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SEM-PLS Training at Universitas Islam Negeri Maulana Malik Ibrahim

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ABSTRACT

At Universitas Islam Negeri Maulana Malik Ibrahim Malang in 2024 SEM-PLS training will develop data analysis capabilities for lecturers and students to enhance their work on quality scientific publications. The Department of Mathematics at Faculty of Science and Technology conducted the session on May 21, 2024, where 40 people participated. Training and mentoring stands as the service method which features instruction about SEM-PLS theory alongside practical utilization of SmartPLS software for implementation. Observation activities together with documentation assessment and satisfaction questionnaire responses determine the program's outcome. Participant satisfaction reached an exceptional level because they showed positive feedback about the material presented. Time constraints together with a constrained space area negatively affected this event. This training achieved success in providing extensive SEM-PLS understanding to students and lecturers. The activity builds campus research capacity. The organization of similar consecutive training courses is highly suggested because it will boost academic knowledge in data analysis fields.

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1. INTRODUCTION

SEM-PLS stands as one of the statistical methods researchers now use extensively in their studies. SEM-PLS yields effective and efficient latent variable analysis due to its merits in research. The SEM-PLS methodology can process data which fails to fulfill classical statistical requirements including restricted sample size and non-normal distribution patterns. The combination of structural modeling features occurs in SEM-PLS together with flexible partial least squares-based estimation. Social along with economic research fields and engineering utilize SEM-PLS because of its described features. Educational institutions need proper training in this method to enhance their research capabilities. All academics focused on research improvement need to master SEM-PLS [1], [2], [3], [4], [5].

The demand for SEM-PLS training and publication release in reputable journals continues to grow parallel in Indonesia [6], [7]. Universities must generate research along with scientific evidence of its validity. The institution should focus on building proper data analytics capabilities among both students and lecturers. The SEM-PLS training provides participants with fundamental understanding for applications of statistical software including SmartPLS [7], [8], [9]. Academic research about training shows its ability to speed up the adoption of analytical technology by university scholars. Higher education institutions may boost their publication quality through these implications. Research capacity development contains SEM-PLS training as a vital strategic component according to [10].

Training under SEM-PLS produces advantages which extend beyond technical aspects [11], [12]. Participants develop greater self-assurance to use advanced statistical methods because of this training. Research from different universities demonstrates that training recipients develop enhanced self-assurance about their ability to use SEM-PLS in research projects. The individuals who undergo this training develop superior capabilities to understand the outcomes generated through analysis. The research validity strongly depends on achieving these necessary criteria to gain acceptance within international scientific communities. Universities should establish this training as a regular educational program according to [13].

The training program of SEM-PLS adds value to global institutional competition through its implementation. Student and lecturer ability to utilize this technique enables them to develop scientific articles with better methodology. Research indicates that the accuracy of analytical techniques determines research quality to a high extent. Quality publications help increase the institution's national and international reputation. Personnel who participate in SEM-PLS training develop enhanced capacity which results in collective benefits for their educational establishment. The training exhibits relevance in academic progress because of its contemporary nature [14].

The training approach for SEM-PLS must adopt a complete system. Basic theory along with practical insights and analysis result interpretation comprise the program content. Such instructional method has shown success in enabling students to grasp the method at a complete understanding level. Studies show that learning programs which unite theoretical instruction with practical applications produce better results when teaching analytical competencies to trainees. The training method builds up researchers' capability to use SEM-PLS on their own research projects. The training design needs to establish a suitable equilibrium between theoretical components and practical exercises to reach its maximum effectiveness [15].

SEM-PLS training delivers its best results when the host institution forms tough partnerships with subject matter experts. The experts' collaboration helps develop positive synergies which enhance the training quality. Alongside experienced practitioners and their involvement the training experience becomes enhanced for participants. The collaborative relationship enables the training to operate efficiently toward its correct goals. When participants actively participate, the training achieves its best possible results. Supporting the research development in higher education requires the SEM-PLS training program to have sustainable practices.

2. METHODOLOGY

The service delivers training together with mentoring sessions that enhance participant abilities in data analysis. The selection of this method works well because it combines knowledge transfer with practical learning opportunities. Active participant interaction occurs throughout the activity with the resource person because of this approach. The service activity contained two distinct sections which included theoretical presentation followed by hands-on practice based on SEM-PLS methods. The theoretical content about the subject was delivered through ITS lecturers who specialized in the field and the practical portion (See Figure 1) was managed by Bambang Widjanarko Otok while Angga Dwi Mulyanto and Cindy Cahyaning Astuti assisted him. Many studies demonstrate that this training method successfully increases participant proficiency in practical skills from previous community service activites [1]. A hands-on training model served as the selection because participants needed practical application opportunities for learned concepts.

Figure 1. Practice of data analysis with SEM-PLS

The service took place on Tuesday, May 21, 2024, within the mathematics department at the Faculty of Science and Technology in Universitas Islam Negeri Maulana Malik Ibrahim Malang. The site served as training implementation base because it provides necessary support with its computing facilities and sufficient teaching spaces. The participants included lecturers and students who exhibited enthusiasm toward exploiting the SEM-PLS method. The first step of the service involves team members opening the session while introducing the content while the following phase will include theory delivery and practice sessions about data analysis. The organization of implementation structure enables participants to understand all stages from theoretical knowledge up to practical applications. Studies show that direct combination of theory with hands-on practice conducts highly effective training to develop participant competencies [15]. One of the essential features of this service has been engineered to deliver exceptional learning value.

I conducted the service implementation approach using lecturing methods alongside interactive sessions and direct practical applications. The lecture sessions delivered fundamental concepts of SEM-PLS to provide participants with complete knowledge of the subject. Participants engaged in interactive discussions so they could both clarify their understanding and question the contents of the material. The implementation of hands-on practice uses SmartPLS software which enables participants to transform theoretical knowledge into practical applications. The combination methodology works well in integration theory with practice while fulfilling the standards described in statistical methods training research [10]. This method selection works effectively for achieving service requirements.

The satisfaction survey was distributed to all participants after the activity finished to evaluate delivery service. This evaluation process helps measure participants' comprehension levels regarding presented material and establishes the quality of the implemented approach. Evaluation results from observation notes together with documentation served to enrich the quantitative assessment findings. Yet analysis of the collected data described the accomplishments together with challenges that emerged during the activities. Multiple research studies demonstrate that questionnaires together with observation produce effective methods for assessing training and community service program success [14]. Evaluating this service plays a crucial role for maintaining its high qualitative standards during implementation.

3. RESULTS AND DISCUSSION

Participants reacted positively to the conducted SEM-PLS training which executed per existing plan. Thirty lecturers and students took part in this activity totaling forty attendees. The participants showed their enthusiasm throughout all stages from start to finish of the activity. The theoretical sessions at the training were completed successfully by lecturers from ITS. The functional instruction sessions were executed properly along with detailed assistance from the assistants. This training achieved success because the theoretical along with practical aspects proved effective for participant understanding development. The successful implementation of this training serves to classify it as economically effective.

The research materials furnished by the training were evaluated as directly suitable to fulfill participants' research needs. Most trainees gained full comprehension of SEM-PLS concepts for the first time after completing this workshop. The participants gained increased confidence in using this research method for their studies. The survey results match past research findings where training programs done by Perdana et al. (2023) resulted in meaningful understanding increases among participants. Real case examples were published alongside material which participants found easy to comprehend. This training makes significant positive improvements in the academic development capabilities of those who participate.

Most of the research participants (90%) indicated satisfaction with the training program provided. Participants rated the delivery materials and presenter interactions along with facility provisions very positively. The participants made suggestions to expand the training duration to study the material more intensively. Most participants approved of how the training was delivered on its main competencies. Research has established that participant satisfaction serves as evidence of training effectiveness [10]. The outcomes of evaluation validate the positive performance of this service initiative.

Room capacity has become an obstacle against a successful training process. A few participants felt distressed because the training room contained a high number of attendees. The limited time available affected the question-and-answer session in an undesirable way. The implementation of this training suffered from typical problems that arise when participant numbers exceed recommended class sizes. Research has proven that training effectiveness depends heavily on facility preparedness and suitable room arrangements [15]. The technical aspects of the training require more evaluation efforts to enhance performance for the following sessions.

Technical limitations during the training program arose from insufficient physical room size. Several trainees expressed unpleasant feelings because there were too many attendees in the training space. The scheduled time limit created less beneficial conditions during the question-and-answer portion. The training faced typical implementation challenges as the number of trainees exceeded the optimal seating capacity. Research by [15] supports the idea that training efficiency depends on ready facilities and appropriate room setup. The technical aspects will require additional evaluation before moving on to the next training.

The training discussions maintained high levels of interaction and movement between participants. Researchers who participated in the training session posed multiple questions which focused on their research-specific problems. Both the resource persons and mentoring team provided simple responses which included practical resolution methods for participants' questions. Along with knowledge transfer the training acted as an open consultation environment for participants. A successful service program depends on active discussions as another article [1] indicates. Learning quality for participants improves because of active training participation.

Future training events will be triggered from this initiative. The participants demanded immediately following training sessions that would include advanced material. Further help is necessary mainly for the interpretation phase of SEM-PLS results according to stakeholders. The implemented service program can still be improved because research indicates such potential. Based on earlier studies researchers agree that training serves as a consistent strategy for enhancing research capabilities within institutions [15]. The program requires necessary implementation of follow-up activities to deal with identified requirements.

Training activities resulted in the formation of a compact group of learners who shared their experiences with each other. Several workshop participants organized their own discussion group which allowed them to exchange experience in SEM-PLS application. The organization is expected to advance into a space where researchers can exchange information regularly. An academic network forms an important benefit of the training because it creates a strong connection among researchers in the campus area. The research from [10] demonstrates that learner communities guarantee the long-term effectiveness of training programs and help researchers collaborate. The creation of this network emerges as a vital positive result among the benefits.

The implementation team benefits from this service activity as a result. The educational methods can be assessed effectively by the team, which will help them improve their competency to conduct better training scheduling in upcoming sessions. Direct dealings with participants enabled the team to acquire valuable information about the statistical training requirements of academic researchers. Developing service initiatives that suit the target needs best will become possible through this valuable experience. The research findings confirm that staff members from the implementation team developed new capabilities through conducting the training sessions [14]. Everyone participating in the professional service tests along with receiving benefits from this interaction.

The SEM-PLS training met its essential goals successfully during the implementation phase. The participants acquired fresh knowledge and practical abilities which directly intensified their research activities. The assessment results proved favorable satisfaction rates along with enduring positive outcomes. The training encountered several technical obstacles while maintaining its effectiveness by producing important results.

Several studies continuously validate that training success depends on its ability to fulfill objectives while generating enduring effects [1]. The planned community service activity should serve as an adoption model for future training programs of similar nature.

4. CONCLUSION

Participants undergoing SEM-PLS training at Universitas Islam Negeri Maulana Malik Ibrahim Malang gained improved abilities in processing quantitative data. Combining theoretical instruction with practical components proves highly efficient for training participants to build their academic competencies according to the program results. The training proceeded without major problems in spite of constraints such as restricted training space and time and was well received by participants who showed high levels of satisfaction. The training helped participants become better off but simultaneously developed both a learning community and strengthened the analysis capabilities of the organizing team members. Working to build and maintain such similar research development programs throughout higher education institutions constitutes an essential recommendation to enhance academic capacity in these institutions.

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