

DEVELOPMENT OF THE AUTOMOTIVE TECHNOLOGY VOCATIONAL EDUCATION CURRICULUM BASED ON CURRENT NEEDS OF THE AUTOMOTIVE INDUSTRY

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Abstract

This research aims to: 1) Analyze the competencies needed by the current automotive industry in the Automotive Industry, 2) Analyze the implications of the automotive industry's needs for the automotive technology vocational education curriculum, and 3) Analyze the supporting and inhibiting factors of the partnership program for the automotive technology vocational education study program. The subjects of this research were 5 practitioners consisting of: Service Manager, Instructor, Service Advisor, and Mechanic from the Business and Industrial World (DUDI) in the automotive sector in the Special Region of Yogyakarta. This research is a qualitative descriptive study. Data collection techniques in this research used observation, documentation and interview methods. The research instrument was validated through expert judgment. The data analysis technique uses qualitative descriptive analysis with the triangulation method to obtain data validity. The research results show that: 1) the competencies required by the current automotive industry for undergraduate graduates include technical competency and managerial competency; 2) The need for technical and managerial competency demands that curriculum study materials be adapted to industry needs; 3) Supporting factors for the partnership program include: complete industrial facilities and infrastructure and adequate human resources (HR). The inhibiting factors for the partnership program are: the absence of an MoU between agencies and difficulties in preparing schedules.

Key Words: *analysis, competency, industry, automotive*

Abstrak

Penelitian ini bertujuan untuk: 1) Menganalisis kompetensi yang dibutuhkan industri otomotif terkini di Industri Otomotif, 2) Menganalisis implikasi kebutuhan industri otomotif terhadap kurikulum pendidikan vokasional teknologi otomotif, dan 3) Menganalisis faktor pendukung dan penghambat program kemitraan program studi pendidikan vokasional teknologi otomotif. Subjek penelitian ini yaitu 5 praktisi yang terdiri dari: Service Manager, Instruktur, Service Advisor, dan Mekanik dari Dunia Usaha dan Dunia Industri (DUDI) bidang otomotif di Daerah Istimewa Yogyakarta. Penelitian ini merupakan penelitian deskriptif kualitatif. Teknik pengambilan data dalam penelitian ini menggunakan metode observasi, dokumentasi dan wawancara. Instrumen penelitian divalidasi melalui expert judgement. Teknik analisis data menggunakan analisis deskriptif kualitatif dengan metode triangulasi untuk mendapatkan validitas data. Hasil penelitian menunjukkan bahwa: 1) kompetensi yang dibutuhkan industri otomotif terkini untuk lulusan S1/ sederajat diantaranya yaitu kompetensi teknis dan kompetensi manajerial; 2) Kebutuhan kompetensi teknis dan manajerial menuntut agar bahan kajian kurikulum disesuaikan dengan kebutuhan di industri; 3) Faktor pendukung program kemitraan diantaranya: sarana dan prasarana industri yang lengkap dan Sumber Daya Manusia (SDM) yang memadai. Faktor penghambat program kemitraan yaitu: belum adanya MoU antar instansi dan kesulitan dalam penyusunan jadwal.

Kata Kunci: *analisis, kompetensi, industri, otomotif*

INTRODUCTION

Vocational education in the field of automotive technology has a strategic role in preparing prospective workers to meet the needs of the growing automotive industry (Crouch, GI, & Mazanov, J., 2017). Vocational education in higher education have various digital technology challenges (Kennedy, 2020). The automotive industry is a very dynamic sector and continues to experience significant changes in response to technological developments, environmental needs and consumer trends (European Center for the Development of Vocational Training, 2018). The automotive technology vocational education curriculum must be able to adapt to the development of digital technology competency needs in the industry in order to produce graduates who are ready to work (al-Fikri, 2021). This speed of development creates a gap between the skills taught in vocational education institutions and the real demands of the automotive industry. Some of the main challenges faced by vocational education in the field of automotive technology involve a lack of in-depth understanding of the current needs of the automotive industry (Miao, W., Badir, YF, & Jahankhani, H., 2019). *The link and match* between the vocational education curriculum and industry needs needs to be synchronized (Kurniawan et al., 2021). A mismatch between the educational curriculum and the latest developments in the automotive industry can hinder graduates' readiness to face the ever-changing work environment. Evaluation of vocational education also needs to adapt to industries needs (R. A. P. ; Hardiyanta & Wagiran, 2023).

This research will discuss and analyze the current needs of the automotive industry and identify the implications for the development of vocational education curricula in the field of automotive technology. With a better understanding of industry needs, it is hoped that educational curricula can be adjusted to create graduates who have skills and knowledge that are relevant to job market demands (World Economic Forum, 2023). If we look at the background of the problem described, the problem we will examine is whether the competencies required by the automotive industry in the automotive technology vocational education study program are good and can achieve the goals or not. The implications of industry needs for the automotive technology vocational education curriculum are also discussed in this research. Apart from that, the driving and inhibiting factors in implementing the curriculum so far also need to be analyzed. The objectives of this research are: 1) Analyzing the competencies needed by the automotive industry in the Automotive Technology Vocational Education Study Program, 2) Analyzing the implications of the automotive industry's needs for the Automotive Technology Vocational Education Study Program curriculum, and 3) Analyzing the supporting and inhibiting factors for partnership programs in the Study Program Automotive Technology Vocational Education.

The urgency of this research is very important because the success indicators of the automotive technology vocational education study program curriculum are largely determined by the success in implementing partnership programs with industry. If the implementation is carried out well and correctly, the objectives will be achieved, including: 1) Increasing graduate competency, 2) Strengthening graduate entrepreneurship, 3) Production of value-added goods or products such as services, 4) Increasing sources of industrial income, and 4) Increased collaboration with related industries or business entities.

METHOD

This research uses a qualitative approach. The results of data collection are presented in narrative form. Qualitative research is used to describe phenomena completely and in detail about the social reality that occurs. Data collection methods use interview guidelines, observation and documentation. The subjects of this research were the workshop head, service advisor, part man and technician. The research design is a case study that occurred in a company, namely the automotive industry. Test the validity of the data using source triangulation. The techniques used in data analysis are: 1) reducing data, 2) presenting data in the form of short descriptions, 3) drawing up conclusions and verification. Conclusions can change according to the evidence found to answer the problem formulation. The following is a flow diagram of this research.

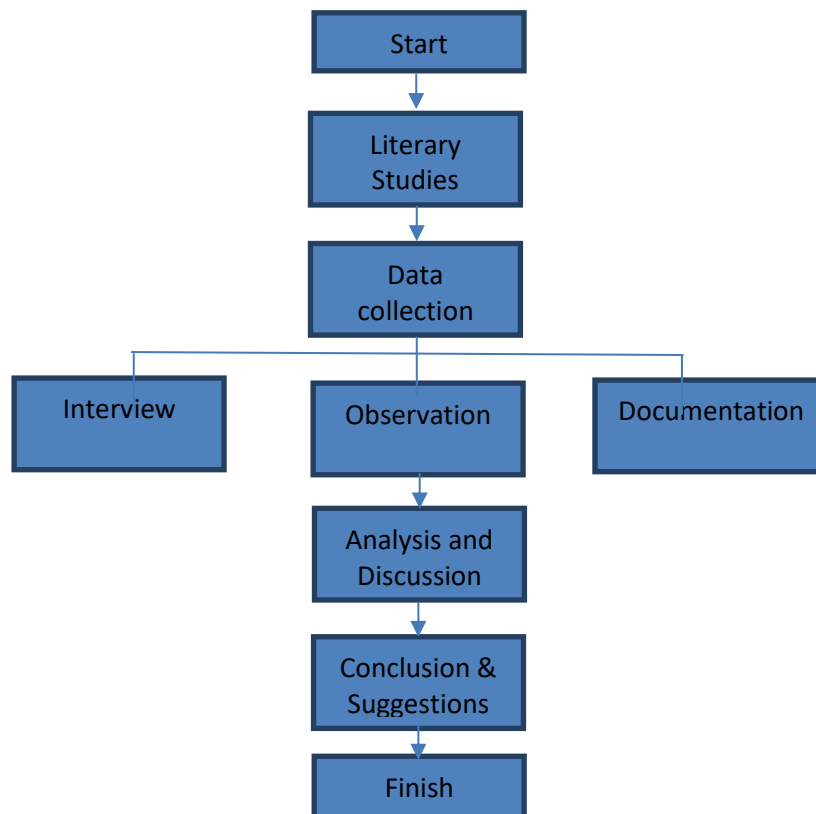


Figure 1. Research Flow Diagram

RESULTS AND DISCUSSION

The data obtained was both primary data collection and secondary data. Primary data was obtained through an interview process with informants consisting of workshop heads/after sales managers, instructors and service advisors spread across PT. Borobudur Oto Mobil (Mitsubishi), PT. Sumber Baru Citra Mobil (Hyundai), PT. Nasmoco Jogja (Toyota Nasmoco Janti), and PT. Yamaha Global Sumber (Yamaha Giwangan). Secondary data is a data source through photo documentation, relevant archives, maps and notes as well as collected literature that can be used to carry out analysis of research subjects and objects. This section discusses the results of: 1) analysis of competency needs, 2) Implications of competency needs for the curriculum, and 3) factors driving and inhibiting the partnership program with automotive technology vocational education of Ahmad Dahlan University (UAD).

1. Need Competence Industry Automotive

The following is an analysis of the current industrial needs of 4 automotive industries.

Table 1. Current needs of the automotive industry

No	Component	PT. Borobudur Oto Mobil (Mitsubishi)	PT. Sumber Baru Citra Mobil (Hyundai)	PT. Nasmoco Jogja (Toyota Nasmoco Janti)	PT. Yamaha Global Sumber (Yamaha Giwangan)
1	Human Resources Profile	Quality and Competent	Excellent Service in Sales, Service, and Spare Parts	Innovative in selling products and creative in creating digital content	Attract and retain customers
2	Requirements for occupying the position	a. graduate , b. Operating a computer c. Cooperate in team d. Used to with targets e. Able to work under pressure f. Own Power high fighting g. Experienced	a. Fulfil Qualification by Hyundai b. Own certificate by Hyundai	a. Head workshop : S1 b. Instructor : S1 Automotive c. Service Advisor: D3 Automotive	a. SA: tiered from Technician with minimum vocational school graduate b. Part Counter & Part Service: D3/S1
3	Knowledge	a. Technique b. Leadership c. Service	a. Technical b. Managerial	a. Basics component automotive b. Sell product	a. Machine service skills b. Basic service skills c. Management Workshop d. Stock Calculation
4	Skills	a. Head workshop : Must get it coordinate technician and control	Technical a. Repair vehicle b. Communication	a. Ability product b. Make Digital Content	a. Operate computer (Excel and Power Point) b. Presentation

		circumstances workshop	Managerial:	c. Using Microsoft Office	c. Administration spare parts
		b. Service Advisor: Must be able to serve customer with Good	a. Use computer		d. Acceptance of service
		c. Part man: You have to get it control and fulfill need spare parts	b. Ability management		
		d. Technician : must can operate order Work with thorough	c. Management workshop		
			d. Pollution workshop		
			e. Warranty management		
			f. Communicati on		
5	Attitude	a. Honest	a. Polite	a. Serve consumer with Good	a. Always try For think bring or take care of customers
		b. Discipline	b. Polite		
		c. Responsibility	c. How to deal with customers		
		d. Nimble	d. Control emotion		
6	Future competencies	a. Can solve problem	a. Competent through technical training	a. Innovative in sell product	a. Technical basics
		b. Think critical	b. Managerial training	b. Expert in make digital content	b. Management
		c. Creative	c. Certified by Hyundai		c. Ability attract new customers and retain customers.
		d. Communication			
		e. Teamwork			
		f. Oriented For serve			

(Source: Researcher: 2024 processed from documentation and interviews)

Researchers have carried out a comparative analysis of the needs of 4 automotive industries regarding curriculum development for automotive technology vocational education study programs. Development of the automotive industry at PT. Borobudur Oto Mobil (Mitsubishi) is very fast so it requires human resources who are able to face challenges. PT. Borobudur Oto Mobil (Mitsubishi) is opening new branches throughout Indonesia requiring workers who are ready to be placed as managers in the regions. PT. Borobudur Oto Mobil (Mitsubishi) needs 5 workshop heads and 5 new managers to fill prospective dealers being built in the near future. This of course requires Human Resources (HR) who have good technical and managerial skills.

The HR profile required by the automotive industry includes: qualified, competent, *excellent service*, innovative, creative, attractive and able to retain customers. This is the focus of curriculum development in the Automotive Technology Vocational Education Study Program. Requirements for positions vary by industry. Requirements are adjusted to the level of difficulty and maturity in thinking so that some require a minimum education of D3 Engineering or S1. PT. Sumber Baru Citra Mobil (Hyundai) requires that you take training and be certified by Hyundai to occupy a position at Hyundai.

The knowledge required to occupy a position in the automotive industry is divided into two, namely technical and managerial knowledge. Technical knowledge is used to explain technical matters in the automotive field. Managerial knowledge is used to manage matters related to human resource management. Furthermore (Efendi et al., 2023) explained that the knowledge that can be observed and develops in the chassis field is: 1) basic knowledge, 2) working principles, 3) procedures, 4) understanding of construction, and 5) knowledge of vehicle safety and security equipment requirements.

The skills required to occupy a position in the automotive industry are also divided into two, namely: technical and managerial skills according to the position held. The workshop head must be able to coordinate technicians and control the condition of the workshop. *Service advisor* : must be able to serve customers well. *Partman* must be able to control and fulfill spare parts needs. Technicians must be able to carry out work orders carefully. Apart from vehicle service skills for technicians, skills in using computers, managing workshops, pollution, *warranty*, communication, creating digital content, are skills needed in the automotive industry. Meanwhile, he (Suhartanta et al., 2023) added that the skills developed in the chassis sector are diagnosing problems/damage according to repair procedures and maintaining vehicle chassis. According to (Fatah et al., 2023) the essential material in the field of vehicle body repairs, namely: removal, installation and light repairs of body panels, doors, fenders and cover panel repairs.

The attitudes expected by the automotive industry include: honest, disciplined, responsible, agile, polite, courteous, good at dealing with customers, controlling emotions, friendly, and always thinking about bringing in and keeping customers. This is in line with the opinion (R. A. P. Hardiyanta et al., 2021) which explains that the attitude most needed as training material for automotive facility managers is discipline. Apart from that, it (Suhartanta et al., 2023) also states that industrial attitudes that can be integrated into the chassis curriculum are: 1) thoroughness, 2) dexterity, and 3) responsibility. On the other hand, an ability that is no less important in vocational education according to (Mahmudah et al., 2023) is digital entrepreneurship via computer.

2. Implications Need Competence to Curriculum

The following is an analysis of partnership programs that have been carried out by 4 automotive industries.

Table 2. Automotive Industry Partnership Program

No	Partnership Program	PT. Borobudur Oto Mobil (Mitsubishi)	PT. Sumber Baru Citra Mobil (Hyundai)	PT. Nasmoco Jogja (Toyota Nasmoco Janti)	PT. Yamaha Global Sumber (Yamaha Giwangan)
1	Curriculum synchronization	V	Plan	Plan	Plan
2	Industrial Practice	V	V	V	V
3	Teaching practitioners	Plan	V	Plan	Plan
4	Competency Certification	Internal	Internal	Internal	Internal
5	Study	Observation	Observation	Observation	Observation
6	Devotion or Service to the Community	Economical Service	Internal	Nasmoco Goes to Campus	Internal

(Source: Researcher: 2024 processed from documentation and interviews)

The needs of the automotive industry encourage the Automotive Technology Vocational Education Study Program to prepare a curriculum that suits needs with various programs. The UAD Automotive Technology Vocational Education Study Program has established a partnership program with the automotive industry in the form of car and motorbike dealers around the Special Region of Yogyakarta.

Programs that have been carried out together PT. Borobudur Oto Mobil (Mitsubishi) to prepare graduates who suit their needs, including curriculum synchronization, industrial practices, and service to the community in the form of economical services. Students are involved in the cost-effective service process together with partner industries.

Industrial practice is carried out in partner automotive industries, namely: to train students ready to work in accordance with real conditions in the field. Students are faced with real problems that consumers need and are required to provide solutions. Students are required to carry out work given by the industry so that they develop the mentality and attitudes expected by the industry.

The partnership program that has been carried out with PT. Sumber Baru Citra Mobil (Hyundai) to develop the learning experience of students in the automotive technology vocational education study program, namely teaching practitioners by bringing practitioners to the campus environment to teach the latest technology in the form of training in the design and maintenance of electric and hybrid vehicles. This is done to train students to think critically and solve problems they face in accordance with the latest developments. Students can experience direct

learning from industry practitioners who upgrade their knowledge, skill, and attitude (Billet, 2001).

Research can be carried out by involving industry to produce student work in the form of final assignments, industrial practice reports, or theses. Lecturers and students provide services to the community by collaborating with industry through various activities including economical services and *nasmoco goes to campus*. Vocational education institutions, especially Automotive Technology Vocational Education, need to increase collaborate with industries so that the quality of vocational education gets better (Hadi, S., & Rabiman, R., 2014).

3. Encouraging and Inhibiting Factors of Partnership Programs

The following are supporting and inhibiting factors for the automotive industry partnership program with the UAD Automotive Technology Vocational Education Study Program.

Table 3. Table of Analysis of Supporting and Inhibiting Factors for the Automotive Industry Partnership Program

No	Factor	PT. Borobudur Oto Mobil (Mitsubishi)	PT. Sumber Baru Citra Mobil (Hyundai)	PT. Nasmoco Jogja (Toyota Nasmoco Janti)	PT. Yamaha Global Sumber (Yamaha Giwangan)
1	Supporter	Good communication and trust.	Any form of profitable cooperation is permitted within the boundaries of the company	Open opportunities for partnership programs.	Open opportunities for partnership programs
2	Inhibitor	Facilities and infrastructure for the “our workshop” business unit are being pioneered	There are no standards or agreements for the costs incurred as a result of the partnership program	There is no agreement on the schedule for program implementation activities	There is no agreement on the human resources implementing program activities

(Source: Researcher: 2024 processed from documentation and interviews)

Supporting factors for partnership programs including : 1) good communication and trust . Obstacle factor partnership namely : 1) not yet all industry have an MoU with the university, 2) facilities and infrastructure institution lack of education , 3) difficulties in determination time implementation cooperation , as well as 4) costs For carry out partnership programs .

CONCLUSION

Based on the results of the discussion , it can be seen that : 1) required competencies industry automotive latest For S1 graduates include that is competence technical and competency managerial ; 2) Need competence technical and managerial demand that the material study curriculum customized with needs in industry ; 3) Supporting factors for the partnership program including : facilities and infrastructure complete industry and adequate Human Resources (HR). Factors inhibiting partnership programs namely : not yet there is an MoU between agencies and difficulties in preparation timetable .

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