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Research Report

Enhancing Korea's Work Competency: Focusing on Problem-solving Skills

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Enhancing Korea's Work Competency: Focusing on Problem-solving Skills

Yong-Seong Kim, Senior Fellow at KDI

Summary

- **This study attempts to explore the use of and underlying issues related to problem-solving skills, a vital competency in future jobs, and policy measures for improvement.**

- **An international comparison shows that Korean workers (aged 16-65) are fairly good at utilizing their skills but poor at applying those skills to solve problems at work.**
  - As problem solving is a key future competency, it is essential that the relevant skills are enhanced and actively utilized.
  - However, insufficient education and training opportunities, poor communication and cooperation at work and a dual labor market structure could become obstacles.

- **To enhance the use of problem-solving skills at work, concerted efforts at various levels are needed, for example changing the contents and methods of educational/training programs and establishing a skill-friendly labor market structure.**
  - Educational/training programs need to provide more field experiences and professional knowledge as well as soft skills including collaboration, compromise and communication
  - Instead of a 'flexible adjustment of the workforce' through easy hiring and firing, labor reforms should be implemented though a 'flexible adjustment of working conditions' (i.e. wages and working hours) so that both employer and employee can accumulate and fully utilize the necessary skills in problem solving in a stable employment relationship.

1

Introduction

- **Developing and utilizing skills needed for 'Industry 4.0' is increasingly receiving attention in the fields of education and employment.**
  - Future jobs will require diverse skill sets to successfully tackle a wide array of work assignments.
  - Enhancing individuals' skills and boosting their use will raise productivity and improve distribution, creating a 'virtuous cycle of growth and distribution.'[1]

- **The following will identify the problems with and causes of Korean workers' (aged 16-65) skill use and seek policy measures for improvement.**

1 Growing emphasis on the skill premium based on rising demand due to skill-biased technical change has exacerbated income (wage) inequality. The OECD (2015) believes that the balance of skill supply and demand could reduce the skill premium and improve income distribution.

2

Skill Use at Work

■ **Table 1 shows that Korean workers are fairly good at utilizing their skills but poor at applying their skills to solve problems.**[2)]

- According to the Survey of Adult Skills (PIAAC), conducted by the OECD, Koreans are above or near the OECD average in reading, writing, numeracy and ICT skills.
- However, they are among the lowest (29th out of 33 countries) in their use of problem-solving skills at work.

<Table 1> Koreans' Skill Use at Work

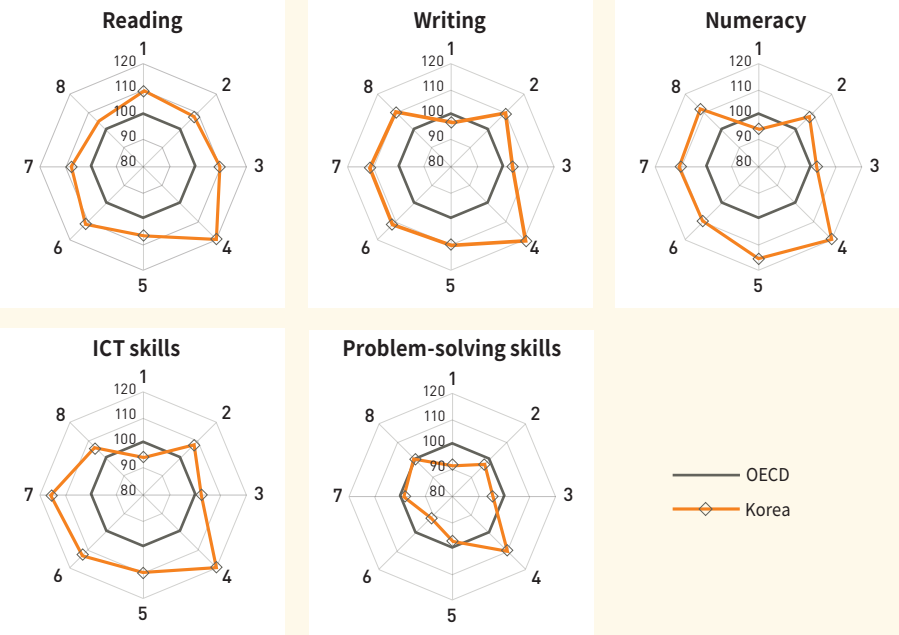
	Type of skill	Score (Rank)	OECD PIAAC average
Skill use at work[3)]	Reading	2.76 (16)	2.71
	Writing	2.99 (14)	2.90
	Numeracy	2.57 (11)	2.51
	ICT skills	2.39 (17)	2.41
	Problem-solving skills	2.53 (29)	2.80

Note: 1) Score ranges from 0 (no use) to 4 (everyday use).
2) ( ) denotes Korea's ranking among the 33 countries that participated in the OECD PIAAC (UK incl. Northern Ireland and England).

Source: OECD, *Programme for the International Assessment of Adult Competencies: PIAAC*, 2012, 2016.

- Korean workers in most occupations, except clerical, fall below the OECD average in problems-solving skills.
  - The use of problem-solving skills is disappointing among those in highly skilled jobs such as managerial and professional occupations where problem-solving skills are critical.

[Figure 1] Skill Use by Occupation



Note: 1) OECD PIAAC average=100
2) Numbers at the end of each axis denote occupation: 1= senior officials and management, 2= professionals, 3= technicians and associate professionals, 4= clerks, 5= service workers and shop and market sales workers, 6= craft and related trade workers, 7= plant and machine operators and assemblers, 8= simple laborers.

Source: OECD, *Programme for the International Assessment of Adult Competencies: PIAAC*, 2012, 2016.

2 Refer to Box 1 for more information on PIAAC and problem-solving skills.

<Box 1> The OECD Programme for the International Assessment of Adult Competencies (PIAAC) & Use of Problem-solving Skills

◆ OECD PIAAC

PIAAC is a study designed to collect and assess data on adults' (aged 16–65) key information processing skills which include literacy, numeracy and problem–solving in technology–rich environments and their use, and personal characteristics, educational/training contents, labor and income. 24 countries including Korea (and sub–governments) participated in the first round of surveys (2011–12) and nine more countries (and sub–governments) took part in the second round (OECD, 2013).

◆ Problem-solving skill: Definition, use and measurement

Opinions vary over the definition of problem–solving competence. The OECD PIAAC defines it as "An individual's capacity to engage in cognitive processing to understand and resolve problem situations where a method of solution is not immediately obvious" (Csapó and Funke, 2017).

Hence, problem–solving skills refer to a combination of competencies that are based on cognitive and analytical abilities, which include not only non–cognitive abilities such as critical and creative thinking but also soft skills such as collaboration, communication, persuasion and negotiation.

The use of problem–solving skills entails: exploring problems; identifying and understanding problems; representing problems through various means such as tables, figures, languages and formulas; formulating hypotheses; gathering information; planning and executing; and monitoring and evaluating problems, etc.

Question with respect to the use of problem–solving skills (F_Q05b):

How often were you usually confronted with more complex problems that took at least 30 minutes to find a good solution? The 30 minutes only refers to the time needed to THINK of a solution, not the time needed to carry it out.

0: "Never"
1: "Less than once a month"
2: "Less than once a week but at least once a month"
3: "Least once a week but not everyday"
4: "Everyday"

Reference:

- OECD, *OECD Skills Outlook 2013: First Results from the Survey of Adult Skills*, OECD Publishing, 2013.
- B. Csapó and J. Funke (eds.), *The Nature of Problem Solving: Using Research to Inspire 21st Century Learning*, OECD Publishing, Paris, 2017.
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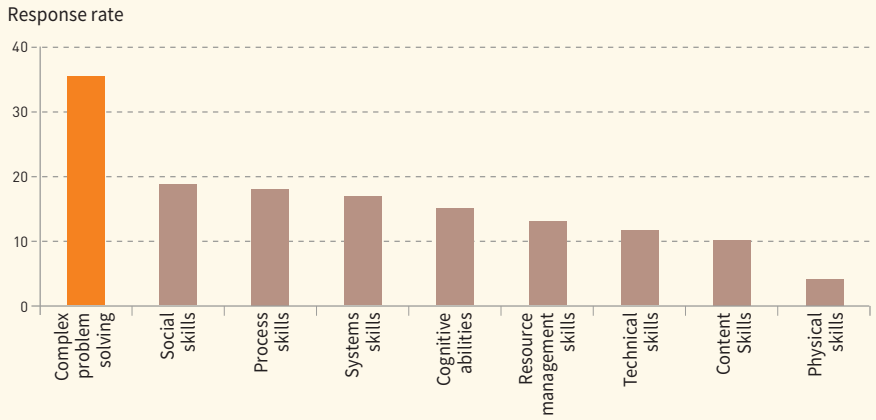
3

Methodology and Data Used in the Empirical Analysis

■ Problem-solving skills are important because:

- For future jobs with 'non–routine abstract tasks,' workers will be required to use various skills to solve problems in the workplace (Autor and Price, 2013; Cedefop, 2016);
- In many corporate surveys, employers answered that problem–solving skills are the most important competence in the future labor market (Figure 2).

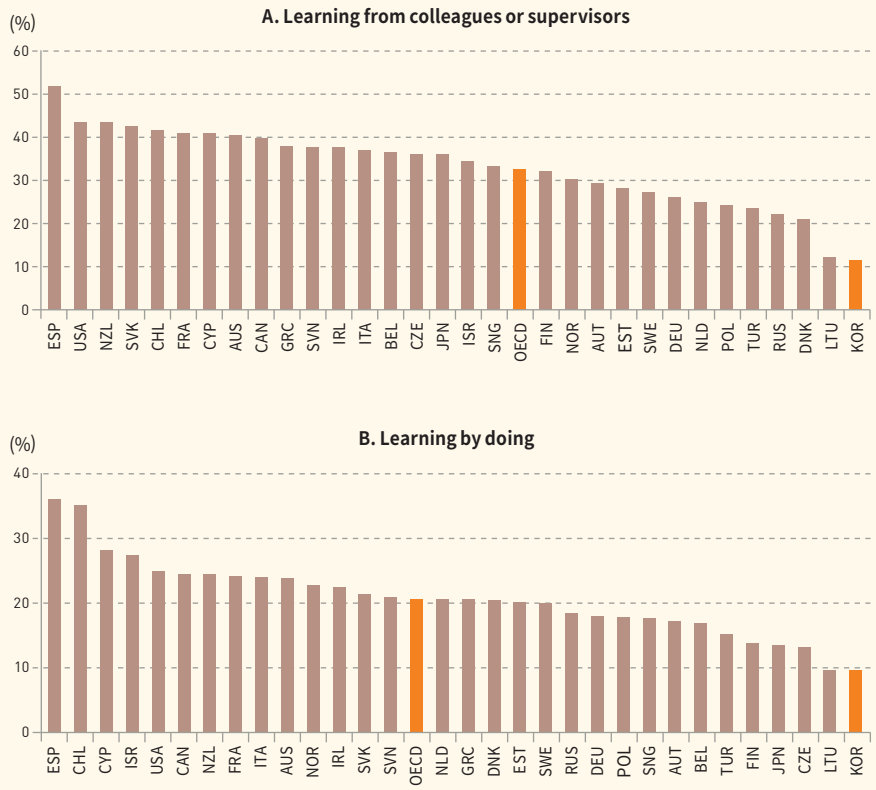
[Figure 2] Most Required Skills for Future Jobs



Note: Multiple responses were allowed.
Source: World Economic Forum (2016), Figure 10.

- **The lack of opportunities to obtain professional skills at work is possibly related to the underuse of problem-solving skills.**
  - For the use of problem-solving skills, workers should be given opportunities to acquire work-related professional skills and be able to update them.
  - However, such opportunities are lacking for Korean workers.
    - The percentage of respondents who experienced 'learning from colleagues or supervisors' or 'learning by doing' is far below the OECD average (Figure 3).

[Figure 3] Percentage of Workers Who Experienced Learning at Work

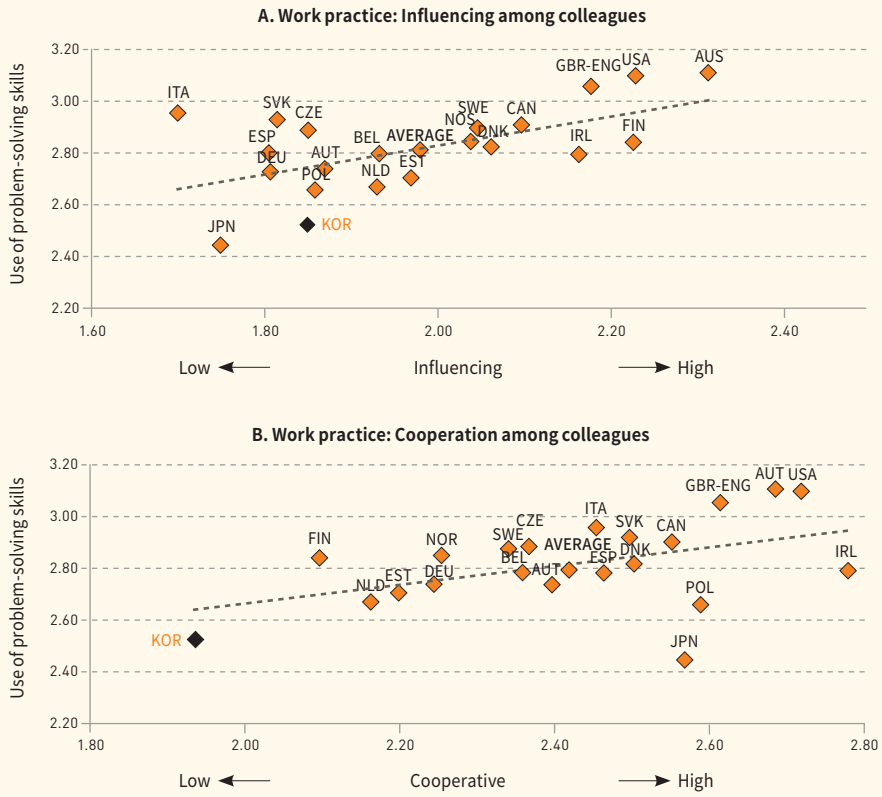


Source: OECD, *Programme for the International Assessment of Adult Competencies: PIAAC*, 2012, 2016.

■ **Korea's work practices can also explain why problem-solving skills are underutilized.**

- Working collaboratively is known to boost workers' skill use in the work place (Green *et al.*, 2001; OECD, 2016).
- Korea ranks very low in terms of interaction (influencing and cooperative) with co-workers at work (Figure 4).

[Figure 4] Relationship between Collaborative Work Practices and the Use of Problem-solving Skills

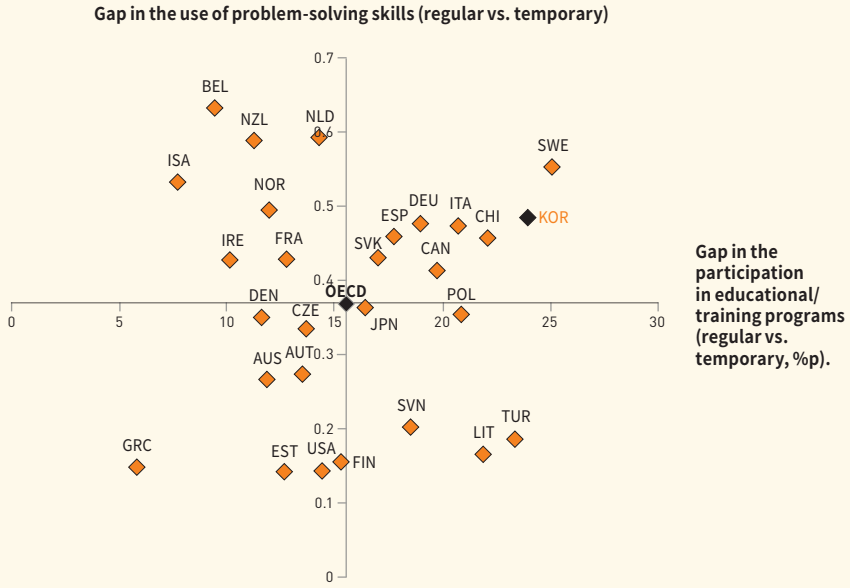


Source: OECD, *Programme for the International Assessment of Adult Competencies: PIAAC*, 2012, 2016.
OECD, *Employment Outlook*, 2016.

■ **Additionally, Korea's dual labor market is an obstacle for workers to fully utilize their problem-solving skills.**

- In insecure jobs, employers are less likely to provide sufficient education/training opportunities to workers, and employees in poor working conditions are less motivated to use their skills to full scale (Kahn, 2016).
  - Unlike general skills such as reading and writing, business and task-oriented problem-solving skills can be accumulated and utilized within a stable employment relationship.
- Based on the type of contract (regular or temporary), there is a significant gap in the participation in educational/training programs and use of problem-solving skills (Figure 5).

[Figure 5] Regular vs. Temporary Workers: Gaps in the Participation in Educational/Training Programs and Problem-solving Skill Use



Source: OECD, *Programme for the International Assessment of Adult Competencies: PIAAC*, 2012, 2016.

4

Enhancing the Use of Problem-solving Skills at Work

■ To establish and support an education and training system that could promote the use of problem-solving skills:

- Vocational education/training programs must be linked to the actual field to maximize the use of problem-solving skills.
  - Expanding the currently limited Work-Based Learning program (WBL) could strengthen field-oriented contents in vocational education/training.
    - * For example, training institutions and companies could jointly provide vocational education/training programs to the unemployed (OECD, 2010) or the government could differentiate subsidies based on the extent to which WBL factors are reflected in programs (OECD, 2014).
  - Educational/training programs need to provide not only professional skills necessary to problem-solving but also soft skills such as communication, collaboration and negotiation.
- In terms of educating future generations, project-based learning (PBL) is recommended for the development and utilization of problem-solving skills.
  - Pedagogical methods geared to developing problem-solving skills are ⅰ) encouraging active participation in classroom activities, ⅱ) emphasizing process-based learning and ⅲ) introducing an evaluation system for intellectual challenges and attempts instead of forcing rote-learning, which is similar to the objectives of PBL (Snyder and Snyder, 2008)
    - * A case study on Korean students found that PBL has a positive impact on students' communication and collaboration skills (Lee *et al*., 2016).

■ To reform the labor market structure to reduce the gap in the use of problem-solving skills:

- Efforts must be made to reform the labor market as a stable employment relationship is the prerequisite to inducing investment in and the use of work skills.

- In response to changing economic conditions, flexibly adjusting working conditions, including wages and working hours, instead of flexibly adjusting the workforce (recruitment and termination), could help establish a stable employment relationship and create an environment in which employee and employer can accumulate and fully utilize the necessary problem-solving skills.
- Flexible working conditions can strengthen job security for non-regular workers (Park and Park, 2016), which will reduce the gap in the use of problem-solving skills between different employment statuses.

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