

Effectiveness Of Road Maintenance Competency Training Model For Fresh Graduates Of Civil Engineering

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Abstract

For fresh graduates it is not easy to get a job, because the number of undergraduate graduates is increasing every year, but the available job vacancies are not proportional to the number of graduates currently available. One of the processes of developing and improving the competence of fresh graduates can be done by carrying out training activities. Through participation in training, fresh graduates are able to improve their competence in construction work, especially road maintenance.

The type of research used is quantitative research with One Group pre test - post test design. In this model there is one class given treatment and then the process and results are observed. The research instrument used was a road maintenance learning outcomes test instrument for fresh graduates of the Civil Engineering study programme. The test was conducted at the beginning of the meeting (pre test) and the end of the meeting (post test). The research analysis used N-Gain score.

Based on the pre-test and post-test scores of the road maintenance training, there was a significant increase in the average score of the participants. During the pre-test, the minimum score obtained by participants was 42 and the maximum was 75, with an average score of 60 and a standard deviation of 9.72. The post test results showed a positive increase in participants' achievements. The minimum score on the post test was 83 and the maximum score was 100, with an average score of 89 and a standard deviation of 4.7. This indicates that the training was successful in significantly improving participants' competencies, with a difference between the mean pre and post test scores of 29 points. The average N-gain for all participants was 0.7, which falls into the high improvement category. This shows that the training was effective in improving

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the overall competence of the participants, with a visible impact on the improvement of their scores after the training.

Keywords: Training, effectiveness, fresh graduate

INTRODUCTION

The implementation of training is regulated by the Minister of Manpower and Transmigration Regulation No. 8 of 2014 concerning Guidelines for the Implementation of Competency-Based Training, which states that the implementation of Competency-Based Training (CBT) is job training that focuses on mastering work skills that include knowledge, skills, and attitudes in accordance with established standards and workplace requirements. The new paradigm of improving the quality of human resources for construction services rests on three main pillars, namely, work competency standards, competency-based training and competency certification by independent institutions. Construction service companies realise that their human resources must always be developed in order to create humans who are in accordance with the development of the needs of the construction industry. Based on data from (Central Bureau of Statistics, 2022) shows only 4.2% of construction businesses whose workers have attended guidance/training/counselling, meaning that 95.35% have never attended training. Organisers of guidance/training for construction workers are mostly carried out by Government Agencies, namely 61.9%, associations 21.42%, private sector, 3.01%, universities / NGOs / foundations and 13.7 others. (Central Bureau of Statistics, 2023).

According to Lv, Zhang, Georgescu, Li, and Zhang (2022), the industry is experiencing a gradual change from traditional technology to modern technology that is accelerating every day. This requires strengthening the development of Human Resources (HR) in the formal and informal sectors. It is very important for individuals to build a spirit of improving themselves, both in soft skills and hard skills, in order to produce innovations that are creative, innovative, and responsive to change. The impact of these changes creates new types of jobs that require different competencies (Sulistyanto, Mutohhari, Kurniawan, & Ratnawati, 2021).

Data from the Central Statistics Agency (2024) shows that the number of open unemployment nationally in February 2024 reached 7.2 million people out of the total labour force. Among these, 4.79% of the unemployed were diploma graduates, 5.18% were university graduates, and 9.31% were vocational high school graduates. This data shows that university



graduates still do not meet the needs of the labour market. To reduce the number of unemployed, additional training is needed for job seekers. This training programme should be tailored to the field of expertise taught at the respective educational institutions (Putra, Widyaswari, Al Azha, Puspitasari, & Parmino, 2020). Despite regulatory support, training implementation is often not optimal due to constraints on learning materials and media.

One of the success factors of construction projects is determined by the level of labour productivity (Hecht, 2018). Many construction projects fail due to labour factors (Maqsoom, Mugheesa, Zahoorb, & Nawaz, 2020).. According to (Windapo, 2016) the failure of construction projects occurs due to the lack of skilled and qualified labour. For this reason, it is necessary to strengthen the development of human resources (HR) in the formal and non-formal sectors. One of the efforts to increase work productivity is by providing motivation and training (Molina & Ortega, 2003)

In the competitive world of work, competency certification is very crucial as proof of the ability and expertise of a particular field. Data from BPJS Ketenagakerjaan shows that the number of active participants in construction services in Indonesia until September 2023 was 8,947,986 people. (Labour Data Management Division, 2023).. Meanwhile, according to data from (Directorate General of Bina Konstruksi, 2024) workers who have SKK are only around 402,241 people. Thus there are approximately 8.5 million who do not have a certificate of competence. This shows a significant gap between the need and availability of construction workers who have SKK at the national level. For this reason, it is necessary to motivate the workforce to take part in training in order to obtain certification according to competence. One of the efforts to accelerate the certification of young experts can be done by cooperation between universities and the PUPR Office. Forms of cooperation include the implementation of competency tests and young expert fresh graduate certificates.

The limitations of fresh graduates make them less competitive in the job market. They need more time to adapt and make effective contributions to construction projects. For fresh graduates, getting a job is a challenge, as specialised expertise and skills are required. These demands are not easy to fulfil because fresh graduates do not have sufficient work experience. Their experience is generally limited to internships or work practices during college. In addition, the materials taught in universities often do not fully cover the practical skills required in the field, resulting in a gap between academic knowledge and the practical skills expected by the industry.



RESEARCH METHODS

This research was conducted on participants who participated in job competency training, especially fresh graduates of the civil engineering study programme. The work competencies given to participants are road maintenance executors. The number of participants who took part in the training was 27 civil engineering graduates with a maximum graduation age of 2 years. The type of research used is quantitative research with a one group pretest posttest-design research design. This research design was chosen because the treatment was only carried out in one class.

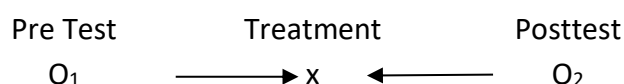


Figure 1. Research design on One Group Pre Test Post Test

As shown in Figure 1, fresh graduates will be given a pre-test to measure the initial ability of participants in road maintenance competency training before being given the module in the learning process. The module content consists of detailed road field surveys, road maintenance engineering, working drawings and Implementation & Quality Assurance Methods. The material is adjusted to SKKNI No. 192 of 2021 for road maintenance job positions. The pre-test results are used to determine the average learning outcomes before using the road maintenance module. Furthermore, participants will receive treatment in the form of a road maintenance learning process using module teaching materials. After the implementation of the module in learning is complete, participants will be given a learning outcome test or post test. The results of this posttest value will be used to determine the average learning outcomes of participants after learning to use modules in road maintenance work competency training. The pretest and post test scores will be analysed with N-gain to determine and measure the effectiveness of using the road maintenance module in road maintenance competency training.

Based on the research design, data collection techniques were carried out through the provision of written tests and questionnaires, written tests were used to obtain data on pretest and posttest scores, while questionnaires were used to obtain data on participants' responses to road maintenance work competency training using modules. The research instruments used in this study include: 1) pretest question sheet; 2) posttest question sheet; and 3) participant



response questionnaire. The pretest and posttest questions were in the form of 12 multiple choice questions.

Furthermore, it was analysed using the N-Gain test to determine the level of effectiveness of the road maintenance work competency training model, namely the difference between the pre-test and post-test scores. The results of the Gain Test showed an increase in road maintenance learning outcomes after the training was carried out. The increase in participant learning outcomes using the road maintenance work competency training model is seen from the post test results compared to the pre test results. After the comparison of post test and pre test is obtained, the N-gain score test is conducted to measure the effectiveness of road maintenance competency training. N Gain score is calculated using the Hake formula (1998) as in the following equation:

$$N - \text{Gain} = \frac{\text{Skor}_{\text{posttest}} - \text{Skor}_{\text{pretest}}}{\text{Skor}_{\text{maksimum}} - \text{Skor}_{\text{pretest}}}$$

Furthermore, the categorisation of the *N-Gain score* to measure the effectiveness of the applied model can be seen in Table 1 below:

Table 1. *N-Gain* score categories

N-Gain Score	Category
$G \geq 0,7$	High Improvement
$0,3 \leq G \leq 0,7$	Moderate Improvement
$G \leq 0,3$	Low Improvement

Source (Hake, 1998)

For the categorisation of the N-gain score in the form of percent (%) according to Arikunto (1999) is as follows:

Table 2. N-Gain Score Criteria for Model Product Effectiveness

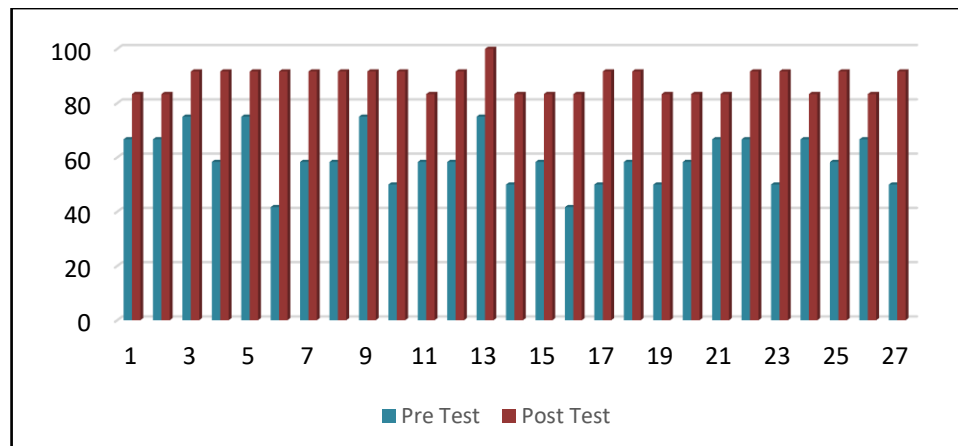
Score range N-Gain (%)	Meaning/meaning
$G \geq 76$	Effective
56 – 75	Effective enough



40 – 55	Less effective
$G \leq 39$	Ineffective

RESULTS AND DISCUSSION

The research was conducted on 27 fresh graduates of the civil engineering study programme at the Faculty of Engineering, Gorontalo State University. Before the training activities began, participants were given a pre-test to measure the initial ability of participants in road maintenance work competency training. After the pre-test, the module was distributed in the form of PDF files to participants and the instructor provided material on road maintenance. After the material was finished, discussion and questions and answers followed. At the end of the activity, participants were given a post-test question. The results of the pre-test and posttest scores are shown in Figure 2 and Table 3 below:



The results of the pre-test and post-test scores

Table 3. Description of Pretest and post test scores

	N	Mean	Std Deviation	Minimum	Maximum
Pre test score	27	60	9,72	42	75
Post-test score	27	89	4,7	83	100

Based on the pre-test and post-test scores of the road maintenance training, there was a significant increase in the average score of the participants. During the pre-test, the minimum score obtained by participants was 42 and the maximum was 75, with a mean score of 60 and a standard deviation of 9.72. This indicates that there was considerable variation in participants' initial abilities, with some participants falling below the mean score and others approaching or reaching the maximum score.

After the training, the post-test results showed a positive improvement in the participants' achievements. The minimum score on the post-test was 83 and the maximum score was 100, with a mean of 89 and a standard deviation of 4.7. The lower standard deviation in the post-test indicates that participants' scores were more consistent and closer to the mean, which was also higher than the pre-test mean. This indicates that the training was successful in significantly improving participants' competencies, with a difference between the pre-test and post-test mean scores of 29 points.

Overall, these results indicate that the training has had a positive impact on participants' competence in road maintenance, with improvements in both the mean and the distribution of scores among participants. The results of the gain categorisation based on the pretest and post test scores are as follows:

Table 4. Percentage of Gain Category

Gain Category	% Participants
High	52%
Medium	48%
Low	0

The results of the N-gain analysis showed that the road maintenance training had a positive impact on improving participants' competencies. Based on the results, 52% of participants (14 people) achieved an N-gain value above 0.7, which falls into the high improvement category. This indicates that more than half of the participants experienced a significant improvement in their competence after the training.

A total of 48% of participants (13 people) obtained an N-gain between 0.3 and 0.7, which falls into the moderate improvement category. This means that although their competency improvement was not as high as the first group, they still experienced considerable improvement. No participants obtained an N-gain below 0.3, which is usually categorised as low improvement.



This indicates that all participants experienced significant improvements in competence. The average N-gain for all participants was 0.7, which falls into the high improvement category. This indicates that the training was effective in improving the overall competence of the participants, with a visible impact on their scores after the training. The following are the results of the N-gain Score Test for pretest and posttest scores.

Table 5. N-gain score test results for Pre test and Post test data

Data	N	Average	
		Gain	%Gain
Pretest & Posttest Score	27	0,7	70,7 %

The table shows that the road maintenance training has been **moderately effective** in improving participants' competencies. The N-gain percentage of 70.7% indicates that the training had a significant positive impact on participants' understanding and skills compared to before the training. The results of this study are in line with the results of research conducted by Latif, Syahrul & Mappaloteng 2023 which states that training modules are very important and very effective for trainees.

CONCLUSION

Based on the results of the study, there was an increase in participants' scores after being given training with a difference between the average pre-test and post-test scores of 29 points. The average N-gain for all participants was 0.7, which falls into the high improvement category. This indicates that the training was effective in improving the overall competence of the participants, with a visible impact on their scores after the training.

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