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Education Reform for the Future: A Case Study of Korea

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ABSTRACT

This paper describes how the global education community can prepare for the future of education. With the aim of promoting global education and creativity, the paper leverages case studies on Korea's education reform, including the Free Semester Program (FSP) and the SMART Initiative using ICT, which are new education initiatives focused on promoting ICT skills in schools across Korea. The paper highlights critical aspects of successful implementation, the role of government, and the positive impact of these education reform policies. It proposes lessons for scaling up similar practices in other settings.

Keywords: *Korea's ICT education policy; Free Semester Program; SMART Initiative; Korea's education reform*

INTRODUCTION

The technology-driven world in which we live holds great promise but has also sparked much public concern as jobs across all industries are increasingly being automated, creating both huge promise and potential peril. The Mckinsey Global Institute's report (2017) suggests that about half of all work activities globally have the technical potential to be automated by adapting currently demonstrated technologies; by 2030, 75 to 375 million workers (3% to 14% of the global workforce) will need to switch occupational categories. According to the World Economic Forum's prediction (2016a), 65% of children entering primary school today will eventually work in jobs that do not exist today. Yet this new era is about more than just technology-driven change. These changes offer opportunities for people all over the world to harness converging technologies to boost economic growth and create an inclusive and creative future—if the complex transitions are effectively addressed. These advances are forcing governments to rethink how to create new values while workers must adapt to new ways of work.

Some of that adaptation will require diverse activities that require social and emotional skills, creativity, high-level cognitive capabilities and other skills relatively hard to automate, and which is ultimately linked to heighten the demands on education systems **(**WEF, 2016b). In a recent report entitled "Education and the Fourth Industrial Revolution (2017)," Brown-Martin mentioned that "nothing in our formal education systems today is designed to meet the human challenges of the 21st century." Indeed, many countries are developing their national education competency framework and reforming educational systems to respond to these advances.

In Korea, the strong performance of its economy over the last four decades has been well publicized. The main driving force behind such development is the government's investment in human resources. Consequently, Korea is able to provide the necessary skilled workforce at the right time through vocational education and training (Ministry of Education, 2015a) and is now preparing for the future by tackling issues posed by the 4th industrial revolution. The Korean government has launched and implemented two major education policies: The Free Semester Program (FSP) and the SMART Initiative. Through such efforts, Korea aims to meet the changing industrial demands and foster a creative economy.

OBJECTIVES OF THIS STUDY

This paper aims to provide the key milestones of education strategy to achieve a creative knowledge economy. It presents global frameworks for education models for the future. Based on these frameworks, it reviews Korea's education reform based on two major models: The Free Semester Program (FSP) and the SMART Initiative. The study analyzes the design and implementation of the two education policies based on academic literature review and relevant policy documents. Finally, it sheds light on certain implications gleaned from Korea's challenges and lessons, which could be applicable to other global settings.

METHODS OF THE STUDY

The study mainly adopted a preliminary literature review, a policy analysis, a case-based analysis, and secondary data analysis. The literature review was used to explore how the international education society presents the global frameworks for the future of education including findings from structured literature reviews. The policy analysis and the case-based analysis was conducted to review the two major education policies in Korea and to analyze the productivity of the next generation of workers through two educational policies: FSP and SMART Initiative. Academic literature review and policy papers from international organizations, government briefings and documents were used for the analysis. Further, OECD and WBG data were used to identify the effectiveness of Korea's education system.

According to Grauer (2012), the case study as research method can be most appropriate when the type of research question is seeking to determine "how" or "why", and the phenomenon is in a real-life context. Given that the study presents 'how' South Korea implemented innovative education programs to nurture the future work force and 'why' it has yielded significant results as well as brought to light certain shortcomings, the case study method is the most applicable.

The following questions were proposed:

1. How has the international community made efforts to shape the future of education and the core skills necessary to respond to it?

2. How has the instructional systems of South Korea developed the knowledge, skills, attitudes, and values effectively?

   2.1 The Free Semester Program (FSP) - how to promote creativity, cognitive and socio-behavioral skills?
   2.2 The SMART Initiative - how to use ICT in classrooms?

GLOBAL COMPETENCY FRAMEWORKS FOR THE FUTURE EDUCATION MODELS

The international community has increasingly made efforts to define the critical competencies for the digital age. One of the best-known indicators of learning outcomes from students around the world is the Program for International Student Assessment (PISA), which applied insights from these reflections by adjusting the competency framework (OECD, 2016). The adjusted framework includes global competence in its metrics for quality, equity, and effectiveness in education to elicit students' capabilities to recognize global issues, understand how to communicate with others, and identify global and intercultural issues.

Driven by these reflections, OECD developed the OECD Learning Compass 2030 (OECD,2018). The project aims to set goals and establish a common language for teaching and learning, providing a conceptual framework for the future of education, curriculum analysis, redesign, and implementation.

According to the Learning Compass, future generations will need a wide range of skills such as cognitive and meta-cognitive skills (for example, critical thinking, creative thinking, learning to learn and self-regulation) as well as social and emotional skills (for example, empathy, self-efficacy and collaboration). Finally, these will need to be accompanied by practical and physical skills (for example, using new information and communication technology devices).

These should be mediated by attitudes and values such as motivation, trust, respect for diversity and virtue, and the change should be done with students, peers, teachers, parents, and communities.

The World Bank (2014) has also proposed a global framework to emphasize four policy priorities that the international education community should embrace to prepare for the future. First, education systems that fully develop both cognitive and non-cognitive skills can also promote creativity. Studies have found that cognitive and non-cognitive skills and knowledge can lead to improved creativity. Second, some educational interventions are more likely to contribute to promoting creative skills. Third, education systems should cultivate the joy of learning rather than a pressure to learn, as the former is tied to a more creative environment. Finally, educational policy actions should focus on skills that can translate into a creative and innovative economy, thereby developing economic and social policies and institutions that enable a country's skill base to be used more effectively for innovation. The relationships are shown in Figure 1 below. Such an approach will ultimately promote a creative economy.

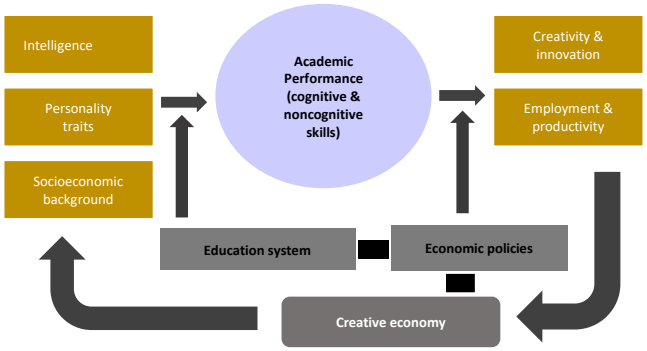


Figure 1: Building a creative economy through education (Source: World Bank, 2014)

The frameworks for the global competencies for the future speak the same language, although the extent may vary. They emphasize both cognitive and non-cognitive skills. They call attention to competency-based approaches for the 4th industrial revolution. Finally, they highlight problem-solving skills through cooperation with others.

It is evident that demand for advanced cognitive skills (critical thinking and problem-solving) and non-cognitive skills (creativity, curiosity, and cooperation) transferable across jobs will increase in the future. Therefore, it becomes important for countries to nurture the next generation to bridge the skills gap. However, education systems tend to resist change, and the readjustment in the supply of skills is happening outside of mandatory education and formal jobs. (WDR, 2019)

That is why education reform requires a holistic approach inclusive of a broader range of stakeholders, extending beyond just education stakeholders. Private sector and technology-related business also should be a part of the conversation to meet the skills gap. The status quo education system and classrooms tend to be laggards in technology advancement. It is pivotal for schools to lead the change, not just follow the flow of the future. The government should also foster widespread discussion and implement education policies in cooperation with a variety of stakeholders as part of an all-encompassing ecosystem.

Moreover, an understanding of how to implement these global competencies in developing countries where necessary infrastructure and institutional capacity should be a part of the global discussion, as the need for future skills is not an option but a prerequisite to survive and thrive in the future.

KOREA'S EDUCATION REFORM FOR THE FUTURE

Korea is well known for its education system, which provides a well-qualified workforce to meet industrial needs at the right time. The country consistently ranks among the best-performing countries in the OECD's Program for International Student Assessment (OECD, 2018), ranking especially high for R&D spending, manufacturing value-added, and high-tech density through education. In addition, Korea has topped the Bloomberg 2019 Innovation Index with a score of 87.38. For six consecutive years (since 2014), it has maintained the world's top position (Bloomberg, 2019).

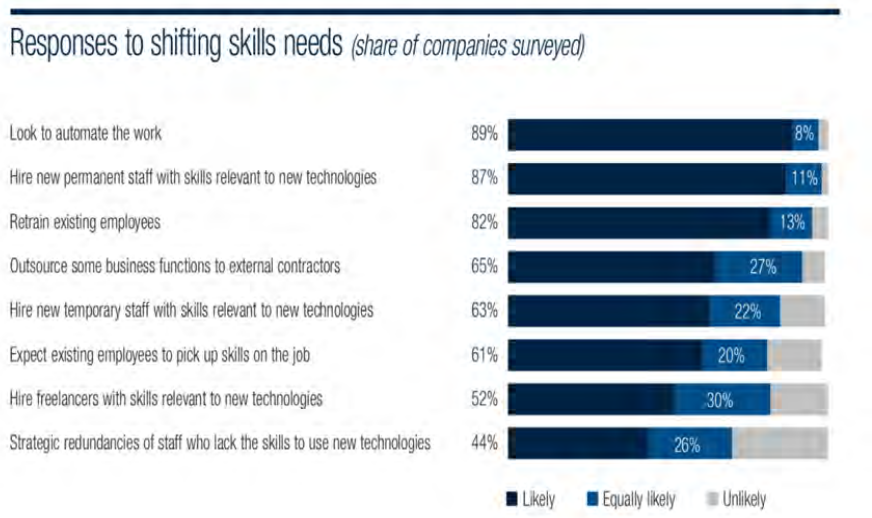


Figure 2: Emerging Skills. Adapted from "Future of Jobs"

Yet fundamental changes to society in the era of the 4th industrial revolution means Korea must educate students in a totally different way, going beyond nurturing an efficient and practical workforce. Technological and demographic changes are having a profound impact on Korea's labour market. According to OECD (2019), approximately 43% of workers in Korea have a high risk of their jobs becoming completely automated or substantially changed. To respond to this

unprecedent shift, the World Economic Forum (2018) proposed global competency indicators and analyzed Korea's labour market, suggesting the core skills needed for the 4th industrial revolution (see Figures 2 and 3) - namely, complex problem solving, analytical thinking and innovation, emotional intelligence, and social skills. Thus, Korea needs to develop a different level of skills beyond traditional skills.

Figure 3: Emerging Skills in Korea (Source: WEF 2018)

Although Korea has proven to be a top performer in cognitive skills in PISA, earning high scores in mathematics, science, and literacy, there is room to improve in areas such as creativity, coordinating with others, and emotional intelligence. According to Forbes (2014), "Korea has historically focused on cognitive skills at the expense perhaps of what Ju-ho Lee called 'connective' skills that focus on character or creative education." The shortcomings of Korea's education system are most evident in the learning process, which understates creativity and the intrinsic rewards of learning.

As a matter of concern, the Korean government started reforming the education system, including the curriculum, teacher policies, and vocational programs, by moving beyond simply providing standardized instruction and knowledge. It set up a framework to nurture creative talents who lead a creative economy through the core skills for the 4th industrial revolution—namely, competence-based skills and creativity.

Consequently, the Korean government introduced two major education programmes, the Free Semester Program (FSP) and the SMART Education initiative, to nurture students while responding to changes brought about by the 4th industrial revolution. FSP focuses on developing non-cognitive skills and SMART Education initiative centers on direct ICT used in classrooms. Given that ICT use in education in the 4th revolution era requires both software and hardware, it is an appropriate response to establish these initiatives simultaneously. Both programmes aim to explore career

opportunities to prepare students for future competencies by promoting creativity and equipping students with core skills through lifelong learning. These relationships are shown in Figure 4 below.

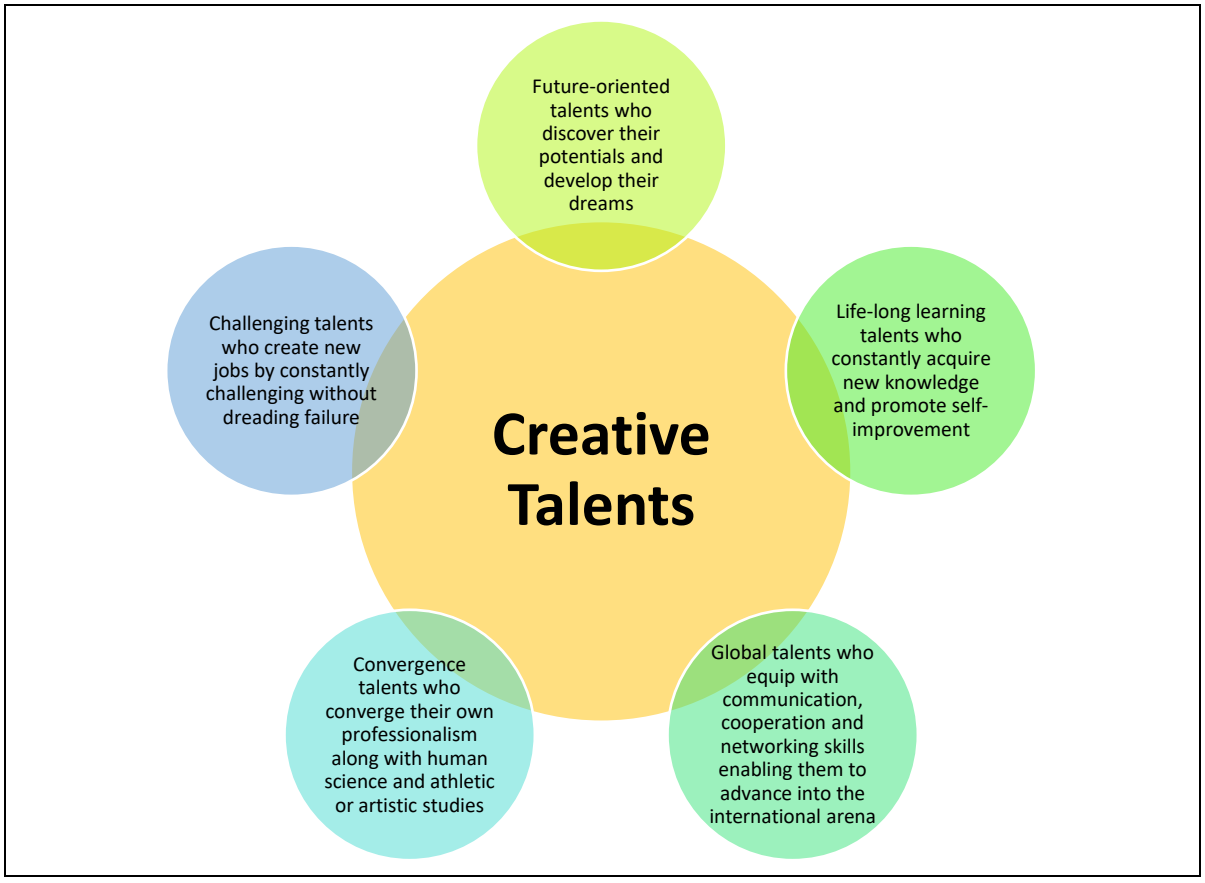


Figure 4: Nurturing creative talents in Korea (Source: KEDI 2016)

Free Semester Program (FSP)

As noted by the World Economic Forum (2018), problem-solving skills, creativity, and cooperation with others are critical, and the Korean education system should respond to promoting non-cognitive skills for the 4th industrial revolution and ICT-used education.

The OECD embedded a "Creative Problem-Solving" assessment in the usual PISA tests (reading, math, and science) to measure students' creativity in solving unstructured problems in unfamiliar contexts. Students are asked to solve problems for which they have no ready-made strategy and need to think creatively to overcome the barriers (OECD, 2016). Korean students scored highly on this assessment, earning 5 or 6 points on the 6-point scale; their average score put them at the top of the rankings, together with students from Singapore (World Bank, 2014). The performances among the participating countries/economies are shown in Table 1 below.

Table 1: *Problem-solving performance among participating countries/economies (Source: OECD 2014)*

	Problem-solving scale					
			Range of ranks			
			OECD countries		All countries/economies	
	Mean score	S.E.	Upper rank	Lower rank	Upper rank	Lower rank
Singapore	562	(1.2)			1	2
Korea	561	(4.3)	1	1	1	2
Japan	552	(3.1)	2	2	3	3
Macao-China	540	(1.0)			4	6
Hong Kong-China	540	(3.9)			4	7
Shanghai-China	536	(3.3)			4	7
Chinese Taipei	534	(2.9)			5	7
North West (Italy)	533	(8.6)				
Western Australia (Australia)	528	(4.0)				
North East (Italy)	527	(6.4)				
Canada	526	(2.4)	3	5	8	10
Australian Capital Territory (Australia)	526	(3.7)				
New South Wales (Australia)	525	(3.5)				
Flemish Community (Belgium)	525	(3.3)				
Victoria (Australia)	523	(4.1)				
Australia	523	(1.9)	3	6	8	11
Finland	523	(2.3)	3	6	8	11
Queensland (Australia)	522	(3.4)				
German-speaking Community (Belgium)	520	(2.6)				
South Australia (Australia)	520	(4.1)				
England (United Kingdom)	517	(4.2)	4	11	9	16
Estonia	515	(2.5)	6	10	11	15
Centre (Italy)	514	(10.8)				
Northern Territory (Australia)	513	(7.9)				
France	511	(3.4)	6	14	11	19
Netherlands	511	(4.4)	6	16	11	21
Italy	510	(4.0)	7	16	12	21
Czech Republic	509	(3.1)	7	15	12	20
Germany	509	(3.6)	7	16	12	21
United States	508	(3.9)	7	16	12	21
Belgium	508	(2.5)	9	16	14	21
Madrid (Spain)	507	(13.0)				
Austria	506	(3.6)	8	17	13	22
Alentejo (Portugal)	506	(13.4)				
Norway	503	(3.3)	11	18	16	23
Ireland	498	(3.2)	15	19	20	24
Denmark	497	(2.9)	16	20	21	25
Basque Country (Spain)	496	(3.9)				
Portugal	494	(3.6)	17	20	22	26
Sweden	491	(2.9)	18	21	23	27
Tasmania (Australia)	490	(4.0)				
Russian Federation	489	(3.4)			23	27
Catalonia (Spain)	488	(8.4)				
South Islands (Italy)	486	(8.5)				
French Community (Belgium)	485	(4.4)				
Slovak Republic	483	(3.6)	20	23	25	29
Poland	481	(4.4)	21	24	26	31
Spain	477	(4.1)	21	24	27	31
Slovenia	476	(1.5)	22	24	28	31
South (Italy)	474	(8.4)				
Serbia	473	(3.1)			29	32
Croatia	466	(3.9)			31	33
Hungary	459	(4.0)	25	27	32	35
Dubai (United Arab Emirates)	457	(1.3)				
Turkey	454	(4.0)	25	28	33	36
Israel	454	(5.5)	25	28	33	37
Chile	448	(3.7)	26	28	34	37
Southeast Region (Brazil)	447	(6.3)				
Cyprus[1, 2]	445	(1.4)			36	37
Central-West Region (Brazil)	441	(11.9)				
South Region (Brazil)	435	(7.8)				
Brazil	428	(4.7)			38	39
Medellín (Colombia)	424	(7.6)				
Manizales (Colombia)	423	(5.3)				
Malaysia	422	(3.5)			38	39
Sharjah (United Arab Emirates)	416	(8.6)				
United Arab Emirates	411	(2.8)			40	41

Bogotá (Colombia)	411	(5.7)				
Montenegro	407	(1.2)			40	42
Uruguay	403	(3.5)			41	44
Bulgaria	402	(5.1)			41	44
Colombia	399	(3.5)			42	44
Cali (Colombia)	398	(9.0)				
Fujairah (United Arab Emirates)	395	(4.0)				
Northeast Region (Brazil)	393	(11.0)				
Abu Dhabi (United Arab Emirates)	391	(5.3)				
North Region (Brazil)	383	(10.9)				
Ajman (United Arab Emirates)	375	(8.0)				
Ras Al Khaimah (United Arab Emirates)	373	(11.9)				
Umm Al Quwain (United Arab Emirates)	372	(3.5)				

Notes: OECD countries are shown in bold black. Partner countries and economies are shown in bold blue. Regions are shown in black italics (OECD countries) or blue italics (partner countries).

Nonetheless, the results only tell part of the story as creativity is enhanced from an educational experience that emphasizes the creative learning process. The Korean education system has focused on efficiency at the cost of some non-cognitive skills that could contribute to enhancing creativity and innovativeness in Korea's economy. According to Lee et al (2014), the Korean education system does not effectively promote certain non-cognitive skills, such as an ability to work harmoniously with others.

Thus, Korea has initiated some transformative changes to promote a greater diversity of non-cognitive skills and creativity. To support the shift to a more creative experience, Korea has implemented the Free Semester Program (FSP), through which it aims to address the identified shortcomings in its education system—namely, academic stress, teacher-centric teaching/learning, learning confined to textbook and class, test-based assessment, and teacher-dominant education manpower (J.Y. Lee, 2015)

First announced in 2013, FSP aimed at developing competencies for the 4th industrial revolution, such as creativity, problem-solving skills, higher-order thinking skills, and social-emotional skills (Ministry of Education, 2015b) with four objectives: offering students a chance to find their dreams and talent and continuously reflect upon and develop themselves through experiences of exploring and designing their aptitude and future; converting knowledge and competition centered education into the one that enables self-leading creative learning and development of creativity, personality, and social skills; providing happy school life for students through recovery of confidence in the public education policy direction; providing intensive career and experience education during FLS and reinforce career education that flows along primary (recognition), middle (exploration), and high schools (determination); and increasing school discretion in curriculum to ensure smooth operation of programs intended to build dreams and talent.

FSP was initiated in 43 schools and continually expanded to all 3204 middle schools (100% of all public middle schools) as its overall positive impact was recognized. It is currently implemented for one semester of Year 1 (Grade 7) in all public middle schools. Students can select a more interactive curriculum and extracurricular programming that cater to their interests and passions (Park, 2016)

The FSP's major features related more to student-centered teaching and learning. Rather than traditional lecture-based classes, students are engaged in solving complex problems through project-based learning and debates. In addition, FSP's extracurricular activities include field trips to regional career centers that help students navigate their career interests. Such opportunities are tied to other activities as well, such as student club activities, arts, and sports activities. Each school

can choose one of four tracks as shown in Table 2 below, based on capacity, infrastructure, and needs of students and parents.

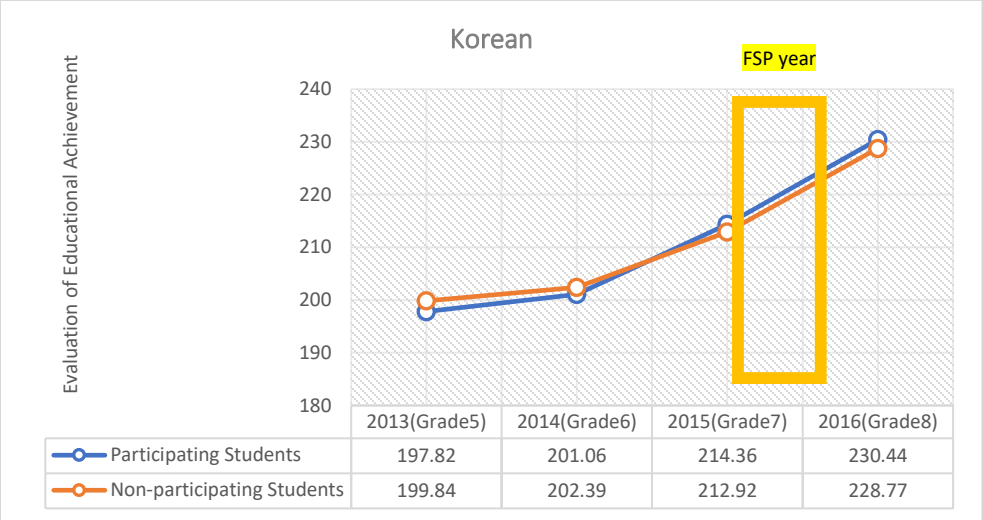
Table 2: *Four tracks of Free Semester Program (Source: Park 2016)*

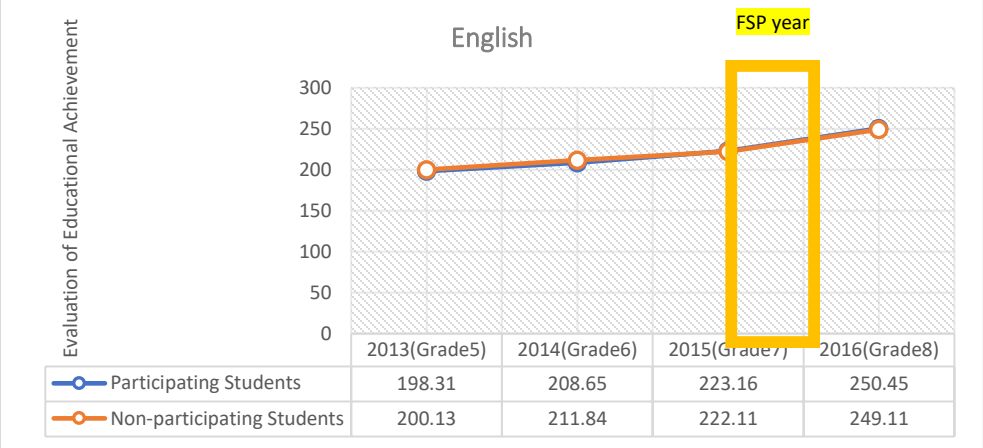
Category	Example of possible programs
Career exploration	Courses and Curriculum designed to promote self-understanding, understanding jobs and careers, Field trips to job sites and career exploration facilities
Free Choice Programs	Special course offerings normally not offered in the main curriculum; Guitar, Mandarin, Japanese, Calligraphy, Magic, Gardening, Creative Writing
Club Activities	Photo Journalist Club, Arts& Crafts Club, and other types of student clubs
Arts and Sports Programs	Korean traditional instrument class, Swimming, Musical, Hip hop dance, Skating

A few studies have sought to measure the FSP's changes to and impact on classrooms, and initial results have been positive. Recent survey data show that FSP is delivering on its promised goals. According to the Korean Educational Development Institute (Choi & Lee, 2015), 81.1% of students who participated in FSP reported that their capacity for self-expression increased, 74.6% said their relationships with teachers improved, 63.5% said their enjoyment of learning improved, and 50.4% said their stress related to studying decreased.

Park (2016) similarly found that FSP enhanced participants' social skills and cooperation with others. In interviews, teachers highlighted the positive impact they had observed during FSP. According to teachers, their students were more likely to work together to initiate self-organization in a circle formation. In addition, some students learned how to use design software and used 3D printers to make race cars. The World Bank (2014) concluded that FSP is a possible way for Korea to "encourage students to explore less direct routes to their careers—for example, by taking time to work or explore between schooling cycles—[which] could have similar effects, by fostering a greater understanding of how education is linked to real-world experience."

FSP has also enhanced students' cognitive skills in Korean, English, and mathematics. Participating students showed a greater increase in their academic achievements than non-participating students after participating in FSP (KEDI, 2018). See Figure 5 below.





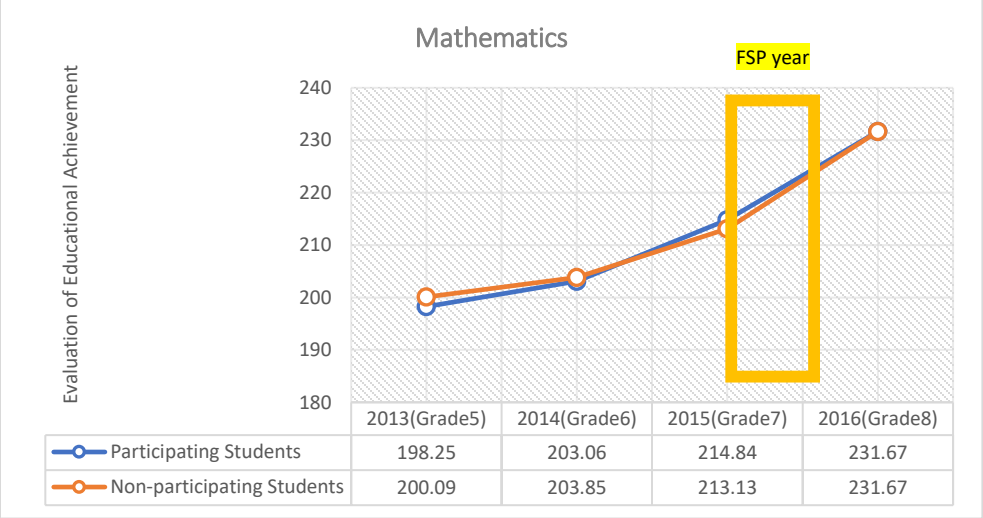


Figure 5: *Comparison of academic achievements between participants non-participants in FSP* (Source: KEDI 2018)

FSP is not just an innovative education programme; it involves orchestrated efforts among policymakers, teachers, parents, and students. The government provides holistic guidelines, in-service teacher training, and a web-based platform (http://www.ggoomggi.go.kr/) to help schools establish FSP and ensure that students, parents, and teachers have access to helpful resources, can monitor their programmes, and can share best practices.

FSP is making positive inroads in overhauling Korea's education system and preparing students with vital skills for the future. These early lessons may suggest possible implications for other education programmes seeking to promote students' non-cognitive skills to meet the demands of a creative economy.

Smart Education Initiative

Korea topped the OECD's Digital Reading Assessment (DRA), with students scoring more than 20 points higher on the digital reading scale, on average, than students from other countries with similar skills in print reading (OECD, 2015). Korea launched its Self-directed, Motivated, Adaptive, Resource-enriched, and Technology-embedded (SMART) Education initiative in 2011 to customize education systems and bridge the gap between these new and innovative fields and the education sector in a way that fosters learner capacities for the Fourth Industrial Revolution.

The key goal of implementing the SMART Education initiative was to digitalize educational contents by 2015, reflecting modern changes of the 21st century and to utilize ICT as a primary medium of learning. It featured major five tasks (Chun, 2018).

1) Expanding and developing digital textbooks including based on smart learning model
2) Facilitating online classes from afterschool programs to university-level programs and building an online assessment system.
3) Creating a free and safe setting for educational contents through developing legal frameworks, ICT infrastructure and eco-system for sharing contents
4) Promoting teacher training of the SMART education.
5) Establishing the infrastructure of the foundation for cloud educational services in schools as well as a platform to share educational contents.

The SMART Education initiative consists of developing infrastructure, new pedagogies, relevant policy and legal frameworks, and culture to support ICT education. Therefore, it aims to change the meaning of education from in-classroom lectures to more interactive educational contents and pedagogies tailored to each student and teacher.

One main feature of the SMART Education initiative is the implementation of digital textbooks designed to link to the online classes. Online classes promote interactive learning and facilitate studies for those dealing with disabilities or health-related issues. Moreover, online classes provide more options for students to select their learning subjects, even for students in rural areas, who have historically been deprived of this right due to lack of subject teachers in their areas (Lee, 2011).

'How to use digital books' was already tested in 20 schools in 2008, 112 in 2009, 132 in 2010, 63 in 2011, and 46 in 2012. The pilot schools were provided with tablet PC, electronic blackboard, and wireless Internet (Lim, 2012). A study of the effectiveness of adopting digital textbooks in schools found that there have been increases in academic achievement, learning flow, self-directed learning ability, and problem-solving ability (Byun et al., 2011).

Building an online platform to share educational materials is a key to success for the SMART Education initiative. An online platform creates a virtuous-cycle educational eco-system. Teachers,

students, private companies, and related organizations can actively engage in this open-market system, where educational contents, learning communities, evaluation data, and materials for teacher development are shared in a standardized form (Eason, 2011). The Korean government developed the SMART education platform, whereby both the government and private companies engaged in the development of contents in the open market together (Park et al, 2013).

The SMART Education initiative has also focused on strengthening teachers' competencies for digital education. The teacher training curriculum incorporates the use of smart technology, communication through SMS, and new teaching and learning methods to promote creativity, cooperation, communication skills, critical thinking, and problem solving through group-level project activities. Both online and offline group teacher learning programmes have been designed, and their performance has been assessed in case studies provided by other teachers, special lectures, and movie previews (UNESCO, 2019).

The Korean government launched the SMART Education initiative in 2011, associated with the national master plan for ICT education. Based on the review for legal and technical prospects, the government set up a long-term plan and implemented the initiative in some pilot schools in various forms (Chun, 2018).

The SMART Education Initiative requires holistic approaches not only to promote digital infrastructure, but also to change the concept of education. Pilot schools have tried various learning and teaching models based on student learning pace. Students lead the entire process of learning from designing topics and research, working with others through cloud computing and presenting their learning to evaluating the class. Teachers can use various instructional methods and materials on the online platform and track the learning outcomes of each student in classrooms so that they support students based on individual student needs (Chun, 2018).

Several assessments conducted have measured changes in students, especially through the use of digital textbooks as part of the SMART Education initiative. These evaluations found that the initiative has led to improvements in problem-solving skills, communication skills, creativity and innovation ability, critical thinking, and information utilization ability. Meanwhile, teachers were found to have become increasingly effective in such competencies as learning facilitation, communication skills, and the use of smart devices (Kye et al., 2015, 2016).

Nonetheless, there has been substantial debate on SMART initiatives, especially as it relates to the adverse side effects of overused digital devices. Before the implementation of the SMART initiatives, there had been concerns that it should be delayed, and most teachers resisted adopting the initiative rapidly. They raised voices that exposure to harmful websites and deterioration of physical functions such as eyesight and neck could be by-product. (UNESCO, 2019)

On top of that, many stakeholders raised a question on weakening the relationship and communication between students and teachers. Given the issues are associated with the general aspects of the use of ICT, the Korean government focused on establishing an eco-system to support students, teachers, and parents and promoting partnerships with local government and the private sector.

The SMART Education initiative presents how the use of technologies can promote core skills for the 4th Industrial Revolution. Yet, the successful implementation of the model requires systemic approaches, including improving various laws and systems, generating an enabling infrastructure, enhancing teacher development programmes for the use of ICT in classrooms, and establishing educational policy to activate successful SMART Education across multiple academic disciplines. The SMART Education initiative in Korea has yielded meaningful outcomes, including free high-quality materials, the ability of legal systems to transition to the digital learning environment, the

adoption of new teaching methods for smart education, and comprehensive collaboration with governments, schools, and the private sector.

CONCLUSION AND LESSONS LEARNED

This study examined Korea's responsive education reform that is largely linked to the 4th Industrial Revolution. As a new era unfolds, the world must nurture individuals who can harness new and emerging technologies to reach higher levels of competence, skill, and creativity for a knowledge economy. No matter how much the future relies on technology, creative and innovative people will ultimately drive that technology and, therefore, the future. In this new knowledge-based economy, the focus should not be on content, but on the students' ability to take charge of their own learning.

Korea, like other countries, is struggling to determine how to reconfigure its education system to prepare its future workforce to lead a fast-changing economy. The government has introduced numerous polices, including two exemplary education programmes, the Free Semester Program and the SMART Education Initiative, that demonstrate the potential to promote development of cognitive and non-cognitive skill.

The following lessons can be drawn from Korea's experiences with education reform:

1. **The government gathered diverse stakeholders to develop a shared agenda to align their visions, goals, and strategies to promote skill development in future generations.**
   When the government initiated two major polices to nurture future generations to meet the prerequisite skills for the 4th Industrial Revolution, it called on schools, the public sector, and industry to work together by pursuing joint policies. The Ministry of Education, the Ministry of Culture, and the Korea Communications Commission work together to develop the interwoven digital education environment.

   Even though many consider that digital learning needs bottom-up drives, considering the foundation of the digital era, the government should provide clear guidelines and platforms where diverse partners can cooperate. It should implement national-level policies and legal systems for the transition. Given the SMART initiative has shown significant outcomes in improving infrastructure and social structure and promoting the engagement of education stakeholders, the role of the Korean government has been critical in implementing the initiative step by step.

2. **Schools are given the autonomy to provide more tailored education programmes.** Education reform aims at promoting schools and principals' autonomy. The SMART Education Initiative promotes schools' autonomy regarding curriculum, facilities, and private-sector partnerships. In the FSP, principals and teachers can make critical decisions about the programs' track and curricula based on their needs, feedback from students and parents, and local infrastructure.

   Promoting autonomy in school operations and curricula yields benefits, including more programmes tailored to meet industrial and social needs. In addition, both programmes developed a Web-based platform to share their results and best practices. The government gathered and shared these data with the public through a system that enabled each school to have more accountability and incentive to improve its system and education programmes.

3. **Teacher workforce development is key to success.** Although Korea has built a high-quality teacher workforce that has driven strong educational performance (OECD, 2014), quality reforms required significant shifts in teachers' roles and training. Therefore, the government made teacher policies the center of its education reform and supported them by establishing a system to develop teachers' pedagogical competencies.

   After developing guidelines, the government introduced the SMART initiative and related tools to teachers using web-based platforms, nurturing teachers, and creating learning communities to share best practices. SMART Education Experience Centers were developed to provide hands-on experience to teachers. In addition to that, the curriculum for pre-service teachers was tailored to reflect new pedagogies for the SMART Education initiative (UNESCO, 2019)

   In the same way, the Ministry of Education provided teacher training for the FSP during summer and winter vacations that included: pedagogy, class design, and sharing best practices by enabling new kinds of networks and communities, as well as innovative teaching modalities, to develop teachers' pedagogical competencies.

This study provided an overview and analysis of Korea's education reforms including two major polices, the Free Semester Program and the SMART Education Initiative, based on the broader context of Korea's creative economy agenda. Other countries can learn from Korea's successes and challenges to create policies that can be implemented in such a way that schools, the government, educators, and parents encourage the next generation to take advantage of a wealth of opportunities and overcome the challenges of the 4th Industrial Revolution.

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