



EDUCATION AND DEVELOPMENT IN NORTH KOREA: THE PUSH FOR A “SCIENCE-BASED ECONOMY” UNDER KIM JONG UN

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This Issue Brief analyzes the development of education in North Korea with particular focus on the Kim Jong Un era and the recent government’s emphasis on scientific development. Once considered the flagship of the regime’s welfare system, education has shown signs of inadequacy before the mid-1990s crisis. Under the Kim Jong Un rule, the DPRK extended its schooling system to 12 years, pushing for faster and broader developments in ICT and STEM. However, the reform has not solved the problems left by the collapse of socio-economic structures in the 1990s. Private education has risen in parallel with grassroots marketization; the distance between Pyongyang and the provinces has widened, and the government may be unable to deliver on its promises of a prosperous future powered by technological advancements.

Introduction

Over the past two decades, the ever-growing presence of North Korea in international news has brought Pyongyang classrooms in front of the camera.¹ Media are eager to present images of schools where pupils marching in uniforms and school textbooks are filled with political indoctrination, but we get little scholarship in proportion. This paper highlights three intertwined issues.

- First, education served for long as the flagship of the DPRK government - whereby this claimed to offer a superior socio-economic model to that of South Korea; however, the system slowly

began to spiral downwards since the late 1970s due to myopic economic strategies and invasive ideological indoctrination.

- Second, during and after the 1990s crisis, the government tried to revitalize the education sector. Pyongyang appealed for international aid and prioritized niche sectors in science, information, and technology. However, the prolonged socio-economic malaise caused the education system to implode and rely on private initiative to survive, much like the collapse of the Public Distribution System (PDS) caused the rise of the Jangmadang (market) economy.

- Third, in the Kim Jong Un era (2012-present), scientific education is at the forefront of government's priorities; however, it is unsure whether North Korea will be able to graft updated knowledge and information upon an outdated economic system. The emphasis on scientific modernization may increase – under certain conditions - chances for the future economic viability of North Korea among neighboring countries that are far more prosperous and technologically advanced; a more substantial international cooperation remains decisive to this end.

The Trajectory of North Korean Education before the Kim Jong Un Era

Even before it proclaimed itself an independent state in 1948, North Korea began to lay grounds for an education system that provided free tuition, preschool care, and learning supplies to the children of working-class families, peasants, the military, and other groups, ranked according to the Songbun system.² Four primary cycles, parallel to socio-economic developments, can be identified to explain North Korea's education trajectory before its last reform in 2012.

Korean students since 1945 were the first to receive an education shaped by a new national identity using their own language exclusively.³ The first major reform of this period addressed compulsory primary education (1945–1956).⁴ The implementation of this reform was initially scheduled to begin in 1949 but suffered delays until 1956–1958 due to the Korean War. North Korean graduate students were sent abroad - mainly to the Soviet Union and occasionally to China - for the first time after being forced to migrate to Japan during colonial times.

Before the Korean War broke out, governmental efforts focused on eradicating widespread illiteracy and eliminating what North Korea saw as vestiges of the colonial past through mass literacy campaigns.⁵ These campaigns had political motivations - as an illiterate population would have been unable to absorb the tenets of the ideology - but they did constitute a stepping stone towards educational improvements. War damages forced North Korea to start over after 1953, and like in 1948, national human resources - students included - were directed towards reconstruction. The later stages of this period saw the introduction of education policies to balance the acquisition of foreign knowledge - mainly Soviet - and the construction of national identity.⁶

From 1959 to 1972

In the aftermath of the Korean War, North Korea went through its most prolific years for industrial output and infrastructure building. Noteworthy has been North Korea's ability to rebuild the entire pre-wartime school infrastructure in a few years and increase the number of educational facilities that hosted the first generation of graduates under a new political system. The number of junior high schools went from 217 in 1946 to 1,013 in 1954 and up to 3,217 in 1965. Additionally, between 1946 and 1965, the number of students and teachers increased tenfold.⁷

Two significant reforms began in this period: one for compulsory secondary education (1958–1967), the other for a nine-year technical education system (1967–1972).⁸ The government emphasized technical

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From 1945 to 1958

North Korea was under direct Soviet influence, and education underpinned the task of nation-building after forty years of Japanese colonial rule. North

education in order to overcome acute shortages of technicians who could adequately develop the North Korean industrial complex. In-classroom teaching was tightly linked to work practices, as technicians and engineers were required to study during the day and work overnight to speed-up production.⁹ In the 1960s, the ideological gap between the DPRK, the Soviet Union, and China widened. North Korea gradually lowered the number of its students in Moscow; it modified the curriculum of special schools where most of the Soviet diplomats and workers in Pyongyang enrolled their families, making Korean language mandatory, and further discouraged Soviet and other foreign students from attending classes in North Korean universities.

From 1973 to 1994

The last major reform before the Kim Jong Un rule began in 1972; the 11-year education system was fully implemented by 1975, and remained in place until 2012 when a 12-year education system substituted it.¹⁰ Despite the reform, the 1970s and 1980s saw North Korea drop out of its own developmental path, as its socio-economic institutions fell from stagnation into decline.

Education, and in general the knowledge-technology-development nexus, suffered continuous setbacks. The regime adopted an ambivalent strategy for education, coupling ideological commitment to self-reliance with repeated calls for the acquisition of foreign knowledge and technological innovation.¹¹ In other words, the DPRK government spearheaded increasing ideological orthodoxy while advocating for a series of improvements within the education system that - if implemented - would require less ideological commitment, if not its complete dismantlement. This strategy was pursued to the detriment of factual innovation vital to the regime's ability to sustain economic growth. While not expressed by virtue of a unitary declaration or in a single historical occurrence, this decision parsed through nearly every single official statement, propaganda materials, or contribution to international cooperation projects that the DPRK produced over the last four decades.¹²

From 1995 to 2011

In parallel with rising democratization in South Korea, the DPRK witnessed a crisis of its socio-economic institutions. Before the 1990s, welfare provision in the DPRK was based on a "security trade-off" sufficiently extensive to encapsulate social and human security aspects.¹³ The trade-off meant that North Koreans would relinquish individual rights to adopt a system of collective duties and rights - participating in the system of collectivism driven by mass mobilization campaigns and accepting that, in return, the state would provide housing, food, health care, and education, among other services.¹⁴ This provision of welfare maintained a seemingly "egalitarian" component, identified by the government as an immediate reaction to centuries of inequalities under the Joseon dynasty and decades of colonial occupation.¹⁵ The government understood education to be a crucial part of this national welfare provision that enhanced political legitimacy.

“In schools, teachers and students alike had to fend for themselves in order to secure food and heating material during winter.”

The famine of the 1990s brought the North Korean social institutions to a halt; however, the quality of education began to implode earlier, when scientific necessities were superseded by the overgrowing top-down demand for ideological commitment. This phenomenon was more visible in the higher levels of the educational ladder than in primary and secondary education.¹⁶ The 1990s famine meant two things: disruption of learning on the institutional level and prolonged effects on brain capacity and pupils' development on a human level. With diminishing amounts of food, the effectiveness of the Public Distribution System (PDS) that regulated the allocation of basic goods decreased gradually, forcing the population to seek for alternative means of subsistence.¹⁷

In schools, teachers and students alike had to fend for themselves in order to secure food and heating material during winter. At the same time, UN agencies (UNICEF in particular) repeatedly warned that years of malnutrition might affect an entire cohort of younger North Koreans, with consequences being far from fully understood at present. The DPRK government focused on securing humanitarian aid for educational institutes in the decade of the crisis (1995-2005); afterward, it began to sow the seeds of distance education as a long-term solution to educational issues.

The issue is not about mere institutional capacity but rather the ability to separate education from ideology.

The Kim Jong Un Era: Emphasis on Scientific and Technological Advancement

On the surface, the change to the 12-year system during the Kim Jong Un regime constitutes a reasonable first step in enhancing an outdated education system. When Kim Jong Un took power, pundits debated whether his years of foreign education could influence his worldview and governance.¹⁸

While there may be truth to the assumption that “the education that Kim received in Switzerland presented a very different worldview to the one he experienced in North Korea”,¹⁹ correlation does not imply causation. Kim Jong Un spent only five years in Europe (1993-1998), and it took another 14 years before he rose to power in the DPRK. He has certainly experienced international education in the Swiss curricula, but there is no way to establish whether his high school experience later prompted him to enact reforms in North Korea.²⁰ In any event, the system now resembles Western counterparts,

particularly South Korea, with compulsory education from age 5 to 17.²¹

The 2012 reform moves along two lines: first, it redesigns education so to increase compatibility with international requirements. North Korea subscribes to all UN frameworks for the development of education since adhering to the first EFA (Education for All) declaration in 1990. Second, the reform strengthens ICT instruction at secondary and academic levels, intending to establish a “powerful country based on the knowledge economy” as stipulated in Article 46 of the Constitution, amended in 2019.²² North Korea’s higher education law was initially proposed on 14 December 2011 as decree number 2036 of the Standing Committee of the Supreme People’s Assembly. The new system came fully into effect since April 2014.²³ With the underlying goal that technological advances would revive the economy, the major shift is the return to a more practical approach to education, a sort of modernized version of North Korea’s emphasis on technical education and the knowledge-productivity nexus of the 1960s.

Today, North Korea’s education system is divided into four categories: preschool education (pupils aged 3 and 4), primary and secondary school education (5–17), higher education, including post-doctoral degrees (18–25), and adult/vocational education. The education system comprises lower and upper kindergarten, primary school, secondary school, universities, graduate schools, and research institutions.²⁴ Parallel to full-time schooling, there is an on-the-job study system (e.g., schools adjunct to factories, farms, and fisheries); finally, vocational and adult education takes place at university-affiliated night courses and communication departments while all institutions are expanding through distance learning. The issue is not about mere institutional capacity but rather the ability to separate education from ideology and gear it towards useful practices for economic development.

Today's Challenge: Overcoming Decades of Stagnation by Reviving Technical Education

Why did North Korean education decline and how can it be revitalized? The education-ideology-productivity nexus functioned insofar as ideology allowed sufficient space for useful educational practices within the domestic labor market and for as long as the government could maintain at least a minimal provision of welfare in return for manpower and political loyalty.²⁵ While this is something that the government cannot admit to, the 2012 reform and subsequent additional measures on improving education correlate with government declarations and actions aimed at reviving the economy through different drivers of production: science-based rather than ideology-based.

Whereas the mid-1970s saw ideology overshadowing technical issues, under Kim Jong Un, the government is clearly looking to invert this course, as the latest educational measures rebuild a direct link between the years that a generation spends in classrooms and the ability to acquire updated knowledge and improve labor productivity. A look at the past reveals that the initial economic success of North Korea did not happen in a void; rather, it was intrinsically related to education policies that emphasized vocational training and technical skills. In North Korea's own assessment, the nine-year technical compulsory education was "an advanced education system, in which all the new generation of working-age could be trained to become talents with wide general knowledge and more than one technique by combining general education with basic technical education and education with production".²⁶

The two-year vocational school system made it possible to complete the secondary general education and give modern basic technical knowledge in specific fields in a relatively short time. Yesterday and today, the government saw the advantage of technical and vocational schools confirmed by facts: in the 1960s through the growth of a post-war managerial class that propelled economic growth;

today, in cohorts of students that produce seek to launch North Korea's own version of biotechnology, software, nano-industry, videogames, and online learning platforms.²⁷

New and Persisting Issues: Covid-19, Social Inequalities, Lack of International Recognition, Academic Isolation, and Outdated Materials.

Through three leaders and numerous reforms in the education sector, North Korea has not altered its social welfare system. The 2012 reform does not modify the educational ladder, which is designed to resemble and perpetuate the Songbun social structure, where members of different social backgrounds are channeled through a specific type of school (technical, artistic, etc.) in view of their future occupational status.²⁸

Despite these technical improvements in the state sector, private education is now both illegal and in high demand.

Throughout the decades and various changes in this system, North Korea maintained a tiny group of elite schools and academies at the system's zenith. These have access to better materials, facilities, and teachers; however, their students are recruited exclusively among the elite's highest ranks to guarantee political stability among younger generations; this facet has not changed with the 2012 reform.²⁹ Granted, the rise of Donju and the Jangmadang economy created a new class of wealthy citizens; however, these nouveau riches are largely from the Songbun classes that had already the opportunity to engage in trade by dint of political affiliation, military rank or personal connections; their ability to create wealth appears disconnected from the climbing of the educational ladder.³⁰

Changes to the education system resemble other

aspects of the greater socio-economic sweep brought by the famine. To start with, the distance between the capital and the provinces widened, as did the urban and rural divide in each region.³¹ The government tried to tackle this issue by reinforcing online education, not only because it is fully controllable and scalable but also because it lowers the overall cost and timing of delivering education nationwide.³² Despite these technical improvements in the state sector, private education is now both illegal and in high demand, like the Jangmadang products and services that replaced de facto state-driven economic activities.³³ Some of the gendered effects of North Korea's marketization also apply to education. Having the lion's share of black-market activities, women who managed to become successful entrepreneurs can finance their husbands' higher education hence securing an official position in the state apparatus and opportunities for their career advancement.³⁴ Meanwhile, as the Donju rise, those who can secure a study abroad place for their children do - mainly in China, some beyond.

The overall performance of North Korean students against international benchmarks is unknown.

The latest challenge to education in the DPRK is the Covid-19 emergency. Schools have suffered prolonged closure and delays, although the extent of the damage brought by the pandemic is hard to estimate, as North Korea continues to claim no deaths among and nearly no infection among the local population while allowing no controls nor any foreign visit in the country.³⁵ In the early months of the pandemic, it appeared that the regime chose to tighten the grip on social control and indoctrination in schools.³⁶ By late September 2020, UNICEF reported the DPRK among the only three countries in Asia-Pacific to have gradually reopened schools.³⁷

Aside from the impact of Covid-19, three issues remain unsolved, the first being the prolonged

isolation of North Korean academic researchers – and the school system at large. For decades, North Korea has been absent from nearly any international test, competitions, and other events related to educational developments; with the exception of some results in math competitions in recent years, the overall performance of North Korean students against international benchmarks is unknown, and the country has not made any impact in world publications.³⁸ However, there are recent signs of change on this front. The push for scientific education initiated by Kim Jong Il and carried out under Kim Jong Un seems to bear its first fruits as North Korea today counts nearly 85,000 indexed articles in Scientific, Technological, and Medical (STM) journals, though the majority are only available through North Korean websites.³⁹ Two recent bibliometric pieces of research indicate a surge in published articles starting in 2015–2016. This “may represent the recent efforts by the North Korean government to emphasize scientific research and development. It is anticipated that the productivity of North Korean researchers in terms of publications in international journals will increase dramatically [...] although the publication baseline is very low”.⁴⁰

The second problem - and a corollary of the larger isolation issue - is the lack of integration between North Korean educational credentials, international degrees and academic standards. Technically, the basic conditions for North Korea to pursue a fuller integration with international education are in place. The DPRK has entered into bilateral agreements with a number of countries regarding recognition of diplomas and degrees.⁴¹ The majority of agreements are with non-OECD countries, somehow reflecting the diplomatic relations of North Korea; China is the most important educational partner, followed by a number of countries in the former Eastern Bloc (Bulgaria, Czechia), or the wider socialist camp (Cuba).⁴² North Korea is also a party to a number of international treaties and bodies dedicated to education and scientific development.⁴³ More importantly, the DPRK has actively participated in the EFA (Education for all), MDG (Millennium Development Goals), and SDG (Sustainable Development Goals) frameworks since the UN set

these, reporting some significant achievements for general education, particularly at primary levels.⁴⁴

What is missing - in spite of government proclaims of “renewed efforts to expand scientific progress” is a substantial effort to (i) bring North Korean educational institutions and practices in line with the standards of the largest education systems (the EU, the UK, and the U.S.), and (ii) measuring the educational offer and the students’ performance against international benchmarks, such as the PISA test.⁴⁵

Here, two key factors stand in the way. First, North Korean curricula at the same time lack certain cultural components that are now mandatory in the West (gender education, religious pluralism, critical thinking, social media awareness), and they contain elements that are either incompatible with - or have been dismissed from - the international system, namely an excessive emphasis on ethnic pride, nationalism, traditional gender roles and stereotypes, and the belligerent tones in educational contents.⁴⁶ Second, North Korea has not fostered any real, two-way knowledge share process (i.e: a full exchange of students, faculty, curricula, each absorbing from the host country) but rather opted for unilateral knowledge transfer – that is, selectively incorporating parts of foreign curricula, scientific methods and materials, into an otherwise unchanged education system; there has not been any real inspection and evaluation of North Korean educational institutions by international accreditation agencies.

The last issue is the access to modern educational supplies and technologies. This problem is not only rooted in North Korea’s prolonged economic decline (recently worsened with international sanctions); it is intertwined with North Korea’s (mis)use of international development assistance - when this was available before the 2000s – as the international community identifies IT education and technological developments as potentially harmful.⁴⁷ In recent years North Korean students have made headlines by beating U.S. ivy-league peers (Stanford) in coding competitions, raising curiosity about the real IT capabilities of North Korean elite schools and how

these relate to the cyber-military complex.⁴⁸ Import of nearly any IT device, technological components or any machinery or materials that could potentially be used for military purposes has been fully banned after the latest round of international sanctions in 2017.

The nature of the North Korean system cast doubts over the viability of educational and scientific assistance.

Future Outlook

On the surface, the benefits of a modernized North Korea finally able to join the East Asian regional economy are hard to ignore, particularly for Seoul. Education and scientific development are key elements to this end, and in the past, they have offered non-politicized grounds for international organizations and regional partners to extend their cooperation with the DPRK.⁴⁹ However, multilateral aid institutions (more than academic ones) have been increasingly reluctant to deliver “pure” developmental assistance to Pyongyang given its track record of economic unreliability and belligerent rhetoric in foreign policy. Recurrent moral interrogatives (“can we help North Korea modernize, should we, and if so under what conditions?”) and the nature of the North Korean system cast doubts over the viability of educational and scientific assistance.

The DPRK’s acceptance and implementation of international rules and regulations have historically been partial and conditional. Nearly every aid or cooperation project, be it knowledge transfer, attempting to open foreign institutions in the country, or developing commercial ventures, encountered issues of territorial access, coordination with national and local authorities, and lack of accountability on the North Korean side. After decades of attempts, donors and potential partners seem to suffer from “assistance fatigue” and a degree

of disillusion that outside help may effectively deliver meaningful improvements in North Korea. ■

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Endnotes

1. *CNN*, Exclusive look into North Korean Schools: https://www.youtube.com/watch?v=GJgS2im_40M&feature=emb_title
2. The Songbun system refers to the social system of North Korea, a class stratification whereby people are ranked by political loyalty, through generational ties. The system rewards family ties and political loyalty over meritocracy. Helen Hunter writes that the negative implications of Songbun through the decades, “in terms of the educational level and the experience of the top leadership, are overwhelming”. See: Hunter, H. L. (1999), Kim Il-song’s North Korea, *Westport*: Praeger, 3-11; also: Collins, R. (2012), *Marked for life: Songbun. North Korea’s Social Classification System*, Washington DC: HRNK.
3. Lankov, A. (2005), “Crisis in North Korea: The Failure of De-Stalinization”, 1956. University of Hawai’i Press, 177. Japanese language was superimposed over Korean during the colonial period, while Chinese served as the medium of studies during the Choson Dynasty, before 1910.
4. Kim, H. C. (1969), “Ideology and Indoctrination in the Development of North Korean Education”, *Asian Survey* 9(11): 831-841.
5. Kim, H. C. (1969), p. 833-4; Also: National Commission of the DPRK for UNESCO. (2008). *National Report on the Development and State of the Art of Adult Learning and Education in the DPRK.*, Pyongyang: Ministry of Education: 4; Sik, C. S.; Hun, H. J. (1980). *Cultural Policy in the Democratic People’s Republic of Korea*, Paris: UNESCO.
6. Lankov, A., (2000) “Continuity within Change. Soviet Influence on North Korean Education”, *Acta Koreana* 3: 57-75.
7. Kim, H. C., “Human Remolding in North Korea. A Social History of Education”, *University Press of America*, NY, 2005.
8. Lee, Y. B. (1986), “Education in the DPRK”, Pyongyang: Foreign Language Publishing House.
9. Kim, H. C., “Human Remolding in North Korea”: 86.
10. Ordinance of DPRK SPA on Enforcing Universal 12-Year Compulsory Education Promulgated. Pyongyang, September 25, 2013 (KCNA) on: www.kcna.kp
11. These calls found echo in a number of international publications, frameworks for cooperation, and development projects by the UN agencies that began working with the DPRK government on issues of education and training since the late 1970s, namely UNESCO, UNIDO, UNILo and the UNDP. This documentation unanimously suggests that while UN agencies were well disposed towards the DPRK government, they also noticed how North Korea requested to participate in programs of international assistance to bridge a technology-knowledge gap that - if and when it was addressed by the government - was presented by North Korea since the early 1980s as the result of temporary setbacks or unfavorable contingencies. UN experts however identified the issue as stemming from numerous political restrictions and ideological limitations imposed against foreign knowledge influx in nearly all fields, from language education to the digitalization of education, to the training of factory workers and medical staff.
12. See; Cho, J. A. (2006). “North Korea’s Human Resource Development System”, Seoul: KINU, pp. 24-27. Also: Kim, H. C. (2005). “Human Remolding in North Korea. A Social History of Education”, Lanham: *University Press of America*. In 1962, at the start of what is acknowledged to be the best decade for the North Korean economy, the DPRK bet decisively on technical and vocational information. Secondary school subjects were divided as follows: languages studies occupied 15.5% of the curricula, political ideology covered 7.7%, natural sciences accounted for 33.7% whereas polytechnic education received the lion’s share with 38.9%. Through a slow but steady tilting in favor of ideology over the next four decades, by the year 2001 technical education shrunk to a mere 6% whereas ideology grew to 22.5%. By comparison, curricula in East Germany during the cold war assigned 36.6% to language studies in 7th grade, and 28.6% to natural sciences, while reserving 8.7 of the programs for political education. Similarly, curricula in the Soviet Union by the end of the 1980s also had political studies and ideology limited to 8.7% of the total amount of study hours, while natural sciences and technical studies received respectively 35.9% and 18.6%. In view of these facts one could still debate whether the North Korean education system (and its human capital) spiraled down starting from the 1980s - or, by some indications, a decade earlier. There is little doubt however that

this decline was largely Pyongyang's own fault and that it came rather unexpectedly to outside observers, given that North Korea presented better socioeconomic indicators than the South for over fifteen years after the Korean War.

13. Smith, H. (2005a). "Hungry for Peace", Washington DC: *USPI Press*. Hungry for Peace has since 2005 set the framework for analyses of North Korean socioeconomic changes that eschew the limits of military concerns, expand traditional security outlooks, and move beyond strategic considerations.
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18. Powell, B. (2012), "Is Kim Jong Un Preparing to Become North Korea's Economic Reformer?", *Times*, April 19, at: <https://bit.ly/3sj2o7n>, Cha, V (2012), "Kim Jong Un Is No Reformer", *Foreign Policy*, August 21, at: <https://bit.ly/39uLdXQ>; Pak, J. (2018), "The Education of Kim Jong Un", Washington DC: Brookings Institution, at: <https://brook.gs/3qhxnP>
19. Fifield, A. (2019/6/12) "Kim Jong Un's undercover adolescent years in Switzerland", *Politico*, at: <https://politi.co/3bAfrLV>
20. The seeds of the last education reform and the introduction of online education date back to the last years of Kim Jong Il in power while the push for scientific development and the acquisition of foreign knowledge started in the early 1980s. It is likely that Kim Jong Un simply implemented plans that were years in the making.
21. Ordinance of DPRK S.P.A. on Enforcing Universal 12-Year Compulsory Education Promulgated Pyongyang, September 25, 2013 (KCNA) on: www.kcna.kp ; See also: Park Young-ja et Al., (2018), "Eight Changes in North Korean Economy and Society under the Kim Jong Un Regime", Seoul: KINU.
22. Government of the DPRK (2019), Socialist Constitution, Articles 43 – 46: Retrieved from <http://www.naenara.com.kp/>
23. On the basis of the law adopted in the 6th Session of the 12th Supreme People's Assembly of DPRK held in September 25, 2012, following the introduction of universal 11-year compulsory education from 1975. See: DPRK National Education Commission (2015), Final report on "Education for All", Pyongyang: UNESCO.
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25. Lim, Y. I. (2004). Op. Cit.
26. DPRK National Education Commission (2015), Final report on "Education for All", Pyongyang: UNESCO: 18-19.
27. Spezza, G. (2013), "Google Goes To North Korea: Why Not?", *NK News*, January 9 at: <https://bit.ly/3iaNATC>; and (2013) Juche 2.0: "How North Korea Uses The Web To Promote Its Ideology", *NK News*, April 2, at: <https://bit.ly/35Ceyyi>; See also: Kretchun, N., Kim, J. (2012). "A quiet opening. North Koreans in a Changing Media Environment", Washington DC: *Intermedia*; Seliger B Schmidt S., (2014), "The Hermit Kingdom Goes Online: Information Technology, Internet Use and communication Policy in North Korea", *North Korean Review* 10(1): 71-88.
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 33. *The Economist*, Private tutors are illegal in North Korea, but thriving, December 12, 2019; Shim, E., “North Korea elites devoting money to private education for children”, *UPI*, July 6, 2012; also: *Radio Free Asia*, (2016) North Korean Parents Catch “Private Education Fever”.
 34. Soh, E.J. (2017), “Informal Life Politics of Marketisation in North Korea”, in: Morris-Suzuki, T.; Soh, E.J. (Eds), “New Worlds from Below, Adelaide”: *ANU Press*: 240.
 35. As of January 17, North Korea restricted travel for 352 days, tested 25244 samples (13259 people), with zero confirmed cases, over 32000 citizens quarantined and an equal amount of people released (of which 382 foreigners, all quarantined then released). See the NK Pro Covid-19 Tracker, at: <https://bit.ly/2XOEpyY> ; The NK Pro Coronavirus tracker aggregates news from North Korean, South Korean and international media on any aspect of life affected by the Coronavirus in the DPRK.
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 37. Reliefweb, (2020) UNICEF EAPRO Education COVID-19 Response Update – September 29: <https://bit.ly/3nTAgNQ>
 38. DPRK students seem to perform particularly well in online math contests. See: International Mathematical Olympiad (2019), Individual and Team scores for the DPRK: <https://bit.ly/3nN73uJ>
 39. Jeong, G. H., & Huh, S. (2017a). Bibliometric analysis of publications from North Korea indexed in the Web of Science Core Collection from 1988 to 2016, *Science Editing*, 4(1): 24-29, and Jeong, G. H., & Huh, S. (2017b). Bibliometric and content analysis of medical articles in the PubMed database published by North Korean authors from 1997 to July 2017. *Science Editing*, 4(2): 70-75.
 40. Jeong, G. H., & Huh, S. (2017a). Bibliometric analysis: 3
 41. UNESCO (2000) Regional Convention on the Recognition of Studies, Diplomas and Degrees in Higher Education in Asia and the Pacific. Bangkok, Thailand, 10 November: 4, 52-53.
 42. Embassy of the PRC in the DPRK, A brief account of the educational exchanges between the PRC and the DPRK: <https://bit.ly/2LZ6Uah> ; the North Korean website “Mirae”, specializing in Sci-tech developments within the DPRK reports MOUs or other institutional agreements with educational counterparts. See: <https://bit.ly/3c3Qzw9>
 43. Among others: the International Organization for Standardization (ISO) since 1954, the international Bureau of Education (IBE) since 1975, the United Nations Industrial Development Organization (UNIDO) since 1981, UNESCO since 1974. Moreover, the DPRK has signed and approved the Regional Convention on the recognition of studies, diplomas, and degrees in higher education in Asia and the Pacific in 1983 and 1989 respectively, and has acceded the International Covenant on Economic, Social and Cultural Rights in 1981.
 44. DPRK National Education Commission (2015), Final report on “Education for All”, Pyongyang: UNESCO; UNICEF (2010). MDG report. Summary results matrix of country programme for the DPRK, Pyongyang: UNICEF; UNFPA-DPRK Central Statistics Bureau, (2014), SDHS Survey 2014, Pyongyang: UNFPA, and UNICEF, (2018) Multiple Indicator Cluster Survey report for the DPRK, Pyongyang: UNICEF.

45. This sort of exhortation is not new at all; North Korean documents produced by government authorities or jointly with UN agencies since the 1980s adopt the same language, however, in stating its goals the government seems to postpone them indefinitely. See, for instance, the minimal change of tone across decades in: National EFA Assessment group of the DPRK (1999). *The implementation of the World Declaration on Education for All*. Pyongyang; Ministry of Education of the DPRK (2004). *National report on the development of education*. Pyongyang; Government of the DPRK (2014). *The Socialist Constitution of the Democratic People's Republic of Korea*, Pyongyang; Foreign Language Publishing House; DPRK National Education Commission (2015), *Final report on "Education for All"*, Pyongyang; UNESCO. These documents are replete with declarations of intents but lack much in resource allocation and budget details for implementation. Very recent news about educational plans have not brought any significant change. Around the time of its most recent party congress (January 2021), North Korea's media reported 'new' measures to expand education, improve facilities and quality of educational services. On the surface, these news, the reference to two distinct university tiers (research-type and field-type universities) and recurrent announcements of scientific goals (or achievements) hint at a constant push for science-based developments in the economy. However, for decades now, the government has been unable to deliver on its promises, due to economic difficulties, and shortages of all kinds. In spite of policy commitments for a sustained, the reality of educational practices is subject to economic downturns much as any other set of institutions; it also suffered from a discrimination between a few, privileged institutes and the majority of schools, nurseries and even kindergartens in the country. If there are resources available, these are allocated in a top-down fashion, and there is very little trickle-down, at least since the 1990s: "Different educational institutions received their funds and goods from different sources. The majority of them did not use cash to pay for their supply, and most of them – in fact nearly all of them at pre-school and primary levels, were dependent on the often reduced regional budgets". See; Cho, M. C., Zang, H. (1999), *North Korea's education system*. Draft prepared for the World Bank (12-99). Seoul: KIEP. In other words, what outsiders can see as factual developments in Pyongyang, are unlikely to find an equivalent in other provinces, particularly in more remote areas.
46. Here "international system" stands for a set of values and norms enshrined in educational curricula and theories that shape schooling in most western liberal democracies and are espoused by the UN at large; there are numerous exceptions to this practices worldwide, of course.
47. In particular, projects, tenders and procurement projects from UN agencies for the DPRK aimed at developing ICT capacities have come under some scrutiny after it was established that the DPRK used CNC machines towards military developments.
48. Kasulis, K. (2017) North Korean college coders beat Stanford University in a 2016 competition. Here's why that matters, *MIC.com*: <https://bit.ly/3imkbpI>
49. Institute for Far Eastern Studies, Kyungnam University (2013), *북한의 개발역량 강화를 위한 지식공유: 성과 및 향후전망* (Capacity Building and Knowledge Sharing with North Korea: Past successes and Future Prospects). Conference Proceedings and Papers. Seoul: IFES; Heikkilä, J. P., Wainwright, T., Et. Al. (2018). *Co-Creating Knowledges and Institutional Space. Introducing Entrepreneurship to North Korea*, 6th Annual International Conference on Innovation and Entrepreneurship (IE 2016) pp. 42-49; Wainwright, T., Et. Al. (2018). *Elite Entrepreneurship Education. Translating Ideas in North Korea*, *Environment and Planning* 50(5): 1008-1026; Seo, H. and Thorson, S. (2010). *Academic Science Engagement With North Korea*. Academic Paper Series on Korea. Korea Economic Institute Volume 3, Park, J.; Jung, S. (2007). *Ten Years Of Knowledge Partnership With North Korea*, *Asian Perspective* 31 (2), 75-93.