

CRD G

Year in Review 2010



Mission



The Curriculum Research & Development Group (CRDG), with its associated Laboratory School, is an organized research unit in the College of Education at the University of Hawai'i at Mānoa that contributes to the body of professional knowledge and practice in teaching and learning, curriculum development, program dissemination and implementation, evaluation and assessment, and school improvement. CRDG conducts research and creates, evaluates, disseminates, and supports educational programs that serve students, teachers, parents, and other educators in grades pre-K–20.

Vision



CRDG, a learner-centered community of educators — recognized locally, nationally, and globally for quality research, design, and curricula — that inspires dynamic teaching and learning.



Director's Message



Dr. Donald B. Young
Director, CRDG
Professor of Education

The year 2010 was a year of great change in our state, in our country, and throughout the world. Along with so many others, we spent much of the year in a process of introspection and analysis, and eventually in a reaffirmation of our guiding principles and a return to our roots. For CRDG, that meant a refocusing on systems as a guiding principle as we forge ahead with the exciting work of contributing to positive change in the field of education.

While we work in a broad range of disciplines and do a number of different kinds of work, the common thread that runs throughout all of our work is our belief in systems as an organizing structure for educational improvement. As you read about our work in this report, you will see that none of the projects deal with isolated elements of the school environment. Instead, we look at learning communities,

addressing all of the elements that make up those communities, in putting together systems of curriculum, professional development, assessment, and community involvement. CRDG concerns itself with the P-20 continuum of education, including those who receive and those who deliver educational programs and services. While CRDG faculty are concerned with and address current needs, their primary focus is on creating innovations that by their very nature are intended to go beyond current practice to investigating and creating quality programs and materials for the future.

CRDG's work is focused on five interrelated fields of educational endeavor. However, just as the elements of a learning system cannot be disconnected, these aspects of education cannot be taken in isolation. You will find stories placed into one or another of these categories in this report, but in reality, projects typically span two or more of the focus areas. You will also see descriptions of the larger system of which we are a part. Our strong collaborations with the Hawai'i Department of Education, our unique partnership with the University Laboratory School, and our many collaborations and partnerships with other institutions ground our work in the practical realities of a real school environment and allow the broader education community to reap the benefits of research in a timely and direct manner.

Our Roots

- 1895** A teacher training department is formed at Honolulu High School, located in Princess Ruth's former mansion (now Central Intermediate School).
- 1896** The teacher training department moves to Victoria and Young Streets and is renamed Honolulu Normal and Training School.
- 1905** After annexation, Hawai'i becomes a U.S. territory. Honolulu Normal and Training School is renamed Territorial Normal and Training School and is moved to Lunalilo and Quarry streets.
- 1921** The school moves to a new 15-acre site (once a pig farm) adjoining the University of Hawai'i at Mānoa. The university's Department of Secondary Education becomes the School of Education.



- 1930** Benjamin Wist (later dean of Teachers College) becomes the principal of the school.
- 1931** The legislature transfers the Territorial Normal and Training School to the School of Education. The School of Education is renamed Teachers College.
- 1939–1941** An elementary school (University Elementary School) is built on Metcalf Street as part of Teachers College. Construction begins on Castle Memorial Hall, a training center for kindergarten and nursery school teachers.
- 1941–1945** Punahou School, displaced by the military occupying its campus, moves into Castle Memorial Hall and other buildings, but Teachers College continues to operate.

- 1943** University High School Building 1 on the Metcalf Street side of Teachers College is completed as an intermediate school.
- 1948** University High School Building 2 is constructed adjacent to Building 1. The schools now offer a complete K–12 curriculum. Hubert Everly (later dean of the College of Education) becomes the principal.
- 1959** Teachers College becomes the College of Education, and Hawai'i becomes the fiftieth state.
- 1966** The schools become part of a new entity, the Hawai'i Curriculum Center. This is a joint operation of the Hawai'i Department of Education and the University of Hawai'i to develop curriculum programs and materials for schools.
- 1969** The Hawai'i Curriculum Center is phased out and the University Laboratory School (ULS) comes under a new College of Education unit known as the Curriculum Research & Development Group (CRDG).
- 1996** CRDG, along with other research units, reorganizes under the UH Office of the Senior Vice President for Research.
- 2000** CRDG merges with the College of Education. ULS applies for charter school status.
- 2001** ULS becomes a charter school. CRDG continues to operate the school as a laboratory for curriculum R & D.





CRDG

Curriculum Research & Development Group

While CRDG and the University Laboratory School's roots go back more than a hundred years, the research partnership in its current form dates to 1966 when CRDG's founding director, Arthur R. King, Jr., was given the charge of creating a center for curriculum research and development. This was the beginning of the research partnership that has allowed CRDG and ULS to influence change in curriculum, instruction, assessment, and school systems by creating programs and practices that result in improved student learning. CRDG assembles teams of academic scholars, teachers, design specialists, evaluators, and others to create instructional programs and professional development services that improve learning, teaching, and assessment. The collaborative nature of the work means that CRDG faculty are continually reaching out and forming new partnerships with researchers both in education and in the various disciplines, with individual schools as well as departments of education in Hawai'i and elsewhere, with community organizations and educational service providers, and with public and private funding agencies.

CRDG's work is focused on these five interrelated fields of educational endeavor, each of which addresses a central issue facing education in Hawai'i, on the US mainland, in American overseas schools, and in other nations.

- * Science, Technology, Engineering, and Mathematics (STEM) Education
- * Hawai'i, Asia, and the Pacific
- * Serving Diverse Learners
- * Educational Technology Development
- * Designing Educational Systems

CRDG concerns itself with the P-20 education continuum, including those who receive and those who deliver educational programs and services. While CRDG faculty are concerned with and address current needs, their primary focus is on creating innovations that by their very nature are intended to go beyond current practice to investigating and creating quality programs and materials for the future.





University Laboratory School: A Unique Partnership

The long-standing partnership between CRDG and the University Laboratory School (ULS) is unique in its ability to marry cutting edge research with a living laboratory on the same campus. In its forty-plus years as a research site, the school has served as a home for researching, designing, testing, and evaluating effective approaches to improving learning, teaching, and assessment. As many of CRDG's curricula have matured, the school has taken on the additional role of demonstration site for the various exemplary programs and for approaches to teaching and learning with heterogeneous groups of students engaged in a full liberal arts curriculum.

The ULS has always served two interlocking missions: to design and deliver the best possible education to its students, and to serve the educational research and development community through the invention and testing of high quality educational programs. The student population at ULS is randomly selected from among applicants to represent a broad cross section reflecting the state population's distribution of gender, academic achievement, family income, and ethnicity. All students take a challenging comprehensive curriculum that includes English, mathematics, science, social studies, art, music, performing arts, and foreign languages, as well as electives each year. All students take the identical core curriculum in middle and high school in non-segregated classes, and all students graduate ready for college, work, and responsible citizenship.

The school curriculum is performance-based and built on multi-year sequences of learning emphasizing creativity, inquiry, problem solving, and active learning. The broad range of activities included in the school's core curriculum allows its students to excel in state- and national-level competitions in all areas. Approximately 80 percent of ULS students participate in activities outside of school in visual and performing arts, speech, mathematics, music, writing, science, social studies, and athletics. The school is widely recognized as successful with diverse learners, as substantiated by high scores on standardized tests, graduation rates, and post-secondary enrollment. Non-academic indicators that add to this picture of success include daily attendance rates between 95 and 98 percent, and consistent college acceptance rates in the neighborhood of 98 percent.

The school's role as a research laboratory and as a research institution working to change its practices to respond to twenty-first century challenges are featured throughout this report.





FOCUS

Science, Technology, Engineering, and Mathematics (STEM)

CRDG continues to focus on P–20 learning progressions and associated curriculum development, professional development, evaluation, and implementation support in STEM. CRDG STEM programs are recognized nationally and internationally as being among the best inquiry-based programs available.



Science, Technology, Engineering, and Mathematics (STEM)

Community Partners

Maui Economic Development Board,
Women in Technology
University of Hawai'i Sea Grant College
Program
Hawai'i Department of Education

Maui

Maui Electric Company
Energy Consulting Associates
Entegry Wind Systems

O'ahu

Hawaiian Electric Company
Bonterra Solar
Hawai'i Natural Energy Institute
Center for Island Climate Adaptation and
Policy
Ocean Resources Engineering

Hawai'i Island

Hawai'i Pacific Academy Energy Lab
Class Solar
Hawai'i Electric Light Company
Digital Science Solutions

Kaua'i

Kaua'i Community College
Kaua'i Island Utility Cooperative
University of Hawai'i Sea Grant College
Program

Community Comes Together to Teach Teachers About Island Energy

CRDG's Teaching Science as Inquiry (TSI) program partnered with the Maui Economic Development Board to present their Island Energy inquiry workshop statewide this year. Piloted in 2009 on Maui, the workshops were geared toward science standards for grades 5–12 and focused on integrating science with technology and engineering. Typical of the TSI program, the workshops combined instruction in inquiry as a teaching strategy with science content. And in keeping with CRDG's collaborative approach, each workshop brought in experts from the island where it was taught. Each workshop focused on three areas: solar energy, energy efficiency, and wind. For each topic, teachers went through an inquiry lesson and then heard from a community resource. Teachers went home with everything they needed to teach the inquiry lesson in their classrooms and with new contacts in their communities. The Island Energy inquiry curriculum is freely available at www.islandenergyinquiry.com.



Science, Technology, Engineering, and Mathematics (STEM)

New Curriculum Products in Development

Curriculum developers in the STEM fields were busy this year with two new textbook projects.

Mathematics faculty are collaborating with the Center for Excellence in Science, Mathematics, and Engineering Education at Iowa State University to create a new algebra text for the community college level based on the process approach used in CRDG's popular and successful Hawai'i Algebra Learning Project.

The book, with the projected title, *Introductory Algebra: A Progressive Approach*, addresses key problems struggling students bring to the learning of algebra. These problems are often perpetuated by the lack of opportunities for students to be engaged by dynamic material that calls on their higher level thinking processes. The new program will use an approach that is responsive to the learning needs of this particular group of students.

The science faculty is engaged in a major revision of the highly successful marine science high school text *The Fluid Earth*. The text, which teaches basic concepts of physics, chemistry, and geology in a marine setting as well as their practical applications in ocean engineering, has been in use throughout the United States and internationally for many years. The new edition will update some of the earth and physical science components based on new knowledge in areas such as meteorology, plate tectonics, and the science of hurricanes and tsunamis.

Both books are expected to be published in 2011.

Focusing on "Tough to Teach" Topics in Algebra

Creating resources focused on algebra I topics that teachers or students find challenging to teach or learn is the focus of the Developing Algebra Resources for Teaching (DART) project. The degree of interest in this area was highlighted when the attendance at a conference, co-sponsored by Texas Instruments, to introduce the project and recruit teachers who may want to participate far exceeded expectations. Gail Burrill, from the National Council of Teachers of Mathematics and a consultant with Texas Instruments, spoke to seventy-six conference attendees about some of what she saw as the most difficult topics and shared some solutions using technology. Following the conference, thirty teachers were recruited to participate in the project, which will work with teachers to identify what they consider especially difficult-to-teach topics in algebra, research these topics, and develop materials to improve their teaching. Some of the areas





Science, Technology, Engineering, and Mathematics (STEM)

this group of teachers identified include proportional reasoning, linear equations, systems of equations, and functions. The project will comprise a series of professional development sessions where teachers will work in collaborative professional learning communities with each other and with CRDG curriculum developers to think about better ways to teach some of these topics and to create replacement units to use in their classrooms.

One of the Makery's most popular programs over the years has been the design and construction of Hawaiian steel guitars. As more and more students have produced guitars, and as the project has become known for the quality of their guitars, they have become a regular presence at the Maui and Waikiki Steel Guitar Festivals. The high number of inquiries at this year's festivals has resulted in plans for on-site workshops next year.



Class at the Waikiki Steel Guitar Festival

Building Twenty-first Century Manufacturing Skills

The Makery project has as its primary goal to help students understand that they can make things. The project has its roots in the Invention Factory, a previous project where students learned about the internal workings of things by modifying toys for use by people with disabilities. A central idea of both projects is that if students only ever work with pre-made products, they won't understand how to make things themselves. From the Invention Factory, where the project worked directly with students, principal investigator Neil Scott and his team developed a set of computer numerically controlled (CNC) machines to help students make their ideas a reality by designing and creating products using a set of manufacturing tools they named the Makery. With the current National Science Foundation-funded proof of concept grant, the project team provided professional development sessions for teachers from eight schools on Hawai'i and O'ahu this summer. To get the project started in their schools, teachers built their own Makery machines to take back and use.

At its core, the Makery project is about helping students express their creativity through hands-on projects, both by helping them to envision their ideas and by giving them the skills to create their inventions. The project is a boon to schools immediately in its ability to engage students in realizing their ideas and in giving them the knowledge and confidence to them carry out. But it is also thinking long-term in providing students with a set of core skills for manufacturing as it will be done in the twenty-first century.



Science, Technology, Engineering, and Mathematics (STEM)

Research on Teacher Training for Marine Science

A major grant from the US Department of Education is bringing CRDG's science, learning technology, and evaluation teams together to investigate how instruction in inquiry-based teaching enhances marine science education. Part of CRDG's Teaching Science as Inquiry (TSI) program, the project is creating a modularized aquatic science course for high school science teachers that combines instruction in inquiry teaching with marine science content, relating both to the ocean literacy principles developed by a collaborative network of scientists and educators. The modular structure of the TSI-Aquatic program allows it to enhance aquatic science teaching wherever it occurs, be it in a dedicated marine science course, or in a biology, physics, or chemistry class. The pilot group of teachers started in 2010 with the physical science and chemical aquatic science modules. In later years, the project will add modules on biological and ecological science, so that eventually teachers will attend all four modules. The structure of the project allows for teachers to attend the workshop, teach the inquiry unit in their classrooms, and then come back for a follow-up session to debrief and share their insights with other teachers. CRDG's learning technology researchers are studying how teachers use the online communities created for the extended follow-up, while evaluators are developing instruments to study the program's impact on participants' teaching.

Partners

Lawrence Hall of Science at UC
Berkeley
UH Sea Grant College Program
Center for Ocean Sciences Education
Excellence
National Oceanic and Atmospheric
Administration
Western Oregon University
University of Kentucky





FOCUS

Hawai'i, Asia, and the Pacific

CRDG programs focus on our unique place in the world. Programs in social studies, humanities, the arts, and STEM reflect the cultural and environmental influences of Hawai'i, Asia, and the Pacific. A particular emphasis is on providing access and support for Native Hawaiian learners.

Hawai'i, Asia, and the Pacific

Hawaii Nature Study Program Updated

The Hawai'i Nature Study program, originally conceived and developed by Sister Edna Demanche in the 1970s, was always popular with Hawai'i teachers because, unlike the science textbooks available to them, it provided inquiry-based activities focused on Hawai'i's local plants and animals.

CRDG's Carol Brennan, a member of the original team that worked with Sister Edna, is updating the program for a new generation of teachers and students. "While much has changed, the activities continue to be engaging for students," Brennan says. The popular environmental education program includes classroom and outdoor, hands-on, problem solving activities and investigations focused on Hawai'i's natural environment and the plants and animals students encounter on their school campuses, in their neighborhoods, or in nearby coastal areas.

The program's goal is to provide useful resources, so the new edition—online beginning in 2011—will be a book of ideas that teachers can adapt as needed to fit their grade levels and locations.



Response to Intervention Strengthens Native Hawaiian Education Programs

While the highly successful Pihana Nā Mamo projects ended last year, the team that carried out that work has received two new grants to continue some of the most critical aspects of the work. In addition to building on past successes, Heluhelu Maoli and Kāko'o Ikaika both use the Response to Intervention (RTI) framework to support students at critical points in their classroom instruction.

Heluhelu Maoli focuses on reading in grades K–6 and mathematics in Grades K–1 in ten schools with relatively high percentages of Native Hawaiian students and an overall poverty rate of 74% (the state average is 45%). The three-year Kāko'o Ikaika project is in three O'ahu middle school/high school pairs providing supports for students through the transitions from middle school to high school and from high school into higher education or the workforce. The previous Pihana Nā Mamo projects had worked with RTI expert George Sugai from the University of Connecticut on positive behavior supports. Based on the positive results from previous work, these new projects include a more structured and formalized RTI element, providing additional supports for the most at-risk students.

Results from the 2010 Hawai'i State Assessment provide exceptionally strong evidence of effectiveness of the projects' reading approach. All



Hawai'i, Asia, and the Pacific

Along with his work on the evaluation of projects involving indigenous peoples, Lai is increasingly supporting Hawaiian doctoral students as a mentor and advisor. The University of Hawai'i has as one of its long-term goals "actively preserving and perpetuating Hawaiian culture, language, and values," and the Mānoa campus has as one of its imperatives to "support advanced research and scholarship on Hawaiian language and culture." And yet, the current group of Hawaiian doctoral students are hampered in their work by a paucity of faculty who can read and advise them on their dissertations written entirely or partially in Hawaiian. While he notes that this task has become very time-consuming, Lai feels a responsibility, as someone who can make a contribution in this area, to help as many as he can.

current and all former project elementary schools met the overall Adequate Yearly Progress standard for reading. Both grants are scheduled to end in August 2012.

Exploration of Indigenous Methods Enhance Evaluations

As a member of the Evaluation Hui and the principal investigator of two federal grants funded through the Native Hawaiian Education Program, CRDG's Morris Lai is making a significant contribution to the development of indigenous methods of evaluation that honor and respect the world views of the target communities. Lai focuses on approaches to evaluation and on evaluator-program relationships that encompass respect, trust, honor, and responsibility, all essential elements when considering culturally appropriate evaluations in Native Hawaiian and other indigenous communities. Recently he has expanded his work to incorporate ideas from the United Nations Declaration on Indigenous Rights, an approach he finds useful because the declaration asserts that indigenous peoples have rights that are in conflict with the usual Western way of doing or viewing things. This leads to the idea that indigenous peoples have the right to develop their own methods of evaluation, including those not typically considered in traditional Western or academic methods. These divergent methods include the credibility of oral testimony or the testimony of elders that may not be cited in published documents or corroborated by other sources as well as the idea that spiritual or other types of behaviors may be just as valid as, or even more valid than, "hard" data in understanding the outcomes of a project. He is exploring ways to make evaluations more closely aligned both culturally and linguistically with the communities a project is meant to serve.

Working to Improve Science Education in the Pacific

The Pacific Education and Research for Leadership in Science (PEARLS) project is a five-year partnership with the John A. Burns School of Medicine (JABSOM). PEARLS seeks to help middle-school students in Hawai'i and other Pacific Islands learn more about scientific inquiry through the study of the local environment and about the kinds of careers available in science and technology. In this, its second year, the program trained some 40 teachers from Hawai'i, American Sāmoa, Saipan, Yap, and Pohnpei through institutes held in Hawai'i. Activities focused on inquiry-based teaching using CRDG's award-winning middle-school science program *Foundational Approaches in Science Teaching (FAST)*. *FAST* is an inquiry-based curriculum that teaches foundational concepts of physical, biological, and earth sciences as well as ecology and science and society.



Hawai'i, Asia, and the Pacific

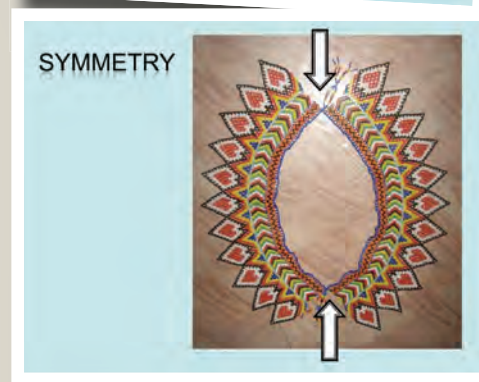
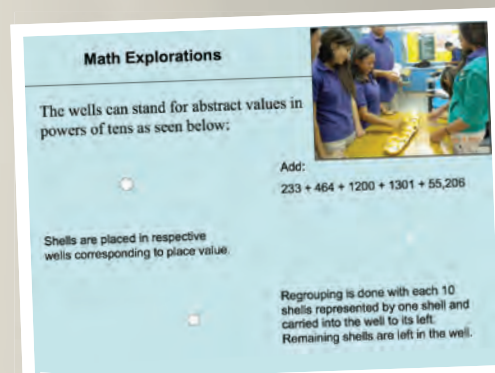
Grounded in field and laboratory work, FAST provides a strong foundation for students to succeed in high school and post-secondary science courses. Half of the teachers at this year's institutes had gone through their initial training the previous summer, and half were a part of a new cohort in their first year of training.

In addition to the summer institutes in Honolulu, follow-up support is provided to teachers throughout the year through distance technology and in-person site visits by CRDG staff.

Conceptualizing Mathematics in Island Cultures

CRDG evaluators are working with Pacific Resources for Education and Learning (PREL) on an exciting new project that studies how mathematics is conceptualized in Pacific Island indigenous cultures. In the Mathematics and Culture in Micronesia: Integrating Societal Experiences (MACIMISE) project, graduate students from American Sāmoa, Palau, Guam, the Federated States of Micronesia (Yap, Chuuk, Pohnpei, and Kosrae), the Marshall Islands, and Hawai'i are enrolled in MEd or PhD programs in the College of Education at the University of Hawai'i at Mānoa. Drawing on the field of ethnomathematics, each participant is working on their home island, thinking about their cultural heritage and what that means for teaching mathematics. The project recognizes that mathematics is a universal language, yet each culture has its own way of working with and teaching it. With an advisory board that includes both mathematicians and cultural experts, the project's ultimate goal is for each of the graduate students to produce mathematics curriculum units that incorporate cultural knowledge as well as indigenous ways of thinking about mathematics.

As evaluators for the project, CRDG faculty are engaged in monitoring the progress of the project, interviewing the principal investigators and participants, developing questionnaires and course evaluations, and reviewing project documents. The first thing that comes across in talking to the evaluators is enthusiasm, both theirs and that of the principal investigators and participants. They also talk about the challenges presented by a project like this. "Everybody is learning as they go," says evaluator Terry Higa. This includes principal investigators, professors, students, and evaluators. As they became more aware of the nuanced ways that information is conceived and transmitted in the various island cultures, they began to look for more culturally appropriate ways to do the evaluation. The project will undoubtedly continue to both excite and challenge as participants work towards exploring indigenous styles of mathematics.





FOCUS

Serving Diverse Learners

CRDG research, development, and resulting programs emphasize equal opportunity and equity of access for all students. Programs are designed to provide success for diverse student populations, including the full range of ability levels and underserved ethnic/minority groups, taught in heterogeneous classrooms. Developing strategies to include all learners is essential to a democratic society.



Serving Diverse Learners

Bringing Mathematics into the Community

The School and University Partnership for Educational Renewal in Mathematics (SUPER-M) project, a National Science Foundation Graduate STEM Fellows in K-12 Education (GK-12) funded program, partners UHM graduate mathematics fellows with K-12 teachers. The goal of GK-12 is to enhance K-12 mathematics education while improving fellows' ability to communicate and work in K-12 education. In the program, graduate students receive fellowship funding in exchange for working with a K-12 teacher-partner for approximately fifteen hours per week. CRDG's Linda Venenciano is working with the University of Hawai'i at Mānoa Department of Mathematics to help create these partnerships as well as to coordinate school and community outreach events.

In addition to their work in K-12 schools during the school year, SUPER-M fellows participated in CRDG Summer Programs, where fellows designed and taught two math courses, one for elementary students and another for middle-school students. Topics in the courses included cryptography, verification of statistical claims, robotics, digital animation programming, and game theory. In the community, SUPER-M sponsored a variety of events throughout the state including Moloka'i Math Day held in March in Kaunakakai and a community workday in Nānākuli in April. Fellows coached the Noelani Elementary School team in the Math Olympiad 2010 and joined other STEM graduate students in December at a Science Night organized by the Graduate Women in Science, Hawai'i Chapter. Farther afield, SUPER-M collaborated with la Commission Genevoise de l'Enseignement des Mathématiques in Geneva, Switzerland on the International Week of Math 2010 in October. The math lessons were translated by SUPER-M fellows for implementation in Hawai'i schools.

SUPER-M also held a series of three workshops in the fall of 2010 that focused on teachers. Each workshop incorporated a talk from a mathematics professor and a series of hands-on activities designed and delivered by the fellows. These resulted in several teachers indicating interest in becoming future SUPER-M partner teachers.

All of these activities contribute to making mathematics more accessible to both students and teachers. The graduate fellows are viewed as math heroes in the eyes of the students and teachers. They inspire students to pursue careers in STEM disciplines and teachers to build their math content.



Participating Schools

2009–2010
Kaūmana Elementary
Lokelani Intermediate
Noelani Elementary
Pauoa Elementary
Hālau Kū Māna
Hālau Lōkahi

2010–2011
Kalākaua Middle
Aka'ula School
Moanalua Middle
University Laboratory
School
August Ahrens
Elementary
Ha'aheo Elementary
Kailua High

Based on an idea that started at the American Institute of Mathematics (AIM) in 2006, SUPER-M started a Math Teachers' Circle of Hawai'i this year. Described by project manager Linda Venenciano as "like a book club for people who enjoy doing math," the Hawai'i group is part of a large and growing network of math teachers' circles. Designed to engage math teachers in mathematical problem solving and involve them in an ongoing dialogue, the groups aim first and foremost to create a culture of problem solving by fostering the enjoyment of mathematics among teachers. Anyone interested in participating can contact Linda Venenciano at lhiraishi@hawaii.edu or 956-4985.

Evaluators Expanding Our Reach into Early Childhood Education

As part of a growing focus on early childhood education, a team of CRDG evaluators collaborated with the University of Hawai'i's Center on the Family to help evaluate the quality of early language and literacy instruction in preschool classrooms. They used two major systems for evaluating early childhood school readiness and achievement. The first, the Classroom Assessment Scoring System (CLASS) looks at the classroom climate, interactions between teachers and students, and the quality of instruction. The Early Language & Literacy Classroom Observation (ELLCO) program looks at teacher-student interaction and focuses on the physical environment, especially as it relates to the promotion of early literacy. Both approaches have a strong emphasis on teacher training and feedback to create a classroom environment that leads to early learning success.

The CRDG team went through intensive training and reliability testing for CLASS and ELLCO and, as a result, has developed local capacity to collect data using these instruments. The availability of locally trained data collectors represents substantial cost savings since it eliminates the need to bring trained evaluators from outside the state. This expertise expands CRDG's ability to provide program evaluation and professional development support to the early childhood education community in Hawai'i.

A Whole-School Algebra Readiness Program at Kapālama Elementary School

Building on professional development based on the Measure Up research project, CRDG's Melfried Olson and Fay Zenigami are working with Kapālama Elementary School to provide a whole-school professional development program focused on algebra readiness for all students. The work is funded through a Hawai'i Department of Education Mathematics and Science Partnership grant. Every teacher in the school is engaged in the program, which comprises doing mathematics, researching and planning for lesson study, and teaching and observing research lessons during collaboration and articulation days. CRDG project team members work to build teachers' mathematical understanding and algebraic reasoning skills through a focus on the process standards of communication, reasoning, and problem solving. For a second year, Kapālama also hosted a summer school program for in-coming second grade students in conjunction with



Serving Diverse Learners

a five-day teacher professional development session. The student class allowed teachers to observe and interact with children learning the same mathematical concepts they were studying in their workshop experience. In addition, a separate eight-day professional development session allowed the Kapālama teachers to identify specific topics they felt were important to spend more time understanding for their grade levels, then develop educative curriculum materials to support enhanced instruction of these topics.

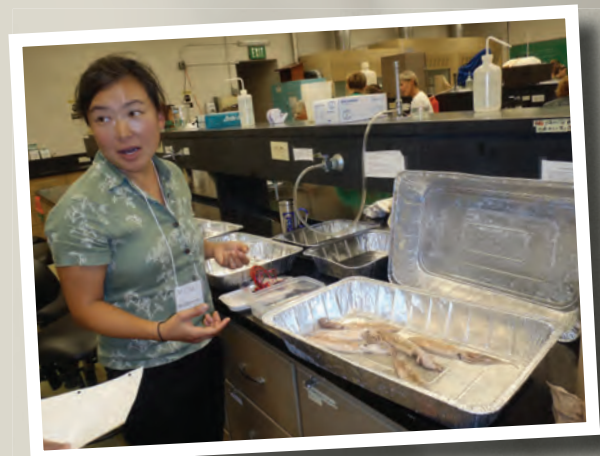
CRDG Contributes to National Study on School Readiness

In their ongoing efforts to provide effective early childhood education and supports that prepare children to succeed in school, the W.K. Kellogg Foundation funded a five-state study to find out what the legacy of their Supporting Partnerships to Assure Ready Kids (SPARK) project was. SPARK, which ended two years ago, did not provide direct educational services, but rather looked at ways to get all the major parties working in this area to collaborate and leverage resources. As a partner in the SPARK project, CRDG worked with the Kellogg Foundation, the Institute for Native Pacific Education and Culture, the Kamehameha Schools, the Good Beginnings Alliance, and the Hawai'i Department of Education to improve the transition from home to school for children aged three to seven.

As part of the current study, entitled Ready Kids Follow-up (RKF), CRDG is conducting longitudinal studies of SPARK participants to determine whether the interventions had a significant impact on children's school readiness and subsequent success. Participants (both SPARK beneficiaries and non-SPARK beneficiaries) are evaluated using the Bracken Basic Concept Scales, the Pre-kindergarten Behavior Scale, the Individual Hawai'i School Readiness Assessment, and a mock report card. Initial results in Hawai'i are showing a benefit from the children having participated in SPARK and in the sustained SPARK initiatives.

Teaching Marine Science for Informal Educators

Following last year's development of a course on communicating ocean sciences for educators and science graduate students at the University of Hawai'i, CRDG's Kanesa Duncan Seraphin collaborated again with the Centers for Ocean Sciences Education Excellence (COSEE) to teach the course for informal educators on Maui. COSEE is a National Science Foundation funded program that supports education



Serving Diverse Learners



centers, each of which is made up of a consortium of ocean science research institutions, informal science education organizations, and formal education entities. One of those centers, led by the Lawrence Hall of Science at the University of California at Berkeley, created a course on communicating ocean sciences, both as a college course for science and education students and as a community resource for informal educators. The new course, modified to incorporate local knowledge including cultural aspects and traditional knowledge specific to Hawai'i, was developed in collaboration with the COSEE-CA center, the Hawaii Institute of Marine Biology, and the University of Hawai'i's Maui College. The partners found the informal educators to have very different needs from the education students. "Participants really knew the science content," Seraphin said. "They needed more instruction in learning theory, teaching theory, and the process of teaching using inquiry methods." Topics such as critical thinking, current issues in science, and what is and is not science were also included.



FOCUS

Educational Technology Development

CRDG learning technology faculty work in teams with content experts and curriculum designers to create and evaluate more effective uses of technology in PreK-12 classrooms and in professional development and support for teachers.



Educational Technology Development

In April, Nguyen's presentation *Multimedia Juvenile Victimization: Helping Teachers Understand Youth Behavior* was awarded the Outstanding Poster Presentation at the Society for Information Technology in Teacher Education's (SITE) 2010 conference for its potential impact in teacher education. She was also recognized by Phi Delta Kappa with an Emerging Leader Award (see more details on p. 40) for her leadership, research and curriculum development work.

Digital Citizenship in a Global World

CRDG's ongoing curriculum development work in the area of computer literacy, informed by the data from the Multimedia Juvenile Victimization project, is focusing on the concept of digital citizenship as we learn how students use the Internet and how they interact with the global community they find there.

CRDG's Thanh Truc Nguyen has been working since 2004 to develop curriculum for computer literacy and Internet safety. Her research in the classroom with University Laboratory School students has focused on computer literacy and ethics, emphasizing issues of personal behavior and reflection on strategies for making wise choices online. The conceptual framework for the curriculum involves the emerging roles and responsibilities of digital citizenship, in which students consider their place in the virtual world and how they contribute positively to that world. This year the focus shifted to *global* digital citizenship, looking at how questions of culture and society come into play when students knowingly and unknowingly begin communicating with someone in another country. Nguyen is increasingly aware of how these interactions in the virtual world become teaching moments when students do not understand the culture of the person with whom they are communicating. In particular, there is an emerging need to pay more attention to the rights of freedom of speech and rights of possession enjoyed in the United States, and to helping our students understand that those freedoms and rights do not exist in all nations. Nguyen is seeing the need to encourage discussion among students about respect for different cultures online and to help them understand that things may be done very differently in different parts of the world.

Partnering with Texas Instruments to Study Assessment in a Networked Classroom

Partnering with the Hawai'i Department of Education and Texas Instruments to provide TI-Navigator networked classroom systems to fifteen middle schools in Hawai'i, the Formative Assessment in a Networked Classroom (FANC) project looked at the use of formative assessment practices in mathematics by comparing two different professional development (PD) models that were designed to provide teachers with strategies to implement formative assessment in a networked classroom.

The National Science Foundation (NSF) funded project focused on algebraic concepts, the use of formative assessment, and the use of the TI-Navigator system and TI 73 calculators in networked classrooms. The

Educational Technology Development

middle school mathematics teachers were randomly assigned into two groups: Group 1 (*FA-then-NAV* group) received professional development in formative assessment without networked technology in the first year and then added the use of networked technology to implement formative assessment in the second year. Group 2 (*FA-and-NAV* group) received professional development in using networked technology to implement formative assessment in two consecutive years. Each model included a five-day summer workshop and five follow-up sessions during Year 1 along with in-school coaching. During the second year all teachers participated in a three-day summer workshop and five follow-up sessions during the school year along with in-school coaching.

Project FANC examined the effectiveness of the two models by collecting data on student achievement and teacher's content knowledge for teaching, knowledge and self-efficacy of formative assessment, and knowledge and use of technology.

Unlike many studies of technology in the classroom, the FANC project went beyond looking at how the technology was used. Researchers looked at the formative assessment strategies the technology facilitated in the classroom and at how that impacted students learning. The data provided these significant findings.

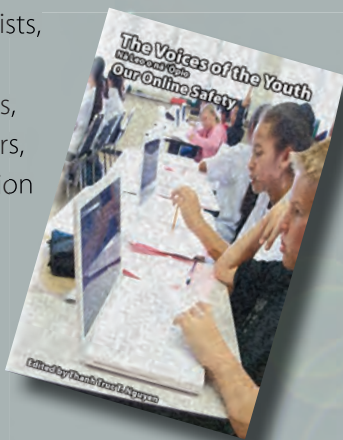
- * Results regarding student achievement showed no differences between the students in the *FA-then-NAV* and *FA-and-NAV* groups, suggesting no effect of the sequence in which teachers were trained in formative assessment and using TI-Navigator to implement formative assessment practices.
- * Students made significant gains between the pretest and posttest in year 2 indicating that teachers in each professional development model were effective in increasing student achievement in year 2.
- * Teachers' perceived efficacy in using formative assessment was a significant predictor of student achievement, with higher self-efficacy associated with higher achievement.
- * Teachers' content knowledge for teaching was a significant predictor of student achievement, with higher teacher content knowledge associated with higher achievement.
- * Teachers' content knowledge increased significantly during the year following their introduction to TI-Navigator.



As Project FANC comes to an end, the research team continues working with many of the FANC schools. Two whole-school projects are ongoing at Kalākaua Middle School in Honolulu and Chiefess Kamakahelei Middle School on Kaua'i. The FANC research team obtained external grants to continue the work at Kalākaua, while obtaining funding for the work at Chiefess was spearheaded by the Kaua'i Economic Development Board.

Educational Technology Development

In a new publication, *The Voices of the Youth, Nā Leo o nā 'Ōpio*, Hawai'i students explore the questions, "What issues do you think of when you consider internet safety?" and "Do you have any concerns for your own internet safety?" *The Voices of the Youth* is a collection of selected essays from a competition among students who wrote in response to these questions. The topics addressed include cyber bullies, sexting, online predators, cyber stalkers, hate-group recruiters, identity theft con artists, scam artists, spam, viruses, worm hackers, misinformation and bias, and violent video game influences.



Community Partners

School Districts in Hawai'i, California, Wyoming, and Virginia
Honolulu Police Department
Federal Bureau of Investigation, Honolulu Division
State of Hawai'i, Department of the Attorney General
University of Hawai'i, Information Technology Infraguard Hawai'i

- * Teachers' use of Learn Check (a TI-Navigator tool) was a significant predictor of student achievement, with more use of Learn Check associated with higher student scores.
- * While there were no differences in effectiveness found between PD models from the beginning of the study to the end of year 2, teacher growth in knowledge of formative assessment, interest in technology, and perceived value of technology had different growth trajectories in the two models.

The researchers were excited about the potential this system created for changing the classroom culture. "The system serves all students," Judy Olson said, "by creating a learning community where all students are involved in a collaborative process. The focus is on teachers and students engaging in formative assessment to impact instruction and student learning, an especially important aspect in mathematics where often a right answer is the only focus."

Grant Funds Study of Technology Facilitated Crimes Against Children

The Multimedia Juvenile Victimization (MJV): Insights into Youth Behavior to Help Law Enforcement project, funded by the US Department of Justice, brought participating school district personnel, law enforcement officers, university researchers, and other interested parties together in fall of 2010 to discuss what the research literature says about ten areas of Internet victimization: sexting; online sexual predators; scam artists; cyber bullies; misinformation and bias; identity theft; cyberstalkers; hate group recruitment; spam, virus, and worm hackers; and the influences of violent video games. Participants focused on the meaning of the data and how those data might be used.

Principal investigator of the multi-year MJV project Thanh Truc Nguyen noted that the project continues to evolve as data are collected. While the original intent was to provide data that would help officials enforce current laws designed to protect children, the focus has shifted to looking at ways to revise the laws to provide better protection based on what the data show is happening online.

Nguyen is hoping to follow up with an online forum and other ways to share the information they are collecting with a wider audience. She is intent on helping teachers create an environment where students feel comfortable discussing online behaviors and coming to a teacher or other adult with their concerns.

Educational Technology Development

Innovation in Education

In their presentation at the 2010 Hawai'i Charter School Administrators' Conference in Kona, ULS teachers Marybeth Baldwin and Brendan Brennan offered this compelling thought on technology in education: "Up to this point we have been very successful at inadequately preparing our kids for the world we used to live in."

They have been addressing this situation by focusing on technology use to develop a set of twenty-first century skills that include thinking critically, making judgments, and solving complex, multidisciplinary, open-ended problems. Brennan, in mathematics, and Baldwin, in English, have taken the lead in looking at ways that new technologies can be used to empower students to build proficiency in twenty-first century skills.

Brennan points to the FANC project as an appropriate pairing of student-centered curriculum and cutting edge technology. This format creates a classroom where the focus changes from what the teacher is doing to what the student is doing. The interactivity of the TI Navigator platform allows for quick, spontaneous discussions between students, between teacher and student, or among the class. The screen capture allows the teacher to follow each student's progress in real time and students to share their work with the class. "The technology used during the research empowered our students. We began to see additional opportunities to introduce even more technology. So did they. Pandora's Box was opened."

In English, Baldwin integrates technology into the pedagogy and processes found in the CRDG-developed Performance English program. The program focuses on sustained writing, a process she has moved to the Google Docs platform to allow review and input by both teacher and peers during the writing process. The "online classroom" format also allows for revision, book reviews, and group book discussion to happen online with work displayed on the class website. In this format, everything is available to the students and teacher to view and work on anytime and from anywhere, a better fit with the way students interact with technology in the rest of their lives than the traditional classroom and workflow model.

Not only have Brennan and Baldwin used technologies to change the way students learn in their classrooms, they are trying to incorporate them throughout the school environment to change the way students and their families interact with the school. Their goal is to reach a point where nothing is on paper anymore, bringing the technology and sustainability initiatives together to better prepare students for the world we live in now.

The collage consists of four screenshots of educational technology interfaces:

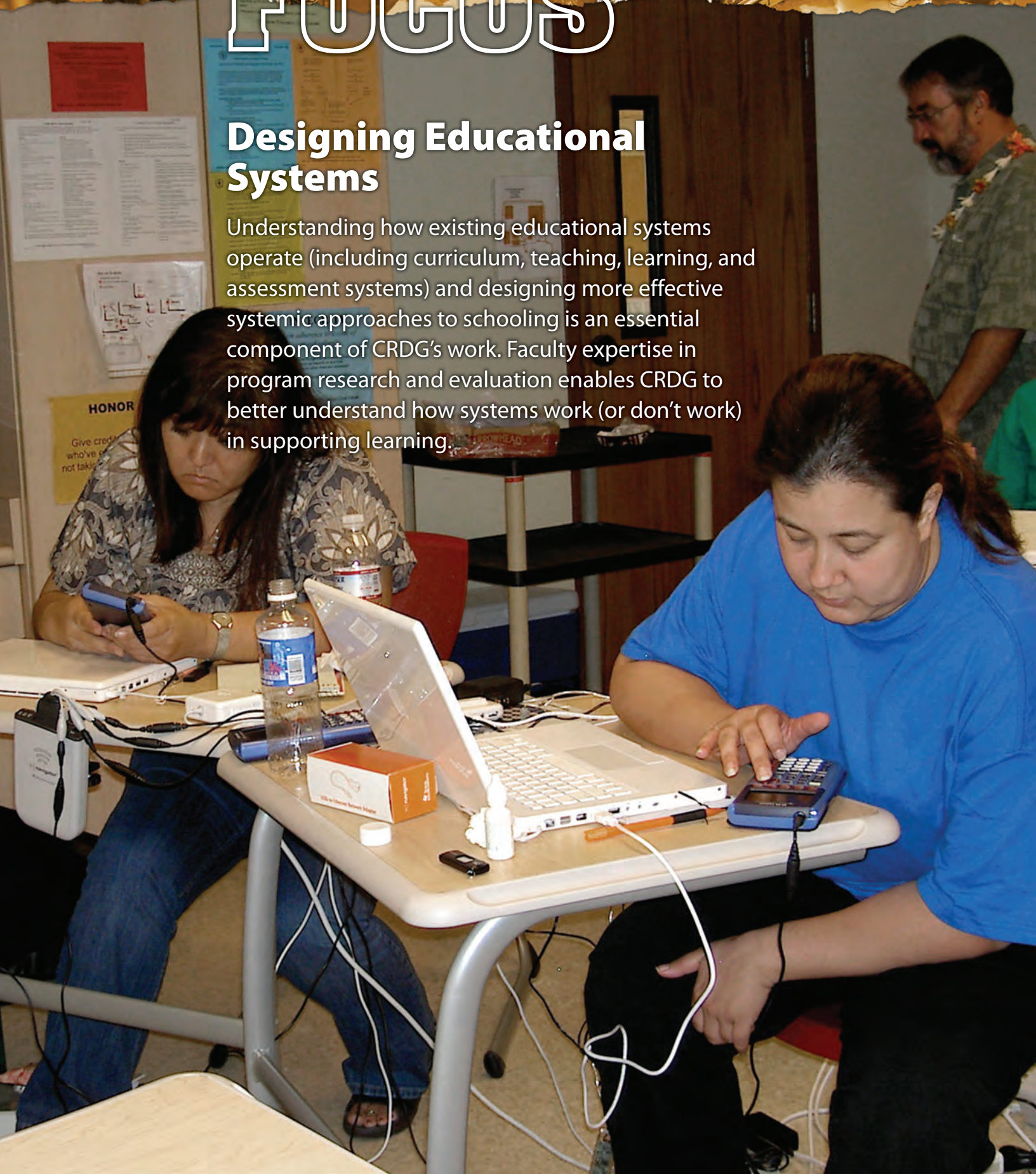
- Peer review process:** A screenshot of a Google Docs document titled "Peer review process". It shows a list of student comments and responses, with some text highlighted in yellow.
- Revision process:** A screenshot of a Google Docs document titled "Revision process". It shows a list of student comments and responses, with some text highlighted in yellow.
- Book review process:** A screenshot of a Google Docs document titled "Book review process". It shows a list of student comments and responses, with some text highlighted in yellow.
- Displaying student work:** A screenshot of a website titled "Displaying student work". It features a section titled "CHECK THESE COOL BOOKS OUT!" with a list of book covers and titles, including "The Hunger Games" and "The Fault in Our Stars".



FOCUS

Designing Educational Systems

Understanding how existing educational systems operate (including curriculum, teaching, learning, and assessment systems) and designing more effective systemic approaches to schooling is an essential component of CRDG's work. Faculty expertise in program research and evaluation enables CRDG to better understand how systems work (or don't work) in supporting learning.





Designing Educational Systems

A Systems Approach to Professional Development in Mathematics

The systems approach to teaching and learning informs all of CRDG's work, but it is perhaps best exemplified in the professional development work conducted by the mathematics faculty. Within their projects, the research and professional development are so intertwined, with one project leading into the next, it is hard to tease out beginnings and endings. Curriculum research projects conducted over the past several years have provided contexts for numerous short-term professional development sessions, which have led to requests for new extended or expanded professional development.

The long-term professional development at Stevenson Middle School is an example of this approach. The Stevenson project uses the lesson study method to get teachers thinking about how students learn and how to structure their "research lessons" in ways that allow teachers to reflect on teaching and learning and the connection between them. What began as a district-wide professional development program that the Stevenson mathematics teachers attended expanded first into a whole-school program at Stevenson, and then expanded again in 2010 to include teachers and principals at two of its feeder elementary schools. Having the whole school as well as teachers from the feeder schools involved means that teachers can support each other in their learning, and students can become familiar and comfortable with the approach from year to year. The program has allowed Stevenson Middle School to slowly reorganize their school to eliminate grouping and teach the same rich curriculum to all students.

Another long-term project the mathematics faculty has been engaged in is a whole-school professional development effort at Blanche Pope Elementary School. This year, with support from the Harold L. Castle Foundation, the school purchased classroom sets of calculators for every class in grades one through six. The latest efforts in this long-term whole-school professional development offered teachers work on both the lesson study method and on using the new TI calculators, while providing summer enrichment for students. Both non-graphing and graphing calculators were introduced during the session where CRDG staff worked with the teachers, who then taught the lessons using the calculators to students entering grade 6.

The FANC project (page 20) and the KARES project (page 16) provide further examples of this approach to systematic professional development. Kalākaua Middle School obtained the TI-Navigator equipment while

Community Partners

CRDG mathematics professional development projects worked with faculty from these schools in 2010.

Mānoa Elementary School
Noelani Elementary Schools
Kapālama Elementary School
Blanche Pope Elementary School
Stevenson Middle School
Dole Middle School
Kalākaua Middle School
Washington Middle School
Mililani Middle School
Moanalua Middle School
Wahiawā Middle School
Wai'anae Intermediate School
Nānākuli Intermediate School
Lokelani Intermediate School
Kawānanakoa Middle School
Kailua Intermediate School
Kahuku Intermediate School
Chiefess Kamakahelei Middle School
Kapolei Middle School
Waipahu Intermediate School
Moanalua High School
Mililani High School
Waipahu High School
Farrington High School
Castle High School
Pearl City High School
Roosevelt High School
Kailua High School
Leilehua High School
University Laboratory School
Connections Public Charter School
Kula Kaiāpuni'o Ānuenue
Ke Ana La'ahana Public Charter School
'Iolani School



Designing Educational Systems

An ongoing partnership with the University of Hawai'i mathematics department has all students in Math 112, a course required of all students in elementary education degree programs, observing elementary mathematics classes in the University Laboratory School. The students start by reviewing information about the research projects being conducted in the classrooms at ULS, then they come into the classroom to observe and reflect in writing on what they have seen. This year about eighty Math 122 university students visited the ULS mathematics classes.

working with CRDG on the FANC project, and the whole mathematics staff is now involved in further research and professional development on the fundamentals of formative assessment using the TI-Navigator system. Likewise, the KARES project grew out of a district-wide professional development session and is now a whole-school approach that uses research done in the Measure Up program, with the goal of preparing all students at Kapālama Elementary School to be algebra ready when they leave the elementary school.

Professional development projects in mathematics took place in approximately twenty-five schools statewide in 2010. Many projects worked with small groups of teachers. But it is the whole school approach that is emerging as the most effective and preferred model.

Partnering with HIDOE on Instructional Materials Selection Criteria and Professional Development Design

In 2010, CRDG continued its partnership with the Hawai'i Department of Education (HIDOE) in an effort to improve standards-based education in Hawai'i. Responding to teachers' and administrators' concerns about the Hawai'i Content and Performance Standards III (HCPS III) and its implementation, HIDOE entered into a multi-year partnership with CRDG in 2008 to reexamine the HCPS III standards and benchmarks and recommend changes to better focus teaching and learning, develop instructional materials selection criteria, and design more effective professional development. A complete review of HCPS III in English language arts, mathematics, science, and social studies was completed in 2009, and a systematic examination of what constitutes effective professional development was undertaken. This year faculty continued developing a professional development design guide and began research and development work on instructional materials selection criteria.

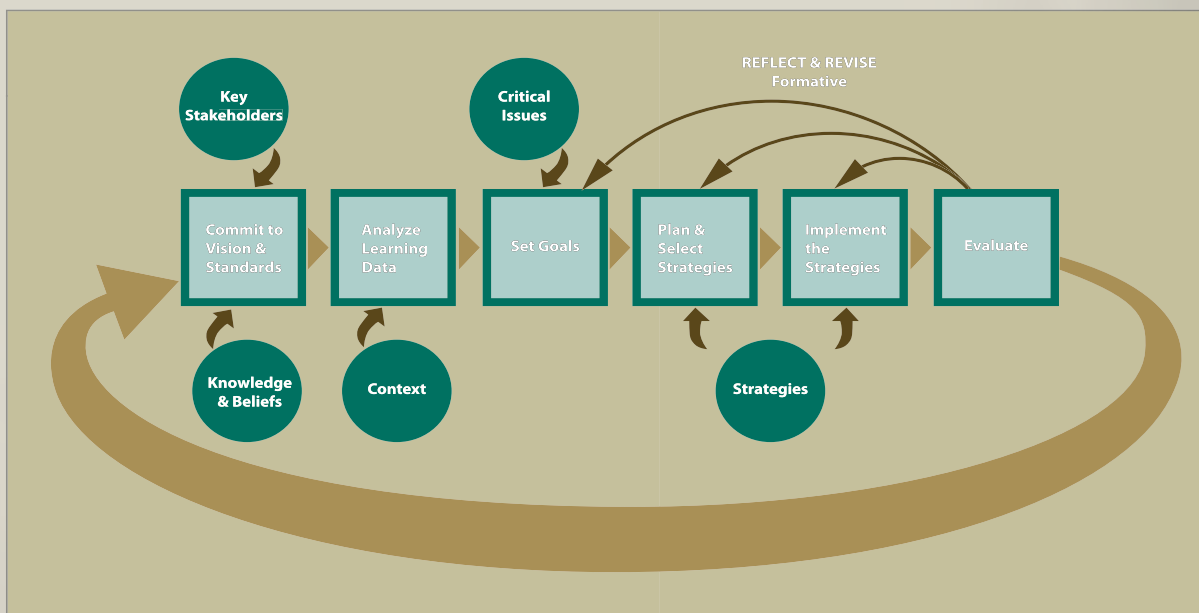
The draft guide, *Designing Professional Development for Educators*, is based on the increasingly rich research on what constitutes effective professional development. The guide is intended for everyone with a role in choosing or designing professional development for educators. Its purpose is to assist everyone in designing and implementing more effective professional development by providing tools to help planners better understand the context in which professional development takes place, set a clear vision for desired outcomes, understand student and teacher data that drive professional development, and evaluate impact.

The design framework, adapted from Loucks-Horsley et al. (2010) comprises six boxes—representing the components of the professional

Designing Educational Systems

development and implementation process—and five circles—representing important inputs into that process. Forward arrows indicating logical, sequential steps in the planning process connect the boxes. Backward arrows represent the iterative nature of the planning and doing process, including both formative and summative evaluation. The guide describes how to use this framework and provides planning and design tools to improve outcomes.

In addition to the research literature review on effective professional development, CRDG staff designed and conducted a principal survey and



teacher focus group interviews on perceptions of effective professional development to validate the essential elements included in the guide. Work will continue in 2011 with field testing and further revisions of the innovative guide.

The second major project carried out under the partnership agreement this year was the development of criteria for selecting or developing instructional materials that align with and support core subject area standards. Based on extensive research and literature reviews, the draft document, *Instructional Materials Selection Components and Criteria*, identifies the essential components and criteria recommended for use in an instructional materials review and selection process. Components are the categories or groups of criteria that are important to consider in selecting instructional materials. Criteria are features or characteristics of components



Designing Educational Systems

that should be examined to determine the merit or worth of instructional materials. The criteria are organized into seven components:

1. Content and Pedagogy (e.g., the extent to which the instructional materials address the Common Core State Standards, learning progressions, practices, structure and sequence, and pedagogy)
2. Materials (e.g., breadth of types of student and teacher materials, readability, difficulty level, differentiation, practicality, modes of delivery, cost)
3. Professional Development (e.g., duration, content focus, active learning, and coherence)
4. Assessment (e.g., variety, multi-purpose [formative and summative], validity and reliability evidence)
5. Theoretical Foundations (e.g., learning theory and underlying assumptions)
6. Evidence of Effectiveness (e.g., data on impact of professional development; evidence of effect on student learning)
7. General Learner Outcomes/College and Career Ready Standards (e.g., the extent to which instructional materials support HDOE goals for student outcomes)

For each criterion within the components in *Instructional Materials Selection Components and Criteria*, definitions or descriptors of quality, checklists, rating scales, and/or statements of adequacy are being developed.

Learning Landscapes for Teaching Science and Sustainability

Something exciting is taking place at the University Laboratory School: worms are eating garbage, fish are feeding plants, butterflies are living in luxury and kids are learning first hand that a sustainable future is possible. Projects throughout the school are helping students truly understand, appreciate, and make informed decisions regarding the natural world.

Under the broad umbrellas of the Learning Through Our Landscape program in the elementary and Project Pono in the secondary, ULS students are engaged in an exciting array of sustainability projects and activities.

Learning Landscapes

In six short months, starting at the beginning of 2010, the teachers, students, and families in the ULS elementary school transformed their environment into a learning landscape that is a showcase for environmental

Scenic Hawai'i, Inc., an organization that promotes and carries out programs that protect Hawai'i's natural beauty, sponsors the annual Betty Crocker landscape awards to honor the best of Hawai'i's garden and landscape projects and the individuals who are instrumental in their creation. The students, teachers, and families at ULS won the award in the Volunteers, Community and Non-profit Groups category this year for the Learning Through Our Landscape project. As second/third grade teacher Laurie Faure wrote in the application, "the sustainable garden project is a source of sustenance for bodies and souls." Vice Principal Peter Estomago and kindergarten/first grade teacher Terry Starko accepted the award on behalf of the school.

Designing Educational Systems

sustainability and community building. An organic garden, an aquaponics system, vermicomposting bins, a water garden, a Monarch butterfly habitat, a vertical garden, and a rainwater catchment system can all be found in the elementary school's outdoor space.

The new focus builds seamlessly on CRDG's *Developmental Approaches in Science, Health and Technology* (DASH), a hands-on, inquiry based elementary program that includes food and nutrition; conservation, recycling, and decomposition; and energy among its ten clusters. The elementary teachers—with help from the families in the form of time, expertise, and in-kind contributions from the community in the form of grants—expanded the gardening, energy, and food and nutrition aspects of the DASH program to include a focus on where our food comes from and the environmental and social implications of our food choices.

Over three hundred people—families, ULS students and teachers, CRDG faculty, and community members—attended the first annual garden celebration in May 2010 where the students acted as docents, explaining what was there and how they used the garden. Students and their families maintained the garden throughout the summer so it was ready to start the new school year.

ULS Part of a Network of Sustainability and Peace

Dame Julia Morton-Marr, part of the group PeaceWomen Across the Globe that was awarded the Nobel Peace Prize in 2005, visited the ULS on October 18, 2010 to rededicate the school's Peace Garden and help inaugurate a new Peace Path. As one of 1000 PeaceWomen, Julia Morton-Marr teaches children how to be citizens of the world through curricula based on the idea that peace, justice, and the environment cannot be taught separately. Adopted by 3,500 schools in 34 countries, the curricula include an array of topics from conflict resolution and cultural understanding, to geography and performing arts, all of which are based on a set of four pillars: human sustainability; ecological integrity; social peace; and individual rights and responsibilities. ULS is honored to be one of the schools involved in the Hawai'i School Peace Gardens community, part of Dame Morton-Marr's International School Peace Gardens.

ULS became part of the International Peace Garden Program two years ago with the dedication of its first Peace Garden. The Peace Path, which has grown out of the many stewardship and sustainability initiatives going on in the school, is designed to physically and spiritually connect the elementary school's learning landscape garden with the secondary school's courtyard garden.



Adopt-a Walkway Project

In conjunction with Dame Morton-Marr's visit and the joining of the two gardens, the second and third graders led the way in getting the whole school involved in taking care of their school. They had formed an "Earth Squad" two years ago that took on the task of keeping their campus clean as one of their first projects. This year they launched the Adopt a Walkway program for all students in grades K–12. An all-school workday in October let the school start the year with a clean campus, and each grade level K through twelve has taken responsibility for an area of the campus that they will maintain and beautify throughout the year.



Designing Educational Systems

Community Partners

Kua'ana/Kahuewai Ola Program at UH
Youth Service Hawaii
UH CTAHR
Starbucks Foundation
Waikalua Loko Fishpond Preservation Society
Kaho'olawe Island Reserve Commission
Protect Kaho'olawe 'Ohana
Give It Fresh Today
Blue Planet Foundation
Paepae O He'eia
Ahupua'a o Kahana Valley State Park
ULS Alumni Association
ULS Booster Club
Kai Makana – Mokuea Island restoration program
Department of Land & Natural Resources
State Parks Division
City & County of Honolulu Department of Parks & Recreation
State Representative Gene Ward
Matson Shipping, Ka 'Ipu 'Aina Program
Styrophobia
Down to Earth
Whole Foods
North Shore Cattle Company
Nalo Farms
Hagadone Printing
KITV4
Aloha 'Aina Earth Day Recyclers
City & County of Honolulu's Opala.org
Waikiki Worm Company
Goodwill
InTrade
Hawaii State Farm Bureau
Makiki Farmers Market
'Umeke Farmers Market
'Aina Ho'ola Food Sovereignty Conference
God's Country Waimanalo
Joyful Community Church
Phi Delta Kappa Hawaii School Peace Gardens Program

Project Pono

Project Pono is an environmental stewardship and service learning course for high school students at ULS designed to develop student leadership, networking, and organization skills and cultivate understanding of complex ideas such as environmental stewardship and food democracy. In Project Pono, students begin by identifying their own environmental and cultural interests, then create or participate in educational outreach and service events grounded in island or Hawaiian values that support environmental and cultural sustainability. Project Pono students are guided to dig deep into the nature of their projects to try to find local and global value: environmental justice, not just environmental stewardship; food sovereignty and food democracy, not just food security; or cultural preservation, restoration, and cultivation, not just “work days” or “community service.” Student organizers are tasked with identifying educational and environmental components for their projects, identifying and inviting community partners, and finding funds. Students applied for and received grants from Youth Service Hawai'i, ULS Alumni Association, and ULS Booster Club this year.

In addition to contributing to or leading projects in their communities, the Project Pono class also turned their attention to taking care of their home. Students carried out a variety of campus beautification projects and improvements centered on the cultivation of a Hawaiian garden. Several varieties of kalo, two varieties of 'uala, three varieties of sugar cane, noni, kukui, and assorted other la'au lapa'au (medicinal) or endemic Hawaiian plants were planted with the goal of teaching students to provide sustenance—food for the body and food for the mind—with plants that are meaningful to and respectful of Hawai'i's rich cultural traditions and environment.

The year ended with the donation of a new aquaponics system to the courtyard garden. The first crop produced golden tilapia, kalo, herbs, and leafy greens that were incorporated into a Food and Family Night designed to cultivate food knowledge in the home and create opportunities for families to eat healthy, locally-sourced, student-crafted food together. Project Pono students and their families harvested or purchased at farmer's markets all the food served at this free educational event, and every Project Pono student had a hand in preparing the food.

Designing Educational Systems

Formative Assessment—An Integral Part of Teaching-learning Systems

In the last dozen years, research on formative assessment has provided evidence of its promise as a strategy for teachers to know more about their students as they plan and teach lessons. However, the words *formative assessment* do not always mean the same thing to everyone. Researchers at CRDG emphasize formative assessment as what a teacher does to try to better understand what students know and to reveal what misunderstandings they may have. Formative assessment is a process that is fundamental to what teachers do and should be a natural practice in teaching and learning rather than a particular kind of measurement. The goal is that teachers learn to use information gleaned from the process of formative assessment in the classroom to plan instructional activities that further students' understanding. CRDG researchers have actively investigated formative assessment in curriculum development, professional development, and program evaluation.

In the National Science Foundation-funded Formative Assessment in a Networked Classroom (FANC) project (see page 20), teachers are taught to watch for moments that have potential for formative assessment, moments that may arise out of students' questions or ideas that come up in the discussion. "Connected classrooms, such as those that use the TI Navigator system, are where the real potential for formative assessment is realized," said Judy Olson, FANC researcher. In a classroom equipped with the TI-Navigator system, what students know and can do can be easily assessed. Students can enter and send their responses to the teacher's computer through their calculators. Similarly, teachers can easily send questions, and receive, organize, and display students' answers, so that the interaction between the teacher and students as well as among students is greatly facilitated.

The FANC project's research has shown that the TI-Navigator system enables teachers to use formative assessment results more effectively because teachers are able to assess student learning in real-time. In addition to identifying and assessing what students' know, the TI-Navigator system allows teachers to check on the level of student engagement, clarify the source of student misconceptions at an early stage, create responses to students immediately, and use a variety of feedback methods. While feedback in the regular classroom is typically very slow, classroom networked technology provides rapid feedback to improve learning in





Designing Educational Systems

real time. Teachers are able to see what students understand during the process of instruction and to give in-depth and personalized feedback while adapting their teaching. They are aware of what every student is doing, rather than only those that speak up.

In the CRDG science programs, formative assessment has been integrated in a more formal way. All of CRDG's science programs have assessments that occur both during the course of laboratory and field investigations and through content-specific assessments. The programs' instructional model is based on the practices of science. The cycle begins with an activity that presents an anomaly to engage students' curiosity and motivate inquiry. Students analyze the anomaly, develop an explanatory hypothesis, and test it. Successful hypotheses are validated in the class community, and their universality is tested. Often, this starts a new cycle of anomaly identification. Within this framework, assessment is both formal and informal, and is broader than mere measurement. The format, which includes written work, homework, quizzes, and tests, also includes teacher observations, students' actions and interactions, analysis of classroom discussion, students' self-assessment, and students' products and inventions. As program developer Frank Pottenger put it, "Formative assessment is the only way that we can truly know what the student knows—it provides richness and depth of understanding of student knowledge."

"Formative assessment has lots of definitions," said FANC researcher Judy Olson. But the key is student work. Formative assessment can be embedded into a curriculum, as in CRDG's science programs, or teachers can be taught to recognize formative assessment opportunities, as in the FANC project. Ultimately, it is about using the instructional process to respond to students' needs and provide effective and meaningful learning experiences.



Scholarship

Books/Media

Chapters in Books

Duncan Seraphin, K., & Baumgartner, E. (2010). Your students as scientists: Guidelines for teaching science as a discipline. In R. Yagar (Ed.), *NSTA exemplary science programs series #7: Science in social and societal contexts* (pp. 33–50). Arlington, VA: National Science Teacher's Association (NSTA).

Olson, M., Olson, J., Okazaki, C., & La, T. (2010). Conversations of parents and children working on mathematics. In H. J. Forgasz, J. Becker, K. Lee, & O. Steinhorsdottir (Eds.), *International perspectives on gender and mathematics education*. (pp. 33–54). Charlotte, NC: Information Age Publishing.

Peer Reviewed Publications

Brandon, P. R., Smith, N. L., Trenholm, C., & Devaney, C. (2010). Evaluation exemplar: The critical importance of stakeholder relations in a national, experimental abstinence education evaluation. *American Journal of Evaluation*, 31, 517–531.

Brandon, P. R., & Smith, N. L. (2010). Exemplars editorial statement. *American Journal of Evaluation*, 31, 252–253.

Duncan Seraphin, K. (2010). A partnership approach to improving student attitudes about sharks and scientists. *School Science and Mathematics*, 110(4), 203–219.

Olson, M., Zenigami, F., & Slovin, H. (2010). The percent predicament. *Mathematics teaching in the middle school*, 15(7), 374–376.

Smith, N. L., Brandon, P. R., Lawton, B. E., & Krohn-Ching, V. (2010). Evaluation exemplar: Exemplary aspects of a small group-randomized local educational program evaluation. *American Journal of Evaluation*, 31, 254–265.

Other Publications

Gilbert, M., Olson, M., Olson, J., & Slovin, H. (October 2010). Examining content knowledge for teaching in a formative assessment project in networked middle grades classrooms. In P. Brosnan, D. B. Erchick, & L. Flevares (Eds.), *The Proceedings of the 32nd Annual Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education VI* (pp. 986–994). Columbus, OH: The Ohio State University.

Higa, T. F., Sagaysay, L., Nakamura, A. D. H., & Oshiro, E. M. (2010). *The Campbell complex's 21st Century Community Learning Center project 2009–10*. Honolulu: Curriculum Research & Development Group.

Higa, T. F., Sagaysay, L., Nakamura, A. D. H., & Oshiro, E. M. (2010). *The Central Kauai complex's 21st Century Community Learning Center project 2009–10*. Honolulu: Curriculum Research & Development Group.

Higa, T. F., Sagaysay, L., Nakamura, A. D. H., & Oshiro, E. M. (2010). *The Kekaulike complex's 21st Century Community Learning Center project 2009–10*. Honolulu: Curriculum Research & Development Group.

Nguyen, T. T. (2010). In an Internet world: Student self-perceived success and invitational theory. Paper presented at the 2010 annual meeting of the American Educational Research Association. AERA Online Paper Repository.

Olson, M., Slovin, H., Olson, J., Brandon, P., & Yin, Y. (July 2010). The effects of two professional development models on teachers' knowledge about assessment and confidence, self-efficacy and interest toward technology. In M. M. F. Pinto & T. F. Kawasaki (Eds.), *Proceedings of the 34th Conference of the International Group for the Psychology of Mathematics Education IV* (pp. 9–16). Belo Horizonte, Brazil: PME

Olson, J., Im, S., Slovin, H., Olson, M., Gilbert, M., Brandon, P., & Yin, Y. (2010). Effects of two different models of professional development on students' understanding of algebraic concepts. In P. Brosnan, D. B. Erchick & L. Flevares (Eds.), *Proceedings of the 32nd annual Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education VI* (pp. 1478–1486). Columbus, OH: Ohio State University.

Olson, M., & Olson, J. (2010). Conversations of parents and children working on mathematics. Paper presented at the 2010 annual meeting of the American Educational Research Association. AERA Online Paper Repository

Olson, J., Olson, M., Slovin, H., Gilbert, M., & Gilbert, B. (2010). The design and delivery of a professional development program to implement formative assessment in a networked classroom. In 8th Annual Hawaii International Conference on Education Conference Proceedings (pp. 140–155). Honolulu, HI.

Olson, T., & Olson, M. (2010). An examination of the methods, models, and reasoning used by prospective secondary teachers on fraction worded problems with regard to common numerator strategies. In 8th Annual Hawaii International Conference on Education Conference Proceedings (pp. 84–101). Honolulu, HI.

Sjostrom, M. P., Olson, M., & Olson, T. (2010). An examination of the understanding of three groups of preservice teachers on fraction worded problems. In P. Brosnan, D. B. Erchick, & L. Flevares (Eds.), *The Proceedings of the 32nd Annual Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education VI* (pp. 1139–1147). Columbus, OH: Ohio State University.

Slovin, H., Olson, M., Brendan, B., Souza, C., & Olson, J. (2010). Changing the mathematics teaching and learning environment through the use of networked technology. In 8th Annual Hawaii International Conference on Education Conference Proceedings (pp. 156–170). Honolulu, HI.

Chyba, M., Marriott, J., Venenciano, L. (2011). Quelle planete choisir? *Matapli* 94, 65–72.

Young, D. B. (2010). Race to the top plan a winner for new decade. *Honolulu Advertiser*: 01-03-10, pp B1, B4

Zenigami, F., Okazaki, C., & Olson, M. (January 2010). A longitudinal study of students' understanding of equality through a measurement context. In 8th Annual Hawaii International Conference on Education Conference Proceedings (pp. 102–113). Honolulu, HI.

Grants and Contracts

Berg, K. Hawai'i Quality of Life Survey: A Study of Military Families on Tour in Hawai'i. U.S. Department of Defense (USPACOM through Johns Hopkins University). \$52,799. 2009–2012.

Berg, K. Pacific Aviation Museum (PAM) Barnstorming Tour Project. BAE Systems. \$22,740. 2009–2011.

Brandon, P. R. Evaluation of the Arts and Literacy for All Project. Hawai'i Alliance for Arts Education. \$117,500. 2009–2010.

Cooper, P., Duncan Seraphin, K. M., Sakamoto, C., & Strang, C. Pacific Ocean Literacy for Youth, Publics, Professionals and Scientists (POLYPPS). National Science Foundation Centers for Ocean Science Education Excellence (COSEE) Collaboration. \$150,000. 2008–2011.

Duncan Seraphin, K., Okimoto, D., Lerner, D. T. Exploring our Fluid Earth: NOAA Ocean Science Curriculum, Teacher Professional Development and Public Outreach. National Oceanic and Atmospheric Administration (NOAA) – Office of Education, \$1.50 M. 2010–2013.

Duncan Seraphin, K. M., Ngyuen, T., Brandon, P. R. Accessible Professional Development for Teaching Aquatic Science Inquiry. US Department of Education – Institute of Education Services. Teacher Quality – Mathematics and Science Education, Goal 2, \$1.49 M. 2010–2013.

Duncan, K. M. Island Energy Inquiry Professional Development: Content enrichment & pedagogical approaches to teaching about energy sustainability, physics and physical science through inquiry. ESEA Title IIA – No Child Left Behind Improving Teacher Quality Program. \$53,387.86. 2009–2010. \$6,032.00. 2010–2010 Supplemental Funding Award.

Gilbert, M. Designing Algebra Resources for Teaching. Hawai'i Department of Education. \$300,000. 2009–2011.

Higa, T. F. Mathematics and Culture in Micronesia: Integrating Societal Experiences. Pacific Resources for Education and Learning. \$230,000. 2009–2014.

Higa, T. F. KARES Evaluation. Hawai'i Department of Education. \$12,960. 2010–2011.

Higa, T. F. An Evaluation of the Campbell Complex's 21st Century Community Learning Centers 2008–2009. Hawai'i Department of Education. \$90,000. 2010–2011

Higa, T. F. An Evaluation of the Central Kaua'i Complex's 21st Century Community Learning Centers 2009–2010. Hawai'i Department of Education. \$60,000. 2009–2010.

Higa, T. F. An Evaluation of the Kekaulike Complex's 21st Century Community Learning Centers 2008–2009. Hawai'i Department of Education. \$67,500. 2008–2010.

Higa, T. F. Evaluation of MACIMISE. Pacific Resources for Education and Learning. \$20,000. 2010.

Higa, T. F. Evaluation of MACIMISE. Pacific Resources for Education and Learning. \$23,000. 2010–2011.

Lai, M. K. Kāko'o Ikaika: Supporting Adolescent Hawaiian Students to Achieve High Standards. United States Department of Education. \$1,651,566. 2009–2011.

Lai, M. K. Heluhelu Maoli: Building Strong Foundations in Reading and Mathematics. United States Department of Education. \$2,051,995. 2009–2011.

Lai, M. K. Ready Kids Follow-up. Institute of Native Pacific Education and Culture. \$39,900. 2009–2010.

Menton, L. Modern East Asian Curriculum Materials. United States Department of Education. \$455,589. 2004–2010.

Nguyen, T. T. Multitmedia Juvenile Victimization: Insights into Youth Behavior to Help Law Enforcement. U.S. Department of Justice. \$435,689. 2009–2011.

Olson, M., Slovin, H., & Olson, J. The Effects of Formative Assessment in a Networked Classroom on Student Learning of Algebraic Concepts. National Science Foundation. \$988,250. 2007–2011.a

Olson, M., & Slovin, H. Mathematics Professional Development. Hawai'i Department of Education. \$30,400. 2008–2011.

Olson, M., Olson, J., & Slovin, H. Math LINC: Mathematics Learning and Instruction in a Networked Classroom U.S. Department of Education. \$89,808. 2009–2010.

Olson, J. The Role of Gender in Language Used by Children and Parents Working on Mathematics Tasks. National Science Foundation. \$547,851. 2009–2010.

Olson, M., & Zenigami, F. Kapālama Algebra Readiness in the Elementary School (KARES). Hawai'i Department of Education. \$287,040. 2010–2011.

Olson, M., Olson, J., & Slovin, H. It's About Time: Technology Integrated in Mathematics Environments. U. S. Department of Education. \$40,000. 2010–2011.

Pottenger, F. M. Background Enrichment for Out-of-Field Teachers Assigned to Physics-Based Courses. U. S. Department of Education. \$37,686. 2009–2010.

Pottenger, F. M. Background Enrichment for Technical Education Teachers Assigned to Physics-Based Courses. U. S. Department of Education. \$38,264. 2009–2010.

Pottenger, F. M. Background Enrichment for ???? Assigned to Physics-Based Courses. U. S. Department of Education. \$27,248. 2010–2011.

Pottenger, F. M. Pacific Education and Research for Learning Science (PEARLS). U. S. Department of Health and Human Services-NIH. \$28,404. 2009–2010.

Pottenger, F. M. Pacific Education and Research for Learning Science (PEARLS). U. S. Department of Health and Human Services-NIH. \$44,064. 2009–2011.

Saka, S. M. Special Tabulations, 2009 Hawaii YRBS Data. Kamehameha Schools. \$9,900. 2010.



Scholarship

Saka, S. M. Hawai'i School Health Surveys, 2010. Hawai'i Department of Health. \$164,951. 2010.

Saka, S. M. Coordination & Administration of 2009 High School Hawai'i Youth Risk Behavior Survey. Hawai'i Department of Education. \$242,475. 2006–2011.

Scott, N. EAGER: Makery Cloud. National Science Foundation. \$176,352. 2009–2010.

Scott, N. Makery Professional Development Workshop for Robotics. Friends of Hawai'i Robotics. \$100,850. 2010–2011.

Slovin, H. Measure Up Project. University of Hawai'i Foundation. \$26,000. 2009–2011.

York, S. Hui A'o Mua. U. S. Department of Education. \$1,083. 2009–2010.

Young, D. B. Standards Streamlining Project. Hawai'i Department of Education. \$1,376,574. 2008–2012.

Presentations

Berg, K. F. (2010, July). *Update on the Interstate Compact on Educational Opportunity for Military Children*. Featured brief at the U. S. Army Garrison, Hawaii, TV Town Hall broadcast on July 28, 2010. Available online at <http://vimeo.com/16009266>

Brennan, C. A. (2010, March). *Concept mapping with young learners*. Workshop presented at the national conference of the National Association of Science Teachers, Philadelphia, PA.

Brennan, C. A. (2010, March). *The outdoor class study area—An integrated learning experience*. Workshop presented at the national conference of the National Association of Science Teachers, Philadelphia, PA.

Brennan, C. A. (2010, March). *Helping young children understand the concept of time*. Workshop presented at the national conference of the National Association of Science Teachers, Philadelphia, PA.

Brennan, C. A. (2010, November). *Discovering a new approach to using inquiry learning strategies in the preschool setting*. Workshop presented at the annual conference of the National Association for the Education of Young Children, Anaheim, CA.

Chyba, M., Iwaoka, C., Kamakeeaina, S., Kim, H. J., Venenciano, L., & Verrette, J. (2010, March) *School and university partnerships for educational renewal in mathematics*. Presented at the Annual National Science Foundation Graduate STEM Fellows in K–12 Education Meeting, Washington D.C.

DaSilva, M., Venenciano, L., & Slovin, H. (2010, April). *Unlocking story problems without key words!* Presented at the National Council of Teachers of Mathematics Annual Meeting, San Diego, CA.

Duncan Seraphin, K., J. Lemus, C. K. Veary, H. Putnam, D. Smith, & K. Wong. (2010, January). *Communicating ocean sciences: Linking educators and research scientists in a cultural context*. Presented at the Hawai'i Educational Research Association Conference. Honolulu, HI.

Duncan Seraphin, K., Heckman, M., & Lemus, J. (2010, February). *Beyond the hype: opportunities & guidelines for effective outreach and education*. Presented at the International White Shark Symposium, Honolulu, HI.

Duncan Seraphin, K. (2010, October). *The importance of effective marine science outreach*. Presented to the Sea Grant Advisory Board, Honolulu, HI.

Fukunaga, L. & Brandon, P. R. (2010, November). *An overview of the methods of the empirical studies of stakeholder involvement in program evaluation*. Paper presented at the meeting of the American Evaluation Association, San Antonio, TX.

Gilbert, M., Olson, M., & Olson, J. (2010, October). *Examining content knowledge for teaching in a formative assessment project in networked middle grades classrooms*. Presented at the Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education, Columbus, OH.

Harrison, G., & Brandon, P. R. (2010, September). *Statistics for planning school-randomized experiments in Hawai'i*. Poster presented at the annual meeting of the Hawai'i-Pacific Evaluation Association, Honolulu, HI

Iokepa-Guerrero, N., Lai, M. K., Noguchi, L., Gomes, K., & Sing, D. (2010, January). *Crossing the P-20 spectrum: Native Hawaiian education for success and empowerment from early childhood to post-secondary education*. Presented at the annual Hawai'i International Conference on Education, Honolulu, HI.

Lai, M. K. (2010, September). *Evaluators must be knowledgeable about the United Nations declaration on indigenous peoples' rights*. Presented at the annual meeting of the Hawai'i-Pacific Evaluation Association, Honolulu, HI.

Lai, M. K. (2010, May). *Past, current, and future effects of the United Nations declaration on the rights of indigenous peoples*. Presented at the 34th annual Pacific Circle Consortium Conference, Ashland, OR.

Lai, M. K. (2010, November). *Using indigenous lenses to evaluate "improved" research/evaluation methods*. Presented at the annual meeting of the American Evaluation Association, San Antonio, TX.

Lai, M. K., & York, S. E. (2010, January). *Indigenous-Western disagreements about the appropriateness of close relationships between evaluators and project participants*. Presented at the annual conference of the Hawai'i Educational Research Association, Honolulu, HI.

Leahy, P., Lai, M. K., York, S. E., & Curtis, P. (2010, January). *A discussion of the evaluation results of the WK Kellogg Foundation, Securing Partnerships to Assure Ready Kids (SPARK) "Ready Kids" Follow-up Study*. Presented at the annual Hawai'i International Conference on Education, Honolulu, HI.

Lemus, J., & Duncan Seraphin, K. (2010, March). *COSEE: Culturally-relevant ocean sciences education in Hawaii*. Presented at the National Science Teachers Association Conference, Philadelphia, PA.



Scholarship

Logan, L., Mann, R., Olson, M., Reck, K., & Sandgren, A. (2010, February). *NIMS: Northwest Illinois mathematics and science partnership*. Presented at the United States Department of Education MSP Regional Conference, San Diego, CA.

Mabbott, A., Olson, J., & Olson, M. (2010, March). *Using TI-Nspire learning handheld to explore the nature of the midpoint quadrilateral*. Presented at the T³—Teachers Teaching with Technology International Conference, Atlanta, GA.

Nguyen, T. T. (2010, October). *Technology and education: Research from Hawai'i Educational Research Association members*. Invited Keynote Speaker. Presented at 2010 Hawai'i Education Technology Summit & Principal Technology Conference, Honolulu, HI.

Nguyen, T. T. (2010, May). *Internet safety: An international issue?* Presented at the 34th annual Pacific Circle Consortium Conference, Ashland, OR.

Nguyen, T. T. (2010, May). *In an Internet world: Student self-perceived success and invitational theory*. Presented at 2010 American Educational Research Association Annual Meeting, Denver, CO.

Nguyen, T. T. (2010, May). *Internet slang and safety: From the mouth of babes*. Presented at Apple Summer Institute, Honolulu, HI.

Nguyen, T. T. (2010, April). *Multimedia juvenile victimization: Helping teachers understand youth behavior*. Presented at 2010 Society for Information Technology and Teacher Education Conference, San Diego, CA.

Okazaki, C., & Zenigami, Fay. (2010, April). *A different approach to teaching first grade mathematics*. Presented at the 88th Annual Meeting and Exposition of the National Council of Teachers of Mathematics, San Diego, CA.

Olson, J., Olson, M., & Gilbert, M. (2010, October). *Effects of two different models of professional development on students' understanding of algebraic concepts*. Presented at the Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education. Columbus, OH.

Olson, J., Slovin, H., & Olson, M. (2010, July). *The effects of two professional development models on teachers' knowledge about assessment and confidence, self-efficacy and interest toward technology*. Presented at the Conference of International Group for the Psychology of Mathematics Education, Belo Horizonte, Brazil.

Olson, J., & Olson, M. (2010, March). *Navigating the quest for questioning with TI-Navigator classroom learning system and TI-73 Explorer graphing calculators*. Presented at the T³ – Teachers Teaching with Technology International Conference, Atlanta, GA.

Olson, M., & Olson, J. (2010, March). *Using the TI-Navigator classroom learning system and TI-73 Explorer graphing calculator to investigate scaling and geometric relationships in the middle grades*. Presented at the T³—Teachers Teaching with Technology International Conference, Atlanta, GA.

Olson, J., Olson, M., & Slovin, H. (2010, January). *The design and delivery of a professional development program to implement formative assessment in a networked classroom*. Presented at the Hawai'i International Conference on Education, Honolulu.

Olson, J., Olson, M., & Olson, T. (2010, September). *Using the TI-Nspire to identify and explore definitional considerations among quadrilaterals through the examination of midpoint quadrilaterals*. Presented at the T³ — Teachers Teaching with Technology Regional Meeting, Bakersfield, CA.

Olson, J., Olson, M., & Olson, T. (2010, September). *Formative assessment in a networked classroom*. Presented at the T³ — Teachers Teaching with Technology Regional Meeting, Bakersfield, CA.

Olson, J., Olson, M., & Olson, T. (2010, September). *Results and discussions of a two-year research project using TI-Navigator in middle grades mathematics instruction*. Presented at the T³ — Teachers Teaching with Technology Regional Meeting, Bakersfield, CA.

Olson, J., & Olson, M. (2010, February). *Top ten reasons for using TI-Navigator*. Presented at the Hawai'i Council of Teachers of Mathematics, Honolulu, HI.

Olson, T., & Olson, M. (2010, January). *An examination of the methods, models, and reasoning used by prospective secondary teachers on fraction worded problems with regard to common numerator strategies*. Presented at the Hawai'i International Conference on Education, Honolulu, HI.

Olson, M., & Olson, J. (2010, May). *Conversations of parents and children working on mathematics. Symposium -International Perspectives on Mathematics Education: Cognition, Equity, and Society*. Presented at the American Educational Research Association Annual Meeting, Denver, CO.

Olson, M., Olson, J., & Sjostrom, M. P. (2010, April). *Fraction fundamentals emerge from models used to solve worded problems*. Presented at the National Council of Teachers of Mathematics Annual Meeting, San Diego, CA.

Olson, M., & Olson, J. (2010, April). *Professional development strategies to implement formative assessment strategies in networked classrooms*. Presented at the National Council of Supervisors of Mathematics Annual Meeting, San Diego, CA.

Olson, J., & Olson, M. (2010, March). *Formative assessment in a networked classroom on student learning of algebraic concepts*. Presented at the National Science Foundation 2010 REESE PI Meeting, Washington, D.C.

Olson, J., & Olson, M. (2010, October). *Seventh grade teachers in Hawai'i get connected: Formative Assessment in a Networked Classroom*. Administrator's Symposium sponsored by Texas Instruments, Hawai'i Council of Teachers of Mathematics, and CRDG. Moanalua Middle School.

Pottenger, F. M. (2010, January). *Studies of six models of inquiry operating in early childhood education*. Presented at the Hawai'i Educational Research Association Annual Meeting, Honolulu, HI.



Scholarship

Pottenger, F. M. (2010, May). *Prerequisites of transformative education*. Presented at the 34th annual Pacific Circle Consortium Conference, Ashland, OR.

Pottenger, F. M. (2010, January). *Special workshop session on inquiry and curriculum design at the University of Hawai'i's Curriculum Research & Development Group and University Laboratory School*. Honolulu, HI

Saka, S. (2010, November). *County-level versus state-level results: Is it worth the effort?* Presented at the American Evaluation Association conference, San Antonio, TX.

Scott, N. G., Shibata, R., Gill, K., & Nguyen, T. T. (2010, December). *The Makery Cloud*. Presented at Hawai'i Charter School Administrators' Conference, Kona, HI.

Scott, N. G., Shibata, R., Gill, K., & Nguyen, T. T. (2010, January). *Makery evolution: Hands-on curriculum development from the Invention Factory*. Presented at Hawai'i Educational Research Association Conference, Honolulu, HI.

Sjostrom, M. P., & Olson, M. (October 2010). *An examination of the understanding of three groups of preservice teachers on fraction worded problems*. Presented at the Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education. Columbus, OH.

Slovin, H., Olson, M., Brendan, B., Souza, C., & Olson, J. (2010, January). *Changing the mathematics teaching and learning environment through the use of networked technology*. Presented at the Hawai'i International Conference on Education, Honolulu, HI.

Strang, C., Duncan Seraphin, K., & Lemus, J. (2010, January). *COSEE: Communicating Ocean Sciences Symposium—Incorporating culture and traditional knowledge*. Presented at the Alaska Marine Science Symposium, Anchorage, AK.

Venenciano, L., Slovin, H., and DaSilva, M. (2010, April). *How do you know that makes sense?* Presented at the National Council of Teachers of Mathematics Annual Meeting, San Diego, CA.

Venenciano, L. (2010, December). *Thinking, wondering, and reasoning like a mathematician*. Presented at the Charter Schools Association, 2010 Annual Administrators' Conference, Kona, HI.

Venenciano, L. (2010, February). *Communicating mathematics research through activities in the K–12 world*. Presented at the Hawai'i Council of Teachers of Mathematics Annual Conference, Honolulu, HI.

Venenciano, L. (2010, January). *Examining the development of logical reasoning: Does the elementary mathematics program matter?* Presented at the Hawai'i International Conference on Education, Honolulu.

Young, D.B., Schlosser, J, Berg, K., & Nguyen, T.T. (2010, December). *How to design effective professional development*. Presented at Hawai'i Charter School Administrators' Conference, Kona, HI.

Young, D. B., Berg, K. F., Brandon, P. R., Brennan, C., Brown, B., Duncan, K., Gilbert, M., Higa, T. A., Lorenzana, R., Nakamura, A., Nguyen, T. T., Olson, M., Oshiro, E., Pottenger, F. M., Scarlett, T., Schlosser, J., Slovin, H., Venenciano, L., & Zenigami, F. (2010, May). *A model for designing and evaluating K–12 professional development at multiple organizational levels*. Presented at the 34th annual Pacific Circle Consortium Conference, Ashland, OR.

Zenigami, F., Okazaki, C., & Olson, M. (2010, January). *A longitudinal study of student's understanding of equality through a measurement context*. Presented at the 8th Annual Hawai'i International Conference on Education, Honolulu, HI.

Zenigami, F., & Okazaki, C. (2010, February). *Introducing unit and the number line to young children*. Presented at the Council of Teachers of Mathematics Annual Conference, Honolulu, HI.

Zenigami, F., & Okazaki, C. (2010, April). *A unit story: Introducing unit and the number line to young children*. Presented at the 88th Annual Meeting and Exposition of the National Council of Teachers of Mathematics, San Diego, CA.



CRDG Organization

College of Education

Christine Sorensen, *Dean*

Curriculum Research & Development Group

Donald B. Young, *Director*
Kathleen F. Berg, *Associate Director*
Helen Au, *Assistant Director,*
Marketing and Publication Services

University Laboratory School

Keoni Jeremiah, *Principal*
Peter Estomago, *Vice-Principal*
Tracy Teixeira, *Dean of Students*

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BA 1977, MPH 1981, Hawai'i

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Learning Technology (Graduate Assistant)
AA 1984, BA 1985, University of District
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BA 1965, Catholic University of America;
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Degnan, Katherine

Science (Graduate Assistant)
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DeWoody, Heather

Learning Technology (Graduate Assistant)
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Science
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PBSCE 2008, Hawai'i

Fujii, Alycia

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BA 1972, Hawai'i

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Mathematics
BA 1996, Arizona State; MEd 2002,
Washington

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BA 1991, Arizona State; MA 1999, PhD
2003, Washington

Gill, Kevin

Learning Technology

Harpstrite, James

Social Studies
BA 1963, Colorado; MA 1967, Hawai'i;
PhD 1971, Michigan State

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(Graduate Assistant)
BA 1994, University of California Santa
Cruz; MA 2002, Hawai'i

Hashimoto, Valerie

Science
BS 1993, Hawai'i Pacific; MAEd 2003,
Phoenix

Hayden, Marcus

Administration
BAS 2001, MBA 2007, Hawai'i

Higa, Terry Ann

Program Research and Evaluation
BEd 1977, MEd 1978, PD 1984, MEd 1994,
PhD 2005, Hawai'i

Inouye, Byron

Learning Technology
BFA 1993, Hawai'i

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Science (Graduate Assistant)
AS 1991, Electronics Institute; BS 2006,
Hawai'i

Kaupp, Lauren

Science
BS 2003, University of Maryland-Baltimore
County; MS 2005, Hawai'i

Kido, Lillian

Program Research and Evaluation
BA 1971, Hawai'i

Klemm, E. Barbara

Science
BA 1964, Ohio Wesleyan; M.Ed. 1972,
University of Hawai'i; Ed.D. 1982,
University of Hawai'i

Krohn-Ching, Val

Visual Arts
BS 1968, MA 1969, Eastern Michigan; MFA
1974, Hawai'i

La, Thuy

Mathematics
BA 1997, Hanoi University of Pedagogy No.
2; MA 2005, Hawai'i

Lai, Morris

Program Research and Evaluation
BS 1965, Stanford; MA 1967, Hawai'i; PhD
1972, UC Berkeley

Lawton, Brian

Program Research and Evaluation
MA 2001, Nevada; MEd 2005, Hawai'i

Lee, Aaron

Marketing and Publication Services
BFA 1999, Hawai'i

Leong, Jaret

Marketing and Publication Services

Liebengood, Fawn

Learning Technology
BA 2010, Hawai'i

Lindberg, Mark

Marketing and Publication Services
BMus 2008, Hawai'i

FRANK POTTENGER Awarded the Inaugural Arthur R. King Award

The Pacific Circle Consortium (PCC) created the Arthur R. King Award for Curriculum Innovation in 2010 and recognized Frank Pottenger as its first recipient. King was the visionary founder and long-time director of CRDG and a co-founder of the PCC, which is dedicated to international cooperation among educational research institutions in the Pacific region.

Pottenger's work in curriculum innovation has improved teaching practice in schools across the region. He has created programs and provided professional development throughout Micronesia; co-designed PCC's The Ocean Project; and engaged in science curriculum collaboration with colleagues in Japan, Korea, Australia, and New Zealand. More recently, he worked on cross-national civic education curriculum with colleagues in eastern Russia. "Given the breadth and scope of Frank's work, I can't recall a colleague, nationally or internationally in the curriculum field, who has impacted as many nations and individuals as he has," University of Minnesota Emeritus Professor John Cogan wrote in his nomination letter.



Frank Pottenger is presented the Arthur R. King Award by Donald B. Young

Liuzzo, Kristen
Mathematics
Lorenzana, Ricardo
Summer Programs
BA 2000, UC Irvine; MBA 2004, Hawai'i
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Information Technology
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Nakamura, Aric
Program Research and Evaluation
BA 2004, Hawai'i
Narimasu, Bert
Marketing and Publication Services
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Nguyen, Thanh Truc
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Okihara, Derick
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Olson, Judith
Mathematics
BS 1968, Valley City State; MST 1981, Wyoming; EdD 1985, Oklahoma State

Olson, Melfried
Mathematics
BS 1968, Valley City State; MS 1972, Arkansas; EdD 1975, Oklahoma State
Oshiro, Elliot
Evaluation
BA 1981, PD 1987, Hawai'i
Philippoff, Joanna
Teaching Aquatic Science Inquiry
BA 2002, University of Delaware
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Science
BS 1951, Otterbein; MEd 1957, Xavier; MS 1964, New Mexico Highlands; PhD 1969, Claremont Graduate School
Pottenger, Larma
Editorial
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Pottenger, Marcus
Summer Programs
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Clerical
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Redmond, James
Science
BA 1968, NY State Teacher Certificate, SUNY at Buffalo; MAEd 1979, Pepperdine; Certificate 1990, Hawai'i
Romero, Gary
Information Technology
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Sagaysay, Lolito
Program Research and Evaluation
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Saka, Susan
Program Research and Evaluation
BS 1980, BBA 1980, MEd 1994, Hawai'i
Scarlett, Thomas
Science
BED 1973, MEd 1980, MEd 1997, PhD 2008, Hawai'i
Schlosser, James
Standard Streamlining Project
BA 1970, California State; MA 1994, Hawai'i; PhD 1998, BYU Provo
Scott, Neil
Learning Technology
BE 1970, DSc 2006, Canterbury University

THANH TRUC NGUYEN is Honored as an Emerging Leader

Thanh Truc T. Nguyen was selected for her outstanding professional accomplishments as one of Phi Delta Kappa (PDK) International's 2010–11 Class of Emerging Leaders.

PDK International is one of the largest global education associations. Their Emerging Leaders program recognizes top educators under age 40 who exemplify their tenets of leadership, research, and service.

In addition to authoring and teaching science and computer literacy courses, Nguyen has developed electronic enhancements for existing curricula; overseen the development of science, economics, and computer distance-learning courses; and developed evaluation and assessment modules. She is currently the principal investigator of a major grant from the US Department of Justice to study multimedia juvenile victimization. In addition, she is a member of several professional associations, president of the Hawai'i Educational Research Association, and a member the University of Hawai'i at Mānoa faculty senate.

"As an education professional, what drives me is the desire to equip all learners with the knowledge to understand and accept their own digital citizenship," Nguyen said. "I firmly believe this is a key component of enabling our students to become global." Nguyen expressed her gratitude to PDK Hawai'i and CRDG for nurturing her intense passion for education research.



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