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Developing a Global Science and Math Education System Based on Real Astronomy Data

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Global Hands-On Universe (GHOU) is an educational system where students use real astronomy data from (largely optical) telescopes to learn fundamental physics, math, astronomy, and technology.GHOU is a good example of a collaborative global education project, where data, software, teacher training methods, curriculum, activities, telescopes, and human resources are developed by many members of GHOU and then shared internationally.Assessments show that in this program students learn more science and math than in conventional classroom teaching, and students change their attitudes towards choosing careers in science and technology.GHOU is an exemplar of appropriate use of computers in the classroom for real data analysis.The International Asteroid Search program of GHOU has helped students discover over 700 asteroids. Half a dozen high schools have named the asteroids they have found after their high school (some from here in Texas!).GHOU has found resonance with many teachers and students around the world, reaching approximately 20,000 global teachers in the International Year of Astronomy in 2009.In addition, activities from French HOU are part of the official French National Curriculum, and exit exam, teacher training syllabus and teacher exit exams. GHOU has found particular enthusiasms in nations with increasing technology basis – for example, GHOU is reaching many teachers in China, Chile, Indonesia, Kenya, Venezuela, with expansion plans for Cuba underway. Some nations, such as Portugal, have reached reasonable fractions of their teachers through GHOU. Workshops are planned in Iran, and HOU colleagues are starting to build a GHOU telescope in Israel. US HOU had trained approximately 1000 teachers in the United States, before the closing of the NSF Teacher Enhancement Section.But as many new large and smaller telescopes come on line – e.g., the Large Synoptic Survey Telescope – the need for GHOU around the world and even the United States will only increase.