Identification of Skill Gaps Amongst Workers in Select Trades of Priority Sector in India

Study Team

J. S. Sodhi

A. C. Sethi

N. K. Nair

Shri Ram Centre for IR,HR, Eco. & Soc. Development
Unit No. 1078 (F/F) Central Square, Plaza – II
Plot No. 20, Manohar Lal Khurana Marg (Barahindu Rao)
Delhi – 110006
Phone : 011-23635815; Telefax : 23635816
E mail : src@srcirhr.com; www.srcirhr.com

Introduction

As per the 11the Five Year Plan, inter-alia other sectors the sectors which are expected to drive the growth of the economy as well as play a significant role in employment are – Auto and Auto Components, Construction and Electronic & IT.

Therefore, looking at the expected growing demand of formally trained workforce it is necessary to undertake short term and part time training. To understand the kind of courses/curriculum to develop it is necessary to study and assess the knowledge involving their practical efficiency, knowledge of materials, tools, accessories, housekeeping and storage of materials & tools, safety norms to be observed etc. of such work force and identify gaps.

With a view to achieve this object it is important to conceptualize and develop a framework that coagulates information about the different facets that define labour market.

This study has been done to facilitate the NIOS to identify the skill gaps and to make recommendations for their accelerated learning support certification of skills in the select trades of priority sector in India i.e. Auto Mechanic (Automobile/Auto Component) – Ludhiana (Punjab), Mason (Building & Construction) – Noida (UP), Carpenter (Building & Construction – Noida (UP), Plumber (Unorganized Sector) – Gurgaon (Haryana) and TV Repair (Electronics Hardware) – Gurgaon (Haryana).

The total sample comprised of 509 respondents numbering to 100, 101, 103, 101 and 104 of the five trades – Auto Mechanic, Mason Carpenter, Plumber and TV Mechanic respectively.

The methodology consisted largely of collecting primary data with the help of separately designed questionnaires. For designing theses questionnaires it was important to understand the total skill set of each trade. A preliminary list of questions was prepared by the SRC and subsequently the discussions were held with ITI & ITC teachers, who were also aware of the revised skill set of the upgraded ITIs. The revised questionnaires were sent to NIOS who gave useful suggestions which were incorporated.

The data thus collected was analyzed into simple tables largely to facilitate a clear understanding of the present level of skills and gaps which exist.

Findings and Implications

The study results provide information about which not much is known as there are fewer studies on the subject. NSDC has done a few studies but more on the quantitative skill gaps.

In terms of their background information the study found that most of the respondents belonged to the younger age group (16-35 years) with the implication that such workers are going to be in the labour market for over two decades. A higher proportion of them studied up to the eight standard with more of carpenters and masons being illiterates or studying up to the primary level. These workers will not be able to attain vocational education in the formal pathways. Most of the respondents, except for the Motor Mechanics, were willing to undertake formal training to bridge their skill gaps. Majority wished to take up part time training and very few opted for the formal sources of training.

The respondents were also not able to invest much time on further training as most of the Masons and Plumbers opted for training up to 30 days while others opted to undertake training for up to 100 days

Inferences and policy implications of the quantitative and qualitative

Skill Gaps

Auto Mechanic

The training duration for getting formal certification is entirely a function of the skill gaps. However, the policy makers would also need to orient the curriculum from the perspective of persons wishing to enhance their skills.

The data on skill gaps shows overall there was a competency gaps of 48% in their competence of the trade. More specifically, about two thirds had nil or negligible competence of the main parts of and the units attached with the engine of a motor vehicle. Two thirds also had nil or negligible competency about other aspects like ‘meaning of stroke’, ‘functions of cylinder’ and ‘components of full supply in diesel engine’. 49% did not have knowledge of the ignition system. Further, 36%

of the respondents had nil or negligible competency regarding the 'merits & demerits of the two stroke engine'. One-fourth did not have any competency of the difference between "two strokes and the four Strokes engine". On other aspects like 'thermostat' 'battery' 'reasons and remedies of the injector pressure' a higher proportion of respondents had no/ negligible competence.

While there were competency gaps most of Auto Mechanics were unwilling to take up further training

Proposed Curriculum for Bridging skill Gaps

- Various parts of a vehicle and their respective locations.
- The technical difference between 2/4 stroke engines.
- Petrol/Diesel/CNG engines.
- The working procedure and purpose & types of clutch, gearbox & brakes.
- Various dos & don'ts to be followed while repairing and maintaining various vehicles.
- The procedure for checking compression pressure.
- The system of power of flow from engine to wheels.
- The working principles of drums and disc brakes.
- The fluid to be put in a battery and its proper maintenance.
- The procedure for dismantling and reassembling after maintenance of clutch, gearbox & brakes.
- The tyre sizes and reasons for their general defects.
- The need & procedure of tyre rotation.
- The air-fuel ratio.
- Various tools & instruments and their usage for maintenance of vehicles, specifically micrometer, feeler gauge, multi meter & dial gauge etc.
- Emission norms.
- The series & parallel resistance circuits.
- Need to learn the procedure for checking and overhauling suspension system.
- The working principle, procedure for dismantling, inspecting & assembling of start motor.
- Need to learn about the safety precautions to be observed in workshop/garage.

Mason

Their competency levels were checked on aspects like Tools, bricks, cement, mortar, masonary technical terms & safety precautions.

Their overall competency gap of all these aspects was 55%. About half or more did not have the competence of various masonary terms, tools & knowledge of storage of Cement and ratio of various ingredients of mortar. Sixty percent of them also did not have any competence of the safety precautions to taken up while on the job. Most of them were willing to take up further training to bridge the skill gaps.

Proposed Curriculum for Bridging Skill Gaps

- Various masonry tools, their storage and correct usage.
- The quality of masonry material and their technical specifications.
- Adequate storage of material.
- The timing of initial and final setting of cement.
- The quality of paste of cement.
- Ratio of cement and sand of making mortar for various purposes.
- The technical terms related to masonry work.
- To deal with the left over mortar.
- To assess the quantity required of various materials for a specific work.
- Lack ability to calculate the quantum of work done or to be done.
- The safety procedures and gadgets/instruments need to be used for safety purposes.
- The modern housekeeping practice, handling of materials and waste disposal.

Carpenter

Their competence was seen on aspects like distinction between soft and hard wood, distinction between various units of measurement, knowledge of Carpentry technical terms, bugs and worms, tools and instruments and safety precautions.

Overall, there was a gap of 39% in their competence of various aspects of their trade. The competence gap was the highest on safety norms as about two-thirds had nil or negligible knowledge of this aspect. About half of them also did not have any competence of soft and hard wood and tools and instruments like Caliper, compass, etc. Over two-thirds had competence of bugs & worms and technical terms of their trade.

Proposed Curriculum for Bridging skill gaps

- Carpentry tools, holding devices, and machines and their usage for various jobs.
- To draw a rough sketch of a job.
- To identify, qualities and usage of various types of hard/soft woods like deodar, shisham etc.
- The preservation of the wood.
- Converting FPS (Foot, Pound, Second) system to MKS (Meter, Kilogram, Second) system.
- Seasoning of wood and its methods.
- Various other carpentry materials and their quality.
- The worms that damage the wood, chemicals to be applied to wood to prevent from damage by the various worms.
- Assessing the quantity of material required for a particular job.
- Assessing the work done or to be done.
- Procedures and gadgets/instruments need to be used for safety purposes.

Plumber

The competence level was drawn out on plumbing terms & systems, conversion of units from FPS to MKS, dimensional tolerance while assembling GI pipes and bending & threading pipes. Overall there was a skill gap of 44% in their competence of the trade. More specially, about one-fifth had nil or negligible competence of Blending & threading pipes, over two-thirds had nil or negligible competence of the conversion of units from FPS to MKS and of dimensional tolerance while assembling the GI Pipes. 39% of the plumbers did not have competence of the reasons for over-flowing from cistern as well as the method of stopping them.

Most of the respondents showed their willingness of training.

Proposed Curriculum for Bridging Skill Gaps

- Various plumbing tools and their usage.
- Various plumbing materials and their usage.
- Various types of pipes and their usage.
- Cutting the various types of pipes.
- Threading the GI pipes.
- Cutting, bending and jointing of PVC pipes.
- Fixing sanitary fitting, kitchen fittings and W.C. fittings.
- Various types of urinals and their fittings.
- Fitting the water meters in main pipe lines.
- Fitting the water pumps.
- Assessing the quantity of material required for a particular job.
- Safety procedures and safety tools and equipments to be used for safety purposes.
- Housekeeping practices.
- Storage and maintenance of the plumbing tools.

TV Mechanic

Competence levels were assessed on their knowledge of resistance, finding typical faults, instruments, Wattage and replacing defective parts like transistor, Diode & IC from PCB. Overall, there was a competency gap of 48% amongst the TV Mechanics. 30% did not having any competence of various measuring instruments and 28% had no knowledge of Wattage of Electric Soldering iron. There were gaps in competence of finding specific faults (38%) and resistance (48%). All of them were willing to take up additional training.

Proposed Curriculum for Bridging Skill Gaps

1) Various instruments used for TV repairs such as:
    - Moving Coil Meter
    - Ammeter.
    - Voltmeter.
    - Ohmmeter
    - Digital Multimeter.
    - Multimeter.
    - Pattern Aenerator.
    - Cathode Ray Oscillator.
    - Frequency Counter.
    - R.F. Signal Generator.
2) Technical knowledge of:
    - Factor affecting Resistance.
    - Resistance colour codes.
3) Inductance:
    - Mutual inductance.
    - Types of coils.
    - Combination of Inductance.
4) Capacitor:
    - Working of Capacitor.
    - Factors affecting Capacitor.
    - Types of Capacitors.

- Combination of Capacitors.
- Color coding.

5) Transformers:
   - Working of transformer.
   - Voltage Ratio.
   - Current Ratio.
   - Step up & step down transformer.
   - Auto transformer.
   - Advantages & disadvantages of transformers.
6) functions of:
   - Microphone.
   - Rectifier.
   - Loud speaker.
   - Video signals.
   - Detector.
7) Different elements of Antenna.
8) Audio system.
9) Functions of Diodes/Triode etc.
10) Functions of semi-conductors.
11) Precautions to be observed while repairing TV.

Other Policy Implications

The qualitative analyses of the skill gaps provides very specific details of the vocational education areas in which training needs to be provided. These study results would be of particular help to the policy makers to design curricula for bridging these gaps. However, it is important to state that curricula development will be applicable for the technical persons in the areas in which the study was conducted.

The study results shows that despite skill gaps willingness of such workforce to take up further training cannot be taken for granted. For example while most of Motor mechanics had skill gaps they showed their unwillingness to take up further training. This findings has two kinds of implications. One there has been a lot of debate on the absolute numbers of persons which would require vocational training. The figure of training 500 million persons has been arrived simply by projecting the number of persons who

are and will enter the labour market till 2022 and the assumption that all of them will require vocational education. Second, the unwillingness of the technical person's to undertake further training raises the basic question of either leaving them alone with the present level of skill gaps or to take a call on giving them further training. In our considered view, it is important that the policy makers make an effort to understand the present gaps of such persons and build some incentives considering that they are going to be in the labour market for over two decades and their present level of skills would become obsolete in the years to come due to technological advancements.

The training capsules would also have to be imparted through part time mode as also of the duration which is in sync with the availability of such persons.

The policy on skill development needs also need to take note of the two distinctive features of the education level of the respondents. One relates to those in informal Sector who are either illiterate or have studied up to the primary level & the other for those who have studied up to the tenth standard or above. The former group needs to be training in non-formal manner as the formal channels of acquiring skills (the ITIs & ITCs) require a minimum educational qualification of Ninth Standards and above. The latter groups of respondents are eligible to take recourse to enhancement of skills through the formal channels.

Recommendations

The recommendations are based on the pilot study conducted with a limited number of samples from five trades largely in Noida & Gurgaon. Auto mechanics sample though was taken up from Ludhiana. Some of the key recommendations are as follows:

1. The technical persons are going to be in the labour Market for over 20 years in view of their age profile. Their skills need to be upgraded to increase the productivity and incomes.

2. The education levels of technical persons, in the trades of Plumbers, Carpenters and Masons do not make them eligible for formal training in the ITIs/ITCs. For such employed persons, avenues of formal vocational education need to be created.

   The policy on skill development needs to take note of the two distinctive features of the education level of the respondents. One relates to those in Informal Sector with

educational levels of upto the fifth standard & the other for those who have studied upto the tenth standard or above. The former group needs to be training in non-formal manner as the formal channels of acquiring skills (the ITIs & ITCs) require a minimum educational qualification of Ninth Standards and above. The latter groups of respondents are eligible to take recourse to enhancement of skills through the formal channels.

3. Most of the technical persons (except the Motor Mechanics) wished to undergo training

The monthly income levels varied in different skills. A larger proportion of Auto & T.V. Mechanics were earning Rs. 10,000/- and above whereas over two-thirds of Mason's, Carpenters and Plumbers were earning between Rs. 5,000 – 10,000/- per month. About one-tenth of respondents amongst Plumbers as well as Masons were earning less than Rs. 5000/- per month (Table 6). The monthly earnings of the respondents were not sufficient to meet their basic needs and therefore, other family members were also marginally supplementing their income (Table 7).

This information has two sets of policy implications. One, while the Auto-Mechanic Sector is like to experience a steep growth skill training requirement may not be parri-passu with the demand. Two, infrastructure for formal training will have to be created for skill development in other trades like Masons, Carpenters, Plumbers and the TV mechanics. There has been a long standing debate on the fact that the whole skill development initiative is supply based and there is very little initiative to integrate the demand side into the total initiative. Many amongst the academic have, therefore, questioned the validity of the target of skilling 500 million persons. This pilot study does attempt to provide information on the demand of Skills particularly in the informal sector.

4. The finding on the desired nature and duration of training will be guide for the policy makers to assess the capacity amongst various providers of Vocational Education.

5. The study helps in identifying gaps which will help the policy makers to develop a curriculum for providing the desired skills.