Index

academic performance 16, 51, 95, 109–10
Academic Ranking of World Universities (ARWU) 48–51, 72–3, 228
Admissions Officer System 102–3, 109, 200–201, 209, 211, 217
adult competency 151–3, 159–81
Africa see BEAR (Better Education for Africa’s Rise)
age-skill profile
country comparison 163–80
participants 160
PIAAC effects 150
regression models 161–2
summary of Korean aging effects 180–81
variables 160–61
ARWU see Academic Ranking of World Universities (ARWU)
Basic Vocational Training Act 30, 32
BEAR (Better Education for Africa’s Rise)
background and pilot countries 264–76
design and implementation 276–9
as development cooperation project 255
as initiative for promoting vocational education 256–7
lessons learned and policy implications 279–85
Becker, G.S. 22, 78, 87
birth rates 22
Blue House 25–6
Botswana 256, 263–78
bottom-up approach 202, 206, 210–16, 220–21
bottom-up projects 231, 252
bottom-up research support 240, 244–5, 254
brain drain 3, 31, 34–5
brain gain 10–11, 31–9
Brown, G. 218–19
bureaucratic control
circle of 251
in education 15, 218
need to overcome 254
peer review avoiding 252
removing excessive 253
in science 229–47
Center for Higher Education Information Disclosure 55
Central Industrial Education Council 26
character skills education 7, 63, 110–11, 113, 129, 144
China
average years of schooling 43
digital reading scores 45
international competitiveness 50
Korean students studying abroad in 47
math scores and student happiness 64, 188
number of researchers per million inhabitants 46
published papers and citations 50–54, 224–8
R&D investment 46
sending students to United States 47
students’ level of value and enjoyment of cooperation 193
top universities 49–50, 228–9
Chung-hee, Park 2, 14, 35, 117
Citizenship Training Schools 12
class sizes 13, 16, 134
cognitive skills
country comparison 98–9
Human capital and development

excessive emphasis on 41, 44, 48, 60, 94–7, 99, 114, 184
College Scholastic Ability Test (CSAT) 101, 185, 199–201, 208–9, 212, 216–17
colleges
admission systems 198–202, 208–10, 220–21
advancement rate 3, 42, 59, 68–71, 74, 77–9, 91, 93–4
eyear 8–10, 14–19, 23–5, 33
and education diversification reform 93–114
and formation of education bubble 65–78
and labor market 79–92
quality problems 48, 54–64
readiness for 78–9
returns to 3, 40, 84, 87
skill mismatch problem 199
two-year and four-year 42, 59–60, 68–70, 75–92, 116
see also vertical differentiation in colleges
Comprehensive High Schools 23
Compulsory Education Expansion Plan 12–13
Confucianism 8, 23, 37
country comparisons
age-skill profile 159–81
average share of vocational education students in upper secondary schools 282
educational research 239
education reform 98–9, 108, 114
educational expansion 39, 42–7
happiness in schools 63–4
pedagogy reform 185–98
project-based learning 185
published papers and citations 50, 52–4, 223–8
student time spent studying 60–61
top universities 49–51, 228–9
youth skills and learning 153–9
Daegu Gyeongbuk Institute of Science and Technology (DGIST) 101, 105, 248–9, 253
DARPA (Defense Advanced Research Projects Agency) 222–3, 248–54
Democratic Republic of Congo 256, 263–78
Department for Business, Innovation, and Skills (BIS) 218
design and implementation of BEAR project 276–9
of Meister High Schools 115–16, 121–3, 130, 146–8
of reforms 117–20, 142, 145
development aid 255–7
development conditions 258, 261–2, 271, 277–9, 280–82, 284–5
development cooperation 255, 263–83
development process Botswana and Namibia 270, 276
human capital for 1
importance of vocational education for 255
of Korea 2, 13, 149, 285
Digital Reading Assessment (DRA) 44–5
domestic enterprises 37
domestic finance 21–2
Economic Development Plan 23, 68
Economic Planning Board (EPB) 23, 118
Economic Trends Report Meeting 34
economy education linking to 22–31
human capital of 257–8
knowledge 65, 130–31, 144–7, 183
sustained development of 8
transition from agricultural to industrial 35
from industrial to technological 38–9
from light to heavy industry 37–8
Education Broadcasting System (EBS) 101, 106, 200
conceptual framework 41, 64
definition 2, 75, 93
discontent for 107–8
Index

education diversification as remedy for 77, 93–6, 99, 103–4, 114
education reforms as remedy for 183
formation 64–78
and labor market 78–92
Meister High Schools as remedies for 115
period 42, 66
quantitative measures masking 93
and vertical differentiation 101, 184
education diversification policy for high school 206–7
reform agenda 99–107
goals of 94–9
major elements of 144
strategy 107–14
as remedy for education bubble 77, 93–6, 99, 103–4, 114
see also Meister High Schools
education expansion with equity 11–22, 65, 92
world’s fastest 42–7
education expenditure college tuition to GDP ratio 66
lessening financial burden of 107, 114
not leading to human capital accumulation 64–5, 93, 97, 145
per student 67–8
at primary and secondary school level 66–7
reducing private burden of 101
trend in Korea by government and private sector 65–6
education reform agenda 99–107
bottom-up 216, 220
for countering education bubbles 93–4, 183
goals 94–9
strategy 107–14
in UK 218–19
Education Reform Committee 108–10, 210, 217–18
education system criticized for too much focus on test scores and rote learning 39–40
futuristic 218
Korea’s as more equitable 10
new teacher 219–20
problem of closed 111
reform rooted in 107
transforming through Meister High Schools 141–8
of United States 78, 99
vocational 116, 259–60, 264, 281, 284
weak life-long learning as fundamental problem for 149, 180
educational development, features of 9–11
Educational Grant Act 21
Electronics and Telecommunications Research Institute 38, 233
elementary education career education 102
early 9, 11–17, 19, 21, 23
financial assistance for 207
and imbalance in education 283
investment in 67
Meister High Schools driving change in 144
pedagogy reform 90
teacher salaries 220
time spent in 116
Employment Insurance System 30
engineering early development 24–6, 33–4, 68
future expansion 256
German meisters 122
marine 126, 130, 140
professors receiving research grants 105, 244
published papers and citations 53–4, 228
turnover rate of researchers 247
enrollment rates 1948–2010 13–14
1990–2010 68
in Africa 271
increasing, as goal in UK and US 93
entrance examinations 15, 118, 150, 159, 180, 200–202, 212
equalization policy
and dispersion of schools and colleges 96
vs diversification 97–8, 107, 109, 114, 121
effect on teachers 62
furthering secondary school enrollment 15–16
and high school management 104
implementation and expansion 96
equity in education 11–22, 65, 92
failing schools
building on past failures 116–21
embarking on presidential project 121–6
and Meister High Schools 141–8
opening-up strategies 133–41
providing incentives 127–32
as vocational 115–16
farmers 8, 12, 20, 122
fast-follower 5, 39, 230
Finland
country comparisons
age-skill profile 164–6, 173–5, 177–80
average share of vocational education students in upper secondary schools 282
educational expansion 39, 44, 46
happiness in schools 63–4
pedagogy reform 186–7, 189–91
student time spent studying 60–61
first-mover model 230
high performance levels 10, 153
teacher qualifications 219–20
university competitiveness 159
first learning generation 3–4
first-mover 5, 39, 229–30
foreign aid 12–13, 21
foreign direct investment (FDI) 37
Fourth Industrial Revolution 182–3, 216–18, 220, 223
France
country comparisons
average share of vocational education students in upper secondary schools 282
educational expansion 45–6
happiness in schools 64
pedagogy reform 186–7, 189–91
published papers and citations 50, 52, 224–7
job-first, degree-later policy 131
state regulation bureaucratic model 259, 261
freshmen quota system 17, 24
George Peabody Teacher College 21
Germany
collaborative research 239
country comparisons
age-skill profile 160, 162, 164–6, 173–5, 177–80
average share of vocational education students in upper secondary schools 282
educational expansion 46
happiness in schools 64
published papers and citations 50, 52, 224–8
student time spent studying 61
top universities 228–9
dual-corporatist model 259, 261–2
grants from 28
job-first, degree-later policy 131
meisters 122, 144
sense of belonging 194
university competitiveness 159
Geun-mo, J. 34
Goldin, C. 41, 65, 78, 93
government research institutions (GRIs)
as beneficiaries of NRDP 233–7
collaboration between organizations 239–40, 253–4
collaboration between organizations 239–40, 253–4
collaboration between organizations 239–40, 253–4
collaboration between organizations 239–40, 253–4
collaboration between organizations 239–40, 253–4
collaboration between organizations 239–40, 253–4
concern over 222
decreasing share in patents and technology transfer 229
financial support 240, 246–7
as helping private enterprises 38
and high R&D expenditure 224, 226
and K-ARPA 250, 252
Korea as slow to transform 229–30
need for reform of governance structure 245–7, 253–4
percentage of principal investigators from 231
purpose 36, 38
special forces approach 248–9
turnover rate of researchers 247
Gwangju Institute of Science and Technology (GIST) 101, 105, 233, 248–9, 253
hierarchy in higher education 4, 96–8
high-risk high pay-off research
bureaucratic control over NRDP 229–47
call for new funding agency 248–54
as challenge to stimulate 223
criticisms of Korea’s R&D system 222
definition 222
poor performance in 223–9
High School Diversification 300 97, 100, 104, 109, 121
higher education
advancement rates 69–70, 77, 79
in African countries 256, 272, 275
balanced mix with vocational education 141, 144, 146
early 9–10, 13–20, 24–5, 27–8, 31, 35
educational investment per student 67–8
hierarchy in 4, 96–8
job-first, degree-later policy 131, 141
mismatch with technological progress 40
quality problem solved through global education market 64–5
R&D expenditure 231
restructuring 105
specialization 101–2
ture rate of return for 87
in UK 218–19
vertical differentiation in 54, 60, 65
wage premiums for 78, 89, 92
see also colleges; vertical differentiation in colleges; vocational education
higher education expansion
factors affecting 67–73
as part cause of education bubble 147
period of 230
rapid, in Korea 42
supply-side issue 80
Hong, S.C. ix, 24, 26–7, 40, 102, 109, 118
Hong Kong
country comparisons
educational expansion 44–5
happiness in schools 64
top universities 49, 228–9
high performance levels 4, 10
horizontal differentiation
and autonomous private high schools 98
benefit of strengthening 75
between two- and four-year colleges 59–60
failure to strengthen 71
four-year colleges failing to achieve 94
and information disclosure 109
and multiple-choice questions 184
policies implemented to strengthen 102–4, 107
reform goal of fostering 99–101
relation to education equalization 96–7
weak in colleges 41, 48, 54, 93
human capital accumulation
access to global education market allowing 65
and changes in wage growth 81, 88
education as channel of investment for 257
education expenditure not leading to 64–5, 93, 97, 145
expanding education with equity 11–22
as fastest in world 47
impact of Japanese colonial war 8
and on-the-job learning 175
Korea’s economic and social development characterized by 10
linked to human capital expansion 47
linking education to economy 22–31
new challenges for 39–40
period of Korea’s triumph in 41
private tutoring not leading to 65, 76
promoting brain gain 31–9
and seniority wage payment system 150
three pillars of 11
human capital concept 257
human capital formation
balanced 258, 283
BEAR project 280–81
human capital and development

danger for 180–81
general school education as backbone of 255
phase of dilution 41
through investments 222
two stages of 2–4
variety of dimensions for national development 285
variety of dimensions in sources of 255
human capital investment and education bubble 1–2, 75
equity in education 11–22
returns 257
TVET policy orientation 261
human capital perspective 258–9, 277
human capital theory 22, 78, 87
in-plant training 24, 28, 30, 32
incentives 127–32
Income Contingent Loan (ICL) 98, 106
Industrial Education Promotion Act 26
Industrial Manpower Supply and Skills Development Restructuring Plan 30
industry–academy cooperation 120, 123, 127–9, 133–7, 146
inequality among college graduates who experienced education bubble 42
widening 78–92, 158
innovation ecosystem
control over 230
DARPA’s impact on US 251
K-ARPA functioning as catalyst for change in 250
lacking high-risk, high-payoff research 222
reform for positive change in 248
research of GRIs designed to fuel 237
universities acting as central hub of 218
Institute for Basic Science (IBS) 101, 105, 248–9, 251, 253
International Civic and Citizenship Education Study (ICCS) 63
Japan
colonial rule 1, 8, 11–12, 19
country comparisons age-skill profile 162, 164–6, 173–80
collaborative research 239
education reform 98–9, 114
educational expansion 43–6
happiness in schools 64
pedagogy reform 186–91
published papers and citations 50, 52, 224–8
top universities 49–51, 228–9
youth skills and learning 153–4, 158–9
grants from 28
Yutori Education 99
Jeong, H. ix–x, 40
job-first, degree-later policy 130–31, 133, 136, 141, 144–7
K-ARPA 5, 248–54
KAIS see Korea Advanced Institute of Science (KAIS)
Katz, L.F. 41, 65, 78, 84, 93
KDI see Korea Development Institute (KDI)
KIST see Korea Institute of Science and Technology (KIST)
Korea
achieving world’s fastest educational expansion 21–2, 41–7
highest rate of educational enrollment in world 8
potential growth rate 40
thirteenth largest economy in world 8
Korea Advanced Institute of Science (KAIS) 11, 34–5
Korea Advanced Institute of Science and Technology (KAIST) 34, 48, 101, 105, 229, 233, 235, 248–9, 253
Korea by date
1945–1958 illiteracy rates 12
1948–2010 enrollment rates 14
1960–2010 average years of schooling 43, 50
1965–2005 average number of students per class 16
Index

average number of students per teacher 17
1965–2010 number of vocational high school students and proportion out of total number of high school students 117
1965–2011 number of students in higher education 18
rate of increase of students in higher education 19
ratio of students enrolled in private schools 20
1965–2012 educational investment as percentage of GDP 65–6
educational investment per student 66–7
employment rates 70–71
percentage of new graduates from vocational high schools 71
student advancement rates 69–70
1967–1989 share of government expenditure on vocational vs higher education 27
1980–2010 educational attainment of workforce 8–9
1980–2011 annual average wage growth rates 81–2
average wages by educational attainment 80–81
college premium using fixed-weight method 84–5
composition of workforce by educational attendance 79–80
four-year college premium by wage income group 85–6
growth and inequality of Korean wages 87–8
income shares and inequality 88–9
log wage of four-year college graduate decile groups 82
log wage of two-year college graduate decile groups 83
two-year college premium by wage income group 86–7
within-group inequality by educational attainment 90–91
1993–2012 expansion of private tutoring business 75–6
1994–2003 mean KSAT scores of two-year and four-year colleges 74–5
1995–2009 project and funding agencies 241–3
1996–2010 number of researchers per inhabitant 46, 50
1998–2012 NRDP budget by performing sector 236
NRDP budget by research type 236
total expenditure and number of projects in NRDP 232
1999–2015 university competitiveness index 159
2000–2011 published papers and citations 50, 52–4
2000–2012 average scores of reading, math and science 44
average youth PIAAC scores 153–8
percentage change in enrollment 72–4
2001–2010 number of papers published 225
2001–2015 changing trend of number of employed among vocational high school graduates and those advancing to university 142–3
2002–2011 number of highly cited papers 227
2004–2012 top beneficiaries of NRDP 233–5
top universities 49, 51
2004–2014 top universities 228–9
2008 career paths of graduates by education level 116
2008–2013 distribution of schools and colleges before and after education diversification 95–6
distribution of schools and colleges before and after education equalization 96
Human capital and development

- Education diversification vs education equalization 97–8
- Misguidance of international comparisons on education reforms 98–9
- Reform agenda for education diversification 100–101
- Reform strategies for education diversification 113
- 2009–2010 salaries and self-efficacy of teachers 61–2
- 2009 digital reading scores 45
- 2009–2012 changes in the number of ‘convergence projects’ in NRDP by sector 238
- 2010–2018 Meister High Schools customized curriculum for industries 128
- Meister High Schools details 124–6
- Meister High Schools lessons for policy and leadership 147
- 2011–2012 average adult PIAAC scores 151–3
- 2012 happiness in schools 63–4
- R&D expenditure as percentage of GDP 222, 231
- Relationship between students’ sense of belonging to school 193–4
- 2013 estimated age-skill profiles for numeracy, literacy and PSTRE 163–72, 177–9
- High school graduate recruitment plan of major financial institutions, companies and public institutions 139–41
- Learning at work by age group 175
- Proportion of active learning in professional development activities 187–8
- Proportion of teachers holding negative views on the adequacy of professional development 186
- Proportion of teachers including either cooperative learning with fellow teachers or research activities within professional development activities 189
- Proportion of teachers observing students and giving immediate feedback 191
- Proportion of teachers providing feedback in person in addition to grades 190
- Readiness to learn by age group 174
- Relationship between students’ mathematics scores and interest in mathematics 195
- Relationship between two noncognitive mathematical activities engaged in by students 192
- Student time spent studying 60–61
- Task discretion by age group 174
- Vertical differentiation among colleges 54–60
- 2015 communication framework for BEAR project 266
- Relationship between students’ sense of belonging to school 193–4
- Target sectors and scopes of BEAR project 265
- 2016 relationship between students’ level of achievement motivation and perseverance 198
- Relationship between students’ level of value and enjoyment of cooperation 192–3
- Relationship between students’ science scores and enjoyment of science 197
- Relationship between students’ science scores and interest in broad science topics 196
- Korea Development Institute (KDI) 36
- Korea Institute for Energy Research 38, 234
- Korea Institute of Machinery and Metals 38, 233
Korea Institute of Science and Technology (KIST) 11, 34, 36, 38
Korea Ocean R&D Institute 38
Korea Research Institute for Vocational Education and Training (KRVET) 87, 123, 126, 132, 151, 256, 264–6, 279, 281, 284
Korea Research Institute of Chemical Technology 38, 234
Korea Research Institute of Standards and Science 38, 233
Korean adult skills 151–3
Korean adult workers 159–81
Korean Educational Development Institute (KEDI) 14, 16, 27, 66, 69–72, 76, 117, 142, 215
Korean Labor and Income Panel Study (KLIPS) 87
Korean Scholastic Aptitude Test (KSAT) 54–5, 57–60, 73–6, 87, 102, 106
Korean War 1, 8, 12, 31, 284
Korean youth skills 153–9

labor market
in African countries 272–5, 277–80
average years of schooling among entrants to 39
changes of demand structure in 258–9
connection with secondary education 145
country comparison 162–3
and education bubble 42, 78–92
mobility of researchers 247
new high school graduates entering 70–71
seniority wage payment system as main compensation scheme in 150
TVET system relevant to 263–4, 280
weak life-long learning as fundamental problem for 149, 180
see also workforce
land reforms 20–21
learning
cooperative 185, 188–9
on-the-job 174–5, 180, 255
life-long 149–50, 158–81, 255
project-based 183–5, 188, 192–3, 201–7, 210–16, 220–21
readiness for 150–51, 173–6, 180, 195
rote 39–40, 60–62, 150, 158, 180, 183, 194, 201, 210, 212, 216, 221
social and emotional 63, 100, 103, 115
youth 153–9
Lee, Myung-bak (President) 112–13, 121–3, 135–8, 146–7
life-long learning 149–50, 158–81, 255
literacy
definition 151
eyear illiteracy rates 11–12
as element of economic development and social governance 11
government promoting 12
of Korean adult workers 160–80
of Korean youth 154–9
measures 149, 151–3
skills falling over age 153
local participation 270–71, 274–6, 278–9, 281–2
Lucas, R. E. 22, 41
Malawi 256, 263–78
Manpower Development Plan 23–4
market economy model 260
mathematics
area assessed by PIAAC 151, 153
average scores 44
average weekly studying time 60
behaviour with regard to 188, 192
in China 228
and happiness of students 63–4
interest in 194–5
Korean student scores 47
in NRDP 238
PIACC vs PISA scores 156
Meister High Schools
control over 136–7
development 122–3
establishment year, field of study, location, number of students and partner enterprises 124–6
fiscal and other incentives 131–2
focus on providing incentives 127
fostering character skills and global
capabilities 129
gradual approach 213
graduates as equipped with better
skills 90
helping students develop potential
and secure quality jobs 101
and hiring of vocational high school
graduates 137–8
implemented to strengthen
horizontal differentiation 102
industry–academy cooperation 123,
127–9, 133–7, 146
job-first, degree-later policy
130–31
job guarantee 127, 130
opening-up strategies 133
origin of name 122
as part of education reform 77, 100,
115
as presidential project 112–13,
121–6, 135–6, 146
recruitment of former CEOs as
principals 111, 133–5
as remedy for education bubble
115
transforming education system
141–8
vocational high schools designated
as 102, 104
whole-of-the-government approach
133, 135–6, 146, 148
Ministry of Education and Skills
Development (MoESD) 265
Ministry of Education (MOE) 14, 16,
23–5, 27, 66, 69–72, 76, 108–9,
116–18, 120, 123, 132, 142, 199,
207, 210–11, 213–14, 218–19, 239,
240–41, 245, 256, 265, 279, 284
Ministry of Education, Science and
Technology (MEST) 112–13, 115,
122–3, 130, 133, 135–6, 138, 146,
245, 247
Ministry of Science and Technology
(MOST) 23–4, 28, 34, 38, 248
Ministry of Science, ICT and Future
Planning 240–41, 245
Ministry of Strategy and Finance 112,
136–7, 146, 247, 249, 253
multiple-choice assessment 16, 60,
62–3, 183–5, 198–201, 205,
209–10, 212, 215–16, 221
Murphy, K. M. 22, 65, 84
Namibia 256, 263–78
national development strategy
BEAR project 263–85
TVET 257–62
National Education Law 12
national innovation system (NIS) 36–7
National R&D Program (NRDP)
bureaucratic control over 229–47
establishment 38
failed attempt to transform 248
increase in size of total budget 254
National Research Foundation (NRF)
240, 244–5, 252
National Science and Technology
Committee (NSTC) 222
National Science Foundation (NSF)
223, 245, 248, 252
National Technical Qualification
System (NTQS) 28
National Universities of Education 13
net expenditure 57–60
non-cognitive skills
country comparison 98–9
difficulties in developing 62, 183–4
difficulties in evaluating 63
diversification to increase 97, 99,
114
lack of emphasis on 60, 94–5
‘Normal Schools’ 13
NRDP see National R&D Program
(NRDP)
Occupational Wage Survey (OWS)
79–80
on-the-job learning 174–5, 180, 255
opening-up strategies 133–41
original equipment manufacturing
(OEM) production 37
ownership 279–80, 282, 284
performance assessment
benefits of 199
combining top-down and bottom-up
strategies 210–21
conditions in place for expansion of 201
hindrances to implementing 200–201
incorrect use of term 197
other assessment initiatives 199–200
and project-based learning 202
reasons for failure 184–5, 198–9, 201
teachers’ opinions on 202–10
PIAAC (Programme for International
Assessment of Adult
Competencies)
age-skill profile and life-long
learning of Korean adult
workers 159–81
data and skills of Korean adults
151–3
features and limitations 149–50
skills and learning of Korean youth
153–9
Pohang University of Science and
Technology (POSTECH) 48, 101,
105, 233, 253
poverty
learning to escape from 13
literacy helping to eliminate 11
ownership 279
successful escape from 8
TVET for alleviating 255, 263
presidential project 112, 114, 121–6
primary education
in African countries 270, 272, 276
brought in from abroad 112
decrease in tuition expenditure 66–7
early 9, 19, 23, 35, 283–4
employees in private tutoring 42,
75–7
information disclosure system 104
lack of attention to non-cognitive
skills 94
lack of ‘college readiness’ after 78–9
long hours of studying outside
school including private
tutoring 60
Meister Schools driving positive
changes in 144
pedagogy reform 90
pressure to increase test scores 101
private tuition expenditure 67
strong emphasis on skills measurable
through test scores 41, 48, 60
teacher salaries 220
teacher-to-pupil ratio 162
universal 8, 10, 13, 22, 258
private education
autonomous private high schools
206, 216
class between equalization and
diversification 97–8
expenditure 42
vertical differentiation among
colleges 55, 57, 94
private enterprises
government subsidies for training at
29–30
increasing investment in R&D
38–9
opportunities to cooperate with
public sector 38
successful industrialization 260
support from 211
technological learning of 38
voluntary training programs for 30
private sector
and German vocational training
system 262
increased investment in R&D 38–9,
47
interventions impeding 218
and K-ARPA 250
labor market competition 247
supplementing insufficient public
finance 19–20
private tutoring
early 10, 14–17, 19–21, 25, 96
education expenditure 65–8, 76–8,
91, 94
expansion of business 75–7, 91
household expenditure 77–8
increase in
due to surge of demand 93
as economic burden 65
in other countries 91
as related to test scores 76–7
long hours of studying through
60–61, 63
not leading to human capital
accumulation 65, 76
number of employees 42, 75–7
and parental trust of teacher
assessments 220
policies to reduce financial burden of 101, 103–4, 106, 109, 183, 220
political influence 107
reasons for expenditure 115
relation to number of students in low-quality colleges 75
Programme for International Student Achievement (PISA)
comparison with PIAAC 153
degree of enjoying and valuing cooperation 192
difference in studying times 60
difficulty in evaluating non-cognitive skills and creativity 62
evaluating problem solving and comprehension 44, 62–3
happiness in classroom 221
interest in mathematics 194–5
interest in science 195–6
as international competence test for students 4
Korean youth comparison with youth of Germany, Japan, US, UK and Finland 153–9
pedagogy problems shown in 188
performance of Danish students 108
performance of Japanese students 99
performance of Korean students 9–10, 44–5, 47, 63, 108, 149, 176
quantitative measures masking education bubble 93
school-life happiness 63–4
sense of belonging 193–4
project-based learning
combining top-down and bottom-up strategies 210–21
as effective deep-learning strategy 183
expected benefits 183
methodology with performance assessment at core 184
need for pedagogy reform 185–202
teachers’ opinions 202–10
PSTRE (problem solving in technology-rich environment)
age profile score with learning indices 179
average scores of Korea and OECD countries 152
consisting of everyday life questions 153
definition 151
no paper-based assessment 162
precision problems 160
score by age group 166, 173
score regression for Korea 171–2
published papers and citations 50–53, 58–9, 223–8
quality
education diversification enhancing 95, 99–101, 103–5, 107, 114
and education equalization 96–7
and enrollment quota system 25
expansion achieved at expense of 16
as not necessarily occurring with quantity expansion 92
private tutoring as obstacle to 107
problems of schools, colleges and universities 48–64
research outcomes, concerns about 39
of universities 48–54, 115, 117, 127, 145, 158
upgrading 2–3
of vocational education institutions 120–21
readiness to learn 150–51, 173–6, 180, 195
reform agenda 99–107
reform goals 94–9
reform strategies 107–14
research and development (R&D)
bureaucratic control over national program 229–47, 254
challenges 39, 223
early 21, 35–6, 38–9
expansion of government support 254
investment 46–7, 222
national defense 251
outputs 223–9
special forces approach 248–9
workforce 45–6
returns to education 3, 40, 83–6, 91, 257
rote learning 39–40, 60–62, 150, 158, 180, 183, 194, 201, 210, 212, 216, 221

school equalization see equalization policy

School of Public Administration 33–4
Science & Technology Education Promotion Plan 26
Science and Technology Policy Institute (STEP) 47
Science and Technology Promotion Act 37

science education
average scores 44
early development 24–6, 34–7
Korean student scores 47, 195–7
professors receiving research grants 105, 244
research councils 246
special-purpose high schools 98, 118, 125–6
turnover rate of researchers 247
two-year and four-year colleges 68 in UK 218–19
universities specializing in 105, 248–9
Science Education Act 37

second learning generation 3–4, 183

secondary education
in African countries 270, 272, 276
brought in from abroad 112
career guidance reinforcement 141, 143–5
decrease in tuition expenditure 66–7
everly 8–10, 13–17, 19–21, 23
employees in private tutoring 42, 75–7
information disclosure system 104
lack of attention to non-cognitive skills 94
lack of ‘college readiness’ after 78–9
long hours of studying outside school including private tutoring 60
Meister Schools driving positive changes in 144
need for more focus on creativity and character skills 101
parents, teachers and new teaching methods 212

pedagogy reform 90
private tuition expenditure 67
reasonable attainment of 258
strong emphasis on skills measurable through test scores 41, 48, 60
and ‘subject egoism’ 217
teacher salaries 220
teacher-to-pupil ratio 162
and TVET model 261–2
and vocational education 282–4
‘selection-and-concentration’ approach 26

self-efficacy 11, 61–2, 183, 216, 221
seniority wage payment system 150
Seoul National University (SNU) 11, 21, 27, 33, 47–8, 50, 105, 229, 233, 235
Seoul National University Hospital (SNUH) 140
sequential expansion of education 3, 10, 13–14
skill-biased technological change 65, 78, 89–90, 145

skill development
early 23–4, 26–32, 260–61
government-led 10
‘life long’ 30
strategies for 32

skills
21st century 45, 129, 136, 144, 184
collaboration and communication 90, 183
competitions 25, 29, 265
creativity and character 39–41, 60–63, 95, 100–102, 184
deteriorating
of Korean adult workers 159–81
of Korean adults 151–3
of Korean youth 153–9
English-speaking 204
gaps 278, 280
human capital as 257
measurement and relation to age 149–81
mismatch problem 199, 258–9, 276–8
multiple-choice 216
problem solving 44, 62, 183
‘specific’ 258
technical 29, 118, 122, 127–9, 256
education by students, parents and colleagues 100, 105, 111
in-house training 145, 147
incentives 121, 208, 214–15
new types of 112
number in private tutoring 76–7
opinions survey 202–10
opposition to 2+1 system 119
preference for rote learning/multiple choice assessment 60–61, 183, 188
principal recruitment system 135
problems of teaching and learning methods 197–202
and professional development 185–9
and project-based learning 184–5, 188, 192, 202–10
providing feedback 190–91
reliance on quantitative assessments 61
self-efficacy 61–2, 183, 216, 221
Sustainable Development Goals 256
top-down and bottom-up strategies 210–21
unions 109–10, 140
technology
early development 8, 10, 21, 23–9, 31, 33
education in UK 218–19
GRIs leading to development of 247
importance in vocational education 256, 258–9
and K-ARPA 251
Korean students’ advanced level of 221
research councils 246
universities specializing in 105, 248–9
see also PSTRE (problem solving in technology-rich environment)
technology transfer 23, 229, 235, 247, 254
Terman, F.E. 34
top-down approach 11, 199, 202, 210–21
top-down projects 231
top-down support 240, 244, 254
transformative research 223
TVET (technical and vocational education and training)
Index

aim to build capacity in five African countries 256
BEAR project
  background 264–76
  design and implementation 276–9
  lessons learned and policy implications 279–85
building blocks of system 264
changes in technical qualification system 29
economic and social significance for development 257–62
individual capacities 6
  lessons learned and policy implications 279–85
  role in development of less developed countries 255, 263–4
target groups 264

Ulsan Institute of Science and Technology (UNIST) 105, 248–9
United Kingdom (UK)
  commercialization rate of R&D outcomes 240
country comparisons
  age-skill profile 162–80
  average hours of sleeping 61
  average share of vocational education students in upper secondary schools 282
educational expansion 46
  happiness in schools 64
  pedagogy reform 186–7, 189–98
  published papers and citations 50, 52, 224–6
  student exercise, voluntary work and sleep 61
top universities 228–9
  youth skills and learning 153–9
DARPA 222, 249, 251, 254
  early initiatives 21, 33–6
education reform 93, 98–9, 103, 114
  encouraging university enrollment 144–5
ehancing autonomy of schools 216
era of human capital 41
failure to respond to skill-based technological changes 78
GOCOs 254
  high-risk high pay-off research 223, 237, 245, 248
  job-first, degree-later policy 131
  R&D grants 238–9
  SAT and ACT percentile scores for colleges 57
selectivity in colleges 75
sluggish college enrolment 79
spread of project-based learning 211, 214
universities
  admission system reform 217
  ARWU 500 73, 228–9
  beneficiaries of NRDP 233, 235–7, 246
  changing trend of students advancing to 142
  competitiveness 158–9
  entrance examinations 118, 150, 159, 180, 185, 199–200
  following economic crisis 137
  in graduate career paths 116
  increasingly important role 46
  information disclosure system 103
  and K-ARPA 250
lacking labor market competition 247
Human capital and development

low-quality 4, 7, 18, 90, 115, 117, 127, 145
and Meister High Schools 127–32, 134, 138, 144–7
opened to countries abroad 112
partnership with industry 103, 111, 239–40
partnerships with GRIs 253–4
quality enhancement in 77, 100–101, 105
quality problems in 41, 48–54, 158, 222
R&D expansion 246
R&D investment 47, 105, 237
researchers moving from GRIs 247
restructuring 101, 104–5, 183
separating from control of MOE 218
support 100
vocational education in admission to 116–22
University of Minnesota (UMN) 33
vertical differentiation in colleges
advantages 60
and autonomous private high schools 97–8
based on admissions test scores 48
based on newly entering students’ KSAT scores 54–60
disadvantages 60, 65, 72–3
disclosed information to strengthen 109
education and research indicators 56, 58–60
education equalization to reduce 107
general and financial indicators 55–8
intensification period 42, 77, 91
Korea’s high degree of 54
leading to education bubble problem 184
reinforcing intense competition among students 94–5, 101
and rewards for higher education in Korean labor market 82
solution for overcoming 72, 96
vocational education
continuous deterioration 115
contributions 10
early government expenditure 27–8
during education bubble 42, 48, 68–72, 77–8, 91, 94
in education diversification reform 95, 100–102, 104, 111
evolution of 23–32
government-led 10
investment in 21
Korea’s traditional neglect of 8
long-standing prejudice against 23
Meister High Schools providing 90, 101–2
share of government expenditure 27–8
summary of major policies 32
trophies won due to 25
turning around failing building on past failures 116–21
embrarking on presidential project 121–6
opening-up strategies 133–41
providing incentives 127–32
transforming through Meister High Schools 141–8
underperforming colleges transformed into 15
see also TVET (technical and vocational education and training)
Vocational Training Special Measures Act 28, 30, 32
wage growth
annual average rates 81
college graduates vs high school graduates 83
and human capital accumulation 88
period of rapid 88
phases of 80, 88
wage inequality 78–92, 158
whole-of-the-government approach 133, 135–6, 146, 148
Workers Skills Development Act 31
Workers Vocational Training Promotion Act 31–2
workforce
abundant human capital for 39
concerns over suitably qualified 14, 31
dramatic increase in educational attainment 8–9
Index

and education bubble 78–92
enhancing diverse technical 59
expansion of vocational high schools
to increase supply of 26
life-long learning and age-skill profile 159–81
in-plant training 28, 30
R&D 45–6
skilled
demand for 23, 30, 137, 281, 283
nurturing 26–7
supply of 24
working overseas 27
unemployment in African 276
upgrading skills 28, 30, 263
Zambia 256, 263–78