

Assesment for plumbing competency instrument

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Submission date: 27-Apr-2022 10:47AM (UTC+0700)

Submission ID: 1821536893

File name: Assesment_for_plumbing_competency_instrument.pdf (615.35K)

Word count: 2678

Character count: 14669

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To cite this article: F A Rouf *et al* 2021 *J. Phys.: Conf. Ser.* **1833** 012037

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Assesment for plumbing competency instrument

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Abstrac. This study aims to determine the quality of the compiled plumbing work competency instrument on clean water. This research was conducted from January to February 2020. This research instrument involved 3 validators each of the test construction and plumbing material. This instrument's assessment involved three elements of competency, such as skill, knowledge of installation and plumbing system, and plumbing worker attitude. This research method is based on a descriptive design. Use the 4 expert assessments within the national qualifications framework as a guide. The results of this research will be used as the basis for the improvement and development of the plumbing instrument on clean water.

1. Introduction

To carry out building installation and maintenance work in Indonesia, a good competency of construction workers is required [1], Based on Law Number 18 of 1999 concerning Construction Services and their implementing regulations state that workers who carry out planning, implementation and supervision of construction must have certificates of expertise and / or skills. Must have a "Certificate of Expertise and Skills": reflects the demands of a competent workforce's quality. These conditions require concrete steps in preparing the tools (standard standards) needed to measure the quality of construction service work. (in the SKKNI Construction Category).

In the current certification the period is becoming something so important. Some certification functions support infrastructure development [2], and the certificate is also an effort to protect the law [3]. Therefore certification must be one of the priorities in improving the quality of the workforce. Assessment and measurement of competence are needed by measuring instruments with valid, objective, and consistent quality[4]. The plumber's competency measurement tools must be of good quality so that certified workers can be responsible for their abilities [5]. The very small number of plumbers compared to the needs of the community is a strong indicator in assessing how well the assessment process and instruments are used to measure plumber competence in Indonesia.

The right strategy to improve construction workers' performance (competency) is by enhancing the competency and quality of workers 'resources through training and certification of workers' expertise [6]. One factor that can improve construction projects' performance is the competence of workers on construction projects [7]. Wages, work skills and work experience significant effect on the performance of the implementation of formwork (construction) work[8].

Based on the problems that have been described, there is a need for standardization in the certification process of construction workers skills. Therefore, instruments are needed to measure, assess, and determine employee competencies. Competency assessment includes three aspects, namely cognitive aspects, psychomotor aspects, and affective aspects.[9], that there needs to be a balance between



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competency assessment of attitudes, knowledge, and skills that is adjusted to the development of the characteristics of students in following their level [10].

2. Method

This research method is based on a descriptive design. Use four expert assessments with national qualification frameworks as a guide. Data collection was carried out by questionnaire assessment and expert assessment in instruments (2 experts) and plumbing (2 experts) using the semantic scale differential. A validation test using the V-Aiken formula is carried out on the plumber competency instrument after collecting the data. This study's analysis was broken down into two components, namely: content validity and instrument construction.

3. Result

The study results are divided into 2 (two) main parts, namely: content validation and the construction of plumber competency instruments. In both parts, There are 3 (three) parts in the instrument in both parts, namely: a test of knowledge, a test of attitude and skills (performance). The V-Aiken range obtained is between 0 and 1.00 with categorizations <0.6 (low / bad), 0.6 - 0.8 (moderate / good) and > 0.8 (high / very good) [11].

3.1 Content Validity

Based on the results of the assessment, experts obtained the results of the content's validity as follows Table 1.

Table 1 Content Validity

No	Performance Test	Coefficient Validity	Knowledge Test	Coefficient Validity	Observation	Coefficient Validity
1	Preparing pipeline schematic Drawing	1	Danger and risk of accident	0,916	Choosing the pipe as needed	1
2	Making Pipeline	1	Personal Protective Equipment (PPE) needed according to work	1	Prepare the pipe in accordance with the amount	1
3	Connecting with solvent liquid	1	Ways to store material	0,75	Select a pipe according to its size	0,8 33
4	Installing Screw Connection	0,75	How to maintain plumbing work equipment	0,916	Work according to the picture	0,9 16
5	Make a Compression Connection	1	How to install a clean water pipe installation	0,916	Marking of the pipeline is carried out in accordance with work instructions	0,8 33
6	Making the Solder Connection	0,416			Check the complete material needs	1

No	Performance Test	Coefficient Validity	Knowledge Test	Coefficient Validity	Observation	Coefficient Validity
					of clean water pipes	
7	Making a Copper Connection	0,416			Determine the number and type of tools needed	0,8 33
8	install the Socket Fusion Joint	0,416			Check the completeness of clean water pipe work equipment	1
9	Making Connections	0,833			Check the quality of the pipe connection	1
10	Install the Electrofusion Joint	0,75			Clean pipe joints from remaining pipe glue	0,9 16
11	Installing water pipes	0,583			Work Pipeline connection Clean from the remaining material	1
12	Installing a Clean Water Pipe Valve	1			Workers tidy up the remaining materials	0,9 16
13	Installing a Water Faucet	1			The remaining materials are stored in a storage warehouse	0,9 16
14	Installing the Pipe Support	0,916			Workers clean plumbing work equipment after use	0,9 16
15	Checking Pipe Joints	0,916			Work equipment is tidied up and stored in a storage area	1
16	Checking Plumbing Installation Work	1			Report the progress of the work	0,9 16

No	Performance Test	Coefficient Validity	Knowledge Test	Coefficient Validity	Observation	Coefficient Validity
17	Oversees Plumbing Installation Work	1				
18	Preparing Procurement in the Workplace	1				
19	Preparing Work Progress Claims	1				

The results of the content validity showed a high score. This score explains that the instrument is basically quite good with several items that need to be repaired, these items are Making Solder Connection, Making Copper Connection, Installing Fusion Socket Connection, and Installing water pipe. On closer inspection, the contents of the instrument are sufficient to meet the accuracy of actual piping work.

The experts who became validators revealed that the instrument developed still had to be improved in several sections, such as an increase in the assessment rubric and items for aspects of knowledge to conform to the established standards SKKNI.

3.2 Construct Validity

Based on the expert judgment, which was then analyzed by the V-Aiken formula, the instrument construction validity results were as follows Table 2.

Table 2. Construct Validity

No	Performance Test	Coefficient Validity	Knowledge Test	Coefficient Validity	Observation	Coefficient Validity
1	Preparing pipeline schematic Drawing	0,916	Danger and risk of accident	0,916	Choosing the pipe as needed	0,75
2	Making Pipeline	0,75	Personal Protective Equipment (PPE) needed according to work	1	Prepare the pipe in accordance with the amount	0,916
3	Connecting with solvent liquid	1	Ways to store material	0,833	Select a pipe according to its size	0,833
4	Installing Screw Connection	0,75	How to maintain plumbing work equipment	0,75	Work according to the picture	0,916

No	Performance Test	Coefficient Validity	Knowledge Test	Coefficient Validity	Observation	Coefficient Validity
5	Make a Compression Connection	0,583	How to install a clean water pipe installation	0,583	Marking of the pipeline is carried out in accordance with work instructions	0,583
6	Making the Solder Connection	0,416			Check the complete material needs of clean water pipes	0,75
7	Making a Copper Connection	0,75			Determine the number and type of tools needed	0,916
8	install the Socket Fusion Joint	0,75			Check the completeness of clean water pipe work equipment	0,75
9	Making Connections	0,833			Check the quality of the pipe connection	0,75
10	Install the Electrofusion Joint	0,833			Clean pipe joints from remaining pipe glue	0,916
11	Installing water pipes	0,916			Work Pipeline connection Clean from the remaining material	0,833
12	Installing a Clean Water Pipe Valve	0,75			Workers tidy up the remaining materials	0,75
13	Installing a Water Faucet	1			The remaining materials are stored in a storage warehouse	0,583

No	Performance Test	Coefficient Validity	Knowledge Test	Coefficient Validity	Observation	Coefficient Validity
14	Installing the Pipe Support	0,916			Workers clean plumbing work equipment after use	0,833
15	Checking Pipe Joints	0,916			Work equipment is tidied up and stored in a storage area	0,75
16	Checking Plumbing Installation Work	0,916			Report the progress of the work	0,833
17	Oversees Plumbing Installation Work	0,916				
18	Preparing Procurement in the Workplace	0,75				
19	Preparing Work Progress Claims	0,75				

Overall validation results for the instrument's construct from experts have shown a high value, but in some items, the experts consider that the items developed still have low validity. It means there is still a need for improvements to the instrument to get a better construct validity. This result is better than the previous instrument [12], The contract validation results show a fairly good result as a form of instrument that measures the competency of plumbing workers..

4. Discussion

Indicators of achievement of plumbers are divided into several elements of competence. High results indicate that the instrument has items that can measure all expected competency indicators reaching a plumber, but some parts still need improvement because of the low validity. Experts who judge instruments are practitioners in the plumbing field. So it is fair to say that the contents of the water channel instruments are stated to be quite relevant to the field's work. In the field implementation, it is important to understand that all instruments must be made as well as possible and comprehensively to accommodate the competency needs that workers should have[12].

The ability of plumbing workers to implement their competencies is the most important thing in sanitation work. Ability to prepare materials and tools, cut and join, group and select pipes, and apply piping systems for clean water, sewage and dirty water [13]. Therefore each instrument that measures knowledge, attitudes, and skills should be separated according to needs and made as effective as possible so that it does not require a long time in its application[14].

Based on the discussion, a good competency instrument is an instrument that can measure the competence of the workforce in accordance with the national qualifications framework that is relevant to market needs. As well as quality improvement efforts need to be carried out jointly, both education practitioners and industry to match types, constructs, and content covering the realms of knowledge, attitudes, and skills. The instruments are arranged based on real needs and according to the performance characteristics to be measured.

5. Conclusion

Instruments that are assessed with low validity, must be improved. The instrument's competence must not only see the final result but also assess the criteria, content, and process carried out. This plumbing competency instrument can be said to represent the framework of national qualifications. The strong relevance between education and training and industry needs is the most important thing at present. Therefore, a good instrument is needed to measure plumber competence with high relevance to the industry.

6. References

- [1] M. E. Castellano, G. B. Richardson, K. Sundell, and J. R. Stone, "Preparing Students for College and Career in the United States: the Effects of Career-Themed Programs of Study on High School Performan¹⁹" *Vocat. Learn.*, 2017, doi: 10.1007/s12186-016-9162-7.
- [2] H. P. Adi and S. U. Adillah, "Sertifikasi Tenaga Kerja Konstruksi sebagai Unsur Pendukung Pembangunan¹⁴ Infrastruktur," *Semin. Nas. Fak. Tek. Unissula*, p. , 2012.
- [3] R. Iskandar, "Sertifikasi Kompetensi Sebagai Upaya Perlindungan Hukum Bagi Lulusan Perguruan Tinggi Pariwisata Dalam Menyambut Mea," *BARISTA J. Kaji. Bhs. dan¹³ Pariwisata*, vol. 2No2Dec15, p. 236, 2015.
- [4] D. Leutner, J. Fleischer, J. Grünkorn, and E. Klieme, "Competence Assessment in Education," *7 Res. Model. instruments. Hambg. Springer*, 2017.
- [5] A. O. Afolabi, R. A. Ojelabi, I. Omuh, P. Tunji-Olayeni, and A. Afolabi, "Building designs and plumbing facilities: The implication for rising maintenance cost," *Int. J. Mech. Eng. Technol.*, ⁶018.
- [6] U. Utomo Tegar Adhi, Handayani Fajar S, Sugiyarto, "Strategi Peningkatan Kinerja Tenaga Kerja Proyek Konstruksi dalam Menghadapi Persaingan Masyarakat Ekonomi ASEAN," *J. Adm. Publik*, vol. 1, no. 2, pp. 131–139, 2011, doi: 10.1002/14356007.a13.
- [7] W. Y. Christina, L. Djakfar, and A. Thoyib, "Pengaruh Budaya Keselamatan Dan Kesehatan Kerja (K3) Terhadap Kinerja Proyek Konstruksi," *J. Rekayasa Sipil*, vol. 6, no. 1, pp. 83–95, 2012.
- [8] S. P. B. V. Amin Zainullah, Agus Suharyanto, "Pengaruh upah, kemampuan dan pengalaman kerja terhadap kinerja pekerja pelaksanaan bekisting pada pekerjaan beton," *J. Rekayasa Sipil*, vol. ¹⁸, no. 2, 2012.
- [9] S. R. Sunarti, "Pen¹¹uan Dalam Kurikulum 2013," *Yogyakarta CV Andi Offset*, 2014.
- [10] P. A. Kunandar, "Penilaian Hasil Belajar Peserta Didik Berdasarkan Kurikulum 2013," *Jakarta¹⁷ ja Graf. Persada*, 2013.
- [11] S. Azwar, "Reliabilitas dan validitas edisi 4," *Yogyakarta⁴ Pustaka Pelajar*, 2012.
- [12] R. Arthur, F. A. Rouf, H. Rahmayanti, and A. Maulana, "Plumbing work competence instrument in the field of civil engineering," in *Journal of Physics: Conference Series*, 2019, vol. 1402, no. 2, doi: ¹⁵.1088/1742-6596/1402/2/022019.
- [13] A. Arfandi, "Relevansi kompetensi lulusan Diploma Tiga teknik sipil di dunia kerja," *J. Pendidik. Vokasi*, 20¹⁰, doi: 10.21831/jpv.v3i3.1843.
- [14] R. Arthur, "Evaluasi program diklat karya tulis il¹⁰n untuk widyaiswara Pusbangtendik Kemdikbud," *J. Penelit. dan Eval. Pendidik.*, 2018, doi: 10.21831/pep.v22i1.16749.
- [15] C. Ford, "Effective practice instructional strategies: Design of an instrument to assess teachers' perception of implementation," *Stud. Educ. Eval.*, vol. 56, pp. 154–163, 2018.

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