A Study of Work Based Learning For Construction Building Workers

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Abstract. Work-based learning (WBL) is designed to improve the competence of participants. This study aims to apply the WBL and to develop attitudes, knowledge, skills, behaviors, and habits, which in turn can improve the competence of construction workers in the field to be sampled. This research was conducted on building construction workers in Medan City with 30 research subjects. The results showed that the evaluation of learning increased in phase I obtained the difference of the average score of 20.9 (the meeting I) and 25.50 (meeting II). The final result shows that the level of activity and competence increased significantly after WBL.

1. Introduction

Concrete work on building construction is the science that underlies the development of technological infrastructure especially building infrastructure. The concrete work itself has various types that must be controlled by construction workers such as foundation work, wall mounting work, column work, beams and plates and finishing. The finishing work consists of draining work, ceramic installation, printing techniques/relief and others. The development of technology is so rapidly building construction work that requires the competence and expertise of construction workers to get a strong, sturdy and aesthetic value. Therefore, construction workers must have adequate competence/skills before entering their workforce.

Data of informal workers in Medan city are workers with education level up to high school until 2016 almost reach 34.32%. The high number of informal workers is an obstacle for the government in providing formal employment. Likewise, for informal workers will have difficulty entering the formal workforce due to its very high competitiveness. Therefore, the work most accessible to informal workers without having to show skills as a construction worker. The obstacle faced is that construction workers have low knowledge in entering the world of building construction work. Low knowledge will then be related to the low wages that will be accepted by them. To overcome these problems, the need for a lesson that can improve the competence of construction workers.

Competence of finishing expertise from concrete work among others ceramic installation, wall plastering, and building relief/molding technique is a job that has high wage value according to the level of difficulty of its work. If finishing work is provided with the education and training of construction workers, it will have an impact on increasing competence, selling power in the labor market, competition in the world of work, increasing wages and ultimately impacting welfare. This competency is highly valuable if workers in the field are competent to the concrete finishing work.

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Competence is the ability that must be owned by a person to perform a task or work based on knowledge, skills and work attitude in accordance with the required performance (Djatnika, 2005). With the competence of a person then the concerned will be able to do a job, organize it so that work can be done, make adjustments when something happens different from the original plan and use the ability it has to solve problems and perform tasks with different conditions. Based on the competencies described above where concrete work that is part of the finishing work is a job that requires special skill competence. Finishing work requires a lot of cost in the process. Therefore, to avoid the mistakes of construction finishing work is to improve the quality of production and improve the competence of workers in their work.

The purpose of this research are:

a. To implement work-based learning on construction workers,

b. To streamline a good learning process, supervised so that the result is technically correct (process/stages)

c. To improve the competence/expertise of construction workers on concrete finishing work

2. Literature Review

Research conducted by Eraut (Linehan, 2008: 14) on educational research, especially at tertiary level, explains the gap between knowledge needed in the workplace and the knowledge and skills generated through formal education. Eraut classifies the knowledge of professional and vocational education programs as follows: a) theoretical knowledge, b) methodological knowledge, c) practical and technical skills, d) general skills, and e) general knowledge of the work concerned. Eraut states that of the many knowledge provided only a few that fit the workplace.

Various theories put forward to define the notion of work-based learning (WBL). Ball, I (2010: 4) describes the definition of the WBL as follows:

a. Vocational workers/learners undertake to learn to improve professional qualifications in their work

b. Workers/students undertake a general study using their type of work to learn and work to assess.

c. Workers conduct in-house programs which are then assessed by the owner of the company

d. Workers undertake planned programs to integrate learning and workplace practices

Boud and Garrick (1999, in Ball I, 2010: 4) states that the WBL is a workplace lesson not only related to direct workplace competence but is an investment in assessing the technical capabilities of the technical workers and the specific knowledge and capabilities in wherever they work. Work-based learning lies in the context of a paradigm shift from 'industrial society' to 'knowledge society' (Rohlinetal, 1998 in Linehan, 2008: 20). Little, (2006) declared the WBL as all forms of learning through the workplace, whether the work experience or work shadowing within a certain time. Another definition states that WBL is all learning that occurs as a result of workplace activity.

Work-based learning as a learning approach plays a role in promoting professional development and learning. WBL is used as a terminology in various countries for programs at school/college to gain experience from the world of work (WBL Guide, 2002). Also used for teenagers to be ready for the transition from school to work to learn the reality of the work/world and be ready to make the right choice in work (Paris & Mason, 1995). Another notion, states: "Work-based learning is any training that relates directly to the requirements of the job on offer in your organization" (Glass, Higgin, & McGregor, 2002).

Work-based learning is a learning strategy that connects learners directly with work in the workplace. This is in line with Bragg (1995):

Work-based learning means instructional programs that deliberately use the workplace as a site for student learning. Work-based learning programs are formal, structured, and strategically organized by instructional staff, employers, and sometimes other groups to link learning in the workplace to students' college-based learning experiences. Work-based learning programs have formal instructional
plans that directly relate students' worksite learning activities to their career goals. These experiences are usually but not always college-credit generating.

Work-based learning is useful in improving learners' motivation for achieving learning outcomes, improving personal and social competence (life skills), improving their understanding of the world of work. Work-based learning is an increasingly important part of the higher education curriculum. Work-based learning can spur the development of student personality and professionalism so they are ready to enter the workforce. Work-based learning tends to be a direct training of learners in the world of work. This learning is more structured by using a work-tailored curriculum.

Bailey & Merrit, 1997, states that recent research results conclude that the use of Work-Based Learning Approach (WBL) in education has a positive influence on achievement, motivation and continuing education WBL. Research and evaluation show the correlation between outputs and graduate outcomes with learning structures provided by schools and industry as workplace experience.

The development of learning in the implementation of vocational education should continue to be done by the managers so that the quality of graduates in accordance with the demands of the labor market. Challenges in the work world with higher work competencies as technology advances and workplace dynamics require vocational education institutions to anticipate and cope with the changes that occur by utilizing various capabilities. Various signals about the quality of education are the background to the problem of vocational education with the WBL approach. WBL is a learning approach that utilizes the workplace to structure workplace experiences that contribute to the social, academic, and career development of learners and be a supplement to learning activities. With the WBL, learners develop attitudes, knowledge, skills, enlightenment, behaviors, habits, and associations from the experiences of both places and allow for learning related to real-life activities (Lynch & Harnish, 1998).

3. Methodology
This research will be conducted on existing construction workers in Medan City with 30 respondents. The place of research was conducted at Civil Engineering Workshop of Building Engineering Department. The implementation of WBL learning does not have to be the same stage, but this stage is adapted to the type of learning, organizational readiness, facilities and infrastructure facilities, funds, human resources available. The steps that must be carried out in a WBL are a preliminary stage, implementation stage, observation stage and re-planning phase. The detailed steps are as follows: 1) identifying needs; 2) formulate objectives; 3) design instructional analysis; 4) developing methods; 5) determine the evaluation pattern; 6) implement the program and; 7) measure learning outcomes.

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4. Result and Conclusion
The results of the implementation of this research activity are described in accordance with the stages in the form of learning cycles conducted in the process of learning in the classroom. Each cycle consists of four stages: planning, execution, observation/reflection, and replanning. The planning stage is done by planning the process before the learning such as identification of needs, formulate goals, design instructional analysis, preparation of learning tools, group determination, materials, and others. The implementation stage is done with three meetings for plastering wall, ceramic installation and molding technique which is done by introduction stage, core stage, and closing stage. The preliminary stage is to pre-test the participants. The core stage is by giving the material by the structure and explaining the learning that will be done. Observation stage where the instructor records all activities during the learning process while at the end of the learning evaluation.
Figure 1. The percentage of the level activity of participants

Graph 1 above is the percentage of active participants in following the WBL. The x-axis shows the measured aspects of the WBL participants consisting of 9 aspects: 1) Noting explanation of instructor, 2) Asking questions, 3) Doing the questions with confidence/not relying on others, 4) Communicating and participating well in group, 5) Providing ideas/opinions, 6) Responding to the opinions of others, 7) Receiving opinion/input of others, 8) Paying attention to fellow members of other groups, and 9) Making a summary of the study. These nine aspects were assessed at the beginning of the lesson before using the WBL and were assessed after obtaining the WBL through 4 meetings. At the beginning of using the WBL, there was a low level of participant activity from various aspects measured by pre-test. Secondly, the first meeting shows an improvement in almost all aspects measured, although no significant changes have been seen yet. A sharply increased percentage can be seen in 'communicating and participating well in group'. This shows that the participants are more comfortable and happy to communicate with fellow participants because it can increase his confidence. The 'making a summary of the study' aspect is the highest aspect of the percentage. This concern is marked by group members helping each other to be able to do the finishing work. Overall, the percentage of the nine aspects measured increases after WBL.

Research activities with WBL conducted have shown success in the implementation. One of the advantages of WBL that experts have discovered is to increase the liveliness of participants in the learning process. Therefore, Figure 2 above shows the results of the liveliness distribution of the participants examined during the WBL execution.

Building construction workers who are given work-based learning in Civil Engineering workshops are something new for the workers themselves. Generally, participants have never had a learning experience that suits the workplace. Figure 2 shows the level of activity of WBL participants observed during the learning process. The implementation of WBL is done for 4 meetings. At the beginning of the meeting, participants were still shy, afraid, with low levels of activity and participation in the learning process. Initially, the number of passive participants was 53.33% (16 persons) along with the
Given, the number of passive students was reduced to 3.33% (1 person). WBL participants, amounting to 30 people are a very active role in the learning process. Furthermore, with the WBL learning done there is a significant increase of each meeting. Increased participant activity is expected to have implications on the results of the final value or evaluation of the competencies of each participant.

Figure 3 shows the evaluation of learning outcomes of the WBL process undertaken. The Y-axis is the number of WBL participants, whereas the X-axis is the learning outcome of the WBL participants. Initially, a pretest (diagram 1) was conducted to participants who produced an incompetent 96.67%. The next meetings (second, third and fourth) have been conducted by the WBL and the results can be seen in diagrams 2, 3 and 4. Along with the WBL implementation that provides increased competency of participants at the end of the meeting, there are 0% not competent. From figure 3, there is a significant increase from before doing WBL and after doing WBL.

5. Discussion
The results of the study at the first meeting showed that there was a change in the participants' cognitive understanding (competence) about the plastering of the walls by applying WBL. Differences between post-test and pre-test (first meeting) were 20.59 and 25.50 (second meeting). The difference in this score does not show any major changes when it is associated with the expected competency outcomes. To improve this through the WBL, the implementation is not only done in workshops but also in the field of work in the observation or directly involved in building construction work (individuals and groups). By applying the WBL, where each student actively communicates and participates in solving a job, a cooperative understanding among the participants will be much better than individual learning. The next meeting found the difference in value between the pre-test and post-test has increased significantly, where the average final score is obtained at 84.25.

Furthermore, with the WBL in addition to obtaining the results of the participants' competency evaluation also obtained the result of evaluation activity level of the student during a learning process. Before implementing WBL, the participant's average activity was 37.72 (pre-test). While after implementing WBL the average value of activity level increased significantly from 42.22 (meeting 1), 46.67 (meeting 2), 53.05 (meeting 3) and finally increased to 67.42 (meeting 4). From the description, it can be concluded that the need for WBL to be given to participants before they enter the workforce they want.

Implementation of WBL conducted in the workshop can be continued by conducting training in the workplace. Workplace training will help construction workers about the real world of work. By implementing a guided WBL, where every participant is active in communicating and participating in finishing work, understanding will be much improved compared to without WBL. Finally, WBL can also be done not only for construction workers but for vocational education students. Providing WBL in the classroom will further enhance the competence of students who will enter the world of work.

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References
[1] Alipour M., et al 2009, A Study of on the Job Training Effectiveness: Empirical Evidence of Iran, International Journal of Business and Management, Vol. 4, No. 11, www.ccsenet.org/journal.html download, February 27th 2017.
[2] Bailey, T.R., Hughes, K.L., & Moore, D.T., 2004, Working Knowledge Work-Based Learning and Education Reform. New York: Routledge Falmer
[3] Ball, D.L. & Forzani, F.M. 2007, What makes education research “Educational”? Educational Researcher, 36, 9, 529-540 download November 27th 2014 dari http://er.aera.net
[4] Billet, S, Learning, 2008, Through Work: Exploring Instances Of Relational Interdependencies, International Journal Of Educational Research, Volume 47, Issue 4, 2008, pages 232-240, https://doi.org/10.1016/j.ijer.2008.07.006
[5] Bragg, D. D., Hamm, R. E., & Trinkle, K. A., 1995. Work-based learning in two-year colleges in the United States (MDS-721). Berkeley: National Center for Research in Vocational Education, University of California
[6] Djadnika, S., et al. 2005, Peningkatan Kinerja Tenaga Kerja Konstruksi Dengan Melakukan Restrukturisasi, Research Gate, DOI: 10.13140/2.1.3767.9366, https://www.researchgate.net/publication/265864692
[7] Donald P. Dingsdag, Herbert C. Biggs, Vaughn L. Sheahan, 2008, Understanding And Defining OH&S Competency For Construction Site Positions: Worker Perceptions, Safety Science, Volume 46, Issue 4, April 2008, Pages 619-633, https://doi.org/10.1016/j.ssci.2007.06.008
[8] Linehan, M. 2008, Work-Based Learning, Graduating Through The Workplace, CIT Press, Bishopstown, Cork, Ireland
[9] Little, B. et al., 2006, Employability and Work-Based Learning. London: HEA
[10] Work-based Learning Guide 2002. download February 2nd 2016, from: http://www.iowaworkforce.org/files/wlg02.pdf