



Improving lecturers' competence in preparing lesson plans of soil test laboratory and building information management

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| ARTICLE INFO | ABSTRACT |
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| <p>Article history Received: 2021-05-30 Revised: 2021-12-17 Accepted: 2021-12-27 Published: 2022-01-01</p> <p>Keywords Building information management Learning plan Soil test laboratory</p> | <p>The insufficient number of lecturers and laboratory assistants has become one of the obstacles faced by STT Pagaram. In addition, the limited ability of lecturers in mastering Soil Mechanics laboratory equipment and the absence of Semester Learning Plans (RPS) that follow the learning format are still obstacles. The purpose of this community service is to improve the competence of lecturers in preparing the RPS for the soil test laboratory and building information management. The method used to carry out this community service were workshops and seminars. It was initiated by giving a seminar on the introduction of building information management application followed by 20 students and continued by providing training on the use of tools for five laboratory assistants and the preparation of Semester Learning Plans for five lecturers. The results of the service implementation based on the participant satisfaction questionnaire shows an increase in knowledge on the application of building information management and an increase in competence using laboratory equipment. In addition, the training participants were also provided with modules.</p> |
| <p>Kata kunci Building information management Laboratorium pengujian tanah Rencana pembelajaran semester</p> <div data-bbox="256 1509 387 1637"></div> <div data-bbox="173 1648 467 1715"></div> | <p>Kompetensi dosen dalam penyusunan RPS laboratorium uji tanah dan Building Information Management. Jumlah dosen dan laboran yang masih belum mencukupi menjadi salah satu kendala yang dihadapi STT Pagaram. Selain itu, masih terbatasnya kemampuan dosen dalam menguasai peralatan laboratorium Mekanika Tanah, serta belum adanya Rencana Pembelajaran Semester (RPS) yang sesuai format pembelajaran maish menjadi kendala. Tujuan dari pengabdian masyarakat ini adalah untuk meningkatkan Kompetensi dosen dalam penyusunan RPS laboratorium uji tanah dan Building Information Management. Metode pelaksanaan pengabdian dilakukan dengan berupa workshop dan seminar, dimulai dengan memberikan memberikan seminar pengenalan aplikasi Building Information Management diikuti 20 orang mahasiswa, dan dilanjutkan dengan memberikan pelatihan penggunaan alat untuk 5 orang laboran serta penyusunan Rencana Pembelajaran Semester untuk 5 orang dosen. Hasil pelaksanaan pengabdian berdasarkan kuisisioner kepuasan peserta menunjukkan peningkatan pengetahuan mengenai aplikasi Building Information management dan peningkatan kompetensi menggunakan peralatan laboratorium selain itu para peserta pelatihan juga dibekali dengan modul.</p> <p>Copyright © 2022, Rahmadona et al This is an open-access article under the CC-BY-SA license</p> <div data-bbox="1129 1653 1315 1715"></div> |

How to cite: Rahmadona, E., Putra, M. S. G. P., Praditya, M. N., Marpen, R., Amalia, K. R., & Uwais, M. A. (2022). Improving lectures' competence in preparing lesson plans of soil test laboratory and building information management, 3(1), 1-8. <https://doi.org/10.22219/jcse.v3i1.16718>

INTRODUCTION

A lecturer has a strategic function, role, and position in national development, particularly in the field of education. Lecturers are professional educators and scientists whose main task is transforming, developing and disseminating

knowledge, technology, and arts through education, research, and community service (Ahmad, 2015; Kusnan, 2017). In the implementation of education, one aspect that needs to be undertaken first is to plan the learning process. Thus, the lecturers must do careful planning. According to SNPT number 44 year 2015, a standard learning process is needed which is presented in the form of Semester Learning Plans (RPS) (Lembaga Penjaminan Mutu, 2018; Susanti et al., 2021). In the era of industrial revolution 4.0, improving the quality of education is one of the main issues of the Sustainable Development Goals (SDGs) (Bai et al., 2020; Beier et al., 2021; Berawi, 2019; Mondejar et al., 2021).

Pagaralam is one of the cities in the province of South Sumatra, it has a distance of approximately 200 km from Palembang, most of the soil conditions in the city of Pagar Alam are of latosol and andosol types with wavy to hilly surfaces. When viewed from the class, the soil in this area generally contains high fertility. Pagaralam City is a producer of vegetables, fruits, and is one of the agribusiness sub-terminals (STA), therefore, it has very high tourism potential. In the aspect of education, Pagaralam City has several higher education institutions, one of them is Sekolah Tinggi Teknologi Pagaralam (STTP). STT Pagaralam is the first higher education technology in the city of Pagaralam. STT Pagaralam has two departments, namely Civil Engineering and Informatics Engineering. To support learning in the field of Civil Engineering, STT Pagaralam has five laboratory facilities, namely the soil mechanics laboratory, soil measurement science, hydraulics, concrete, and computers. To support the teaching activities, there are 8 permanent lecturers in this department. Along with the development, STTP students increase every year, this is a consideration for STTP leaders to improve the facilities and expertise of the lecturers to accelerate student learning, several steps are undertaken such as increasing the competence of lecturers by developing curriculum through Study Learning Plans (RPS) and laboratory assistants in mastering laboratory equipment.

Based on the results of observation in the Civil Engineering Department, the number of lecturers and laboratory assistants is still insufficient, this issue has become an obstacle faced by STT Pagaralam. Further, the competence in operating laboratory tools is also still limited. It is found that the number of lecturers is not yet developed and plan the RPS for the teaching and learning process. The RPS used is an example of an old RPS or just an example of an RPS. Therefore, the partners of this community service feel that it is necessary to conduct training to use laboratory equipment, especially the soil mechanic laboratory which is one of the important laboratory practices in learning Civil Engineering and training for planning RPS for soil testing laboratories in order to improve the quality of education so that it will have an impact on the improvement of the learning process for students at STT Pagaralam.

The purpose of preparing the RPS is to determine the next action in the implementation of education (Muslim et al., 2021; Panjaitan, 2016; Sitepu & Lestari, 2017). In addition, in the construction area, technology is developing so rapidly during the era of the industrial revolution 4.0. To develop and increase student knowledge about software or technology applications in the construction sector, seminars are also held by introducing BIM to students. BIM is a method that increases the effectiveness and efficiency of the implementation of construction work (Agirbas, 2020; Fakhruddin et al., 2019; Fagnoli & Lombardi, 2020; Maskuriy et al., 2019). BIM is a digital representation of the physical and functional characteristics of a building (or BIM object). Therefore, it contains all information regarding the elements of the building which are used as the basis for decision making in the life cycle of the building, from concept to demolition. BIM is one of the technologies in the construction world in the current 4.0 era. With the existence of BIM as technological innovation, it has proven that the field of construction work has come into the era of digitalization in the process of planning, designing, implementing development, and maintaining the building and its infrastructure for all parties involved in a project (Azhar et al., 2012; Borrmann et al., 2018; Matějka & Tomek, 2017; Moses et al., 2015; Pu & Wang, 2021; Sinenko et al., 2020; Tahir et al., 2018; Vite & Morbiducci, 2021). The purpose of this community service is to improve the competence of lecturers in preparing the RPS for the soil test laboratory and building information management.

METHOD

Analyzing the problem faced by the service partner, STT Pagaralam, in understanding to prepare the RPS as well as operating tools for a soil test is still low, the project team from the Civil Engineering Department of Civil Polytechnic conducted a program in the form of a seminar by introducing BIM application which was followed by 20 students, training on planning RPS for soil test laboratory for lecturers, which was followed by five lecturers, and training on operating soil test laboratory for five laboratory assistants. This community service was done in two consecutive days. The flow of solution to that problem is described in the flow chart as shown in Figure 1.

The targets of the service activities carried out were laboratory assistants, lecturers, and students from Pagaralam Higher Education Technology that consisted of approximately 30 participants. The service team from the Civil Engineering Department of Sriwijaya Polytechnic did an onsite visit to STT to give a seminar and training for two days. During the training, health protocol is well maintained by using a face mask and hand sanitizer. For the effectiveness of the program, the project team divided the agenda into two phases, they were: (1) Material 1 is the seminar on introducing BIM technology for construction work; and (2) Material 2 is training on planning RPS and operating soil test laboratory tools.

Next, the seminar was done by presentation, lecture, and discussion between the keynote speakers and the participants. For the training session, it was undertaken by giving a demo on how to operate the laboratory tools with a

question and answer session. The measurement of the success of this activity was done through questionnaire distribution using this link <https://tinyurl.com/surveysttp> to the participants to test their understanding.

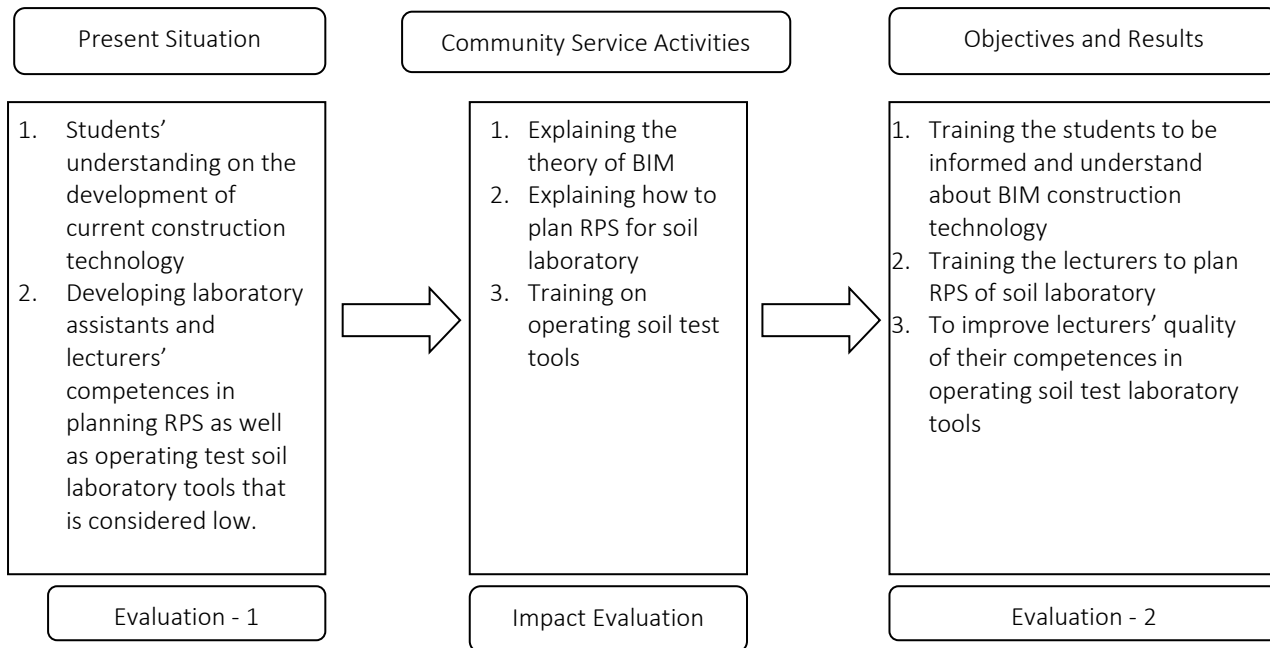


Figure 1. The flow chart of community service on training to plan RPS for soil test laboratory and BIM introduction

RESULTS AND DISCUSSION

The service activities are firstly initiated by planning. According to Terry (Riyadi, 2005), planning is an effort to select and relate facts then envision the future by describing and designing activities to achieve the desired results. Therefore, the project team tried to analyze problems faced by the partners from STT Pagaralam. It was found that the partner had a problem operating the equipment in the soil testing laboratory because the laboratory assistant had limited knowledge. Thus, the partner suggested the team to provide training and workshop. In the early stage of planning, the project team was formed. The next step was training on developing RPS of the soil test laboratory, training on operating laboratory equipment, and introducing the BIM program to the participants (Table 1).

Before the activity, the project team took a group photo with the participants, as shown in Figure 2. At the beginning of the activity, the event was started at 08.00 WIB by STT Pagaralam represented by the Head of the Civil Engineering Department, followed by remarks from the representatives of the Civil Engineering Department Sriwijaya State Polytechnic. The activities were carried out by providing seminars and presentations about BIM introductory, the participants were students and lecturers of STT Pagaralam. The second material was about the preparation of RPS for soil testing laboratory to support the learning of soil mechanics and soil testing laboratory course.

After the seminar session, the activity was continued with a training session and an explanation of the use of laboratory equipment by providing several tool demos (Figure 3). The mastery of the material is expected to increase more knowledge in operating tools for the laboratory assistants and lecturers at STT Pagaralam, thus, it has a positive impact on student practical learning.

Table 1. Training Material on Developing RPS of Soil Test Laboratory and Introducing BIM at STT Pagaralam

| No | Speaker | Material | Material Description |
|----|------------------------------|---|------------------------|
| 1 | M. Sang Gumilar P, S.ST, MT | Introducing BIM Preparation of Lesson plan and Laboratory Equipment Training | BIM Theory Explanation |
| 2 | Efrilia Rahmadona, S.ST, M.T | Laboratory Equipment Training | Sieve Analysis |



Figure 2. Photo session with participants of seminar and training



Figure 3. Photos of participants of the seminar and training

Building information modeling (BIM) is a major issue in the Indonesian construction sector today. BIM itself is a system or technology that includes some important information in the Design, Construction, Maintenance process that is integrated into 3D modeling. The success story of using BIM has been widely used in national strategic projects.

The main objective of applying BIM is to simplify and accelerate the work process on projects, in other words, BIM can be used as an arena for technological innovation in the construction sector for the future. Therefore, it is important to introduce what BIM is, how it affects the construction sector, how it will affect construction workers, and how the STT Pagaralam as a campus that has Civil Engineering Department can produce graduates who understand BIM and can use it in their future work. In this BIM introduction activity, several aspects presented are (1) definition of BIM; (2) BIM and President Joko Widodo's Nawacita vision; (3) history of BIM in Indonesia; (4) Ministerial Regulation that requires the use of BIM in the construction sector in Indonesia starting in 2024; (5) success stories of using BIM in construction projects in Indonesia; (6) BIM concepts and models; (7) BIM software; (8) construction industry 4.0 roadmap, and (9) BIM challenges for workers, alumni, and civil engineering students.

Figure 4 below provides an overview of the use of BIM in the construction sector today.

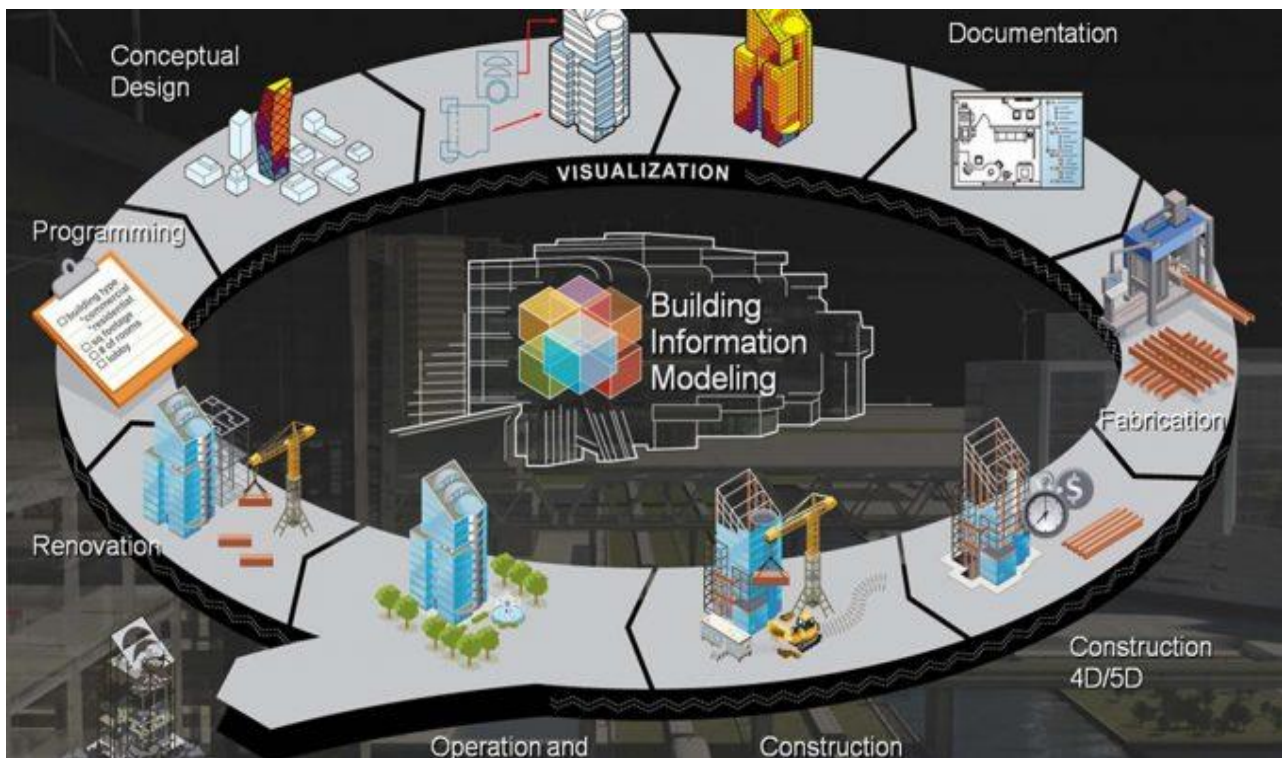


Figure 4. An overview of the use of BIM in today's construction industry

STT Pagaralam has a soil testing laboratory for civil engineering student practicums but does not have reliable laboratory instructors and appropriate RPS for the course, so in this activity, the team also delivered training on the use of laboratory equipment and soil testing laboratories. Soil mechanics is a branch of science in civil engineering that studies the characteristics of the soil on which construction is to be erected, besides that soil mechanics/soil testing is a compulsory subject before enrolling on the foundation engineering course. Some of the materials presented were: (1) Definition of soil test/soil mechanics; (2) Re-introduction of existing tools in the soil testing laboratory at STT Pagaralam; (3) Training on the use of tools such as water content test, Atterberg test, GS test, and others; and (4) Introduction and practicum of sieve analysis. It is expected that this soil test laboratory training can help lecturers, instructors, and students explore the soil test practicum better.

After the seminar and training, the team conducted a satisfaction survey on the material presented to all participants. Based on the result of the questionnaire, 60% of the participants stated that this activity was very beneficial and the other 40% percent said it was beneficial (Figure 5). This means that the activity is considered valuable for the participants. Meanwhile, in terms of material clarity, 66.7% of participants stated that the material presented was very clear and 26.7% stated it was clear (Figure 6). The results illustrate that the team has delivered the material very well so that all participants feel that the material is well explained. In regards to the usefulness of the teaching and learning process, as many of 73.3% of the participants said it was very helpful and 20% of them said it was useful. Only 6.7% of the participants stated helpful enough. (Figure 7).

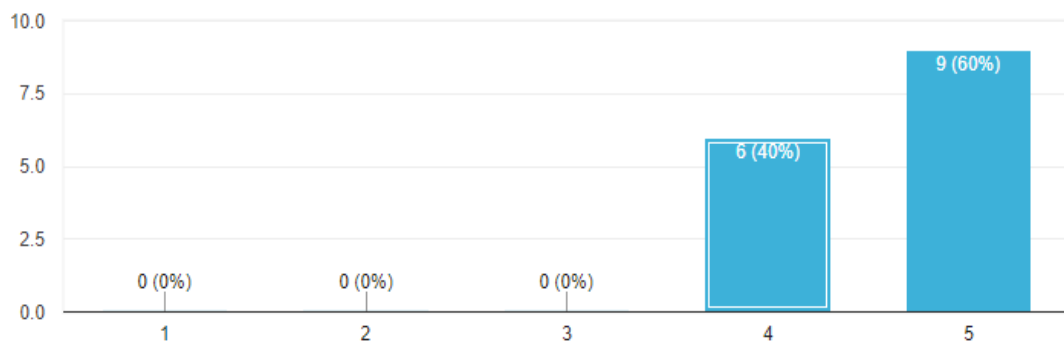


Figure 5. Participants' response in regards to the usefulness of the activities

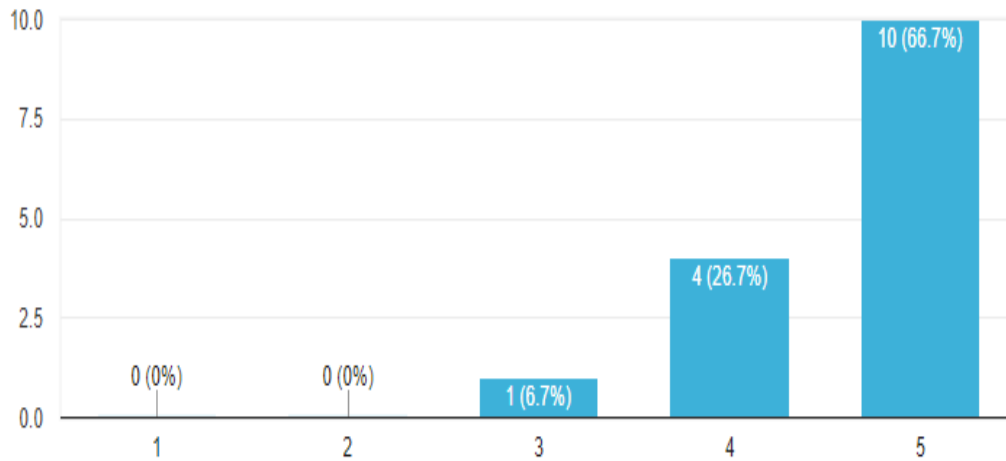


Figure 6. Participants' response in regards to the quality of material delivery

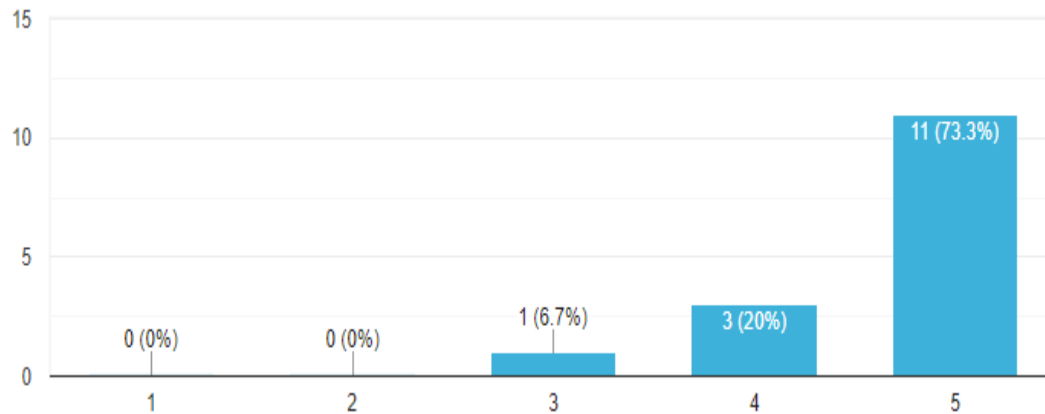


Figure 7. Participants' response in regards to the usefulness of the teaching and learning process

Thus, in general, it can be concluded that this activity provides added value to the participants, particularly in the teaching and learning activities that they carry out. This activity is potential to improve the quality of teaching and learning activities where lecturers are important figures in it. This is important because the ability of lecturers in preparing RPS must be improved (Sitepu & Lestari, 2017). To carry out the dharma of education professionally, lecturers are required to have competence in (1) planning educational lessons, (2) implementing quality teaching, and (3) assessing, evaluating, and carrying out follow-up learning based on the principles of assessment in universities (Laksmiwati et al., 2019). However, every lecturer is required to have the skills in preparing RPS then teach referring to the RPS that has been prepared previously (Sudiarta, 2016).

This activity is one form of three pillars (*Tri Dharma*) of Higher Education which is one of the visions of all universities in Indonesia and is an achievement that must be fully supported by the entire academic community to build high spirit people with a critical mind, creative, independent, and innovative. This activity is a form of *Tri Dharma* of Higher Education in the form of community service.

CONCLUSION

From the service activities in training to develop RPS for soil test laboratory and BIM introduction at STT Pagaram, it can be concluded that there is an increase in knowledge about technology in the construction industry today and an increase in expertise in operating soil testing laboratory equipment. In addition, this service activity received positive interest from participants, laboratory assistants, and several lecturers from STT Pagaram. Based on the results, it is expected that this activity can be continuously conducted and there will be subsequent training activities through an MoU between universities. Thus, students and lecturers at STT Pagaram can comprehensively apply the training. The challenge in this service is to improve participants' curiosity in order to continuously increase knowledge in the field of construction.

ACKNOWLEDGEMENT

The project team would like to thank: (1) Sriwijaya State Polytechnic and Department of Civil Engineering Sriwijaya State Polytechnic for the facilities and support in running this community service every year under the assignment letter 2034/PL.6.4.2/ST/2021 (2) STT Pagaram for the partnership in this community service.

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