. In order to realize the vision of the head of the Gamping Vocational Muhammadiyah Vocational School, Mr. Sardi, stated that it still needs Islamic, superior, and competitive human resources as well. The Gamping Muhammadiyah Vocational School has three expertise competencies, namely: (1) Automotive Light Vehicle Engineering, (2) Motorcycle Engineering and Business, and (3) Clothing Design. The expertise competence in the Muhammadiyah Gamping Vocational School is dominated by the automotive engineering family so that to be able to realize the vision of the school, the attention towards the automotive department also needs to be improved, especially in the field of implementation and service management infrastructure and learning practices in the automotive department in the Gamping Vocational Muhammadiyah Vocational School.

The Automotive Engineering Department at Muhammadiyah Gamping Vocational School expects competent human resources to excel and be competitive to form students who are ready to work. However, based on the results of the questionnaire and interviews with the two Heads of Competency Expertise namely: Automotive Light Vehicle Engineering and Motorcycle Engineering and Business problems that occur in the management of facilities and infrastructure of learning practices include: (1) lack of work motivation, (2) facilities and infrastructure are not well laid out, (3) lack of ownership, (4) low work discipline, and (5) low technical competence. If you see from the existing problems, the researcher intends to find out the causes of the problems that occur and how alternative solutions to problems can be resolved. One way to solve the problem through need assessment at The Automotive Engineering Department at Muhammadiyah Gamping Vocational School.

The objectives of this study are: (1) identify problems in the management of facilities and infrastructure practices in the automotive engineering department at Muhammadiyah Gamping Vocational School, (2) identify the causes of infrastructure management problems and practice in the automotive engineering department at Muhammadiyah Gamping Vocational School, and (3) formulate solutions the problem of management of facilities and infrastructure practices of the automotive engineering department at the Muhammadiyah Gamping Vocational School.

1. **Method**

This reseach is descriptive study to find out the problems of infrastructure and management training needs use interview assisted with a questionnaire to retrieve data. Trust is obtained by validating instruments for quantitative data and triangulation for qualitative data [6][16]. This research was conducted at the Muhammadiyah Gamping Vocational School. Data source in this research were from: (1) the principal, (2) the vice-principal in the field of facilities and infrastructure, (3) the head of expertise competence, (4) the head of the workshop, and (5) the technician / toolman. The data analysis technique used in this research is descriptive-quantitative analysis technique. The Research Steps are presented in the following table.

**Tabel 1**. Research Steps Training Needs Analysis

|  |  |  |
| --- | --- | --- |
| **No.** | **Steps** | **Description** |
| 1. | Problem / Complaint Documentation | Problems are captured through observation, questionnaires, interviews, and documentation. Teachers and students complained about the quality of service learning facilities and infrastructure practices that are less satisfactory. |
| 2. | Problem Investigation | There is a gap between the skills needed / expected (skill needed) and the existing skills (actual skill). |
| 3.  | Develop needs analysis | The analysis carried out are: (1) analysis of organizational needs, (2) analysis of the needs of positions in competency expertise, and (3) analysis of individual needs |
| 4. | Selection of analysis techniques | Data collected by questionnaire and interview with stakeholders related to facilities and infrastructure. The analysis technique used is training needs assessment, which is identifying the needs most needed by descriptive-quantitative analysis. |
| 5.  | Data analysis | Data is processed with the help of computer programs in the form of Microsoft word and Microsoft excel. |
| 6.  | Formulate conclusions | Conclude from the results of data collection and analysis by comparing it with literature studies. |
| 7 | Formulate a suggestion | Discussion and interview with the head of the workshop, head of expertise competencies, deputy school principal in facilities and infrastructure |

The instrument used must meet the validity and reliability requirements. Measuring instruments developed with authentic approach [14]. The data analysis of this study used quantitative and qualitative descriptive statistics with percentages to provide a description of the variables obtained in this study.

Questionnaires and interviews were distributed to principal, vice principal, and the head of expertise competence to describe organizational goals and problems regarding the management of facilities and infrastructure. Questionnaires and interviews were distributed to head of the workshop, and technician/toolman to prove the their performance about management of facilities and infrastructure. Variables of questionnaire were about: (1) organization, task, and individual performance. The instrument to interview is about: (1) kualification required, (2) problems, and (3) competence needed in management of facilities and infrastructure in Automotive Engineering Department.

1. **Result and Discussion**

This research took place at The Automotive Engineering Department at Muhammadiyah Gamping Vocational School on March 2020. At the time the research was underway the National Examination was being carried out so a special approach was needed to obtain data on problems that occurred related to the management of facilities and infrastructure for learning practices in the automotive engineering department at SMK Muhammadiyah Gamping. The approach taken is in the form of observation, and interviews with students, and teachers to capture the problems of learning facilities and infrastructure services.

*3.1 Organization Analysis*

This research is a Training Needs Analysis. In conducting training need analysis through the training needs assessment approach, it is necessary to understand the vision and mission of the institution. The vision of Muhammadiyah Gamping Vocational School is Islamic, superior, and competitive. Furthermore, in order to realize this vision, the mission of Muhammadiyah Gamping Vocational School, namely: (1) Practicing and acculturating religious values as a joint / basis in the educational process; (2) Increasing the participation of stakeholders (educators, education personnel, students, community, government and industry) in the development of schools, (3) Increasing the professionalism of human resources (educators and education personnel), (4) Increasing and optimizing the use of resources school facilities and infrastructure, (5) Improving the quality of continuous learning based iScience and technology, (6) Improving the quality of organizational services based on standards, (7) Management of transparent and accountable financial resourcesel, (8) Creating networks and cooperation with industries / companies that use graduates, (9) Creating effective and efficient school information media.

Furthermore, the vision and mission of the department / expertise program and expertise competency also need to be identified. The results of the questionnaire and interview show that the vision of competency in automotive light vehicle engineering expertise and motorcycle engineering and business has a high target of picking an Islamic workforce in terms of morals, excellence in technical competence, and competitiveness, meaning that they are ready to work and can compete in the national arena and international. This vision can be realized if the school community, including the managers of teaching learning facilities and infrastructure, have the qualifications as expected and communicate with each other and humanize each other. Gap / competency gap at the organizational level that occurs is the qualifications of the management of facilities and infrastructure with the needs not in accordance with regulations. The problem of demands from employees including the management of learning facilities and infrastructure in the form of salary increases and friction between work can be overcome through a family approach and mutual understanding.

*3.2 Taks Analysis*

The steps taken after the organization's goals are known are knowing the educational qualifications and minimum competency qualifications in a position needed to carry out the functions of managing learning facilities and infrastructure of practice in Muhammadiyah Gamping Vocational School. The position that is directly related to the facilities and infrastructure of practical learning in the Gamping Muhammadiyah Vocational School is the Head of Workshop and Technician/Toolman. The following are the qualifications and competencies expected for the position of the workshop head and technician / toolman based on the results of the interview with the Head of Expertise Competency.

**Tabel** **2**. Educational and Technical Qualifications for Managing Facilities and Practices in the Automotive Engineering Department

|  |  |  |
| --- | --- | --- |
| **No.** | **Head of the workshop** | **Technician / Toolman** |
| 1. | Minimum D3 Automotive Education | Minimum D3 Automotive Education |
| 2. | Have a relevant certificate | Have a relevant certificate |
| 3. | High dedication to the workshop | High dedication to the workshop |
| 4. | Handy and thorough | Handy and thorough |
| 5. | Neat | Neat |
| 6. | Good at administration | Good at administration |
| 7 | Have integrity | Have integrity |

Based on the results of interviews with the Chairman of the Competency Expertise showed that the gaps that occur are (1) the manager does not yet have the relevant certificate of expertise, (2) lack of motivation to work, (3) lack of ownership, (4) tools and practice materials are falling apart, and (5) bad habits are buying a device but not yet being able to maintain it. This happens due to lack of integrity and dual position factors. This shows the lack of professionalism and the need for training related to things that are not in accordance with the expectations and vision, mission, competence, expertise and vision and mission of the school. Because if training or coaching is not immediately carried out then the conditions will stagnate and even if the longer it is left will have a detrimental effect on the time, cost, and quality of the results of Muhammadiyah Gamping Vocational School graduates.

*3.3 Individual Analysis*

Individual analysis is a way of knowing individual needs specifically about the planned training material. Data collection techniques in the form of a checklist questionnaire filled out by the head of the workshop and technician / toolman. The competency standard grid is as follows.

**Tabel** **3**. List of Competency Standards

| **No.** | **Head of the workshop** |
| --- | --- |
| 1 | Planning a workshop usage list |
| 2 | Arrange the rules for the use of workshops |
| 3 | Inventory workshop facilities and equipment for practice |
| 4 | Make a workshop layout for practice |
| 5 | Arranging workshop facilities |
| 6 | Plan and carry out regular maintenance of practice equipment |
| 7 | Check and record the procurement of equipment and practice materials |
| 8 | Coordinate the list of tools / practice materials from the teachers of the field of study |
| 9 | Helping practical teachers prepare for the use of equipment and practice materials |
| 10 | Ensuring that the tools / practice materials are well available in PBM activities |
| 11 | Noting borrowers / use of practical equipment |
| 12 | Supervise the operation of equipment and use of materials |
| 13 | Perform maintenance and repair tools that are damaged according to the procedure (damage analysis, repair orders and make repairs) |
| 14 | Prepare competency test tools / materials |
| 15 | Doing SOP for the use of equipment in practical activities |
| 16 | Supervise cleanliness, occupational health and safety (K3) and anticipate disasters on the use of equipment and materials |
| 17 | Preparing tools / materials for training activities internship and other training |
| 18 | Maintain cleanliness of the practice room, instructor room and bathroom / WC in the workshop |
| 19 | Administer workshop management and activities |
| 20 | Make a workshop activity report to the Head of Workshop and or Head of Expertise Program |

The level of competency mastery in each of the competency standards for the management of facilities and infrastructure for learning practices in the automotive engineering department at Muhammadiyah Gamping Vocational School can be determined after filling out the questionnaire. Based on the results of filling out the questionnaire, the summary can be seen in the graph below.

**Figure 1.** Graph of Competency Level of Competence in Management of Facilities and Practices of Automotive Engineering Department

The graph above shows the level of mastery of competence in managing facilities and infrastructure for learning the practice of automotive majors at Muhammadiyah Gamping Vocational School. Graph of mastery level of material is inversely proportional to the need for training / training / training. The lower score on the graph shows the level of training / training / training needs on these competencies to achieve the maximum performance target of 100%.

The dimension of human resources is divided into two namely the organizational dimension and the public service dimension. The training needs for facility and infrastructure managers in terms of organizational dimensions and public service dimensions can be mapped after filling out the training needs analysis checklist [18]. The recapitulation of the training needs analysis checklist questionnaire is as follows.

**Tabel** **4**. Competency Training Need Analysis

|  |  |  |
| --- | --- | --- |
| **No** | **Dimensions of Organization** | **Dimensions of Public Services** |
| 1 | Describe and plan the vision and mission | Motivating |
| 2 | Understanding policy | Developing employees |
| 3 | Interdeparmental relations | Communication |
| 4 | Train subordinates | Leadership |
| 5 | Initiative | Planning / organizing |
| 6 | Involvement in Management | Human relations |
| 7 | Technical competence | Performance |
| 8 | Human Relations Skill | Diciplining |
| 9 | Safety and Houskeeping | Decision making |
| 10 | Communication | Handling complains and grievances |
| 11 | Willingness to accept responsibility | Management method |
| 12 | Integrity, trustworthiness, and honesty | Written report |
| 13 | Department of administration | Counseling |
| 14 |  | Functioning in the organization |
| 15 |  | Time management |
| 16 |  | Delegation |
| 17 |  | Affirmative actions |
| 18 |  | Safety |
| 19 |  | Termination procedure |
| 20 |  | Inverviewing |

After taking the data through a questionnaire, the results of the Training Need Analysis Diagram show the management of facilities and infrastructure for the learning practice of the Automotive Department at Muhammadiyah Gamping Vocational School as follows.

**Figure 2.** Graphic Training Need Analysis Management of Facilities and Infrastructure of Leaning Practices of Automotive Engineering Deparments

Training Need Assessment can show what training must be based on the level of urgency / needs of the agency. Based on the analysis results of the two diagrams above, the three most needed training competencies are training on: (1) making a workshop activity report, (2) managing the workshop arrangement, and administering the workshop activities. The three training materials most needed to improve public organization and service are: (1) technical competence, (2) discipline, (3) time management, and (4) safety. The training for Management of Facilities Infrastructure Learning Automotive Engineering were needed and effective in tune with katarina Johan said that industrial training programs can make students gain new competencies because they will experience the life as an employees [8].

The reason why training / training needs to be done immediately is the need for expertise competence to achieve the vision and mission of expertise and school competence and has never been done in training that supports the management of facilities and infrastructure for automotive majors. Ahmad Esa said that training can improve skills. Furthermore, training can develop soft skills and hard skills [1].

The training should be done at the internal workshop (Automotive Department at Muhammadiyah Gamping Vocational School Workshop), at the University Automotive Workshop, or on BLPT to develope skills and performance [9]. Then, instructor should be an expert in infrastructure management who has experience as a toolman and/or workshop head and has educational qualifications and competency qualifications for the workshop facility and infrastructure manager or Head of Expertise Competency, Interview Results [20]. Training costs are taken from the School Budget Plan in the field of human resource development, curriculum, or facilities and infrastructure of each personnel.

The effect that occurs if the training is carried out well then the performance of facilities and infrastructure services will increase, if the service increases, the quality of learning increases, if the quality of learning increases the quality of graduates also increases, if the quality of the results of graduates increases, the absorption of graduates in the world of work will be high [20]. The quality of schools is also likely to improve in accordance with the expectations and vision and mission of the school.

Supporting factors for training / training include: (1) adequate practice equipment facilities with industry standards, (2) a large enough workshop area, and (3) strong commitment from the leadership to realize the school's vision. The competence of the management of facilities and infrastructure of practical learning that can be learned on their own is about: (1) inventory of equipment facilities, (2) supervising hygiene, occupational safety and health (K3) and anticipating disasters on the use of equipment and materials, (3) Conducting workshop facility arrangement , and (4) Noting the borrowers / use of practical equipment

With the Training Need Analysis through the Training Need Assessment approach it is expected to be able to provide schools with real conditions in the implementation of facilities and infrastructure management learning practices for automotive engineering majors in Muhammadiyah Gamping Vocational School so that leaders are able to make quick and appropriate decisions to overcome the problems that occur and support the realization of the institution's vision and mission, namely Islamic, superior, and competitive.

1. **Conclusion**

Based on the results of data analysis and discussion, it can be concluded that: 1) The problems that occur in the management of facilities and infrastructure practices majoring in automotive engineering at the Muhammadiyah Gamping Vocational School include: (a) lack of work motivation, (b) facilities and infrastructure are not well organized, (c) lack of ownership, (d) low work discipline, and (d) low technical competence; 2) The causes of problems that occur include: (a) educational qualifications that are not appropriate, (b) do not have relevant expertise certificates, (c) there is no education and training that is in line with expectations; 3) An alternative solution is training / training of facilities and infrastructure managers in the automotive department at the Muhammadiyah Gamping Vocational School with competencies: (a) technical competence, (b) communication, and (c) workshop management.

1. **Refrences**

|  |  |
| --- | --- |
| [1] | Abdul Musid, N., Mohd Affandi, H., Hussain, S. H., Mustaffa Kamal, M. F., & Abas, & N. H. (2019). The Development of on Job Training Assessment Constructs and Elements for Construction Technology Students in Malaysian Vocational College. Journal of Technical Education and Training, 11 (1). Retrieved from <https://publisher.uthm.edu.my/ojs/index.php/JTET/article/view/3177> |
| [2] | Allison Rossett. (1987). Training Needs Assessment. New Yersey: Educational Technology Publications Englewood Cliffs |
| [3] | Erni Susiyawati (2013). Need Assessment. Accessed from<https://ernisusiyawati.wordpress.com/2013/05/21/need-assessment/> On March 16, 2020. |
| [4] | Esa, A., Abd. Aziz, Z. @ A., Mohd Salleh, B., & Mohamad, & N. H. (2017). Integrating Vocational Training in Culinary Arts and Islamic Studies at Juvenile Rehabilitation Centres: Malaysian Experience. Journal of Technical Education and Training, 9(1). Retrieved from <https://publisher.uthm.edu.my/ojs/index.php/JTET/article/view/1439> |
| [5] | Fenwick W.; Kaufman, Roger A. (1999). Needs Assessment: A Focus for Curriculum Development: Association for Supervision and Curriculum Development, Washington, D.C. |
| [6] | JW Creswell. (2009). Research Design. Qualitative, Quantitative, and Mixed Methods Approaches (3st edition) ‖, SAGE Publications, California |
|  | Barbazette, J. (2006). Training Needs Assessment: Methods, Tools, and Techniques Skilled Trainer: John Wiley & Sons |
| [7] | Kartina Johan and Faiz Mohd Turan 2016 IOP Conf. Ser.: Mater. Sci. Eng. 160 012075 <https://iopscience.iop.org/article/10.1088/1757-899X/160/1/012075/pdf> |
| [8] | Kumar, A., Kumar Singh, S., & Kumar, & G. (2017). Effectiveness of In-House Training on Technical Employees in Biotech Industry. Journal of Technical Education and Training, 9 (1). Retrieved from <https://publisher.uthm.edu.my/ojs/index.php/JTET/article/view/1452> |
| [9] | Mangkunegara, Anwar Prabu. (2003). HR Planning and Development. PT. Refika Aditama. Bandung. |
| [10] | Ministry of National Education. (2003). Republic of Indonesia Law No.20 of 2003 concerning the National Education System. |
| [11] | Moch. Bruri Triyono, Thomas Köhler, Lilis Trianingsih. (2018). Technical working skills of vocational high school students at the interface between digital workplaces and schools. An empirical study of construction engineering drawings in Indonesia. |
| [12] | Mochammad Bruri Triyono, GHS (2020). The Competencies of Automotive Engineering Pre-Service Teachers. International Journal of Advanced Science and Technology, 29 (1), 790 - 800. Retrieved from http://sersc.org/journals/index.php/IJAST/article/view/3549 |
| [13] | N R Rusalam et al 2020 IOP Conf. Ser.: Mater. Sci. Eng. 830 042066 <https://iopscience.iop.org/article/10.1088/1757-899X/830/4/042066/pdf> |
| [14] | P. Sudira. (2018). XXI Century Vocational Learning Methodology: Innovation, Theory, and Praxis. Yogyakarta: UNY Press. |
| [15] | Ranu Iskandar, Zainal Arifin, Putu Sudira. (2020). Problems of Automotive Vocational Teaching-Learning Process for Students with Mild Intellectual Disability (MID). International Journal of Advanced Science and Technology, 29 (7s), 417 - 424. Retrieved from http://sersc.org/journals/index.php/IJAST/article/view/9456 |
| [16] | Sidi Hastowo. (2016). Management of Practice Facilities for the Study Program in Vocational Automatic Engineering Taman Karya Intermediate Mining in Kebumen. Yogyakarta State University |
| [17] | Suharto. (2020). Development of Competency Based Training. Postgraduate. Yogyakarta State University |
| [18] | Sylte, A. L. (2020). Predicting the Future Competence Needs in Working Life: Didactical Implications for VET. International Journal for Research in Vocational Education and Training, 7(2), 167–192. <https://doi.org/10.13152/IJRVET.7.2.3> |
| [19] | Tapani, A., & Salonen, A. O. (2019). Identifying teachers’ competencies in Finnish vocational education. International Journal for Research in Vocational Education and Training, 6(3), 243-260. <https://doi.org/10.13152/IJRVET.6.3.3> |
| [20] | Wagiran, Pardjono, Herminarto Sofyan. (2020). What Industry Needs of Vocational School Graduate Competence in the Era of Industrial Revolution 4.0. International Journal of Advanced Science and Technology, 29 (05), 2459 - 2470. Retrieved from http://sersc.org/journals/index.php/IJAST/article/view/11137 |
| [21] | Wardiman Djojonegoro. (1998). Human Resource Development: Through Vocational High Schools (SMK). Jakarta: PT. Jayakarta Agung. |