



Development of a Roadmap for Research and Community Service

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Abstract. The preparation of a roadmap for research and community service is carried out to map research studies and community service activities based on the competence of lecturers and science. The roadmap for research and community service can be a guideline for the implementation, evaluation and development of research and community service based on the competence of lecturers and students as researchers. The research approach to be used is the ADDIE development model. ADDIE is an acronym for Analyze, Design, Develop, Implement and Evaluate. ADDIE is a product development concept. This concept is applied to carry out performance-based learning. The philosophy underlying this concept is learner-centered learning, innovation, authenticity, and inspiration. The preparation of a roadmap for research and community service of the applied undergraduate study program (D4) of the State Administration Vocational Program, Surabaya State University, is expected to be a clear guide for the academic community in planning and implementing Research and Community Service activities with better and measurable results. The roadmap that has been arranged is also expected to be something that can synchronize related activities in its implementation.

Keywords: Roadmap · Research · Community Service

1 Introduction

Research is one of the pillars of the tridharma of higher education activities that must be carried out by all universities without exception. The research and community service roadmap is the implementation of the university's research master plan, which contains the research umbrellas that are its flagship. Improving quality, relevance and competitiveness through education and learning, research and development of science, and community service is the goal and goal of all higher education. State Administration Vocational Program State University of Surabaya is one of the study programs that organizes a quality Tridharma of Higher Education to educate the nation's life. In the general provisions of Law No. 14 of 2005 concerning Teachers and Lecturers, it is stated that lecturers are professional educators and scientists with the main task of transforming, developing and disseminating science, technology, and art through educators, research and community service.

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The preparation of a roadmap for research and community service is carried out to map research studies and community service activities based on the competence of lecturers and science. The roadmap for research and community service can be a guideline for the implementation, evaluation and development of research and community service based on the competence of lecturers and students as researchers. The road map of research and community service is also a benchmark for leaders at the study program level of faculty and university departments. The ultimate goal of preparing this research and community service road-map is to improve the quality and quantity of research and community service.

Regulation of the Minister of Research and Technology Number 44 of 2015 concerning National Standards for Higher Education regulates research standards, which, among others, states that Article 47 paragraph 4 concerning the depth and breadth of applied research materials must be oriented towards research outputs in the form of innovation and development of science and technology that are beneficial to society, the business world, and/or industry. Furthermore, paragraph 5 mentions "Material on basic research and applied research includes special study materials for the national interest. As well as paragraph 6 which mentions "Material on basic research and applied research must contain the principles of expediency, updating, and anticipating future needs.

The very rapid development of technology, especially in the field of Information Technology, has pushed Indonesian industry into the Industrial 4.0 era. The characteristics of this Industrial Revolution are centered in several things, namely the Internet of Things (IoT), Cloud Computing, Big Data, and Artificial Intelligence or artificial intelligence. These characteristics made great changes in the world of work and industry, especially in terms of the absorption of human resources.

With changes in the form of digitalization in the industrial world, the world of work will also be directly affected by major changes. The visible change is the loss of skills that were once needed in the industrial world, because the job position has been replaced by machinery or is no longer used in the industrial sector. Along with this, there will be new job positions that also require special skills, maybe even the emergence of a job position that currently does not exist [1].

This change is one of the challenges for vocational programs, which have a focus on preparing graduates to be able to compete in the era of rapidly changing jobs. In fact, it is possible that what vocational students are studying today, will become irrelevant again when they have completed their studies [2]. Therefore, students are required not only to be competent, but also to be able to transform the knowledge gained in lectures into the knowledge needed in a new job position.

To respond to these challenges, the Ministry of Research, Technology and Higher Education urges every university to refer to the RIRN to improve the quality of its graduates through improving the quality of quality research, and outputs that are tough and beneficial for improving the welfare of the community at large. Surabaya State University as part of the Ministry of Research and Technology has compiled a clear and directed research roadmap as outlined in the Research Master Plan (RIP), which states one of the university's visions, namely, to become a world-class research university.

To support the Vision of Surabaya State University, the UNESA Vocational Program, especially the State Administration study program, seeks to compile a directed and

measurable research and PKM roadmap, where these topics are adjusted in such a way that they can support the graduation profile of D4 State Administration students, where the direction of vocational is to produce graduates who are ready to work [3].

Dotted with what has been explained above, the formulation of the problems proposed in this study is related to the development of the Research Roadmap and PKM of the Applied Undergraduate Study Program (D4) of the State Administration Vocational Program, Surabaya State University. The formulation of the problem is as follows: How is the development of the research roadmap and PKM of the Applied Undergraduate Study Program of State Administration, vocational program of Surabaya State University?

2 Literature Review

Efforts to encourage the promotion of science and technology and increase the contribution of research to the economy by the government have been carried out by issuing a number of regulations and policies. However, from the results of the evaluation of the 2005–2025 White Paper on Research, Development and Application of Science and Technology, the National Strategic Policy for Science and Technology (Jakstranas Iptek), and the National Research Agenda (ARN) shows that these various policies have not fully become a reference. Therefore, a sectoral master plan that is more structured and has higher legal strength is needed in the form of a National Research Master Plan (RIRN). RIRN has a time range of 2017–2045 [4]. RIRN is prepared to create planning synergies in the research sector that are in line with national development planning. RIRN not only integrates research with long-term development goals, but also to meet the needs of the business world and society.

For this reason, the 2017–2045 RIRN was prepared by considering planning in the industrial sector (RIPIN: National Industrial Master Plan 2015–2035), KEN (National Energy Policy) and the creative economy sector (RIEKN: National Creative Economy Master Plan). This is based on science and technology-based research which is expected to lead to industry for technology-based manufacturing, as well as on the other hand the creative economy for creative products based on science and technology innovation [5]. The development of human civilization, especially since the existence of historical records around the last six millennia, has taught that one of the important factors for improving social welfare is the ability to increase the production capacity of aggregate goods/services.

Meanwhile, the ability to increase aggregate production capacity is determined by the degree of addition of production factors and efficiency improvements. One of the things that is needed for the addition of production factors and efficiency improvements is technology. Therefore, the ability to improve the welfare of mankind is largely determined by the level of technological progress and its management ability. Technological progress is largely determined by the speed of accumulation of science. Meanwhile, the speed of accumulation of science is largely determined by socio-cultural factors, namely the system of values, fighting power and noble moral values. The accumulation of science begins with research.

The main purpose of the research is to find novelty (invention). The novelty of the results of research activities is evidenced by outputs that have been verified by the community in the form of IPR, especially scientific publications and patents/PVT/registered

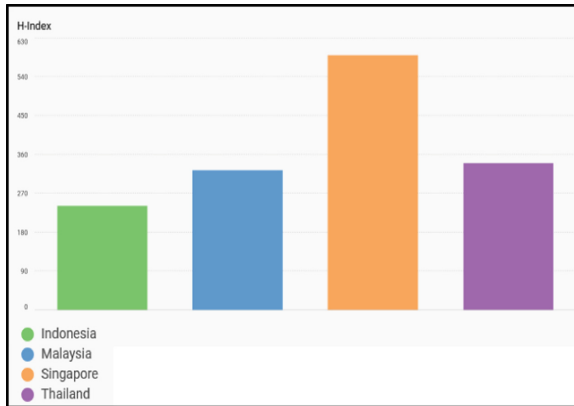


Fig. 1. The H-Index of Indonesian Publications is compared with several ASEAN countries (source: SCImago, 2021).

copyrights. Claims to a novelty must be recognized and recognized globally. For this reason, since the era of modern science and technology, publications in globally indexed journals have become one of the main indicators. On the contrary, novelty that is applicable and physically and non-physically tangible is evidenced by patent certificates, PVP and copyrights/registered, both at home and abroad. Therefore, the position and contribution of Indonesian research can be measured from globally indexed scientific publications and registered patents. National research outputs in the form of globally indexed publications produced and the number of registered patents is available in various global indexing systems.

Based on SCImago data in the period 1996–2014, the number of publications indexed globally in Indonesia reached 32,355 publications. From this data, Indonesia is still ranked below Malaysia, Singapore and Thailand and is ranked 57th in the world, and ranked 4th in the ASEAN region (Fig. 1). The growth of Indonesia's global indexed publications continues to increase but is still far from the other four ASEAN countries. This shows that Indonesia's research contribution is still far behind neighbouring countries.

Based on research areas (Fig. 2), since 1996 it has been dominated by the field of engineering as many as 7,261 publications. According to SCImago, the scientific fields in Indonesia that have a major contribution are the fields of engineering, agriculture and biology, medicine, computer science, environment, physics and astronomy, biochemistry, genetics and molecular biology, social sciences, earth and planetary sciences, and chemistry.

Universities are obliged to organize education, research, and community service as mandated in Law Number 20 of 2003 concerning National Education Article 20. Research in universities is directed at developing science and technology, as well as improving community welfare and national competitiveness as explained in Law Number 12 of 2012 concerning Higher Education Articles 45 and 46. The research as referred to is carried out by the academic community and is carried out based on competency and competition pathways. Research results must be disseminated by dissemination,

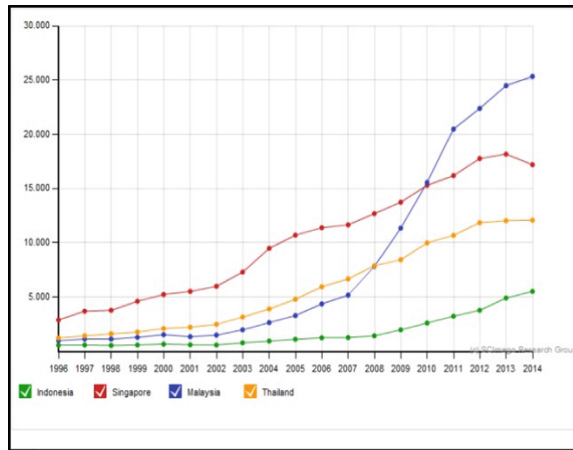


Fig. 2. Indonesia's International Publications compared to ASEAN Countries. (source: SCImago 2016).

publication, and/or patent. The results of research at the college level are expected to be useful for:

- 1) Enrichment of science and technology and learning;
- 2) Improving the quality of higher education and the progress of the nation's civilization;
- 3) Increased independence, progress, and competitiveness of the nation;
- 4) Fulfilment of strategic needs of national development; and
- 5) The change of Indonesian society into a knowledge-based society.

In Law Number 11 of 2019 concerning the National System of Science and Technology, it has been emphasized that universities are in charge of organizing science and technology through education and carrying out their functions of preparing human resources for the implementation of science and technology, and are responsible for improving the ability of the tridharma of higher education [6]. Universities also have a strategic role in strengthening the position of science and technology as short-term, medium-term, and long-term investment capital for national development.

One of the goals of the National System of Science and Technology is to increase the nation's independence and competitiveness which means that universities supported by R & D institutions (LPNK, LPK, and Business Entities) and skilled higher education personnel in order to contribute to strengthening the economy and improving community welfare. Universities must be more encouraged and facilitated to be able to produce more inventions and innovations that result in down streaming appropriate technology, creating added value, and increasing the production and use of domestic components to reduce dependence on imported products. Unesa is an Educational Personnel Educator Institution (LPTK) has a vision: Superior in Education, Strong in Science|. This vision confirms the strong determination of all Unesa residents to make Unesa a higher education institution that has advantages in academic quality, authority and academic dignity

(academic morality). Comparatively at the national and international levels in the field of education, so as to be able to become a reference in the development of education. Unesa's missions are:

- 1) Producing graduates who are intelligent, religious, have noble character, are independent, professional and have excellence;
- 2) Producing scientific works and creative works both in the fields of education and science that are superior and become a reference in the application of education, science, technology, socio-cultural sciences, art, and/or sports;
- 3) Producing community service work through the application of educational science, science, technology, socio-cultural sciences, art, and/or sports to create an independent, productive, and prosperous society;
- 4) Realizing Unesa as an educational center, especially primary and secondary education and a scientific center based on the noble values of national culture; and
- 5) Producing effective, efficient institutional performance by realizing a humanist academic climate, transparent, accountable, responsive, and equitable institutional management to ensure the quality of the implementation of the tridharma of higher education in a sustainable manner.

To harmonize the theme of research and PKM in the D4 Study Program of State Administration, the basic affirmation to determine the theme must be determined, so that later the theme chosen will still support the quality of teaching in the Study Program. Outcome base Education (OBE) was chosen to be one of the curriculum approaches not only to improve the quality of teaching but also to prepare study programs in the context of International Accreditation. The approach of the OBE in determining the curriculum is based on the student competencies obtained at the end of their education, therefore this final competency will later be used as a benchmark for making curriculum, learning models, and assessment strategies [7]. For OBE implementation itself requires collaborative efforts from teachers, parents, students, and also representatives from IDUKA, so that the implementation can be carried out properly [8].

Every research and community service carried out in the Applied Bachelor Study Program (D-IV) of State Administration is directed at achieving the targets that have been set by the vocational program, through research and community service schemes as follows:

- 1) Research and community service PNBP Surabaya State University. In general, the stages of research and community service activities include announcements, proposals, selection/appointments, determination, implementation, supervision, reporting, and output assessment. The schedule of all stages of the activity is conveyed by LPPM Unesa through the <http://lppm.unesa.ac.id> and/or through other media. Unesa's PNBP funding research program includes 3 (three) categories, namely competitive grants, assignments, and self-financing.
- 2) Research Directorate of Research and Community Service, Diploma IV Study Program of State Administration manages research that meets applicable standards.

- 3) Research and community service. The policy of vocational programs, research and community service policy funds are given to all vocational program lecturers as a forum for research development according to the expertise of each Study Program.
- 4) Research and community service cooperation of other institutions. The research conducted is based on the results of cooperation/MoU with the business world and the industrial world (DUDI).

3 Method

The research approach to be used is the ADDIE development model. ADDIE is an acronym for Analyze, Design, Develop, Implement and Evaluate. ADDIE is a product development concept. This concept is applied to carry out performance-based learning. The philosophy underlying this concept is learner-centered learning, innovation, authenticity, and inspiration. This concept is believed to be very effective in the development of a product and is a guide in dealing with complex situations [9] (Fig. 3).

Analyze, Design, Develop, Implement, and Evaluate (ADDIE) is a concept that describes the learning process. This process consists of 5 stages, namely the stages of analyzing, designing, developing, applying, and evaluating. In its application these 5 stages form a cycle. The results of the evaluation stage will be the material for carrying out the analysis stage [10]. The following will explain the objectives of each stage.

The following is a description of each stage of model development that has been implemented, namely:

- 1) Analysis: The main activity is to identify and analyze the research and PKM that has been carried out by lecturers of the D4 State Administration study program, then present it in the form of a table to make it easier to read the data and analyze the competencies of each lecturer what is in accordance with the research and PKM that has been carried out.

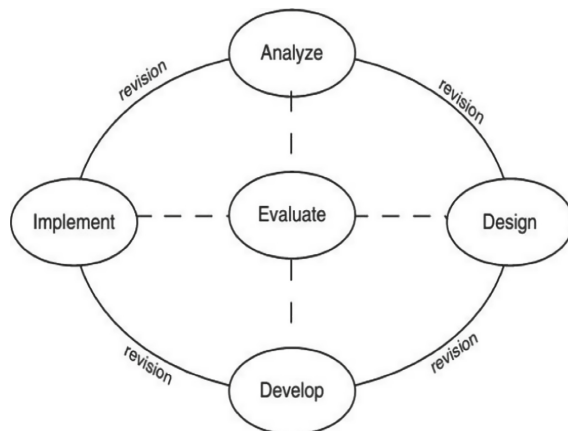


Fig. 3. ADDIE Development Model

- 2) Design, this design stage designs or maps adjustments to the competencies possessed by each lecturer to determine research themes and PKM.
- 3) Development, Development in the ADDIE model contains product design realization activities, by identifying any research results that can be made a model or application to be applied to PKM activities. Because there are several research results in the form of service applications, namely archival software. The application was developed in an off-line form, which means it can be used without internet media. The hope is that in the future the application will be patented or made Copyright so that it can raise the number of IPR in Unesa.
- 4) Implementation, the implementation of the application was only used in this year's PKM which was carried out in Kendal Lamongan Village, but it is still internet-based. Incidentally, in the village, the internet network has been installed.
- 5) Evaluation, Evaluation is carried out at the stage of the process and the end of the activity. In the implementation of research and PKM in 2021, the form of evaluation used is to provide pre-tests and post-tests on research activities and PKM. Another form of evaluation is that the study program invites practitioners from bureaucrats through FGD in the hope of giving a feed-back to some of the results of research and PKM that have been implemented, are being implemented and will be implemented.

The acquisition of data also comes from the database of the LPPM Unesa agency, statistical data documents or reports of research results that have been carried out by homebase lecturers. The document data taken include: National Research RIP Document, Renstra Unesa, Unesa Research RIP, and other relevant documents. In secondary data analysis research, researchers collected sources of information through these found data sources. Researchers will then reimagine or combine information into new ways to answer research questions, which are then used to develop research roadmaps and PKM. This method is used because the output of this research is the result of an analysis of the research theme and PKM that has been taken by the Homebase D4 State Administration lecturer, also paying attention to the theme that is being worked on in the 2021 submission year. These data will then be processed and adjusted to the research background, namely increasing the number of publications, citations, and PKM as well as to improve the quality of the study program curriculum in accordance with IDUKA.

4 Discussion

Academic development at Unesa is no longer centralistic (top-down) nor full autonomy (bottom-up), but includes both in proportion. The Unesa Strategic Plan 2020–2024 and the National Education System Law of 2003, as well as the Law on Teachers and Lecturers Number 14 of 2005 which stipulates that sustainable quality development can be encouraged with autonomy in the frame of accountability actualized through accreditation and based on the self-evaluation process to achieve competence. Quality development standards must be realized by referring to Leadership, Relevance, Academic atmosphere, Internal management and organization, Sustainability and Efficiency, Equity, Accessibility, and Partnership (LRAISE-EAP).

Autonomy in the governance of higher education is expected to provide opportunities for acceleration and more free wiggle room for the dynamics of Unesa's development

in the future. Organizational health was chosen because a healthy organization is the main prerequisite to be able to contribute to academic freedom, innovation, and creativity, encourage efficiency, effectiveness, and organizational responsibility, and make universities an asset not a burden. Increasing national competitiveness is carried out by encouraging programs/disciplines that can increase the nation's competitiveness through improving the quality and relevance of education, research, and community service.

Based on the results of the identification mentioned above, the study program conducts a SWOT analysis to further identify the development of the study program in the future. The Study Program conducts a SWOT analysis to identify strengths and weaknesses as well as formulate a corresponding study program development strategy to produce alternative development programs that are in accordance with the competencies of each existing lecturer and adapted to the needs of the world of work.

Based on the results of the research track record and PKM of study program lecturers, it can be concluded that most of the research themes and PKM are in accordance with the research focus, research theme, and priority research topics of Unesa. However, based on the results of the FGD (dated October 29, 2021, <http://d4an.vokasi.unesa.ac.id/post/pengembangan-roadmap-penelitian-dan-community-service-pkm-prodi-d4-administration-state-through-fgd-with-iduka>) with the Balitbang of Kediri Regency and the Office of Community and Village Empowerment of East Java Province, it was concluded that the results of research that had been carried out by study program lecturers had mostly not been implemented into PKM, even though the final purpose of the research was to increase the dissemination of research results to improve the standard of living and welfare of the community and that is what has not been implemented.

The result of other recommendations from the two government agencies is the implementation of research themes that are currently urgently needed by local governments (considering that this study program's vision is: Producing superior and competitive applied scholars in the field of public sector policy and personnel management based on information technology) then the issues of research themes and PKM of study programs should refer to the needs of local governments. The following are the research and PKM themes recommended by the two government agencies:

The research themes and PKM recommended by the two government agencies above are themes that are currently being intensified by almost all local governments throughout Indonesia and these themes are very interesting and must be followed up by study programs. However, with the limitations of the hr scientific specialization owned by the study program, it is not comparable to the needs of these themes. The Field of Research Studies & PKM Lecturers of the D4 AN Study Program, of the 7 (seven) study program lecturers, there are 4 (four) study program lecturers who have the same scientific specialization, namely the scientific field of public policy, 2 (two) lecturers also have the same scientific field as well, namely Public Management and only 1 (one) lecturer who has the scientific field of local government (Table 1).

When referring to these recommendations, the study program is only able to meet the 3 research fields mentioned above, while the other 3 scientific fields of the study program do not yet have it. This is become a homework (homework for study programs to immediately find new lecturers who have these 3 scientific fields in the future). For

Table 1. Research and PKM themes

Research Field	Research Theme Development and PKM
1. Local Governance	<ul style="list-style-type: none"> – Office Management: Archives (Digital & Manual) – Regional Business Institutions – Public & Economic Sarpras – Procurement of goods and services
2. Public Management	<ul style="list-style-type: none"> – Public health – Community Institutions (Business and Social) – Entrepreneurship – Customs & Culture – Licensing, Taxes and Public Activities
3. Public Policy	<ul style="list-style-type: none"> – Preparation and Socialization of Regulations – Enforcement and Implementation of Regulations
4. People's Welfare	<ul style="list-style-type: none"> – Community Economic Enterprises – Conflict and Order – Market – Public Literacy
5. Finance	<ul style="list-style-type: none"> – Planning And Finance – Public Financial Institutions – Accountability
6. Rural	<ul style="list-style-type: none"> – Village Economy and Village Communities – Village Assets – Village Arrangement and Administration – Pilkades – Bumdesa – Tourist Village

now, the study program will concentrate on fulfilling the first recommendation related to the results of the FGD, namely increasing the dissemination of research results to PKM activities that have not been fulfilled so far. Likewise, the second recommendation is to maximize research themes that are work programs of local governments and have not been touched by study programs (Fig. 4).

Based on the results of the FGD and mapping the competence of lecturers of the Applied Undergraduate Study Program of State Administration, the stages of research and community service are arranged divided into three stages, namely– strengthening institutional capacity and public services, developing networks and quality of public services and Accelerating Accessibility of public services. These stages are described in the Research and Community Service Roadmap below:

The stages of research and community service mentioned above are prepared based on the phenomenon of the development of community needs in an effort to improve the quality and quantity of public services in the perspective of applied state administration and the competence of lecturers and students in the D-IV Study Program of State Administration Unesa. Of course, it also refers to the results of the FGD (although not

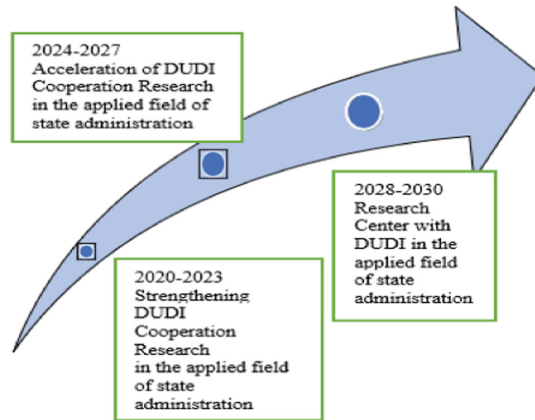


Fig. 4. Roadmap of research and community service

all research themes can be accommodated in connection with the limitations of existing HR competencies) and in line with the LPPM Unesa strategic plan which was relegated to the vocational program strategic plan which was then aligned with the study program strategic plan.

5 Conclusion

The preparation of a roadmap for research and community service of the applied undergraduate study program (D4) of the State Administration Vocational Program, Surabaya State University, is expected to be a clear guide for the academic community in planning and implementing Research and Community Service activities with better and measurable results. The roadmap that has been arranged is also expected to be something that can synchronize related activities in its implementation.

The entire academic community of the applied undergraduate study program (D4) of the State Administration Vocational Program, Surabaya State University has an important role in supporting the successful implementation of research and community service activities. A great commitment is needed to go towards the progress of all aspects in the Vocational Program of Surabaya State University. The results of research and service are expected to be a material/source for progress for the Vocational Program of the state University of Surabaya in the future.

The limited competencies possessed by the study program are a must to be followed up in order to achieve the research and PKM objectives that have been launched by LPPM Unesa. Of the 7 (seven) competency needs needed to be able to synergize with government programs, study programs only have 3 (three) existing competencies. Study programs need to immediately meet the shortcomings of these competencies by recruiting new lecturers, so that the performance of study programs can be maximized related to research and PKM.

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