Online Geoscience Offline

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As universities race ahead with digital learning resources and online courses, the majority of the focus has been on developing new and innovative digital content, without much concern for computer processing power or bandwidth requirements. Most universities have access to an abundance of both, and assume that students without reliable network connectivity or adequate computing technologies at home have access to a nearby university or library. The majority of humanity does not yet have access to the internet [1], often as a result of underdevelopment or conflict. Although "online education" has been touted as a panacea for students who don't have access to premier universities, the reality is that these students may not have the necessary equipment to access digital educational content reliably, nor be able to access services to help them locate, understand, and use the content.

Until internet connectivity, services, and devices to access both are ubiquitous, innovative local solutions may be more appropriate. Co-author Laura Hosman has developed the Solar Powered Educational Learning Library (SPELL), a small solar-powered box that casts a wireless local area network to which nearby devices can connect to access digital content on an SD card within the device. Currently deployed across multiple Pacific Islands, these devices give access to digital educational resources in parts of the world without internet access, university campuses, or nearby libraries, with content tailored for that location. Recently, we have adapted pre-existing immersive virtual geology field trip technology, paired with Google Cardboard, to be served entirely out of a SPELL, which we will demonstrate. These technologies enable educators to think beyond the cutting-edge classroom and to consider the opportunities available for developing novel and innovative geoscience content for low-tech, low-bandwidth environments.

[1] Broadband Commission for Sustainable Development (September 2016). *The State of Broadband: Broadband catalyzing sustainable development, September 2016*.