


SKILLS

PLUMBERS 2015


aspiringminds
Employability Quantified



An analysis by Aspiring Minds, the global leader in standardized employability assessments with presence in India, US, Philippines, China, Middle East and Africa. With millions of candidates assessed annually, Aspiring Minds' assessments provide a comprehensive measure of language, aptitude, behavior and hundreds of work skills. This analysis is in continuation of Aspiring Minds' efforts in gauging employability of young and upcoming workforce, provides an insight into the skill gaps of trained/semi-trained plumbers. The report is based on data collected by assessing 3,000 plumbers on a comprehensive and standardized assessment.



I. Introduction

The job paradox exists around the world: there are open positions that do not get filled, and there are people without jobs. The problem encompasses jobs both in the knowledge industry and also, the world of skilled trades and vocations. According to a Manpower Group survey¹ of nearly 40,000 employers in 41 countries, workers in skilled trades (plumbers, electricians, welders, bricklayers etc.) are in the shortest supply.

One major reason identified for this gap is lack of skills and information among people about these jobs. Governments, industry organizations and NGOs all across the world have put efforts to address this gap. In context of plumbing workers, we find considerable efforts by the Ministry of Skill Development And Entrepreneurship, National Skill Development Corporation and Indian Plumbing Skill Council in India to catalyze the training and credentialing ecosystem.

Plumbing is one of the professions on Australia's wanted list as it raises its annual target figure for skilled workers coming into the country. Pimlico Plumbers, one of the biggest plumbing firms

in London, has launched national recruitment drives to attract people in the profession from outside the national capital. Interestingly, the rise in demand of plumbing workers across the world indicates that the world economy is doing much better².

Given all these efforts, we are keen to investigate whether the training intervention for plumbing workers has been effective. We wish to find how candidates trained in plumbing across India fare in the various employability skills needed for the job. This analysis is in the same vein as Aspiring Minds' earlier efforts in gauging the employability of engineers³ and graduates⁴ for various jobs. This work has not only added to the public discourse of concentrating on quality rather than just quantity, but provided multiple insights on competencies on which training institutions should focus. We continue and extend these analyses to the plumbing profession, based on our experience of testing more than a million candidates annually on various employability skills and also, working with 2000+ employers.

¹ Talent Shortage Survey 2013

² Rising demand for plumbing services indicative of how the economy is doing!

³ Aspiring Minds National Employability Report | Engineers | 2014

⁴ Aspiring Minds National Employability Report | Graduates | 2013

This analysis provides insight on what skills currently trained plumbers lack and areas where we should focus our training interventions. We believe this will help training institutions develop their interventions better and will influence both curriculum and pedagogy. It will also provide a better idea to all stakeholders of what is required by the industry. In turn, it will also help the industry design better programs. Although the data in this study is from India, it is a case study which may provide insights for programs across the world. The analysis is done with the same rigor as all earlier studies by Aspiring Minds. The instruments are scientifically designed, follow global standards and validated by the industry.

They measure competencies spanning soft skills, functional knowledge, handling real-world situations and also understanding of health and safety. Most importantly, they were delivered with credibility, electronically, on tablets in a scalable way.

We hope that policy makers, educators, and the industry will find this report useful as they embark on building a better employment ecosystem around the world.

II. Study Design

In order to ascertain the impact of the learning of the plumbing workers through the training program, 'Aspiring Minds' conducted a study with 3000 candidates from across India, who underwent plumbing training of 4-8 weeks during the year 2014.

The aim of the study was as follows:

- A.** To understand the particular **gaps in learner skills with respect to those needed in the plumbing profession**. Given that a variety of skills are needed, from theoretical knowledge and problem solving to soft-skills and workplace safety, we wished to understand which skills are students gaining and which not.
- B.** To make pedagogical suggestions to training institutions on **what could be changed in training to make the learners more suitable** for the plumbing profession.

A **standardized test was designed and delivered** to candidates at the end of their training to test their skill and knowledge required in this profession.

In 2014, more than 400,000 blue-collar workers took the test on the TESLA platform which is Aspiring Minds' framework for vocational assessments. The test helped establish the level of proficiency attained by the candidates through the training.

Given the fact that plumbing is largely a skill trade and involves the repair, installation and maintenance of drainage, water supply and heating systems, it is befitting that to do this the plumbers must be *au fait* with water and building regulations, country specific codes of practice and

health and safety issues. They should also possess the essential people skills to grow their customer base and communicate with the team they work in. The test thus assessed the performance of candidates specifically in the following four areas:

- **Theoretical knowledge** : Does the candidate have the basic know-how of the field?
- **Real world application** : Can the candidate handle a real world plumbing situation like building something or troubleshooting?
- **Soft skills** : Does the person have the right soft-skills to manage customer and team/supervisor situations?
- **Health and safety** : Does the person know how to deal with basic and critical health situations which may occur in workplace?

III. Vocational Assessment Framework

TESLA is Aspiring Minds’ framework for vocational assessments. It has been designed keeping a balance between theoretical knowledge and practical skills needed to handle a particular job role. TESLA brings technology to vocational certifications both in terms of assessment construction and delivery. The item banks are built to evaluate practical and relevant work tasks using a variety of item types that include

audio/visual stimulus, automated simulation based questions and case based scenarios that represent a simulated work environment and probe to understand the candidate’s response to those amongst others. The assessment scoring is based on standardized rubrics of evaluation benchmarked against experts for every job role. The test suite is available in multiple languages, delivered on a tablet and/or IVR platform.

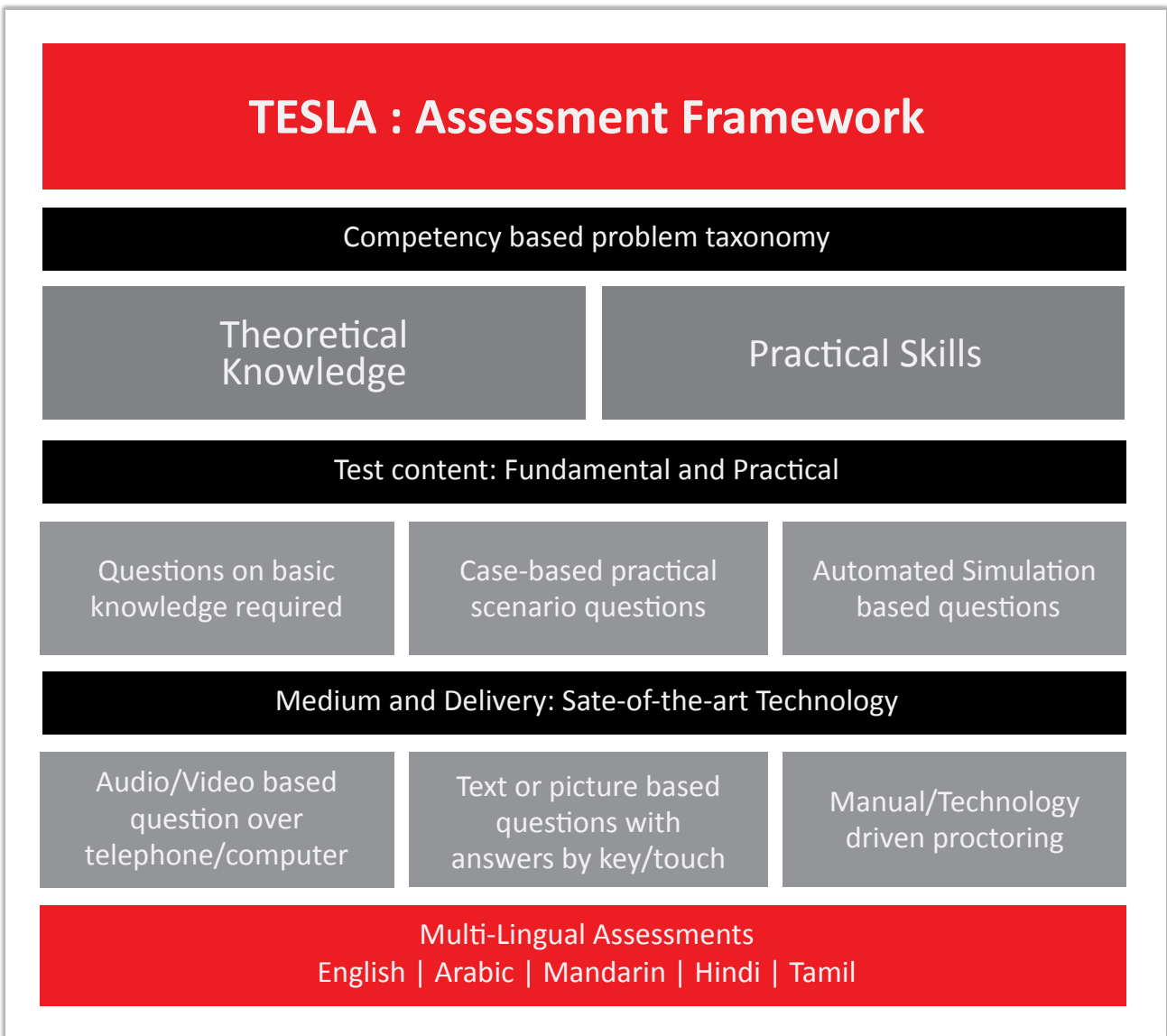


Figure 2: TESLA- Aspiring Minds’ framework for vocational assessments

IV. Observations & Results

Basic Knowledge: The study helped us bring to the fore the strengths of the training courses and also highlighted certain areas that need intervention. The candidates seem prepared and definite with regards to the very basics like the tools etc. used for specific purposes. This was evident through their responses on the 'Theoretical Knowledge' questions. Almost 90% responded correctly to the question on use of wrench for loosening the nuts for detaching a faucet from the sink and 75% mapped the exact pipe fittings to their uses.

Application of knowledge: The application of theory that the candidates gathered through the course in the real world scenarios was tested through application based questions. It was noteworthy to see that out of the 3000 candidates who took the test, about 55%-66% candidates found these questions difficult and responded incorrectly. While they all might know what the caulking, coupling and threading techniques are, 45% of them couldn't rightly choose caulking as a technique to rectify the issue presented in front of them. The results in this category of questions

draw attention to the fact that the trainings need to be designed in a manner where the participant is able to apply the acquired knowledge. And for this, the gap between the classroom and the real world needs to be bridged.

For instance, let us look at the question in Figure 3. Here we find that only 43.6% candidates got the question right. The question queries a day-to-day situation where the sink is draining very slowly, whereas the rest of the things are draining fine. The plumber needs to trouble shoot. Interestingly, the plumber can rule out option A and C simply by analytical reasoning: if either of these options were true, drainage for everything in the bathroom will slow down. Yet, 44.5% candidates choose this option. Between option B and D, the candidate needs to use simple plumbing knowledge to identify D. The example clearly shows that there is a need to make sure that plumbers are learning how to think analytically rather than gaining plumbing knowledge to sort out real-world troubleshooting issues.

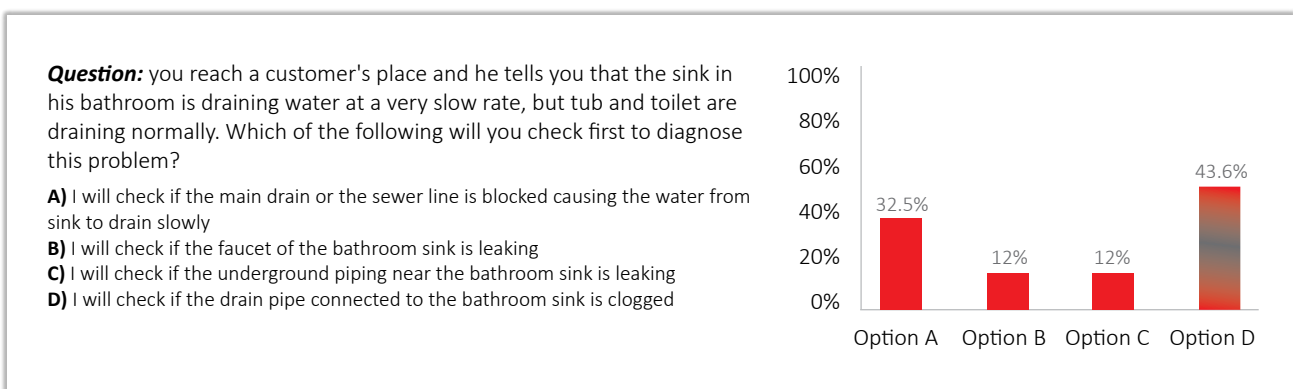


Figure 3: Real World Application- Troubleshooting a drainage problem

Soft skills: Soft skills attained by the test takers were studied by means of situation based tests. It is interesting to see good work ethics across the participants. For instance, Figure 4 shows a situation-based question that tests the ethical aspects of a plumber's decision making ability. Almost 82% of candidates identified the right option B with regards to maintaining professionalism and right attitude towards not

only the work but also with their colleagues, supervisors and most importantly the customers. In the related domains of adaptability, however, working in new environment and managing the customer situations about 33% of candidates didn't meet the required expectation. And it hence becomes a need to be addressed carefully through the training sessions.

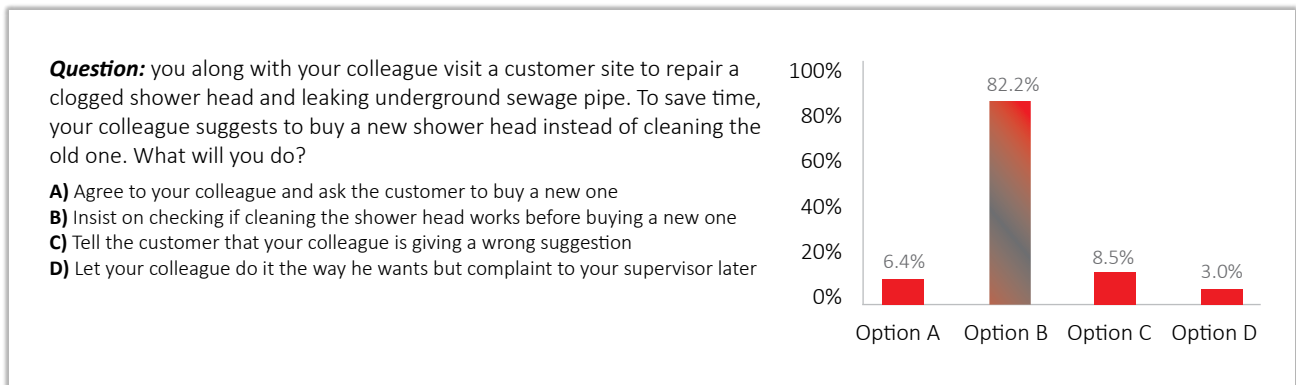


Figure 4: Soft Skills – Situation testing work ethics

Health and Safety: Lastly and most importantly, 30-40% candidates seem unprepared to handle an emergency health and safety situation. This is alarming and very concerning because of the very nature and the core requirements of the plumbing role. Only 52%, for instance, answered correctly (option C) to the question on handling a colleague with a sudden heart attack (see figure 5). Just about the same percentage of candidates could respond to the question on a co-worker getting seriously injured while working at an

underground sewage repair.

With almost half of the total candidates unaware of the health and safety norms it is essential that a strong and uncompromising focus is paid on this particular aspect of the training. Inside the classroom, the use of pedagogical techniques like- role plays or situation judgment activities can help prepare the work force better for any and every mishap.

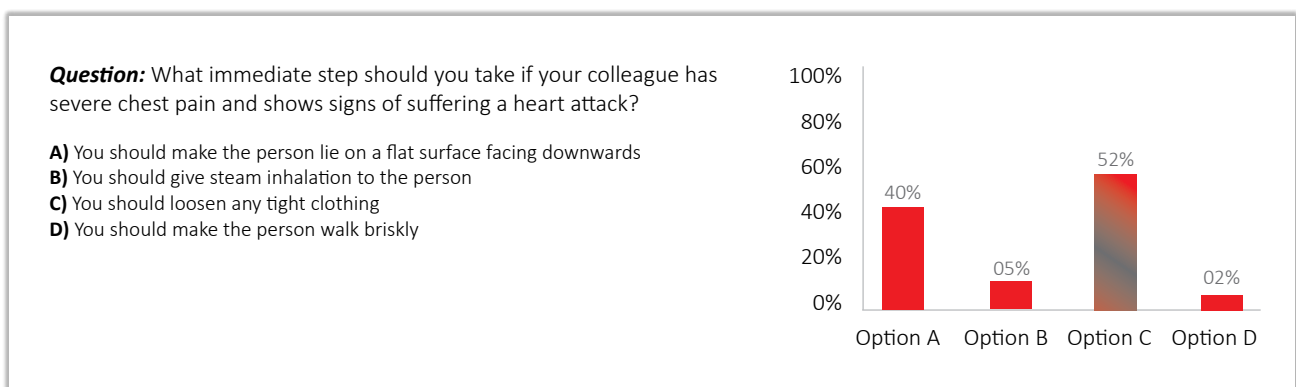


Figure 5: Health & Safety Practices – Situation involving health emergency

V. Conclusion

The study has brought forth the lacuna that exists in the current training programs for training and education of the plumbing workforce as summarized below.

- About 80% of the candidates have knowledge of basic plumbing principles such as usage of tools and pipe fittings.
- 55%-66% candidates are unable to handle real-world plumbing situations, where they have to observe, identify and solve a problem by application of plumbing knowledge combined with analytical reasoning. This clearly shows training should focus more on real-world situation handling.
- Although a high number of candidates show good work ethic, around 33% show lack of adaptation to new environments and managing customer situations with expectation mismatch.
- 30%-40% candidates do not show the ability to handle an emergency health and safety situation. This is very concerning. We need a strong uncompromising focus on this aspect by role play.

It is evident that to strengthen the workforce more stress should be laid upon a training program that puts equal emphasis to practical proficiency as well as theoretical knowledge. And this is only possible if the classrooms are made more interactive and hands-on. Students should be asked to draw from the experiences of other people in the trade. The teachers, apart from lecture classes, can make use of different pedagogical techniques such as- role play, audio-video aides, interviews and field visits. The students can be assigned certain situation judgment tasks to promote their soft skills, know-how of first aid and other health and

safety standards. The training needs to keep the students abreast with the evolving needs of the society and this is possible if they all abide by a certain professional code of conduct.

As we realize the importance of training and

*1/3rd of the total
trained plumbers are
not able to handle the
customer's situations*

development as a fundamental organizational tool, we know that it will provide a strong platform to the new entrants

into the plumbing profession to learn further, on-the-job. But we need to understand that training and assessment are two sides of the same coin. Quality assessment is always insightful, locative, advisory, and hence helps find out the efficacy of any training program. Strong evaluative practices are as important as effective teaching practices. Through the high quality tests we have been able to illustrate the existing gaps and point the need of a more hands-on training curriculum which will not only help vocational workers gain a better socio-economic status but it will also help build a stronger nation that has well planned cities, villages and houses.

About Aspiring Minds

Aspiring Minds, a job and skills credentialing leader, delivers AMCAT - the world's most widely-used employability test and the only standardized test designed for job matching. AMCAT™ is a proven, scientific, comprehensive solution that uses patent-pending technology to help companies dramatically improve their hiring while enabling job seekers to evaluate and certify their skills and find appropriate career opportunities. More than 2 million candidates have taken the cloud-based, data-driven test, resulting in 400,000 job matches and awarding of millions of credentials.

A strong in-house research and development team with alumni from IITs and MIT form the development back bone of the patent pending assessment tools. Aspiring Minds' products and solutions have been adopted by more than 2000 corporations across 4 continents, including some of the world's largest multinational companies, and 4,000 educational institutions and various government and non-government institutions.



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