

## Country Reports

### South Korea

#### 1.1 Relevant Policy

There is increasing awareness in Korea that the emphasis on university education has led to imbalances in the labour market. Nearly a quarter of university graduates work in jobs for which they are overqualified, and the rate of graduate employment among 25-34 year olds is the lowest in the OECD at 75%.<sup>1</sup> The Korean Government has shifted the focus of secondary vocational education away from the training of a technical workforce and towards a balanced curriculum aimed at both continuing to higher education and/or employment.<sup>2</sup> The Government aims to support and develop vocational schools to extend their role in response to the increasingly scientific nature of the country's industry, and is providing incentives to develop vocational education as the major source of skilled manpower in Korea.<sup>3</sup>

The main issue with vocational education in Korea is not perceived to be one of curriculum, but rather of improving connections between schools and employers and ensuring clear pathways for vocational students.<sup>4</sup> Although there is a mismatch between the skills delivered in post-secondary VET programmes and those required in the labour market, numeracy and mathematical skills do not seem to be a major element of this problem. On the contrary, challenges are arising from the over-education and relatively large numbers of VET graduates in jobs that require a lower level of education than that which they have attained.<sup>5</sup> Plans are currently being developed to introduce an apprenticeship system in response to this mismatch;<sup>6</sup> traditionally, in Korea, there has been an 'effective absence' of apprenticeships.<sup>7</sup>

The late 1990s saw a change in direction in terms of policy towards the maths curriculum, which was seen as too demanding in comparison to other countries, and insensitive towards the different abilities and inclinations of learners.<sup>8</sup> The existing approach to maths was criticised for leaving the brightest students unengaged while leaving the less able struggling to keep up. High expectations in maths were also seen as underlying a good deal of the growth in high-pressure extracurricular tuition with which Korean learners must contend.<sup>9</sup>

The seventh curriculum reform, which took place in 1997, thus aimed to reduce the difficulty level of the curriculum and reduce mathematical content by 30%;<sup>10</sup> however, it ultimately effected only a 10% reduction.<sup>11</sup> The reform also introduced a differentiated approach to the curriculum that attempted to allow for different levels of aptitude among learners.<sup>12</sup> The goal was to make the curriculum more 'learner centred', with an emphasis on voluntary active participation by students and on stimulating learners' interest in mathematics.<sup>13</sup> The reform also aimed to make the use of calculators and computers in classroom settings more acceptable, as traditionally they were rarely permitted by teachers or parents.<sup>14</sup>

All teachers in public schools in Korea must undertake a university level training programme culminating in the Teacher Employment Test (TET).<sup>15</sup> Admission to the training programmes is highly competitive, with only the top 5% of high school graduates accepted.<sup>16</sup> The TET is subject-specific: for maths, it covers general education, maths education, and maths content knowledge.<sup>17</sup> In 2011, only 4.1% of students taking the TET went on to be hired as public school teachers.<sup>18</sup>

<sup>1</sup> <http://monitor.icef.com/2014/01/high-performance-high-pressure-in-south-koreas-education-system/>

<sup>2</sup> Guo, Y. (2008). *Asia's Educational Edge: Current Achievements in Japan, Korea, Taiwan, China and India*. Lanham, MD: Lexington Books.

<sup>3</sup> Guo, Y. (2008). *Asia's Educational Edge: Current Achievements in Japan, Korea, Taiwan, China and India*. Lanham, MD: Lexington Books.

<sup>4</sup> <http://www.ncee.org/programs-affiliates/center-on-international-education-benchmarking/top-performing-countries/south-korea-overview/south-korea-school-to-work-transition/>

<sup>5</sup> <http://www.oecd.org/korea/SBS%20Korea.pdf>

<sup>6</sup> <http://www.cedefop.europa.eu/EN/news/22145.aspx>

<sup>7</sup> Hanushek, E., S. Machin & L. Woessmann (2010). *Handbook of the Economics of Education, Volume 3*. North-Holland.

<sup>8</sup> [http://matrix.skku.ac.kr/For-ICME-11/ICME/Chap2\(Paik\).htm](http://matrix.skku.ac.kr/For-ICME-11/ICME/Chap2(Paik).htm)

<sup>9</sup> [http://mathnet.or.kr/mathnet/kms\\_tex/115181.pdf](http://mathnet.or.kr/mathnet/kms_tex/115181.pdf)

<sup>10</sup> [http://mathnet.or.kr/mathnet/kms\\_tex/115181.pdf](http://mathnet.or.kr/mathnet/kms_tex/115181.pdf)

<sup>11</sup> [http://matrix.skku.ac.kr/For-ICME-11/ICME/Chap2\(Paik\).htm](http://matrix.skku.ac.kr/For-ICME-11/ICME/Chap2(Paik).htm)

<sup>12</sup> [http://matrix.skku.ac.kr/For-ICME-11/ICME/Chap2\(Paik\).htm](http://matrix.skku.ac.kr/For-ICME-11/ICME/Chap2(Paik).htm)

<sup>13</sup> [http://matrix.skku.ac.kr/For-ICME-11/ICME/Chap2\(Paik\).htm](http://matrix.skku.ac.kr/For-ICME-11/ICME/Chap2(Paik).htm)

<sup>14</sup> [http://matrix.skku.ac.kr/For-ICME-11/ICME/Chap2\(Paik\).htm](http://matrix.skku.ac.kr/For-ICME-11/ICME/Chap2(Paik).htm)

<sup>15</sup> [http://c.ymcdn.com/sites/www.amatyc.org/resource/resmgr/educator\\_feb\\_2013/sami2013februarymae.pdf](http://c.ymcdn.com/sites/www.amatyc.org/resource/resmgr/educator_feb_2013/sami2013februarymae.pdf)

<sup>16</sup> [http://c.ymcdn.com/sites/www.amatyc.org/resource/resmgr/educator\\_feb\\_2013/sami2013februarymae.pdf](http://c.ymcdn.com/sites/www.amatyc.org/resource/resmgr/educator_feb_2013/sami2013februarymae.pdf)

<sup>17</sup> [http://c.ymcdn.com/sites/www.amatyc.org/resource/resmgr/educator\\_feb\\_2013/sami2013februarymae.pdf](http://c.ymcdn.com/sites/www.amatyc.org/resource/resmgr/educator_feb_2013/sami2013februarymae.pdf)

<sup>18</sup> [http://c.ymcdn.com/sites/www.amatyc.org/resource/resmgr/educator\\_feb\\_2013/sami2013februarymae.pdf](http://c.ymcdn.com/sites/www.amatyc.org/resource/resmgr/educator_feb_2013/sami2013februarymae.pdf)

## 1.2 Institutions and Courses

### GENERAL SYSTEM

Compulsory education in South Korea consists of six years of primary education from six to 12 years of age, followed by three years of lower secondary.<sup>19</sup> At 15, learners may take an entrance examination for upper secondary school, after which they go to either an academic or a vocational institution.<sup>20</sup> On gaining their high school certificate, learners may sit the College Scholastic Aptitude Test, which determines access to universities for those in the academic stream, or to junior college for those in the vocational stream.<sup>21</sup>

### VOCATIONAL COURSES

According to the OECD, despite the systemic division into vocational and academic streams, vocational institutions 'often see themselves as having a largely academic orientation'.<sup>22</sup> In some schools, as much as 75% of the curriculum studied by academic and vocational students may be common.<sup>23</sup> Some observers have commented that parental pressure has led vocational schools to include more academic content in order to allow more of their learners to proceed to university.<sup>24</sup> Others, however, see this as a deliberate effort by the Korean government to tackle VET's persistent image as a second-rate option for students by allowing for improved progression routes.<sup>25</sup>

At the upper secondary level, guidelines for the content of maths curricula (along with other core subjects such as Korean language) are strict in comparison to the vocational elements, where schools have more flexibility.<sup>26</sup> Employers are not involved in the development of these guidelines.<sup>27</sup> At the junior college level, institutions have more autonomy with regard to curricula.<sup>28</sup>

In addition to vocational subjects, vocational high schools are required to provide advanced general education including units of common science.<sup>29</sup> In principle, a common national curriculum applies to the first year of upper secondary education in both the academic and vocational streams.<sup>30</sup> PISA data from 2006, however, indicates that students in the vocational stream spend just under four hours per week on maths, compared to five hours per week in academic institutions.<sup>31</sup> Participants in vocational secondary education show significantly worse performance in mathematics than their counterparts in general secondary education.<sup>32</sup>

In the second and third years of high school (Grades 11 and 12), the approach to mathematics switches from a compulsory, shared curriculum to an elective approach where students may choose to take one or more of six maths modules (Practical Mathematics, Mathematics I, Mathematics II, Calculus, Probability & Statistics, and Discrete Mathematics).<sup>33</sup> At this point, vocational learners receive less instruction in core subjects, with the emphasis switching to their specialisation.<sup>34</sup> Teachers have limited scope to take into account students' abilities or preferences at the high school level, as the curriculum as a whole is strongly oriented towards the college entrance examination.<sup>35</sup>

## 1.3 Practice and Pedagogy

The modern education system in Korea has been significantly influenced by trends in Western education, but these have not always proven to be a good cultural fit.<sup>36</sup> For instance, efforts to introduce social processes of knowledge creation into maths classes by facilitating co-operative small-group learning have not met with success in a cultural context that traditionally emphasises respect for historical approaches to learning, rather than the ability to think and argue critically.<sup>37</sup>

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<sup>19</sup> <http://www.ncee.org/programs-affiliates/center-on-international-education-benchmarking/top-performing-countries/south-korea-overview/>

<sup>20</sup> <http://www.ncee.org/programs-affiliates/center-on-international-education-benchmarking/top-performing-countries/south-korea-overview/>

<sup>21</sup> <http://www.ncee.org/programs-affiliates/center-on-international-education-benchmarking/top-performing-countries/south-korea-overview/>

<sup>22</sup> <http://www.oecd.org/education/skills-beyond-school/42689417.pdf>

<sup>23</sup> [http://www.unevoc.unesco.org/fileadmin/user\\_upload/pubs/VocEdSpecial\\_en.pdf](http://www.unevoc.unesco.org/fileadmin/user_upload/pubs/VocEdSpecial_en.pdf)

<sup>24</sup> <http://faculty.washington.edu/sangkok/education.PDF>

<sup>25</sup> [http://www.unevoc.unesco.org/fileadmin/user\\_upload/pubs/VocEdSpecial\\_en.pdf](http://www.unevoc.unesco.org/fileadmin/user_upload/pubs/VocEdSpecial_en.pdf)

<sup>26</sup> <http://www.oecd.org/education/skills-beyond-school/42689417.pdf>

<sup>27</sup> <http://www.oecd.org/education/skills-beyond-school/42689417.pdf>

<sup>28</sup> <http://www.oecd.org/education/skills-beyond-school/42689417.pdf>

<sup>29</sup> Guo, Y. (2008). *Asia's Educational Edge: Current Achievements in Japan, Korea, Taiwan, China and India*. Lanham, MD: Lexington Books.

<sup>30</sup> <http://www.oecd.org/education/skills-beyond-school/42689417.pdf>

<sup>31</sup> <http://www.oecd.org/education/skills-beyond-school/42689417.pdf>

<sup>32</sup> OECD *Learning for Jobs*.

<sup>33</sup> [http://matrix.skku.ac.kr/For-ICME-I1/ICME/Chap2\(Paik\).htm](http://matrix.skku.ac.kr/For-ICME-I1/ICME/Chap2(Paik).htm)

<sup>34</sup> <http://www.oecd.org/education/skills-beyond-school/42689417.pdf>

<sup>35</sup> <http://www.cimt.plymouth.ac.uk/journal/hwang2.pdf>

<sup>36</sup> [http://matrix.skku.ac.kr/For-ICME-I1/ICME/Chap2\(Paik\).htm](http://matrix.skku.ac.kr/For-ICME-I1/ICME/Chap2(Paik).htm)

<sup>37</sup> [http://matrix.skku.ac.kr/For-ICME-I1/ICME/Chap2\(Paik\).htm](http://matrix.skku.ac.kr/For-ICME-I1/ICME/Chap2(Paik).htm)

From 2008, integrated curriculum reforms were introduced in vocational schools with the intention of linking vocational education with the core subjects of Korean, English, maths, social studies and science.<sup>38</sup> The new curriculum, which emphasised active participation by students above theoretical education, was supported by a manual and teaching support materials to assist teachers in implementation.<sup>39</sup>

Korea's strong educational performance has been highly dependent on after-hours private education and tuition, which is an enormous industry in the country.<sup>40</sup> 75% of Korean students attend after-hours cram schools known as *hagwon*.<sup>41</sup>

A comparison of maths curricula in Korea and England found five key differences between the two, as follows:<sup>42</sup>

- In Korea, each content area tends to be dealt with discretely and on a one-off basis, whereas the English approach is more iterative and emphasises gradual building of skill level.<sup>43</sup> For instance, in Korea the content of linear equations is dealt with at the eighth grade, whereas in England basic content (linear equations using integer coefficients) is covered at key stages three and four, while more advanced topics such as the use of fractional coefficients are introduced at key stages four and above.<sup>44</sup>
- The English curriculum puts more emphasis on approximation, mental arithmetic and calculator use, and less on formal written methods, in comparison to the Korean approach.<sup>45</sup>
- The English curriculum introduces concepts such as even and odd numbers, negative integers and sequences earlier than the Korean curriculum, as these are often used in a range of real-life situations.<sup>46</sup> Fundamental abstract concepts of maths such as sets, binary systems etc., are dealt with later than in the Korean case.<sup>47</sup>
- The Korean curriculum emphasises formal, abstract knowledge based on an understanding of specific mathematical terms and concepts, compared to the more flexible approach used in England which emphasises the application of mathematics to real life situations.<sup>48</sup>
- The English curriculum is based on key stages, which last two or three years, allowing students to learn more flexibly in terms of depth and speed, whereas the Korean curriculum is structured by semester and requires all students in one grade to study the same content, regardless of ability. Assessment and attainment targets are also set out more flexibly in England, allowing for different targets to be used for students of different ability and maturity.<sup>49</sup>

#### 1.4 Key Points of Learning

There is little evidence of a specific approach to teaching mathematics in vocational settings in South Korea. The curriculum is the same as that followed in academic high schools, and the pressure to allow for progression to university has led vocational institutions to follow an explicitly academic approach. The overwhelming focus on preparing for college entrance examinations leaves little room for innovative practice, and there is little evidence available on any such practice in vocational settings. The country's success in mathematics in international rankings such as PISA hides the fact that its vocational institutions do less well on these measures. Korean learners also study the longest hours of any OECD country and are generally thought to be under intense pressure.

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<sup>38</sup> [http://eng.krivet.re.kr/eu/ec/prg\\_euCDAVw.jsp?gn=M06-M060000056](http://eng.krivet.re.kr/eu/ec/prg_euCDAVw.jsp?gn=M06-M060000056)

<sup>39</sup> [http://eng.krivet.re.kr/eu/ec/prg\\_euCDAVw.jsp?gn=M06-M060000056](http://eng.krivet.re.kr/eu/ec/prg_euCDAVw.jsp?gn=M06-M060000056)

<sup>40</sup> <http://monitor.icef.com/2014/01/high-performance-high-pressure-in-south-koreas-education-system/>

<sup>41</sup> <http://monitor.icef.com/2014/01/high-performance-high-pressure-in-south-koreas-education-system/>

<sup>42</sup> <http://www.cimt.plymouth.ac.uk/journal/hwang.pdf>

<sup>43</sup> <http://www.cimt.plymouth.ac.uk/journal/hwang.pdf>

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<sup>46</sup> <http://www.cimt.plymouth.ac.uk/journal/hwang.pdf>

<sup>47</sup> <http://www.cimt.plymouth.ac.uk/journal/hwang.pdf>

<sup>48</sup> <http://www.cimt.plymouth.ac.uk/journal/hwang.pdf>

<sup>49</sup> <http://www.cimt.plymouth.ac.uk/journal/hwang.pdf>