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

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

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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 through 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

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.

- **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.**

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 ²⁾	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

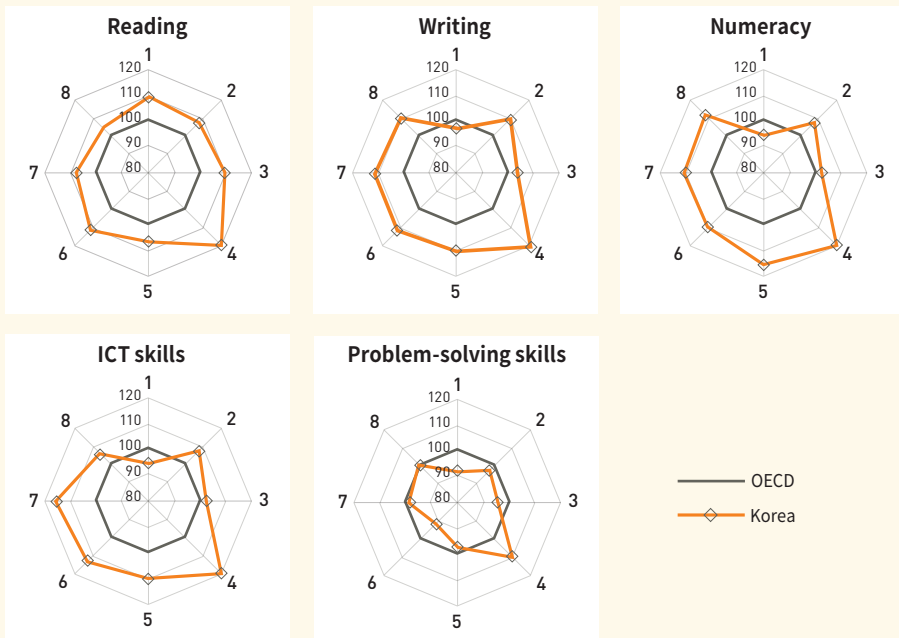
Note: 1) Score ranges from 0 (no use) to 4 (everyday use).

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.
- Ministry of Education, Ministry of Employment, and Labor and Korea Research Institute for Vocational Education and Training, *Korean’s Competencies, Learning and Work: Report on Programme for the International Assessment of Adult Competencies (PIAAC)*, 2013 (in Korean).

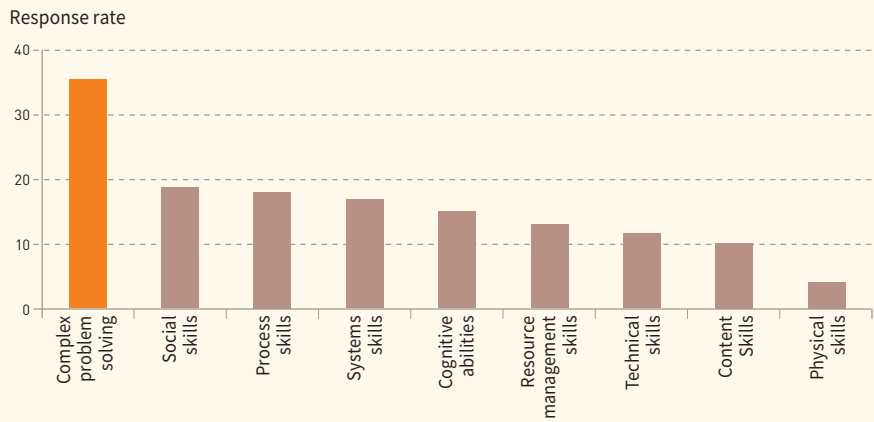
3

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

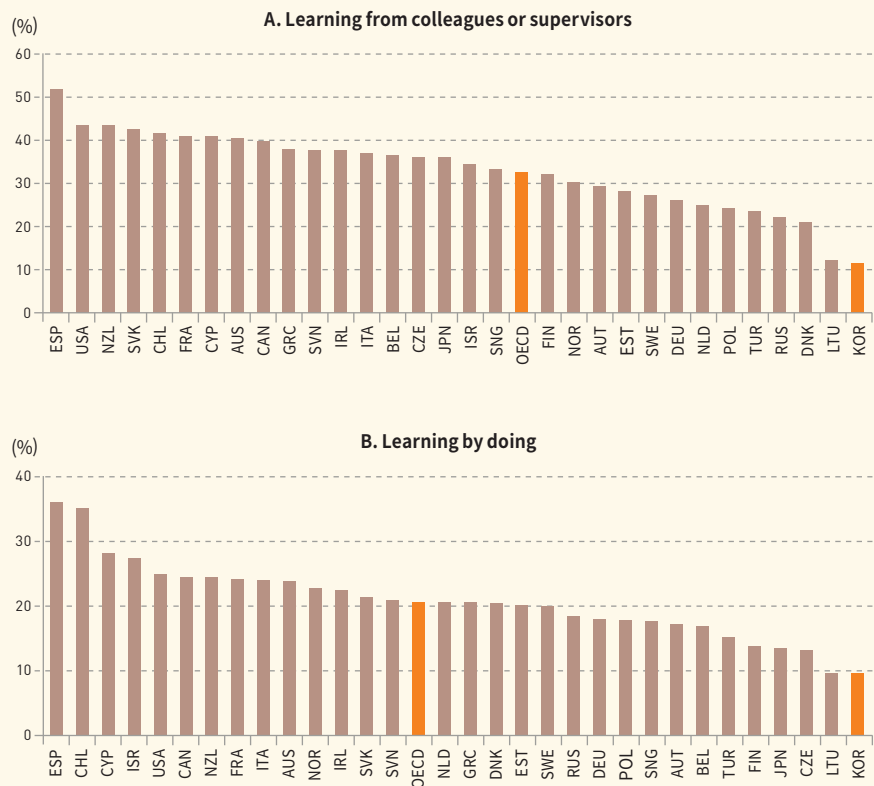


Note: Multiple responses were allowed.
Source: World Economic Forum (2016), Figure 10.

■ **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

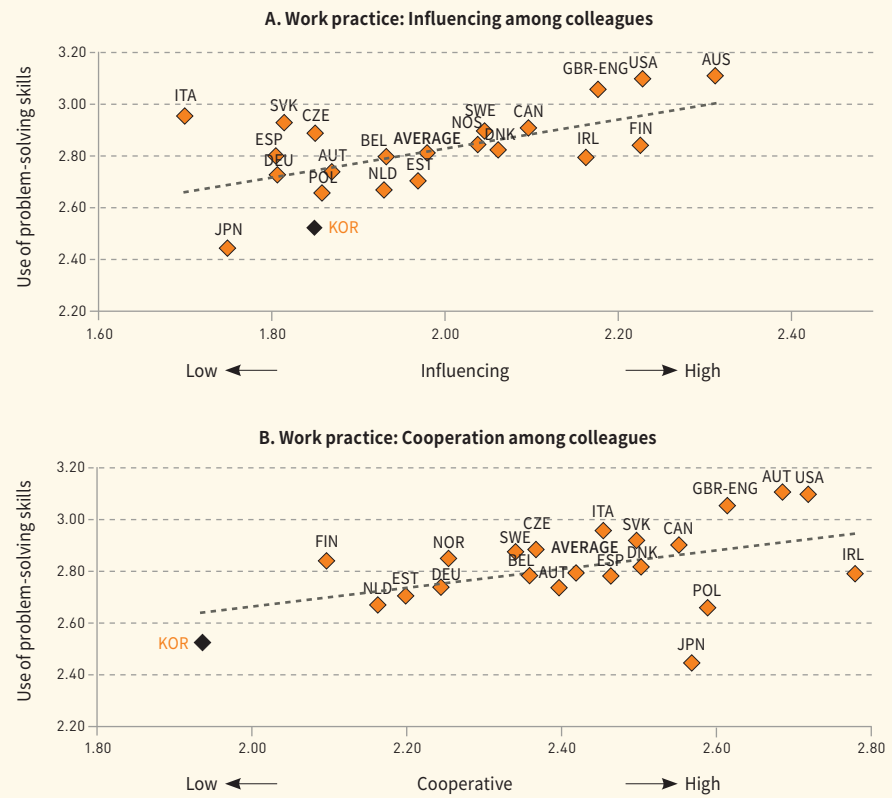


Source: OECD, Programme for the International Assessment of Adult Competencies: PIAAC, 2012, 2016.

■ **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

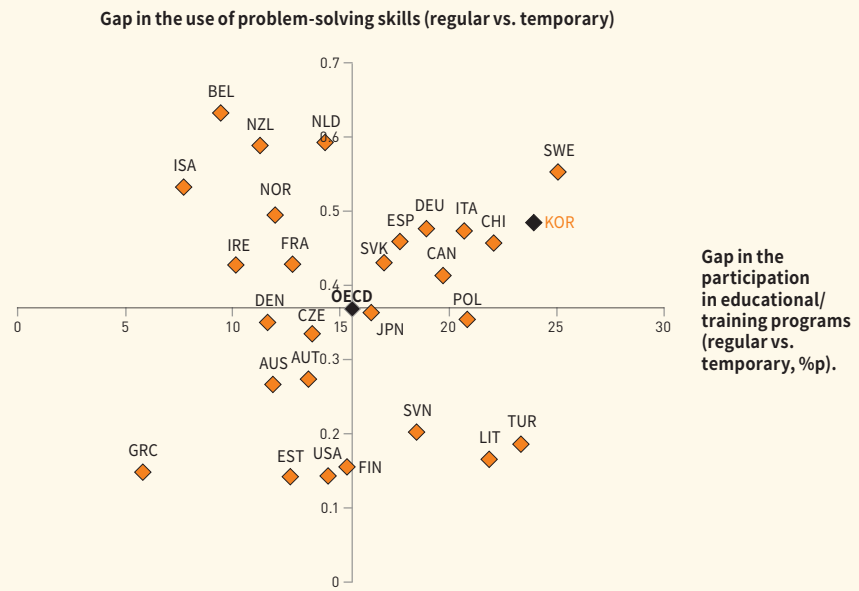


Source: OECD, *Programme for the International Assessment of Adult Competencies: PIAAC*, 2012, 2016. OECD, *Employment Outlook*, 2016.

■ **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.

References

- Autor, David H. and Brendan Price, “The Changing Task Composition of the US Labor Market: An Update of Autor, Levy, and Murnane,” MIT Working Paper, June 2013.
- Csapó, B. and J. Funke (eds.), *The Nature of Problem Solving: Using Research to Inspire 21st Century Learning*, OECD Publishing, Paris, 2017. (<http://dx.doi.org/10.1787/9789264273955-en>)
- Cedefop, “Forecasting Skill Demand and Supply: Employment trend,” 2016. (<http://www.cedefop.europa.eu/de/events-and-projects/projects/forecasting>)
- Green, F., D. Ashton, and A. Felstead, “Estimating the Determinants of Supply of Computing, Problem-solving, Communication, Social, and Team-working Skills,” *Oxford Economic Papers*, Vol. 53, No. 3, Special Issues on Skills Measurement and Economic Analysis, Jul., 2001, pp.406-433.
- Kahn, Lawrence, “Permanent Jobs, Employment Protection and Job Content,” IZA Discussion Paper, No. 9961, May 2016.
- Lee, Ju-Ho, Booyuel Kim, Yoonsoo Park, and Syngjoo Choi, “Educational Reform through Project-based Learning (PBL),” KDI Focus, No. 66, 2016.
- Ministry of Education, Ministry of Employment, and Labor and Korea Research Institute for Vocational Education and Training, *Korean’s Competencies, Learning and Work: Report on Programme for the International Assessment of Adult Competencies (PIAAC)*, 2013 (in Korean).
- OECD, *OECD Reviews of Vocational Education and Training – Learning for Jobs*, OECD Publishing, Paris, 2010. (<http://dx.doi.org/10.1787/9789264087460-en>).
- OECD, *Programme for the International Assessment of Adult Competencies: PIAAC*, 2012, 2016.
- OECD, *OECD Skills Outlook 2013: First Results from the Survey of Adult Skills*, OECD Publishing, 2013. (<http://dx.doi.org/10.1787/9789264204256-en>)
- OECD, *Skills Beyond School: Synthesis Report, OECD Reviews of Vocational Education and Training*, OECD Publishing, 2014. (<http://dx.doi.org/10.1787/9789264214682-en>)
- OECD, *OECD Employment Outlook*, OECD Publishing, Paris, 2015.
- OECD, *OECD Employment Outlook*, OECD Publishing, Paris, 2016. (http://dx.doi.org/10.1787/empl_outlook-2016-en)
- Park, Yoonsoo and Wooram Park, *Expected Effect of Extension of Legal Duration Limit of Fixed-term Employment*, Research Monograph, Korea Development Institute, 2016 (forthcoming) (in Korean).
- Snyder, L. and M. Snyder, “Teaching Critical Thinking and Problem Solving Skills,” *The Delta Pi Epsilon Journal*, Vol. 1, No. 2, 2008, pp. 90-99.
- World Economic Forum, *The Future of Jobs: Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution*, Global Challenge Insight Report, 2016.