



Innovate, Iterate, Improve: Strategies for Developing 21st Century Competencies

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Innovate, Iterate, Improve: Strategies for Developing 21st Century Competencies

The Global Cities Education Network (GCEN) is an international learning community of education systems from North America and Asia, launched in 2012 by the Center for Global Education at Asia Society (CGE). GCEN is intended to foster the sharing of promising approaches and to support systems with generating innovative policy and practice reforms to ensure that students develop the knowledge and skills needed to succeed in a global economy and society.

As the GCEN convener, CGE organizes events and identifies tools and resources to build the capacity of city systems to implement innovative reforms that address key problems of practice. CGE invites high-level leaders from education systems and often from partner institutions—including the business community, philanthropy, and academia—to an annual symposium, usually hosted by a GCEN city. These symposia offer opportunities to collaboratively discuss problems of practice, share and disseminate emerging system-building practices, and learn from both local educators and international experts. Between symposia, CGE facilitates periodic virtual meetings of city systems in GCEN’s three topical working groups: professional learning, career and technical education (CTE), and 21st century competencies.

In these symposia and meetings, leaders receive training and technical support on tools and methods to support innovation, discuss problems of practice, and give feedback to each other on systems change efforts. CGE’s resources and tools are grounded in improvement science and leverage resources from the Carnegie Foundation for the Advancement of Teaching.¹ System leaders in CGE’s working groups have—within city teams and through peer feedback—homed in on concrete problems facing their systems; identified likely drivers of change; and begun to explore new strategies and identify promising practices through rapid cycle testing and iteration, informed by data collection and analysis.

Although CGE did not prescribe a process, leaders were encouraged to start with small tests of change, typically at the classroom or school level, rather than launch a system-wide reform, and to collect data to determine whether a new strategy is effective or requires adaptation. System leaders also shifted their reform thinking to incorporate “user-centered design”: putting the users of policies and programs—typically students and teachers—at the center of solutions and approaching challenges through the lens, and with the ideas and experiences, of these users.

Based on interviews with lead GCEN team members and a review of materials developed for the GCEN symposia and virtual meetings, this report documents how three systems in the 21st century competencies working group—Denver Public Schools in Colorado; the Bureau of Education in Hangzhou, China; and the Hiroshima Prefectural Board of Education in Japan—leveraged these approaches to create new strategies for developing 21st century competencies, from summer 2016 through early 2019.

Each of these systems joined the working group with unique cultural and policy contexts. A 2016 report documented the local structures and frameworks guiding the work.² Additionally, CGE did not expect the

¹ Carnegie Foundation for the Advancement of Teaching, “The Six Core Principles of Improvement,” 2019, <https://www.carnegiefoundation.org/our-ideas/six-core-principles-improvement/>.

² C. A. Russell, “System Supports for 21st Century Competencies,” Asia Society and Policy Studies Associates, 2016, https://AsiaSociety.org/files/system-supports-for-21st-century-competencies-2016_0.pdf.

systems to address a common competency or change idea, or to coalesce around a definition of 21st century competencies. Rather, through the working group, CGE offered a learning network, accountability, and structure for a shared improvement process as teams grappled with questions reflecting their local priorities:

- **Denver:** *How can school-centered design approaches—with tailored supports from the district office—lead to improvements in interpersonal skills to ensure that students have full potential for classroom engagement?*
- **Hangzhou:** *How do course selection decisions in high school open—or limit—future choices within the educational system, and how can students make the best decisions that will lead to personal fulfillment as they pursue that pathway?*
- **Hiroshima:** *What skills and mindsets do students need to engage with and succeed in a competency-based education system? What supports do teachers need to foster new instructional strategies promoting competency-based learning?*

This report is not an evaluation of the effectiveness of the strategies implemented in each city or of CGE's support for the work. Rather, this report explores how these three education systems developed and tested strategies to foster the competencies that students need to succeed in the 21st century, using improvement science approaches to iteratively build on emerging lessons and practices to better support students and teachers.

The work is not yet done. System change takes time and continuous improvement, by its nature, is an ongoing learning process.

DEVELOPING SCHOOL-CENTERED APPROACHES IN DENVER

Denver Public Schools' (DPS) participation in GCEN has been guided by two main policy directives: Denver's strategic plan (the Denver Plan 2020³), which includes a focus on the whole child, and a substantial shift from the district office to a school-centered approach for improvement efforts. District leaders have embraced and leveraged continuous improvement strategies, including improvement science, to navigate these policy directives and to create systems of supports to ensure that all students have the opportunity to develop the social-emotional skills needed to succeed in school and, ultimately, college and/or career.

A thread throughout Denver's involvement in CGE's 21st century competencies working group has been creating processes to better align district office supports to social-emotional development of teachers and students.

SUPPORTING THE WHOLE CHILD

The Denver Plan 2020 articulates five goals for the district to close achievement gaps and prepare all students for success in college and careers. One of these five goals is to support the whole child: the district is committed to ensuring that all students are “healthy, supported, engaged, challenged, safe, and socially and emotionally intelligent.” In addition, in 2017, the DPS superintendent articulated a theory of action for district-wide improvement, establishing schools as the lever of change, with the district office offering resources and supports requested by schools.

The Denver team for the GCEN 21st century competencies working group, led by the Student Equity and Opportunity division of DPS, focused on this question:

How can school-centered design approaches—with tailored supports from the district office—lead to improvements in interpersonal skills to ensure that students have full potential for classroom engagement?

The team first focused on developing a set of strategies—a “basket of supports”—that schools could draw from based on the social-emotional needs of their students. Over time, the district began to apply this concept of school-centered supports to addressing two specific issues facing the district: middle school bullying and out-of-school suspensions (OSS) for students in Early Childhood Education (ECE) through grade 3. Most recently, the team focused on using the tools of improvement science at two schools, focused on improving student engagement as a means of reducing disruptive behavior and increasing learning time.

DENVER PUBLIC SCHOOLS

Number of students: 93,000

Number of teachers: 4,500

Number of schools:

- Early Childhood Education-kindergarten: 4
- Elementary schools: 92
- Early Childhood Education-grade 8: 18
- Early Childhood Education-grade 12: 4
- Middle schools: 34
- Grades 6-12: 12
- High schools: 44

Area of focus: building interpersonal skills of students (and also adults who work with students) to ensure that students have full potential for classroom engagement, which will ultimately lead to college and/or career success

Website: <https://www.dpsk12.org/>



³ Denver Public Schools, “Denver Plan 2020,” 2019, <https://www.dpsk12.org/denverplan/>.

ESTABLISHING PROCESSES FOR IMPROVEMENT SCIENCE

The Denver team enthusiastically embraced the improvement science approaches of the CGE 21st century competencies working group, which aligned with the efforts under way in the district to develop user-centered, solution-oriented approaches for supporting schools. In 2015, DPS created the *Imaginarium*, a design thinking department at the district office, as part of a system-wide goal to move toward a proactive, solutions orientation and away from a “firefighting” perspective, for instance introducing protocols to guide both key district staff and principals to identify and solve problems in more creative ways.

This was a shift for Denver, at both the district and school levels: district staff were used to providing direct support to schools whenever data trends identified an issue. Under the district’s new theory of action, the district office provides direct support only when schools request it. Yet, developing a system-wide culture of empowering school staff to identify and test solutions to challenges takes time and significant shifts in mindsets. Schools might struggle to identify innovative solutions to deeply ingrained challenges. And, school change isn’t always perceived as flexible; having choices can be difficult: some schools want the district office staff to provide the solution so they can move on to other priorities. According to a district leader, “We can’t emphasize enough, that for us in Denver, we needed to spend a lot of time actually practicing helping people talk about their work and their concerns or anxieties about this approach.”

The Student Equity and Opportunity division leveraged materials offered through GCEN to train all district office staff in improvement science principles. These improvement science practices were then utilized to better understand school-level needs and design supports. DPS aimed to create a process to support principals with making decisions and identifying supports from the central office and district, including creating guides to decision-making for principals and providing access to materials and resources to implement solutions. District-level staff were empowered to use improvement science methods to evaluate the effectiveness of interventions and to continuously improve supports. Student Equity and Opportunity division staff also closely partnered with the *Imaginarium* team to create approaches to support whole child development, which included a grant award to a subset of schools to improve their outcomes using improvement science processes.

APPLYING IMPROVEMENT SCIENCE TO INCREASE STUDENT ENGAGEMENT

In 2008, the Board of Education for DPS revamped Board policy to address the disparities in out-of-school suspensions (OSS). Further, in 2016, DPS approved a policy to restrict the use of OSS for students in Early Childhood Education through grade 3 (ECE-3), except in instances of violence or when mandated by state statute. The district also set a priority to ensure that African American students—two to three times overrepresented in suspensions—were brought to a more proportionate level.

Denver’s team in the 21st century competencies working group, with support from the superintendent, saw this as an opportunity to use improvement science to develop practices to help schools navigate this significant mindset shift: teachers and principals needed to commit to keeping more students in class, rather than suspending them. Teachers needed new techniques and supports to address classroom disruptions and keep students engaged in learning. Community members needed opportunities to understand the advantages of shifting from punitive to proactive approaches to student discipline and engagement.

The DPS district team held conversations with more than 4,000 ECE-3 teachers, principals, instructional superintendents, and community members. Through these conversations, the DPS team uncovered a desire to better understand how the Board’s OSS policy was intended to support student learning and for more professional learning about how to address student conduct. In addition, to better understand existing practices,

DPS leaders—including the superintendent and the associate chief of student equity and opportunity—interviewed staff in schools with low suspensions and consulted with researchers at the University of Denver.

Based on this input, the district prioritized resources for elementary schools with 20 or more suspensions or serving a high percentage of African American students. The district office supported school-level planning, using improvement science principles with individual schools to develop and refine school plans and ensure that each school was on track to reduce the use of suspension. This was a shift from the top-down strategies DPS had recently used in addressing suspensions and disciplinary policy in grades 4-12. According to the associate chief of student equity and opportunity:

“[We] focused on what an individual school or teacher feels they need to accomplish this goal, instead of the central office mandating the process as well as the outcome.”

Because of GCEN, instead of what we did five years ago with a strong central focus, we've started with deeper listening of teachers, educators, and community members and a much more targeted approach. [We] focused on what an individual school or teacher feels they need to accomplish this goal, instead of the central office mandating the process as well as the outcome.

The DPS team theorized that by providing increased flexibility to schools to determine their own challenges related to ECE-3 discipline, schools would have increased buy-in to the change in district policy. The district:

- Offered professional learning focused on non-violent de-escalation
- Provided \$100,000 in grants to eight schools to implement innovative practices via an implementation science lens
- Established a district-community advisory committee
- Designed a dashboard to help schools gain awareness of available resources
- Clarified language about the Board of Education ECE-3 discipline reform policy
- Provided improvement science supports to schools with above-expected averages in the use of out-of-school suspension

Reducing OSS was a district-wide priority; the team began to engage schools across DPS in developing change efforts and utilizing improvement science. However, implementing these supports system-wide limited the ability of the DPS team to learn about which approaches were most effective in engaging educators and changing mindsets and instructional practices: there was no process in place yet for determining the success of the district supports. It was also a challenge to engage principals and teachers across the district in these new improvement science approaches, requiring a learning curve and shift in roles for both schools and district office staff.

With guidance from CGE and the 21st century competencies working group, the DPS team reflected that smaller, more intensive pilots in a small number of schools could result in evidence of concrete, classroom-tested strategies for reducing OSS. The team realized that through a pilot it needed to deepen understanding of three questions to better tailor and refine available supports:

1. What are the implicit biases and/or mindset factors that impact teachers' decisions to remove students from the classroom?

2. How can coaching, teacher training, and support be more responsive so that teachers feel it is a value-add in improving their ability to teach a wider variety of students?
3. What culturally responsive curricular materials are needed for addressing the social-emotional needs of students?

The team also theorized that if teachers in other schools knew that their peers in the pilot schools had benefited from the new improvement science strategies and seen increases in classroom engagement, they would be more willing to participate as well.

Therefore, the DPS team decided to focus on working closely with two elementary schools, and in specific grades in those schools. These schools were selected based both on need—the OSS rate for African American students was higher than that of their peers—and on readiness: school leaders indicated a willingness to buy in to the improvement science approaches.

The DPS team also refocused on user-centered design as an improvement approach, more deeply engaging teachers in identifying challenges and solutions. District staff would work with school teams to identify and unpack the issue of OSS in the school, including sharing data about how the school (or grade or classroom) was significantly different from similar schools (or grades or classrooms), and then work with teachers to identify strategies to address the challenges.

In addition, to be more reflective of the priorities of teachers and increase teacher engagement in the change effort, the team shifted its language away from the focus on reducing suspensions to a focus on increasing student engagement in classrooms. This was accompanied by a shift in thinking about the data used to determine the success of tested strategies: while the ultimate goal of DPS is to reduce OSS, tracked through objective quantitative measures, the district began to embrace qualitative reports from teachers and informal data as valuable assessments of the effectiveness of new approaches and as guidance for changes in supports or training.

ADAPTING AND INSTITUTIONALIZING CHANGE

Reform will not come immediately, district leaders know. The context of the work—including a new superintendent, community priorities, shifts in the federal landscape regarding suspensions, teacher unrest that is resulting in a strike—can all create delays in implementation and possible new policy priorities. Integrating continuous improvement work into existing processes is key for institutionalizing change. Schools and principals must also continue to learn about and embrace improvement strategies and new supports.

Engagement with CGE has shifted the way the Denver team approaches change efforts, and improvement science methods are gradually becoming institutionalized. According to the associate chief of student equity and opportunity, “Three years ago, we would have prescribed an intervention measuring OSS. There would not have been as much listening to teachers. Now we are doing pretty much the opposite ... Instead of having the district prescribe [a strategy], we sit down with a lens of cultural and social awareness and believe that the community has the germ of a solution.”

SUPPORTING STUDENT DECISION-MAKING IN HANGZHOU

The Hangzhou Institute of Educational Science, a division of the Bureau of Education for Hangzhou Municipality in the Zhejiang province of China, serves as an important learning partner to schools, providing technical support for applying research-based theories and methods to schools and teachers. Working with CGE and the 21st century competencies working group, the Hangzhou team saw the opportunity to learn and spread the improvement science process for systems change efforts. Specifically, as part of a redesign of the career counseling program, the team sought to explore innovative approaches for developing high school students' academic decision-making skills that support their college and career goals.

The Hangzhou team worked with two pilot high schools to explore practical strategies for increasing 10th grade students' competencies with making academic choices that align with their personal career goals and interests. The strategies explored by the Hangzhou team focused on helping students become more introspective and reflective when selecting courses that could have long-term outcomes, rather than following what may be perceived as the “most desirable” pathway by society, parents, or peers.

A planned reform of the college entrance examination led the Zhejiang province to, starting in 2017, provide high school students with more course selection opportunities and elevated the need to foster the competency of students to engage in a thoughtful decision-making process to yield the most appropriate choices based on student interest.⁴ The reformed college entrance examination includes three compulsory subject areas (Chinese, math, and English). At the end of 10th grade, students must choose three additional subjects from seven options (physics, chemistry, biology, geography, history, politics, and information technology). Cumulative exam scores among these six subjects will serve as the key for university entrance.

As part of the 21st century competencies working group, the Hangzhou team explored this question:

How do course selection decisions in high school open—or limit—future choices within the educational system, and how can students make the best decisions that will lead to personal fulfillment as they pursue that pathway?

The team hypothesized that developing the skill and confidence to ground decision-making in personal interests was central to future success and fulfillment. According to a team member from the Hangzhou Institute of Educational Science, “The ability to choose independently, and students' understanding of the relevance between selected courses and future work, will affect their curriculum choices.”

HANGZHOU BUREAU OF EDUCATION

Number of students: 898,262

Number of teachers: 71,002

Number of schools:

- Primary schools: 458
- Middle schools: 251
- High schools: 80

Area of focus: academic decision-making

Website: <http://edu.hangzhou.com.cn/2016rdzt/jygl/index.htm>



⁴New Gaokao Reform System to Be Built by 2020,” China Daily, October 20, 2017, http://www.chinadaily.com.cn/china/2017-10/20/content_33488526.htm.

The Hangzhou team had observed that students typically made course decisions based on their prior academic performance, focusing on expectation of achievement rather than considering personal interests. In effect, students were choosing subjects based on “What am I good at?” rather than whether the subject would lead to future university and occupation goals. According to the lead researcher, “I believe that many students may succumb to so-called ‘good jobs’ instead of putting their interests first, because their understanding of ideals and realities and the belief (the fact) that in our life many people do not do or cannot do their favorite jobs.”

The Hangzhou team developed processes grounded in improvement science methods to identify, test, and iterate on a series of ideas to support student course decision-making and related confidence levels in two high schools. The Hangzhou team identified these change ideas—summarized below—grounded in teachers’ instincts about what students needed and tested these ideas to refine and codify them.

Research partners from the Hangzhou Institute of Educational Science created a measure of *Comprehensive Considered Decision* (CCD). This measure of course decision-making, based on student survey questions, compares the extent of student consideration about performance and the level of importance attached to that consideration (e.g., “Is this my dominant subject?”/“Can this subject help me achieve a higher score?”) to the extent and importance of consideration of career interest (e.g., “Will this subject align to the major/occupation that I am interested in?”). If the score for metrics of interest is higher than the score for performance, according to this measure, the student is making a comprehensive considered decision.

In addition, over time the team increasingly saw the benefit in more immediate data collection. Teachers assessed the effectiveness of each change idea by observing the reactions, behaviors, and changes in the students and by talking with students; a sample of students were also surveyed about their experience. This feedback on each intervention was designed to inform learning and improvement.

STRATEGIES TO INCREASE CAREER AWARENESS

Consistent with the improvement science emphasis on small tests of change, the Hangzhou team—implementing ideas generated by teachers, with support from the research team—iterated on a series of strategies for increasing career awareness and alignment with course decision-making in the two pilot schools.

Early change efforts involved providing opportunities for students to shadow professionals in their workplaces and reflect on their experience; however, the team observed that this experience was not sufficient for students to truly understand the career. Therefore, professionals successful in their chosen careers were also invited to share their experiences with students through speaking engagements and posters highlighting the skills and knowledge at the foundation of their profession. However, feedback revealed that this activity did not increase student interest as expected—students were not interested in the occupations of these “career elites.”

As a result, in a next iteration, the team surveyed students about the occupations that interested them most and invited school alumni and parents from occupations with high levels of interest to present their career pathways. However, student interest still did not increase as much as desired. The team observed that the alumni and parents lacked interaction: their opinions and insights were not cohesively presented to students. In a third iteration, alumni and parents communicated in advance to identify summary points for students and to organize their presentations about their courses of study and occupational experiences accordingly. The team discovered that this approach led to greater enthusiasm and insights among students.

DEVELOPING DECISION-MAKING SKILLS THROUGH PEER LEARNING

Increasing career awareness alone was not sufficient. Hangzhou researchers also found that students struggled with making decisions about which three subjects to select, suggesting low confidence about their choices and process for making course decisions. Responding to advice from CGE and the 21st century competencies working group members, the team hypothesized that peers may be effective in helping students be more confident in decision-making: how did senior students make the important course decisions that younger students grapple with?

To test this hypothesis, in 2017, the team organized discussion rounds during which 11th grade students hosted small-group peer discussion roundtables and answered 10th grade students' questions about their course experiences and decision-making processes. Student feedback was largely positive, and the 10th grade students thought the activity was useful—although they expressed some confusion as to how the roundtables best reflected their own needs and stages in decision-making.

The early phases of the Hangzhou improvement science work had also revealed that about 10 percent of students were “mismatched”—their dominant strengths did not match their career interests. This particular group of students was an important area of interest for educators and Hangzhou researchers. The Hangzhou Institute of Educational Science's data showed that these students had lower confidence and thought more frequently about their choice-making; they struggled more than students whose skills and interests were better matched, even after implementation of the career awareness activities. For this mismatched group, the impact of the career awareness activities on the CCD rate was also lower than for students whose interests and skills were better matched.

To more explicitly address decision-making, teachers in the pilot schools also tested an innovative approach for encouraging students to more deeply explore the decision-making process. Students scripted and performed role-playing “psychodramas” that explored pathways to careers aligned with interests and the emotional struggle that occurs when interests and strengths are mismatched—or when they are not aligned to family or cultural expectations. Teachers reported a high degree of student enthusiasm for this activity, and sampled student reactions indicated an increase in self-reflection about decision-making.

SPREADING STRATEGIES FOR ENHANCED COURSE DECISION-MAKING

The combined impact of the tested strategies has been promising, based on formal analyses of CCD rates. But the Hangzhou team seeks to further strengthen the strategies based on feedback received and to reflect the emerging focus on “mismatched” students through earlier identification and targeted interventions.

Therefore, in fall 2018, the Hangzhou team planned an iteration on the peer learning strategy with a new cohort of 10th grade students. This iteration included two important changes, based on earlier feedback. First, 11th grade students provided information in advance about their course selections and interests—allowing the 10th grade students to select peer discussion tables most closely aligned to their interests. Second, the team intentionally invited more 11th grade students who had previously been identified as “mismatched” to share their experiences: 10 of the 15 peer discussion tables were led by these previously mismatched students, to be more relatable to the experience of this priority group of 10th graders.

The team also embraced the rapid cycle approach of testing and refining ideas for supporting course decision-making using more immediate measures of student engagement, with encouragement from CGE and the 21st

century competencies working group. According to a research team member, “The effectiveness of change ideas is better reflected by the rapid assessment indicators, such as increases in students’ voluntary participation” in the awareness and discussion activities. The Hangzhou team collected feedback from the 11th grade peer discussion hosts, from teachers’ observations of student engagement in the activity, and on “exit slips” designed to get immediate feedback from participating students. Initial results were positive: the majority of students were highly engaged until the end of the activity. The team has also identified additional areas for exploration and improvement, such as the role of gender in the selection of peer discussion tables.

“The effectiveness of change ideas is better reflected by the rapid assessment indicators...”

There are signs that the success teachers have observed with the career awareness and peer sharing activities will lead to institutionalization of these strategies in Hangzhou schools. The school teams in each of the pilot schools have committed to continuing implementing these new strategies, based on the successes experienced. The team also expects that teachers in other schools will be interested in receiving guidance and materials for implementing the tested strategies in their classrooms, and one strand of the team will focus on sharing this information.

SPREADING IMPROVEMENT SCIENCE STRATEGIES

In addition, the Hangzhou team is beginning to spread the use of improvement science methods, an effort led by one of the researchers from the Hangzhou Institute of Educational Science. Sub-teams were created: the *methods* team is focused on introducing and supporting the adoption of improvement science by *project teams*, which are, in turn, charged with using improvement science to address priority change efforts. To this end, this methods-focused team recruited eight additional schools and, beginning in the 2018-19 school year, is training educators in those schools in the concepts and methods of improvement science.

These schools responded to a call for interest: about 20 schools applied, and the methods team selected eight school-based project teams to support in this next phase of the work, based on existing capacity, appropriately small scope of the planned project, and geographic diversity across Hangzhou. In these eight schools, teams of teachers will use improvement science to design and implement innovative strategies on a range of topics that they identified as important in their schools, including redesigning homework and improving e-learning opportunities.

SHIFTING TO COMPETENCY-BASED EDUCATION IN HIROSHIMA

The GCEN team representing the Hiroshima Prefectural Board of Education focused on increasing student agency as part of system-wide education reforms designed to increase successful transitions from school to work in a global economy. This focus reflects a national action plan for change, as Japan moves toward a competency-based system of education following a 2014 revision to the *Courses of Study*, the national standards that are the foundation for school curricula. According to a 2015 Organisation for Economic Co-operation and Development (OECD) policy profile, “The new standards enrich the content of education and increase the number of classes, with an emphasis on the balance between acquiring basic and fundamental knowledge and skills and fostering the ability to think, make decisions, and express oneself.”⁵ The new Courses of Study were officially implemented in 2016.

This new policy represented a significant instructional shift for Japanese educators to a focus on “what students can do, not only know.” Traditional instructional approaches in Japan have been didactic: teachers provide knowledge, and students receive that knowledge. In competency-based classes, students are expected to demonstrate their learning and be more actively engaged throughout the process. Teachers must give students opportunities to produce and showcase learning in a variety of ways, across all subjects. According to a teacher leader, the “Japanese teaching style before was more content-based, not competency-based. Teachers and students focused on content. Students focused only on exams, especially university entrance exams. Our system is changing to focus on students’ competencies in the classroom.”

Driven by a goal to help students develop the social skills and agency needed to succeed as global citizens, under the new system, students will have to demonstrate their ability to apply knowledge and critical thinking. Students need to develop not just academic knowledge but also problem-solving skills. A principal reflected, “Students need opportunity to make decisions. Students don’t have any voice and choice in schools. They just follow school rules and what teachers say. We have to change the whole school culture. Students have to be involved in the process of decision-making more. We need more inquiry-based learning and experiential learning.” Japan is also cognizant of the challenge of ensuring that the quality of teaching is not weakened in this shift, according to the OECD profile, emphasizing the need to provide teachers with opportunities to improve professionally.

HIROSHIMA PREFECTURAL BOARD OF EDUCATION

Number of students: 259,722

Number of teachers: 18,936

Number of schools:

- Primary schools: 474
- Middle schools: 236
- High schools: 83
- Special schools: 17

Area of focus: effective discussion and critical thinking skills

Website: <https://www.pref.hiroshima.lg.jp/site/kyouiku/>



⁵OECD, “Education Policy Outlook: Japan,” 2015, <http://www.oecd.org/education/Japan-country-profile.pdf>.

Reflecting this significant policy shift, the Hiroshima 21st century competencies team examined:

*What skills and mindsets do students need to engage with and succeed in a competency-based education system?
What supports do teachers need to foster new instructional strategies promoting competency-based learning?*

PRIORITIZING STUDENT COMPETENCIES

In the twenty-first century, Hiroshima leaders know, students need to be able to communicate, be open-minded, and collaborate with people from different backgrounds. They must be able to argue, make decisions, and reach consensus.

In the first phase of Hiroshima's involvement in the 21st century competencies working group, the team worked with one test high school to identify change ideas to promote deeper engagement of 11th grade students in group discussions, including their capacity and willingness to express disagreement. Hiroshima educators found that students tended to avoid conflict in discussions in order to preserve personal relationships, which limited their critical thinking in discussions: "In Japan, we think of harmony as very important. But students need to learn, 'I think.'"

The team conducted a survey of students and found that three factors limited students' active commitment to discussion:

- The learning environment
- Quality of inquiry tasks
- Critical thinking competencies

Initially, the team considered testing interventions that changed the learning environment in the test school to better support inquiry and classroom discussion, including rethinking the arrangement of desks. However, this was not logistically feasible, and the team shifted to focus on instructional approaches, including how teachers plan for and assess learning.

The team worked with teachers to design inquiry tasks, including through social research project-based learning in which students explore community issues and share their ideas for solutions with peers and City Council members. The team hypothesized that by engaging more authentically in communities through project-based learning, students would be more motivated to freely express opinions. Teachers in the test classrooms observed that students became more critical and logical in their arguments when debating real social issues and found that willingness to express disagreements increased. However, the City Council considered the presentations a student learning opportunity rather than a true source of feedback on community issues. The team saw opportunities to further refine the approach with a focus on authentic learning and to develop innovative assessments and rubrics.

SUPPORTING TEACHER COMPETENCIES

Similar themes emerged as a new team was formed to plan for and design the Hiroshima Global Academy (HiGA), set to open April 2019. The goal is for HiGA to be a model school for implementing competency-based education in Hiroshima.

The HiGA design team realized that shifting to the competency-based education model also required a developmental process for educators to hone the instructional skills that support critical thinking in students. Teachers needed additional training to learn to make inquiry tasks more authentic, to facilitate deeper learning by asking good questions, and to develop new methods and rubrics for assessing learning.

The HiGA leadership team hypothesized that building buy-in was key to helping teachers implement and support the new national expectations for competency-based education. “We have to change teachers’ beliefs first. Teachers are focused on content-based learning models because we received content-based teaching as students. So, we have to change teachers’ beliefs,” reflected a teacher leader.

DEVELOPING NEW SUPPORTS

Teachers needed support to increase confidence with defining, understanding, and implementing the core components of competency-based education. To address this challenge, teachers without prior exposure to international education systems went abroad—to the United States, Australia, Canada, the Philippines, and China—to observe other systems’ instructional approaches; others observed model classrooms in Japan.

Through teacher reflections, the team found that this exposure was helpful for changing teachers’ beliefs but insufficient for supporting their ability to implement competency-based education. New approaches were needed to support teachers’ needs. While Hiroshima leaders “still believe that the first step must be observing good practice in real classroom situations,” the team also explored complementary strategies to provide more direct support for teachers in creating lesson plans that engaged students in problem-solving and critical thinking. HiGA candidate teachers created unit plans that were tested in existing schools.

Asking teachers to develop and test new curricula without sufficient firsthand experimentation with new practices, however, proved to be a challenge. As the Hiroshima team continues to plan for the opening of HiGA in April 2019, it has identified additional strategies to address gaps in the instructional capacity to implement the vision for competency-based education:

- Developing new rubrics for analyzing unit plans and student work
- Creating a learning community of school leaders and teachers to continue to refine and revise units
- Holding a weekly curriculum meeting so teachers can share and discuss their lesson planning ideas

The new HiGA principal was a member of the original Hiroshima Prefecture team for the 21st century competencies working group that received guidance on improvement science from CGE. According to the HiGA principal: “It’s very useful. We can set a target and learn about what kind of changes we need ... We usually do and do and do and don’t change anything for the next year. We have to improve for the next year and change something and try again.” Although staffing changes at the Hiroshima Prefecture interrupted the 21st century competency team and use of improvement science to test and iterate on strategies, the methods shared by CGE helped the team identify these gaps in which teachers needed additional support to deliver competency-based education.

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REFLECTIONS AND LESSONS LEARNED

Each of the education systems profiled in this report incorporated improvement science into efforts to develop innovative strategies to support system priorities. Incorporating these new approaches was not easy. Each team has experienced shifts in the work and made adaptations based on experience, changes in local context, and guidance from CGE and the 21st century competencies working group—or on a combination of those factors. These ebbs and flows in the work are part of systems change and improvement.

The lessons emerging from the teams in Denver, Hangzhou, and Hiroshima teams offer insights for other systems to anticipate and navigate the improvement process.

GROUND EFFORTS IN SYSTEM-WIDE PRIORITIES—BUT START SMALL

Innovation should be grounded in current priorities of the education system. Each of the systems profiled in this report embedded their improvement work in overarching policy directives, shifting specific interventions as needed to both maintain commitment and pursue learning goals. In Hangzhou and Hiroshima, the teams were driven by national shifts in policy related to coursework and instructional approaches. In Denver, the team was committed both to a district process goal—to shift the role of the district office to support school-based improvement efforts—and to a Board policy directive to reduce out-of-school suspensions. This alignment to local policy, and willingness to make shifts in response to new priorities, increased the buy-in and commitment to the improvement process at the system level.

Although each team addressed system-wide policy goals, starting small—by piloting new approaches in one or two schools or classrooms, and by iterating on specific and targeted ideas for change—proved effective. Improvement efforts take time as strategies are tested, refined, and tested again, and this can sometimes feel at odds with improvement goals. Leaders often feel pressure to implement reforms and changes system-wide. According to a Denver leader, “There is tremendous pressure to innovate and change and to be very outcomes focused. You don’t want to spend the time engaging in conversations or in small test cycles.” However, by design, continuous improvement is an ongoing process that may have some early successes—and some early failures—as new ideas are developed, implemented, and tested, often within a rapidly changing education context. Starting small allows practitioners and leaders to learn what works without taxing resources in order to ultimately scale promising practices reliably and effectively.

Whereas the Hiroshima and Hangzhou teams took this small-scale approach from the start, the Denver team shifted approaches when it struggled to engage principals and teachers and manage a learning process throughout the entire district. By fall 2018, with guidance from CGE, Denver had begun to refocus its efforts and resources to work more closely with just two elementary schools, and two grades, to help teachers develop new approaches for productively managing classrooms and student behaviors to increase engagement and, ultimately, reduce suspensions.

ENGAGE TEACHERS IN THE IMPROVEMENT PROCESS

In each of the three systems, change efforts had the most traction when teacher-informed and teacher-driven. System leaders from the Hiroshima Prefecture, Denver Public Schools, and the Hangzhou Institute of Educational Science initiated the work and helped to create a process for supporting innovation and learning, but the ideas for change were most effective when they originated with teachers—reflecting the improvement

science principle of user-centered design by involving teachers in identifying solutions and strategies that they would be charged with implementing.

For example, reflection journals by candidate teachers in Hiroshima helped to unpack and begin to address concerns related to competency-based instruction. In Hangzhou, ideas for new approaches to support course decision-making were generated by teachers in the pilot schools—with implementation support from the local research team—and grounded in the observations and professional experience of those teachers.

This helped to both create buy-in and sustain the improvement process across the system through a snowball effect: working with a small number of teachers, and helping them experience differences in their work, can encourage peer teachers to seek out and be motivated to engage in improvement efforts as well. A Hangzhou researcher commented that, in scaling the improvement process, it was valuable to “first influence 10 opinion leaders, and then they can influence more,” especially by allowing the teachers to pitch change ideas, which leads to “greater influence than telling them what to focus on. You can influence more teachers exponentially.”

Similarly, in Denver, the team first solicited input from teachers district-wide. But moving from buy-in to actually changing practices around the use of suspensions increased when leaders brought improvement science methods to two pilot schools. In this process, leaders acknowledged that the educators in those schools are the “experts” in understanding the specific challenges and generating ideas: “In our support, we need curiosity to listen closely to what the client is saying. Instead of believing we have the right tools, we are paying more attention to ground-level work.” District leaders also shifted language away from out-of-school suspensions to better reflect teacher priority: increasing student engagement in learning.

Engaging teachers in the improvement process also helped teachers develop the new instructional practices needed to foster the targeted student competencies. Ultimately, the goal of the 21st century competencies working group was to develop new strategies to promote competencies that would enable students to succeed in school, college, and careers—course decision-making (Hangzhou), critical thinking (Hiroshima), and interpersonal skills (Denver). The teams realized that it was also important to consider teacher mindsets before focusing on student change and to support teachers in developing the instructional capacity to foster these competencies in students. A Denver leader reflected, “All of this work helps with self-awareness ... and the self-awareness of our teachers in particular so that they can impact our students. Teachers need tools and mastery.”

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DISTINGUISH DATA FOR IMPROVEMENT FROM DATA FOR ACCOUNTABILITY

Improvement science relies on collecting and analyzing data to first understand the system and where there might be opportunities for improvement and also to determine whether an idea for improvement is effective and should be scaled and sustained or further adapted. Systems are often challenged to find appropriate measures to assess the effectiveness of change ideas in a timely manner. Systems profiled in this report were typically inclined early on to want to use formal system measures—such as suspension rates—that might highlight a system-wide challenge but are not always easily accessible or reported regularly enough to provide rapid feedback. For example, the Hangzhou team developed the Comprehensive Considered Decision scale assessed via a student survey. Leaders in Denver wanted to know whether interventions reduced out-of-school suspension rates.

CGE worked with the teams to understand that while these types of measures are helpful at a system level to understand a problem and periodically assess system-wide changes, measurement lagged too much and was too far removed to be effective in understanding whether an idea for change was effective. Over time, teams discovered that using less formal measures could provide more responsive feedback without burdening administrators, teachers, or students.

The leader of the Denver team commented, “I shifted in the belief that we need empirical [district] data to understand movement. I needed to be more comfortable with individual data, anecdotal data, qualitative data. That allowed me to be a better district leader.” For example, Denver gathered reports from teachers on the perceived effectiveness of new instructional and disciplinary approaches and used those reports as guidance for changes in support or training offered. The Hangzhou team relied on teacher observations of student engagement in peer learning sessions and on reports from participating students to determine success of the tested strategies.

ESTABLISH AN INFRASTRUCTURE FOR THE IMPROVEMENT PROCESS

Applying principles of improvement to designing and refining new strategies for supporting students takes time and effort and requires new roles and responsibilities both for system leaders and for school-based teams. Ensuring that staffing and resources for improvement efforts are grounded in system infrastructure and policy priorities is essential.

For the 21st century competencies working group, CGE facilitated a learning community and provided guidance and resources to each team, through training on improvement science at GCEN symposia, access to webinars, and quarterly technical assistance calls. However, if that knowledge is limited to a small number of leaders, changes in staffing structures can significantly affect the pace of change and innovation. For instance, changeover in staff at the Hiroshima Prefectural Board of Education, including the GCEN lead appointed to the role of principal at the new HiGA, meant that original team members who had been trained in improvement science through CGE were no longer present at the Prefecture, and it became difficult to sustain the effort.

The Hangzhou and Denver teams both worked to put into place structures for improvement efforts, identifying the following strategies to scale and sustain the work:

- **Offer training in improvement science—or the chosen continuous improvement strategies—to educators in the district.** The Hangzhou Institute of Educational Science researchers, for instance, recruited new schools and teachers to identify, design, and implement improvement projects, and leveraged the CGE resources to share knowledge about the methods of improvement science.
- **Ensure that facilitators of improvement efforts are perceived as partners.** Not every innovative idea will be effective, and learning through improvement requires transparency. School-based educators need to feel comfortable sharing both what worked and what did not. The Denver team, for instance, found that assigning a manager who had strong relationships with the focus schools could increase the buy-in to the process, and that manager could be seen as a learning partner rather than an accountability monitor.

The case studies and reflections in this report provide a snapshot of how teams of system leaders and school-based educators in Denver, Hangzhou, and Hiroshima are designing interventions and managing the learning process, with support from CGE. The work continues as teams seek to implement and refine strategies for helping students develop 21st century competencies for success and begin to use the improvement process to address additional education priorities.

