

# Chapter 4

## On the Path Toward Lifelong Learning: An Early Analysis of Taiwan's 12-Year Basic Education Reform



Blansefloer Coudenys , Gina Strohbach , Tammy Tang ,  
and Rachel Udabe 

**Abstract** Over the past two decades, Taiwan has sought to adopt a holistic approach to education. Reform has been directed towards guiding students to realize their individual potential and to contribute to increasing national competitiveness. In recent years, the extension of basic education from nine to twelve years serves to advance an increasingly equitable, high-performing education system, one which encourages students' lifelong learning and their contributions to a dynamic and diverse society. This chapter assesses the preliminary implementation of Taiwan's 12-Year Basic Education reform, which consists of the 2014 Senior High School Education Act, and the 12-Year Curriculum Guidelines implemented in 2019. We analyze government data sourced through the Ministry of Education and the National Statistics Bureau; interviews with teachers, school administrators, professors, and national education researchers; and an online survey disseminated among teachers around the country. Taiwan's 12-Year Basic Education reform works to reimagine society's definition of educational success and broaden opportunities for all students—by expanding and diversifying enrollment opportunities for senior high school, revising comprehensive curricular guidelines, supporting innovative pedagogies, and increasing school autonomy. Taiwan's transition to twenty-first century learning within a traditionally high-stakes, exam-centric educational culture serves as an important case study for discussion within the global pursuit to redefine teaching and learning for the students of today and citizens of tomorrow.

---

B. Coudenys

University of Antwerp, Edubron Researchgroup, Aalmoezenierstraat 26, 2000 Antwerp, Belgium  
e-mail: [blansefloer.coudenys@uantwerpen.be](mailto:blansefloer.coudenys@uantwerpen.be)

G. Strohbach (✉)

Harvard Graduate School of Education, 1801 Crystal Drive, Apt. 215, Arlington, VA 22202, USA

T. Tang

Harvard Graduate School of Education, 15 N Beacon Street Apt 806, Allston, MA 02134, USA

R. Udabe

Harvard Graduate School of Education, 10 Magnus Ave. Unit 2, Somerville, MA 02143, USA

© The Author(s) 2022

F. M. Reimers et al. (eds.), *Education to Build Back Better*,  
[https://doi.org/10.1007/978-3-030-93951-9\\_4](https://doi.org/10.1007/978-3-030-93951-9_4)

## 4.1 Background

### 4.1.1 *Taiwan's Context*

Taiwan is an island on the western edge of the Pacific Ocean. It is home to over 23.5 million people of diverse cultures and beliefs, including sixteen indigenous tribes (Government of Taiwan, 2020). Although geographically small, the de facto independent nation is a leader of democracy in East Asia. Since its first direct presidential election in 1996, the country has advanced and adopted various progressive policies. Taiwan is the first nation in Asia to legalize same-sex unions and is currently led by its first female head of state, President Tsai Ing-wen (Government of Taiwan, 2021). Taiwan is one of the “Four Asian Tigers,” alongside Hong Kong, Singapore, and South Korea, so-called for their rapid economic development and thriving industries, such as tourism and technology. Taiwan’s steady growth over the past few decades has been attributed to a combination of timely policy decisions, a flexible labor market, and the prioritization of education (Ash & Greene, 2007).

The country’s response to the COVID-19 crisis exemplifies its capacity for strong government action and rapid policymaking. From December 31, 2019, onwards, the Taiwan Centers for Disease Control and the Central Epidemic Command Center organized a proactive cross-ministry epidemic prevention strategy, which included health screenings and subsequent additional travel restrictions, public awareness campaigns, quarantine and face mask mandates, and community monitoring (MOFA, 2020). Furthermore, schools were provided with sufficient medical and sanitation equipment, alongside explicit universal protocols for school quarantines and closures. Through this whole-government approach, Taiwan was one of the few nations that did not experience significant pandemic-related disruptions to education in 2020, with the only real change being an extended winter break for additional school disinfection and safety measures (Taiwan CDC, 2020).

Taiwan strives to be a progressive and multicultural hub of Asia, balancing its Chinese, Japanese, and indigenous influences with the impacts of internationalization. Like other countries in the region, Taiwan searches for the equilibrium between conserving traditions and promoting diversity and social justice—alongside the need for sustainable development amid globalization, a falling birth rate, and high youth unemployment. This sociocultural context sets the stage for Taiwan’s recent education policy reforms.

### 4.1.2 *Taiwan's Education System*

Education is positioned as a tool for empowerment of Taiwanese citizens, and as a mechanism to “ensure Taiwan’s global competitiveness” (MOE, 2014). Taiwan’s

Ministry of Education (MOE), in partnership with the National Academy for Educational Research (NAER), oversees national education policy, research, and management in a centralized, top-down system. Taiwan has a combined total of 10,931 schools and 4,260,327 students (MOE, 2019a) across twenty-three counties, cities, and special municipalities. There are three levels of basic schooling: primary (grades 1–6), junior high (grades 7–9), and senior high (grades 10–12). Since 1968, compulsory education encompasses grades 1–9 (Chen & Huang, 2017). Students can access academic and vocational pathways in senior high school, as well as university and graduate studies for higher education. Educational spending accounted for over twenty percent of total government expenditure in 2019 (MOE, 2020a).

Education is highly valued in Taiwanese society, which stems in part from Chinese influence and the Confucian tradition. Confucianism emphasizes the social value of education for cultivating learners to achieve social harmony. Advancing through the education system is a symbol of status and a demonstration of high social and moral values. Taiwan has historically utilized high-stakes examinations for entrance into senior high schools and universities as a sign of meritocracy in allocating higher education opportunities. This high-stakes testing, however, is often a source of student stress, as these tests often determine future academic and career pathway options (Chou & Ching, 2012). In this environment, many Taiwanese parents may enroll their children in evening or weekend *buxiban*, or “cram schools,” to receive supplementary instruction (Liu, 2012). Cram schools are often clustered in urban areas and charge tuition, therefore contributing to educational inequality and widening the gap between students from families with lower socioeconomic status and those living in rural areas. Additionally, such intense, high-pressure academic environments can negatively impact students, and psychosocial challenges ranging from sleep deprivation to depression have been documented among Taiwanese adolescents in relation to academic stress (Kuan, 2011; Chen et al., 2015). PISA results also show that life satisfaction among Taiwanese students is among the lowest out of participating countries (OECD, 2019a).

Within this often high-pressure and stressful environment, Taiwan’s students have also been among the highest academic performers on the PISA examination since the country’s first participation in 2006. Students score well above the OECD average in science, mathematics, and reading scores. At the same time, socioeconomic equity in academic achievement has been increasing and is slightly above the OECD average—in the most recent PISA examination, around 12% of disadvantaged students scored among the top performers in all subjects (OECD 2019a). This perhaps mirrors the Ministry of Education’s consistent prioritization of educational equity for socioeconomically disadvantaged and rural students, considering that universal access, quality, and academic excellence have been a focus of prior and ongoing reforms (Chou & Ching, 2012). Despite these successes, PISA performance for both mathematics and reading peaked in 2012, with scores in all three subjects declining in recent years. In 2018, scores in mathematics and science reached their lowest point since Taiwan’s first participation in the assessment (OECD, 2019a). These recent declines, in addition to the need to address student stress and burnout, create an impetus for reinvigorating the education system and students’ learning.

Pursuing high achievement, counteracting academic pressure, and promoting socioeconomic equity through education are all salient goals of Taiwan's education sector. Yet, these challenges are not new. Precursors to recent and ongoing education reforms can be seen in the 1990s, when Taiwan enacted its nation-wide 9-Year Curriculum Reform. This reform introduced competency-based learning into Taiwan's national curriculum and laid much of the groundwork for the later 12-Year reform. The history of this transition is further explored below.

### ***4.1.3 9-Year Curriculum Reform***

In the mid-1990s, public opinion in Taiwan encouraged an increasingly decentralized education system and a holistic curriculum to promote the development of knowledge, skills, and attitudes for both academic success and life satisfaction. In 2000, the MOE revised curriculum to "join the global wave of competency-based curriculum development" for students' moral, intellectual, social, physical, and aesthetic development, steering education away from solely test-based knowledge acquisition (Chen & Huang, 2017). The 9-Year Curriculum Reform, implemented from 2001 onwards, explicated ten fundamental competencies related to self, society, and nature, which reflected the new goals of education: to educate the "whole child" and to prepare students for an increasingly diversified, interconnected, and innovation-driven job market (Chen & Huang, 2017; Lin et al., 2015). School subjects were organized into integrated learning areas (e.g., discrete subjects like chemistry and biology were combined into "Science"). Schools were given more discretion to develop individualized curricula and select textbooks, and teachers were given increased autonomy to create their own teaching materials.

However, the rapid, top-down approach of the reform resulted in some confusion and pushback from teachers and the public. Some argued that the curricular competencies were too abstract and high-level for elementary and junior high students, and others stated that they were not accurate representations of essential life competencies (Chen & Huang, 2017). Adaptive teacher training also lagged the reform, leaving teachers without adequate support for their increased autonomy (Lin et al., 2015). Furthermore, the curriculum reform did not alter entrance examinations for senior high school or university enrollment. While the curriculum changed, academic pressure to succeed on these high-stakes and knowledge-based assessments remained. Without an institutional restructuring of the entrance exam process to align with the curricular shift, "school leaders and teachers face[d] the dilemma of whether to teach to the exams or to teach in accordance with the goals of the student-centered, experience-oriented curriculum" (Lin et al., 2015). The demand to alleviate academic pressure, promote competency-based learning, and allow students to develop their knowledge, skills, and individual talents remained after the sweeping 9-Year Curriculum Reform. These continued goals helped set the stage for the subsequent 12-Year reform (MOE, 2014).

### ***4.1.4 Transition from the 9- to 12-Year Curriculum Reform***

From the 9-Year Curriculum Reform, changes regarding competency-based curriculum, cross sector implementation, and decentralization laid the groundwork for key aspects of the 12-Year reform. In fact, the intention to provide 12-Year basic education had long existed in the political consciousness; as early as 1989, then Minister of Education Lee Huan proposed extending basic education from nine to twelve years, inspiring the later Senior High School Education Act (Yen & Vun, 2016). In 2003, just two years after the implementation of the 9-Year reform, the National Educational Development Conference initiated the design process for the 12-Year reform, in which the MOE and the Executive Yuan (Taiwan's executive branch) reached a consensus to prepare the 12-Year basic education curriculum (Chien et al., 2013; MOE, 2014). In that same year, the OECD published the DeSeCo framework, delineating nine core competencies that promoted twenty-first century success through lifelong learning. Taiwan's 12-Year Curriculum Guidelines largely echo the DeSeCo framework, and these connections are further discussed in Sect. 2.3.

In 2004, the MOE incorporated the plan for revised curriculum for all grades as one of its major administrative goals, and within two years it established a special assignment office to align the different levels of schooling. NAER was assigned to develop the content of the revised 12-Year curriculum (MOE, 2014). Their research began in 2008, analyzing Taiwan's educational system through an internationally comparative lens to inform a draft of the 12-Year curriculum, which was further revised by the 12-Year Basic Education Curriculum Review Committee (Chen & Huang, 2017; MOE, 2014). In 2011, the 12-Year Basic Education Implementation Plan was approved by the government and officially announced by President Ma Ying-Jeou. The two major parts of the reform are the Senior High School Education Act—extending basic education to include upper secondary schooling—and the basic education curriculum guidelines (MOE, 2014). The Senior High School Education Act was passed in 2013, and the 12-Year Basic Education Curriculum Guidelines were published in 2014.

## **4.2 12-Year Basic Education Reform**

### ***4.2.1 Theory of Change***

The 12-Year Basic Education reform is comprised of the Senior High School Education Act and the 12-Year Curriculum Guidelines. The Senior High School Education Act extended basic education from nine to twelve years, increased educational opportunities for all students regardless of socioeconomic background or inherent abilities, and created diversified pathways within upper secondary schools. According to the new 12-Year Curriculum Guidelines, the national curriculum was redefined through

emphasis on the core competencies at each stage of learning. The modified guidelines illustrate national aims to inspire students to unleash their full potential, develop knowledge about life, promote career development, and inculcate civic responsibility (MOE, 2014).

By fostering talent development for every student, the 12-Year Basic Education seeks to promote a proactive and engaged citizenry, a prosperous society, and national competitiveness. The Senior High School Education Act aims to expand equitable access to upper secondary schooling, while the 12-Year Curriculum Guidelines reframe core competencies, setting new standards for all students to develop their aptitudes as lifelong learners because of basic education. In this way, Taiwan's 12-Year Basic Education maximizes the potential of the country's education system to foster all students' development and lifelong learning.

#### ***4.2.2 Senior High School Education Act***

Beginning in 2014, the Senior High School Education Act extended basic education from nine to twelve years, aligning with the fourth Sustainable Development Goal of “free, equitable, and quality primary and secondary education” for all (UN, 2015). The act introduced changes to enrollment, tuition, and entrance exams to promote equity, especially for students in rural areas, students with special needs, and indigenous students. Prior to the Senior High School Education Act, students were required to pass the entrance examination to be admitted to public high school. Students who did not pass the knowledge-based entrance exam would have to either enroll in private school or vocational school to continue secondary education. Private schools in Taiwan tend to both charge tuition and be of lower quality than public schools, which can create a financial barrier for marginalized students (Chou & Ching, 2012). Furthermore, Taiwan's cram school culture indicates that students with more support and financial resources can better prepare for entrance examinations; success on tests may be more difficult for those students whose families cannot afford after-school instruction or who have less time to study because of cost or other barriers and obligations, such as the need to assist with a family business. Because success in senior high school is vital for university admittance, the entrance exams heavily influence students' future trajectories.

To increase equity, the Senior High School Education Act expanded public school choice by codifying four schooling tracks, giving students the option to choose between: general, skills-based (vocational), comprehensive, and specialty-based high school education, which students choose during 9th grade and then attend for 3 years. In the general track, students take university-preparatory core classes in general subjects. In the skills-based vocational track, students take general, vocational, and practicum courses to learn professional skills. The comprehensive track offers courses in both general and specialized subjects, preparing students for entry into either academia or other career paths. Lastly, the specialty-based track provides students with courses tailored towards special aptitudes, such as performance arts.

These pathways provide opportunities for students to develop and cultivate their individual interests, goals, and talents within upper secondary education.

The Act also introduced a diversified entrance program, requiring schools to enroll up to at least 85% of their students through an open, exam-free enrollment. Article 37 of the Act states that “under the exam-free admission program, all applicants can be admitted as long as the number of applicants does not exceed the limit set by the competent authority” (MOE, 2016a). If the number of applicants does exceed the limit, “the final enrollment number shall be determined by the competent authority at the special municipal/county level along with the competent authority of each school district and reported to the central competent authority for future review” (MOE, 2016a). This means that schools may admit a small portion of students based on application criteria like an entrance exam, but it cannot be the primary basis for their enrollment. Further, the number of students not admitted through the exam-free enrollment must be reported to the government for review. Admission varies by program: some programs admit all interested students, and others require demonstration of specific skills or recommendations. However, skills-based and specialty-based senior high schools are not subject to open enrollment requirements because they have their own enrollment procedures, which may include academic subject exams, practical exams, or portfolios also named “technical subject performances” (MOE, 2016a). All students prepare for enrollment into high school through career-planning coursework, which junior high schools are required to integrate into their curriculum. The Act also mandates equitable and inclusive enrollment practices by prohibiting discrimination based on social identity or ability. Certain at-risk student groups, such as students with disabilities, indigenous students, and students from major disaster-stricken areas, supersede enrollment quotas. These students’ enrollment is ensured by the central government, rather than by individual schools (MOE, 2016a).

Finally, the Act stipulates that senior high school enrollment must also be tuition-free for most students. Whereas nine years of education is compulsory, and enrollment is exam- and tuition-free, the Senior High School Education Act states that the additional three years of basic education are *primarily* exam-free and “students are voluntarily enrolled to schools based on their inclination, interest, and merit, and shall be enrolled tuition-free pending certain requirements” (MOE, 2016a). These requirements are determined by the schools in cooperation with the municipal or county governments. Under the tuition-free policy, the total amount of student tuition is treated as a subsidy paid out to schools by the government (Chen, 2017). Tuition-free enrollment is not applicable for students who are not of Taiwanese nationality, who have dropped out, or who are enrolled in non-governmental and unsubsidized private schools. To promote equity, socially disadvantaged students may apply for additional subsidies and scholarships on top of tuition-waivers (MOE, 2016a). To subsidize at-risk students’ tuition, as well as fund county and school grants for innovative education proposals, the government spent NT\$30 billion on the Act’s first year of implementation and NT\$33 billion the second year (Chen, 2017).

### 4.2.3 12-Year Curriculum Guidelines—Core Competencies

To complement the institutional changes introduced by the Senior High School Education Act, new curriculum guidelines were introduced, redefining the progression of learning stages and revising the core curricular competencies to reflect international best practices. The new curriculum guidelines drew inspiration from international trends in basic education expansion and policies within the United States, Finland, New Zealand, the UK, and Hong Kong for coherent subject and competency integration, by promoting the holistic development of each child with opportunities to cultivate their individual aptitudes (NIE, 2014). The refined curricular competencies also aimed to clarify the previous 9-Year curriculum and emphasize students' lifelong learning. To this aim, the 12-Year Curriculum Guidelines envision four core goals:

1. To inspire students to unleash their full potential
2. To teach and develop students' knowledge about life
3. To promote students' career development
4. To inculcate students' civic responsibility (MOE, 2014).

These goals recognize that students are self-directed learners, and schools should (1) ignite their motivation and passion; (2) guide them to develop their interactions with self and others; (3) help them apply learning into practice and experience the meaning of life; and (4) obtain the common good (Chen & Huang, 2017). Thus, the revised 12-Year Curriculum Guidelines state: "To implement the ideas and goals of 12-Year Basic Education, core competencies are used as the basis of curriculum development to ensure continuity between educational stages, bridging between domains, and integration between subjects" (MOE 2014). The guidelines consist of nine core competencies in three primary domains and contain a set of standards defining the development of these nine core curricular competencies in five stages.

The 12-Year Curriculum Guidelines recognize that students must take initiative to *act autonomously*, *communicate interactively*, and engage in *social participation* toward the collective good (MOE, 2014). These three domains are meant to drive lifelong learning. Each domain contains three specific core competencies, which comprise the nine core competencies of the 12-Year Curriculum Guidelines. The framework of cultivating lifelong learners through *spontaneity*, *communicative interaction*, and *social participation* mirrors the three areas the OECD DeSeCo framework uses to classify its twenty-first century core competencies: acting autonomously, using tools interactively, and interacting in heterogenous groups. DeSeCo defines "acting autonomously" as the ability to set goals, to act within the bigger picture, and to form and conduct life plans and personal projects. Taiwan's corresponding "spontaneity" interpretation states that students should act from their own will, use creative flexibility, and work on self-improvement. DeSeCo's category of "using tools interactively" corresponds to Taiwan's "communicative interaction," as it aims to equip students with tools (sociocultural, linguistic, technology-based, and artistic)



to actively engage with others and within society. Taiwan's third learning area—referred to as “social participation”—mirrors DeSeCo's “interacting in heterogeneous groups,” with the emphasis on accepting and appreciating diversity while collaborating for collective good (MOE, 2014; OECD, 2003). The delineated goals of Taiwan's 12-Year reform reinforce international influences and emphasize teaching and learning practices informed by twenty-first century competencies.

#### ***4.2.4 Implementation Steps for the 12-Year Curriculum Guidelines***

The 12-Year guidelines explicate eight major items for implementation: (1) curriculum development; (2) teaching implementation; (3) learning assessment and application; (4) teaching resources; (5) teacher professional development; (6) administrative support; (7) participation of parents and nongovernmental organizations; and (8) supplementary provisions (MOE, 2014).

1. Curriculum development entails the creation of individual school-based curriculum development committees, integrated school-adjusted curriculum plans, improvement-focused curriculum evaluation mechanisms, and resources for experimentation and innovation with school autonomy.
2. Teaching implementation includes teacher preparation, support for adaptive and innovative activities, and the practice of varied teaching models to increase learning motivation and foster a positive learning atmosphere.
3. Learning assessment and application places an increased focus on the use of formative and varied assessment types in class to help teachers adjust their methods to benefit learner outcomes. It also suggests the use of tutoring and remedial services depending on student needs.
4. Teaching resources mandate materials, equipment, and budget for teachers to develop innovative pedagogical methods. Curriculum and materials must reflect multiculturalism and an appreciation for diversity; local authorities can adjust curriculum to local needs. The MOE is tasked with creating collaboration channels between teachers, schools, researchers, and the community.
5. Teacher professional development outlines professional learning communities for preparation, observation, and research inside and outside classrooms, emphasizing a change toward a positive peer learning culture and interpersonal and financial support systems. Professionalism increases through content integration and regular relevant workshops.
6. Administrative support highlights the need for competent authorities to help teachers to accomplish curricular goals and implementation steps through funding, informational seminars, and responsive evaluation surveys.
7. Participation of parents and nongovernmental organizations validates the necessity of whole-community support for student learning, especially through

engaging parents in the school environment and utilizing community resources to offer real-life learning opportunities.

8. Supplementary provisions state that progressive implementation will begin in August 2018 (although this was later postponed to August 2019), and local authorities have jurisdiction over providing appropriate education and activities for special education, art and vocational activities, indigenous curriculum, and experimental education.

The guidelines place an emphasis on alignment among these components, stating:

The objectives are to promote communication between relevant education entities, facilitate flexibility in school curriculum design and development, support teaching and learning activities, integrate diverse teaching resources, and evaluate curriculum implementation outcomes to ensure students' right to learn and enhance teachers' professionalism and responsibilities. Schools are also encouraged to incorporate issues of global importance in their curriculum, offer school-developed courses relevant to local topics, and use project-based, cross-curricular, integrative, practical, and experiential pedagogy.<sup>1</sup> (MOE, 2014)

This comprehensive strategy promotes subject integration, multicultural appreciation, and teacher professionalization. Additionally, the guidelines adapted the senior high school assessment process, provided references for teaching integrated subjects, and required seminars to increase stakeholder awareness—especially for parents. A resource website about the new curriculum was also published by the MOE. The implementation protocols require city and county education bureaus to provide administrative oversight and facilitate cross-school collaboration, but school autonomy is heavily emphasized in curriculum development and teacher support (MOE, 2014). In total, thirty-five pieces of legislation were passed in this reform cycle, with standards for teaching, curriculum, textbooks, assessment, equipment, and other topics (MOE, 2019b).

Implementation of the revised guidelines was projected to begin in the 2018–2019 school year, but a survey conducted by National Taiwan Normal University shortly after the guidelines' publication found that 87.5% of junior high, general, and vocational teachers did not believe that the MOE was ready for 12-Year Basic Education curriculum guideline implementation (NTNU, 2015). In a later interview, the Minister of Education Pan Wen-Chung predicted on-schedule implementation by 2018 because it was the “expectation of many school officials and teachers” (Taipei Times, 2016). However, both schools and teachers felt unprepared with this timeline, so the curriculum implementation was postponed from 2018 to 2019. Beginning in the 2019–2020 school year, the progressive implementation started with the first grade per school level per year (i.e., 1st, 7th, and 10th grades). Subsidies for schools were provided contingent on schools establishing curriculum development committees to oversee the textbook choices, creating a school-based curriculum, and designing evaluation frameworks (MOE, 2019c).

---

<sup>1</sup> The guidelines state: “School curriculum development should emphasize the integration of distinct domains, clusters, programs and integrate issues of global importance, including gender equality, human rights, the environment, global ocean, morality, energy, life, technology, reading literacy, international education, and indigenous education” (MOE, 2014).

### 4.3 Approach to Analysis

Our multidimensional analysis of Taiwan's 12-Year Basic Education reform was conceptualized through the Reimers' five perspectives framework (2020). To understand the systems-level transformations of the Senior High School Education Act, we focused on the institutional perspective through examination of changes in enrollment data, expenditure, and educational attainment.

The psychological perspective helped to evaluate the revised guidelines' competencies and pedagogical goals based on the relationship to scientifically and internationally recognized best practices. Similarly, the professional perspective was used to analyze support for teachers' capacity to deliver curricula, comparing original survey and interview data with published professional development participation statistics from the MOE. This overlapped with the political perspective, which informs our discussion of teachers as key stakeholders, as well as the contextual political environment which shapes responses to reform. Finally, we utilized the cultural perspective to consider how the 12-Year guidelines broadly aim to reform Taiwan's societal framing of the goals of education and the definition of educational success. These lenses provide a holistic assessment of the 12-Year Basic Education reform for Taiwanese education within this preliminary timeframe.

#### 4.3.1 Interview and Survey Methodology

To account for the recency of the revised curriculum guidelines and the limited student-level information available at the time of writing, we conducted semi-structured interviews with nine teachers and seven administrators, researchers, and professors. Administrators and national researchers with publicly available contact information were recruited for interviews via email; others were recruited through professional connections formed through Fulbright Taiwan, an organization which recruits English teachers to foster cultural exchange between the United States and Taiwan. In addition, we surveyed eighty-eight teachers across thirteen administrative divisions. This survey was distributed through a shareable link and disseminated through Fulbright Taiwan's professional network. The online survey included both Likert-style and open-ended questions to assess teachers' experiences, impressions, and practices regarding the 12-Year Curriculum Guidelines' teacher-related components. Most respondents lived in either Kaohsiung City (33 teachers), Hualien County (16 teachers), or Kinmen County (24 teachers), with a nearly even divide between teachers in urban and rural areas. A majority (67%) of respondents are primary school teachers; 11% are junior high school teachers, and 21% are senior high school teachers. Forty-nine percent of respondents have been teaching for ten years or less, and 51% of respondents have been teaching for over ten years.

Finally, we used publicly available data from the Ministry of Education's published statistics and meeting minutes to supplement our understanding of the

goals and impact of the 12-Year education reform. From the MOE statistics, we analyzed enrollment rates, graduation rates, and hours of teacher professional development. Additionally, corresponding meeting minutes between governmental officials and working groups were recorded to provide insight into the design process of the new 12-Year Curriculum Guidelines and its learning goals.

### **4.3.2 Limitations**

The limitations of our data should be noted. First, the small sample of teachers was not selected with methods that would denote representation of the larger population. Additionally, teachers who were interviewed or participated in the survey may be those who are more interested in the reform or who have stronger positive or negative impressions about educational change generally. Furthermore, the survey relies purely on teachers' subjective experiences and perceptions. Despite these limitations, we felt that given the centrality of teachers in the 12-Year reform's implementation, attempting to understand these perceptions from the broadest base possible within the limited time of our project was warranted. With this data, we can begin to evaluate the reform's impact on a ground level, with the quality and quantity of teacher implementation to be used as an initial proxy for the reform's impact. Future considerations from stakeholders—including parents and students—alongside student-level data about academic and social outcomes would increase the scope and understanding of this reform.

## **4.4 Implementation Analysis**

### **4.4.1 Expansion of Equitable Access to Senior High School**

In general, Taiwan has a broadly accessible education system in terms of gross and net enrollment. The net percentage of junior high school graduates advancing to upper secondary school has averaged at greater than 99% since 2012. For upper secondary school specifically, net enrollment rates have remained at around 93% since 2011 (MOE, 2019d). While the Senior High School Education Act has broadened enrollment opportunities for students through the diversified entrance program, net enrollment rates have not drastically changed. However, since the Act was implemented in 2014, the percentage of junior high school graduates advancing to senior high school has increased by 0.4% (MOE, 2019e), equating to a few thousand students. Since enrollment was already high prior to the reform, it is possible that this marginal increase is the result of lowered barriers for some of the most marginalized students. Overall, this may indicate the reform's impact of increasing the number of students continuing to upper secondary education.

Students' average years of schooling has also been increasing steadily since 2009, surpassing twelve years of education in 2016—two years after the Senior High School Education Act was passed. By 2019, the average length of schooling for Taiwanese students was 12.3 years, and the expected time of total education was 16.5 years (MOE, 2019f). While these increases appear to have begun before the Senior High School Education Act was passed, a marginal increase was observed in students from junior high school continuing to senior high school. This continued trend of increased years of education reflects a general improvement of access to educational opportunities in Taiwan. The explicit inclusion of disadvantaged students in the Senior High School Education Act also led to an increase in the quantity of classes for students with disabilities: between 2013 and 2019, there was a 15% increase of special needs classes in senior high and vocational schools (MOE, 2019g). In terms of socioeconomic equity, the proportion of students enrolling in private senior high schools versus public senior high schools has decreased substantially between 2013 and 2019 (MOE, 2020b).

On the other hand, vocational high schools have received fewer tuition subsidies compared with general high schools, despite enrolling a higher proportion of poor students and facing greater costs associated with internships and practicum courses (Chen, 2017). Additionally, educational attainment data with respect to other student groups identified in the act—such as indigenous students—does not appear to be as readily monitored and available. Disaggregated data surrounding enrollment changes, graduation rates, and postsecondary plans specifically among disadvantaged students are needed to better assess the Senior High School Education Act's impact on providing an equitable education for all.

#### ***4.4.2 Integration of 21st Century Learning in the Classroom***

On a theoretical level, twenty-first century competencies are well-integrated into the 12-Year Curriculum Guidelines. On a practical level, most surveyed teachers strongly agreed that they integrate competency-based teaching models into their own practice on a regular basis. They also agreed, though slightly less strongly, that they believe that the competency model in the 12-Year curriculum has positively impacted students' learning. Surveyed teachers further reported feeling confident in using ICT in their classes on a regular basis, which is an important tool for students to develop competencies related to digital literacy and communication.

Formative assessment also appears to be well-integrated; over 80% of teachers report that they use formative assessment at least once a month. Thirteen teachers even reported they use some form of formative assessment at least once per day. Most surveyed teachers (73%) also indicated that methods to help teach twenty-first century skills, such as interdisciplinary classes, have positively impacted students' learning. This focus on students was mirrored in the interviews as well. One senior high school teacher said that the reform has a focus on well-being and on well-rounded students, while a primary school teacher mentioned that teaching methods

have changed to encourage inquiry-based learning and open-ended questions. This teacher described the policy's goal as encouraging students to solve problems independently, without teachers providing the answer. Her perception was that this would increase discussion and render classes more interesting. However, despite our survey's indication that competency-based learning is well-integrated, a recurring theme among teacher interviews was the continued prevalence of traditional, teacher-centered practice and reliance on textbooks to determine course content.

Survey results indicate that teachers understand and see value in the curricular changes and in competency-based teaching practices. However, the intended learning outcomes because of these large-scale changes in teaching practices may not yet be fully visible. NAER is currently compiling a database to assess student learning of transversal competencies and to determine how to better support teachers' needs under the new guidelines. Further research on changes to student outcomes and perceptions of the curriculum and pedagogy is necessary for developing alternate perspectives of relevant stakeholders. Moving forward, more data will be needed regarding student employment, educational attainment, and international assessments; this information will yield insight into the success of the revised guidelines in improving students' learning and well-being.

#### ***4.4.3 Increase of Autonomy for Schools and Teachers: School-Based Curriculum Development***

The revised 12-Year Curriculum Guidelines require schools to develop their own alternative curricula, alongside the new MOE-mandated curriculum. School-based curriculum should be “designed and offered by each school to highlight the school's vision of education and facilitate students' development according to their aptitudes” (MOE, 2014). School-based curriculum includes both required and elective courses developed by individual schools, as well as alternative learning or group learning periods that schools may arrange depending on their students' specific needs. Depending on the learning stage (elementary, junior, or senior high), the school-based alternative curriculum comprises between two to seven class sessions per week, with a greater number of weekly sessions allocated for students who are in grades 3–9. Additionally, the four different tracks of senior high school (outlined by the Senior High School Education Act) have different requirements for the balance of school-developed curriculum and MOE-mandated national curriculum. Specialized and comprehensive high schools have the most autonomy regarding curriculum development, allowing well over half of their required credits to be considered alternative curriculum. For general and vocational high schools, although there are more requirements using MOE-mandated curriculum, students in all four tracks of senior high school can expect to take 2–3 sessions of school-based alternative curriculum per week (MOE, 2014).

School-developed curriculum aims to provide an increased opportunity for schools to “[s]park students’ learning interests” and encourage the development of their aptitudes and skills” (MOE, 2014). This reflects the idea that effective instruction integrates student’s prior knowledge, motivations, and interests (Aspen Institute, 2019). The revised curriculum guidelines explicitly position these school-based alternative curricula as opportunities to promote twenty-first century skills: schools are encouraged to use this time for theme-, project-, and inquiry-based learning in interdisciplinary cross-subject courses and in professional, service-based, outdoor education, self-directed learning, and experiential courses (MOE, 2014). Courses like “community service learning, experiential courses in outdoor settings, civic practice, small-scale thesis research, and project-based exploration” emphasize practical learning experiences for students, giving them the chance to apply knowledge and skills to real world situations (MOE, 2014). This provision for alternative curricula also allows schools to increase the relevance of their curriculum, by adapting them to their local contexts. For example, schools serving large populations of indigenous students can incorporate indigenous history and culture into curricula and involve local indigenous knowledge-keepers in developing courses, lessons, and projects.<sup>2</sup> These connections between academic and home lives can increase students’ interest and pride in their indigenous identities while fostering intrinsic motivation (Lee et al., 2011).

#### ***4.4.4 Preparing Teachers for Innovative Pedagogy***

The 12-Year guidelines aim to promote increased innovation and adaptive pedagogy among teachers, encouraging student-driven learning in the classroom to facilitate competency development. The revised guidelines thus grant autonomy to schools and teachers to increase adaptive support for students. Therefore, sufficient professional support, teacher buy-in, and self-motivated interest to adapt pedagogical techniques are vital to the success of guideline implementation. The MOE, county governments, and schools provided workshop opportunities in the years leading up to the revised guidelines’ implementation, allowing teachers to learn directly about the new curriculum and its pedagogical approaches. Some workshops were mandatory, but others were provided on either a selective application-basis or open to any teacher as self-funded study. Our survey found that most teachers (97%) reported having participated in professional development activities related to the reform at some point, including workshop participation, joint lesson preparation, teaching observation, and/or professional learning communities. In 2018, TALIS responses showed 71.3% of participants engage in collaborative professional development less than

---

<sup>2</sup> In primary school, students are required to enroll in one of these language courses: Minnan, Hakka, Indigenous Languages, or Native Languages of New Immigrants. In junior high school, students can choose to continue enrolling in indigenous language courses. At least one indigenous language session should be held weekly at schools. Native Languages/Native Languages of New Immigrants may be integrated into cross-curricular courses to meet competency requirements (MOE, 2014).

once per month (OECD, 2019b). While our survey corroborates that most teachers (63%) participate in collaborative professional development 1–2 times per month or less, about a third of teachers reported engaging in these activities at least once per week—with 12% stating that they engage in PD activities daily.

While our survey is not fully representative, these findings may suggest a preliminary increase in the frequency of collaborative professional development supporting teachers' professional competency to implement the revised curriculum. However, one teacher noted that there are fewer government-run workshops on the outlying islands (rural areas), and teachers find it difficult to attend weekend workshops on the main island of Taiwan due to the time commitment and limitations to personal funds. This is supported by government data showing that while workshops have been held across counties, significantly fewer have been held in rural areas (MOE, 2016b).

Despite survey responses, average hours of professional development (PD) per teacher per year decreased between 2013 and 2019, from an average of 89.05 to 70.83 h (analysis of MOE Inservice Portal). The variations between counties and grade levels are wide, with Kaohsiung (an urban county) averaging 60.6 h per teacher—lower than the rural counties of Hualien (67 h) and Kinmen (99 h). Average hours of teacher professional development per teacher also vary. Elementary school teachers participate in the most hours of PD on average, followed by junior high teachers, then senior high teachers (MOE Inservice Portal). Kinmen teachers, in fact, have notably high PD hours for primary school specifically, with 125.08 average hours of PD per teacher, compared to Kaohsiung's 78.35 h and Hualien's 94.23 h. This information counters the notion that quantity of professional development activities across all levels and areas has increased. More data is needed to determine if these discrepancies are related to budget, PD quality versus quantity, or other factors.

Beyond the frequency of professional development, though, an important consideration is whether teachers agree with, and are inspired to use, what they learn from their professional development. Effective professional development is responsive to needs for adult learning and recognizes their capacity as creators, rather than passive recipients of training (Reimers, 2020). Most teachers surveyed agreed that their participation in professional development activities has positively impacted their students' learning, indicating that they have found the PD activities beneficial and useful to their practice. However, this was more strongly agreed upon by elementary school teachers; only 60% of junior high and 50% of senior high teachers perceived a positive impact on student learning because of their PD participation. This could be because our elementary school teacher survey respondents reported more frequent PD activities, but it could also indicate a variance in quality of PD between school levels. Additionally, over 70% of our survey respondents indicated that their school offers incentives for teachers to design curriculum, teaching materials, and innovative assessments, and many believe the incentives have a positive impact on student learning. However, senior high school teachers were slightly less likely to report that they agreed with this.

More research is needed to determine the impact of targeted professional development activities between school levels. Our preliminary data underline an optimistic



view: with increased opportunities for collaborative PD and professional incentives, teachers will increase their self-efficacy with the new curriculum and pedagogy. Consequently, teachers can adapt and implement student-based curriculum in the classrooms, resulting in positive impacts on students' learning.

#### ***4.4.5 Challenges to Implementation: Conflicts Arising from the “Top-Down” Approach to School Autonomy***

Because of the historically centralized approach to government, top-down reforms are the norm in Taiwanese education. Although the 12-Year Curriculum Guidelines aim to promote school autonomy and explicitly call for the involvement of multiple stakeholders—including teachers, administrators, parents, and NGOs—the guidelines have faced some resistance, much like the challenges preceding the 9-Year curriculum reform. Our analysis focuses on the role of teachers as the reform's primary implementors, although perspectives of each of these stakeholders warrants further research and attention as the reform progresses. The first challenge of implementation pertains to teachers' direct and perceived involvement within the reform; some teachers interviewed expressed that they did not feel teachers were adequately involved in the process of revising the curriculum guidelines, and that teachers' interests were not sufficiently addressed throughout the process. For example, one senior high school teacher shared his impression that the reform was made by approximately fifty people, comprised of mostly experts and professors but not many teachers. Other teachers echoed the perception that professors played a disproportionately large role in guideline creation relative to teachers.

Contrary to these perceptions, meeting notes from the MOE National Curriculum Development Committee show that teachers were included in the guidelines' revision process (NAER, 2020). For example, the requirements for indigenous languages included in the revised curriculum require a special division of teachers and NAER professors who specialize in language education. Additionally, the MOE published public websites and online forums to solicit feedback from teachers, parents, and the public, which was then used by the committee members throughout the revision process. However, the extent of teacher engagement with these platforms is uncertain. Despite a clearly defined intention from the MOE to engage diverse stakeholders and involve teachers and the public actively in the process, some teachers still felt detached from the reform and perceived it as predominantly top-down. This perception appears to have limited some teachers' enthusiasm for the process, despite their agreement with the overall goals of the reform.

#### ***4.4.6 Impression of Increased Teacher Responsibilities***

The historically top-down approach of the Taiwanese education system leaves many with feelings of inadequate MOE consideration regarding stakeholder interests. One national curriculum researcher expressed that the government tends to have a “do as you go” attitude towards policies, not always addressing parent and teacher concerns. This explains the most frequently noted theme among teachers interviewed, which is that the revised guidelines have generally increased responsibilities and teaching demands for them and their colleagues. As one primary school teacher put it: “The intention behind the [curricular] change is good, to encourage students to think critically,” but “teachers should have more time to really design the lessons, to teach, [and the MOE should] give teachers more time so that they can do a better job.” Under the revised guidelines, teachers are encouraged to plan lessons that spur students’ critical thinking and to create activities that permit them to work in small groups on interdisciplinary projects. Despite expectations for innovative pedagogy, systematic changes to teachers’ schedules to reflect these new demands—such as increased time scheduled for planning and observation—have not occurred. Some teachers expressed that the pre-existing demands of teaching leave teachers feeling too busy for the additional task of collaboratively innovating lessons.

Before the revised guidelines were implemented, teachers in Taiwan taught an average of 17+ hours per week (OECD, 2019b), with many spending additional hours teaching remedial classes, leading student clubs and extracurricular activities, completing administrative tasks, and serving on school committees to implement a school-based curriculum. TALIS reported that teachers spent a weekly average of nearly 7 h on individual planning, 3 h on collaborative work with colleagues, 4 h on grading, and 4.5 h per week on administrative tasks (OECD, 2019b). Reducing teachers’ course responsibilities to give more time to prepare and implement professional development strategies is recommended by the TALIS report (OECD, 2019b), but it is not clear to what extent this has taken place to accommodate for the requirements of the new curriculum guidelines. Increased demands for teachers may also disproportionately impact smaller, rural schools. Without the financial resources to increase staff size, these schools may find challenges in rearranging teachers’ schedules to meet new requirements for increased number and diversity of elective courses offered. New requirements for course offerings have also led to teacher shortages, especially in subjects that were not previously emphasized within the education system, such as indigenous languages (Lin et al., 2019).

#### ***4.4.7 Public Understanding of the Reform***

Another challenge facing the reform’s future is the dissemination of information to the public to create awareness of the goals and processes of the revised guidelines. Like the preceding 9-Year reform, the 12-Year Curriculum Guidelines are written

with ambiguity. A public concern is the lack of confidence in how the new guidelines will equip students with the knowledge and skills they need to master the “basics” of education. As one teacher explained, she felt nervous and skeptical upon first hearing about the 12-Year Curriculum Guidelines, interpreting them as a wholesale change of the content taught in schools. After she was more familiar with the guidelines, she better understood their purpose, and understood that the guidelines mainly call for changes to teaching methods rather than changes to curricular content. After this, she was able to appreciate how the reform could allow students to better develop critical thinking and interpersonal skills, while ensuring that the curriculum would not skip fundamental content. This mentality parallels parents’ misconceptions about competency-based learning which explains their lack of buy-in; according to our survey, most teachers (91%) agreed that parents do not understand the goals of interdisciplinary, competency-based education of the 12-Year Curriculum Guidelines. Interviewees described the concern that curriculum changes will result in the deterioration of students’ grades.

#### ***4.4.8 Cultural Challenges: Redefining the Purpose of School and Learning***

Support for the 12-Year Curriculum Guidelines is impacted by several factors beyond TPD, including larger sociocultural values about the goals of education. While a competency-based curriculum was introduced in the 9-Year reform, the 12-Year guidelines are more closely aligned with competencies from international models, including increased school autonomy, innovative student-centered lessons, and opportunities for students to explore their interests. The 9-Year reform sought to ultimately shift the purpose of schooling to holistic competency development; the 12-Year reform retains this spirit of holistic education and lifelong learning while pivoting to how students relate to the world around them and command their own learning. Like the 9-Year reform challenges, the 12-Year Curriculum Guidelines also appear to have ambiguity in its goals and intended outcomes.

The 12-Year Curriculum Guidelines emphasize innovative pedagogy and applied learning, and thus mark a departure from tradition. Accordingly, day-to-day changes to teaching methods and assessments have lagged curricular changes. Among interviewees, there was a distinct perception that the pedagogical approaches set forth in the revised curriculum guidelines are “imported,” producing tension with traditional approaches to education in Taiwan. The biggest perceived conflict is between the student-driven, inquiry-based learning approaches recommended by the curriculum guidelines and the existing teacher- and textbook-centered pedagogy, designed to prepare students for rigorous testing. Many teachers interviewed expressed their belief that the cultural value of academic success defined through high test scores would continue to prevail, regardless of curricular changes.

With increased autonomy to design a school-based curriculum that aligns with student interests, some teachers have expressed that the 12-Year Curriculum Guidelines are burdensome; teachers face the same social and professional pressure to deliver high test scores but must now do so through unfamiliar means. For some teachers, this may mean forestalling guideline-suggested approaches until there is “time” to do so, prioritizing traditional pedagogical methods to prepare students for exams. Simultaneously, interviewees noted a lack of student motivation in school and a dissatisfaction with traditional models of teaching. Thus, there is the simultaneous perception that traditional teaching styles are not sufficient to engage students, as well as a sense of uncertainty for how to effectively practice more interdisciplinary, inquiry-driven approaches. This perceived departure from the norm appears to have left many teachers with a sense of feeling “not ready” for the reform.

Overall, our interviews and survey demonstrated strong consensus that the goals of the 12-Year Curriculum Guidelines are positive and well-intentioned. However, shifting the cultural role of schools from arbiters of test scores to sites of twenty-first century competency development and lifelong learning has proven difficult to change. Like the preceding 9-Year curriculum reform, the revised curriculum guidelines for 12-Year Basic Education have struggled to elicit widespread buy-in. Disconnect between MOE policies and teachers’ interests, on top of parent and public misunderstanding, appear to have hindered the most preliminary stages of implementing the 12-Year guidelines. With the widespread perception that test scores and grades are crucial for student success in Taiwanese society, developing collective buy-in among teachers and parents is a critical step for effective implementation of the competency-focused curriculum and innovative pedagogy. Moving forward, as the MOE continues to develop platforms for eliciting feedback and facilitating dialogue among teachers, parents, and the public, the re-envisioning of schools and learning in Taiwan appears promising.

## 4.5 Conclusion

Taiwan’s 12-Year Basic Education reform seeks to increase equity and national educational attainment throughout Taiwan, through the extension and diversification of basic education and the transformation of teaching and learning in the national curriculum guidelines. Although enrollment in Taiwanese upper secondary schools was already high, alleviating entrance exam requirements and tuition has further increased enrollment. What is more, by prioritizing the tuition- and exam-free enrollment of marginalized student groups, the government has promoted more accessible pathways to education for all students.

Taiwan is a developed nation, with high levels of educational access, resources, and attainment. The newly implemented 12-Year Curriculum Guidelines support the development of twenty-first century competencies, individual talent development, and lifelong learning through an interdisciplinary, innovative, and locally adaptive approach. Taiwan’s curriculum revision exemplifies the adoption of internationally

influenced frameworks to create national-level standards, while promoting mechanisms of school and teacher autonomy for adaptation to local context and student's needs. The push for increased school autonomy in an historically top-down system, as well the approach to competency-based national curriculum in a traditionally test-centric learning culture, makes Taiwan a compelling case study for education reform.

The implementation challenges of the 12-Year Curriculum Guidelines underscore the pivotal role of teachers in curricular reform—and the need to integrate political, professional, and cultural perspectives when considering how to involve teachers as stakeholders as well as curriculum innovators and agents of educational change. Moving forward, the high cultural value that Taiwanese society places on education can be leveraged to promote an increased alignment and shared vision among teachers, parents, the government, and the public. While this analysis will be strengthened by future research of educational outcomes, Taiwan continues to set its students on the path toward lifelong learning, and in doing so, set its society on the path to success.

## References

- Ash, R., & Greene, M. (2007). Taiwan in the 21st century. Retrieved from: <http://www.econ.yale.edu/~granis/papers/Taiwans-success.pdf>.
- Aspen Institute. (2019). National commission on social, emotional and academic development. In *From a nation at risk to a nation at Hope*. Retrieved from: [http://nationathope.org/wp-content/uploads/2018\\_aspen\\_final-report\\_full\\_webversion.pdf](http://nationathope.org/wp-content/uploads/2018_aspen_final-report_full_webversion.pdf).
- Chen, H. L. S., & Huang, H. Y. (2017). *Advancing 21st century competencies in Taiwan*. Retrieved from: Asia Society Center for Global Education. <https://asiasociety.org/files/21st-century-competencies-taiwan.pdf>.
- Chen, L.-J. (2017). *From full charge to tuition-free: An inquiry into the student fee policy of Taiwan's 12-year basic education*. Retrieved from: <http://140.127.82.166/bitstream/987654321/19234/1/043.pdf>.
- Chen, T. Y., Chou, Y. C., Tzeng, N. S., Chang, H. A., Kuo, S. C., et al. (2015). *Effects of a selective educational system on fatigue, sleep problems, daytime sleepiness, and depression among senior high school adolescents in Taiwan*. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4372029/>.
- Chien, et al. (2013). *The main features and the key challenges of the education system in Taiwan*. Retrieved from: <https://files.eric.ed.gov/fulltext/EJ1079213.pdf>.
- Chou, C. P., & Ching, G. (2012). *Taiwan education at the crossroad: When globalization meets localization*. Palgrave MacMillen: New York. Retrieved from Open WorldCat.
- Government of Taiwan. (2020). *National statistics: Total population*. Retrieved from: <https://eng.stat.gov.tw/point.asp?index=9>.
- Government of Taiwan. (2021). *Historical timeline of Taiwan*. Retrieved from: [https://www.taiwan.gov.tw/content\\_3.php#:~:text=The%20ROC%20was%20founded%20in,end%20of%20World%20War%20II](https://www.taiwan.gov.tw/content_3.php#:~:text=The%20ROC%20was%20founded%20in,end%20of%20World%20War%20II).
- Kuan, P.-Y. (2011). Effects of cram schooling on mathematics performance: Evidence from junior high students in Taiwan. *Comparative Education Review*, 55(3), 342–368. <http://www.jstor.org/stable/https://doi.org/10.1086/659142>.

- Lee, H., Yen, C. F., & Aikenhead, G. (2011). *Indigenous elementary students' science instruction in Taiwan; indigenous knowledge and western science*. Retrieved from: [https://www.researchgate.net/publication/225353181\\_Indigenous\\_Elementary\\_Students'\\_Science\\_Instruction\\_in\\_Taiwan\\_Indigenous\\_Knowledge\\_and\\_Western\\_Science](https://www.researchgate.net/publication/225353181_Indigenous_Elementary_Students'_Science_Instruction_in_Taiwan_Indigenous_Knowledge_and_Western_Science).
- Lin, C., Gao, I., & Lin, P. (2019). Efforts and concerns for indigenous languages. Retrieved from: [https://link.springer.com/referenceworkentry/10.1007%2F978-981-10-3899-0\\_11](https://link.springer.com/referenceworkentry/10.1007%2F978-981-10-3899-0_11).
- Lin, T. B., Wang, L. Y., Chang, C. M. (2015) *Pursuing quality education: The lessons from the education reform in Taiwan*. Retrieved from: [https://www.academia.edu/12130408/Pursuing\\_Quality\\_Education\\_The\\_Lessons\\_from\\_the\\_Education\\_Reform\\_in\\_Taiwan](https://www.academia.edu/12130408/Pursuing_Quality_Education_The_Lessons_from_the_Education_Reform_in_Taiwan).
- Liu, J. (2012). *Does cram schooling matter? Who goes to cram schools? Evidence from Taiwan*. Retrieved from: [https://www.researchgate.net/profile/Jeng\\_Liu/publication/257243764\\_Does\\_cram\\_schooling\\_matter\\_Who\\_goes\\_to\\_cram\\_schools\\_Evidence\\_from\\_Taiwan/links/5bb7045f92851c7fde2ea2cf/Does-cram-schooling-matter-Who-goes-to-cram-schools-Evidence-from-Taiwan.pdf](https://www.researchgate.net/profile/Jeng_Liu/publication/257243764_Does_cram_schooling_matter_Who_goes_to_cram_schools_Evidence_from_Taiwan/links/5bb7045f92851c7fde2ea2cf/Does-cram-schooling-matter-Who-goes-to-cram-schools-Evidence-from-Taiwan.pdf).
- Ministry of Education Republic of China (Taiwan). (2014). *Curriculum guidelines of 12-year basic education: General guidelines*. Retrieved from the National Academy for Educational Research: <https://www.naer.edu.tw/ezfiles/0/1000/img/52/129488083.pdf>.
- Ministry of Education Republic of China (Taiwan). (2016a). *Senior high school education act*. Retrieved from: <https://law.moj.gov.tw/ENG/LawClass/LawAll.aspx?pcode=H0060043>.
- Ministry of Education Republic of China (Taiwan). (2016b). *The number of teacher training activities handled by national primary and secondary schools in each county*. Department of Teacher Training and Art Education. Retrieved from: <https://data.gov.tw/dataset/78566>.
- Ministry of Education Republic of China (Taiwan). (2019a). *Educational situation, brief introduction to school education*. Retrieved from: <http://stats.moe.gov.tw/files/ebook/indicators/11.pdf>.
- Ministry of Education Republic of China (Taiwan). (2019b). *I am a teacher-108 curriculum information network/twelve years of national basic education*. Retrieved from: <https://12basic.edu.tw/link-teacher.php>.
- Ministry of Education Republic of China (Taiwan). (2019c). 12年國教. 108課綱 資訊網. Retrieved from: <https://12basic.edu.tw/12about-5-1.php>.
- Ministry of Education Republic of China (Taiwan). (2019d). *Net percentage of graduates advancing to next higher level of education*. Statistical Indicators. Retrieved from: <http://stats.moe.gov.tw/files/ebook/indicators/12.pdf>.
- Ministry of Education Republic of China (Taiwan). (2019e). *Enrollment rates of schools-net enrollment rates*. Statistical Indicators. Retrieved from: <http://stats.moe.gov.tw/files/ebook/indicators/13.pdf>.
- Ministry of Education Republic of China (Taiwan). (2019f). *Main education statistical indicators*. Retrieved from: [http://stats.moe.gov.tw/files/Statistical%20Indicators/index\\_eng.pdf](http://stats.moe.gov.tw/files/Statistical%20Indicators/index_eng.pdf).
- Ministry of Education Republic of China (Taiwan). (2019g). *Special classes attached to regular schools*. Retrieved from: <http://stats.moe.gov.tw/files/ebook/indicators/27.pdf>.
- Ministry of Education Republic of China. (2020a). *Expenditure situation on education*. National Statistics Republic of China. <https://eng.stat.gov.tw/ct.asp?xItem=41873&ctNode=6343&mp=5>.
- Ministry of Education Republic of China (Taiwan). (2020b). *Number of students in schools at all levels*. Retrieved from: <http://stats.moe.gov.tw/result.aspx?qno=MQA1AA2.>; Ministry of Education Republic of China (Taiwan). (n.d.). *Inservice portal*. Retrieved December 2020 from: <https://www1.inservice.edu.tw/index2-3.aspx>.
- Ministry of Foreign Affairs (MOFA) Republic of China (Taiwan). (2020). *Advance preparations and early response to the COVID-19 pandemic*. Retrieved from Ministry of Foreign Affairs: [https://www.mofa.gov.tw/Uplod/RelFile/2890/172268/20200517\\_1-3%20Advance%20preparations%20and%20early%20response.pdf](https://www.mofa.gov.tw/Uplod/RelFile/2890/172268/20200517_1-3%20Advance%20preparations%20and%20early%20response.pdf).
- National Academy for Educational Research (NAER). (2020). *Meeting minutes of the curriculum research and development committee from the 2013 to 2020*. Retrieved from: <https://www.naer.edu.tw/files/11-1000-1182-1.php>.

- National Institute of Education (NIE) Republic of China (Taiwan). (2014). *Twelve year national basic education curriculum development proposal*. Retrieved from: <https://www.naer.edu.tw/bin/downloadfile.php?file=WVhSMFXTm9MemN3TDNCMFIWOHINeIF3WHpFNU5EazFPV GxmTWpJMk9EZ3VjR1Jt&fname=KLRPDGOPWXB5B5OPIHSTDG55SXZOLFHKLA5FD45SXYY45DDSRP314045OPCDPKHD01STOPKLOPGHUTSTA531EHMLFDTWRP14JHHDA5UXOPTW4551VT51FHGHOPJHRPKLA5VX55UXOPGHUTGHUT15CHI4VTMPST>.
- National Taiwan Normal University (NTNU). (2015). *Survey on current implementation of character and moral education and response to the curriculum reform of 12-year basic education in Taiwan*. Retrieved from: <http://jntnu.ord.ntnu.edu.tw/pub/PaperContent.aspx?cid=193&ItemId=1492&loc=en>.
- OECD. (2003). *The definition and selection of key competencies (DeSeCo)*. Retrieved from: <http://www.oecd.org/pisa/35070367.pdf>.
- OECD. (2019a). *Results from Pisa 2018. Country note: Chinese Taipei*. Retrieved from: [https://www.oecd.org/pisa/publications/PISA2018\\_CN\\_TAP.pdf](https://www.oecd.org/pisa/publications/PISA2018_CN_TAP.pdf).
- OECD. (2019b). *TALIS results 2018. Teachers and school leaders as lifelong learners, volume I*. Retrieved from OECD: <https://www.oecd-ilibrary.org/sites/1d0bc92a-en/index.html?itemId=/content/publication/1d0bc92a-en>.
- Reimers, F. (2020). *Educating students to improve the world* (pp. 1–22). Chapter 1. Five Eyes to Educate Global Citizens. The Need for a Useful Theory of Global Education.
- Taipei Times. (2016, June 6). *Interview: Minister touts transformation of education system*. Retrieved from: <https://www.taipeitimes.com/News/taiwan/archives/2016/06/06/2003648006>.
- Taiwan Centers for Disease Control (CDC). (2020). *Government agencies working in-unison to ensure proper cleaning and disinfection procedures for the upcoming school semester—Taiwan centers for disease control*. Retrieved from: <https://www.cdc.gov.tw/En/Bulletin/Detail/hJ-0sxqj-IY0Af8Gkn2pXw?typeid=158>.
- United Nations. (2015). *The sustainable development goals, goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*. Retrieved from: <https://sdgs.un.org/goals/goal4>.
- Yen, K. L., & Vun, Y. S. (2016). *A study of the 12-year basic education policy implementation in Taiwan*. Retrieved from: <http://www.academicstar.us/UploadFile/Picture/2016-8/201681734556168.pdf>.

**Blansefloer Coudenys** is currently pursuing a Ph.D. in education at the University of Antwerp and acts as director of the US-based non-profit “Teachers for Vietnam.” She trained as a teacher in Belgium and developed a keen understanding of the international education world through her career journey which brought her from a Flemish Integration classroom for refugee youth in Flanders to a position as private tutor for international families in London and a role as English Lecturer at Can Tho University in Vietnam. She earned her Ed.M. in International Education Policy from the Harvard Graduate School of Education on a Fulbright and Frank Boas scholarship and is passionate about inclusive policy making and global citizenship education.

**Gina Strohbach** is an educator and researcher whose previous work spans public health and preK-12 education. She was awarded an extended Fulbright grant as an English Teaching Assistant in Taiwan, where she taught for two years, and she has previously served three AmeriCorps terms with Jumpstart, working to promote equity through early childhood education. Her research interests include the social, environmental, and neurobiological influences on education and promoting high-quality teacher-child interactions. She completed her Ed. M. in Human Development and Psychology at the Harvard Graduate School of Education and holds a BA in Biological Anthropology from Northwestern University.

**Tammy Tang** is an educator who has taught English in Taiwan with the Fulbright Program, implemented a reading program with Americorps, and tutored students from bilingual families. Her top interests in education include literacy, socioemotional development, global education, and family engagement. Tammy earned her Bachelor of Arts in Sociology and Chinese from the University of California Davis and completed her Master of Education in International Education Policy at the Harvard Graduate School of Education.

**Rachel Udabe** is an educator and currently serves as a teacher in Somerville Public Schools. Previously, she taught as a Fulbright English Teaching Assistant for 2.5 years in Kinmen, Taiwan, where she also directed student arts performances and co-authored a sustainability-focused ESL book. She graduated with a Bachelor of Science in Public Policy and Bachelor of Arts in Political Science from the University of Southern California, and she is currently pursuing a Master of Education in Education Policy and Management from Harvard University. In her spare time, she enjoys playing ukulele, running, and giving haircuts to friends.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

