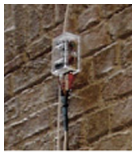
CAROL STROHECKER
cs@carolstrohecker.info

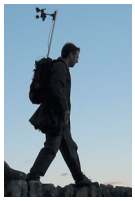
For further information see:
www.carolstrohecker.info/EnvironPages/el.html

Everyday Learning projects enable people to learn through creative processes with digital media. Many of the projects involve sensors, so the thinking focuses on dynamics of natural and cultural environments.

- By putting together computer-screen images of dinosaur bones, you can form cartoon creatures that walk and run. The animations use gait patterns appropriate to the number of legs and the speed of movement. I worked with a medical illustrator to develop the images, and key references for the animations came from James Gray, R. MacNeil Alexander, and contemporary roboticists. Aspects of this project fueled contributions to a proposal for BBC's Digital Curriculum.



- We rigged a staircase with microphones, movement sensors, and speakers that play bird sounds to emulate the aural experience of a coastal walk. We worked with a British Library ornithologist to select the recordings, and BBC Radio featured the installation in their Soundings from the Future series.



- A sensor-equipped backpack detects weather conditions around an outdoor trail, while a handheld device detects changing locations for playing little movies as you hike. Members of Scotland's tourism industry are adapting this project to assist visitors' learning about history, culture and ecology of the northern parklands.

- Miniature sensors in Ireland's National Botanic Gardens monitor the plants' environmental conditions. School children will be able to manipulate visualizations of the changes in humidity, temperature, and light to aid learning about ecosystems.

- We worked with The Ark cultural center to support children and a parent or grandparent as they made electronic jewelry. They combined familiar materials such as fabric, leather, metal and feathers with sensors, computer chips and light-emitting diodes. Together they created hats, necklaces, belts and bracelets that lit up or made sounds when near partnering pieces. They wrote computer programs to detect environmental triggers and effect responses. Their colorful invented systems have much in common with systems of the natural world.

- The Ark, Computer Clubhouses, and teenagers and adults in various communities worked with us in using the readily available technologies of cameras and mobile telephones to debate social issues. Participants took photographs addressing housing inequities, anti-smoking legislation, and political influences on daily life in Northern Ireland. We selected salient images and projected them large-scale in public arenas. Passersby augmented the images by sending SMS text messages that appeared as captions and sparked discussions.

- We supported a researcher at Ireland's premier college of education as she studied teachers' learning with and about computational media. Teachers worked with their students to create computer programs that controlled robotic toys. They made digital movies and wrote about the experiences to document their projects and consider their learning. The teachers became "reflective practitioners" who learned through constructive activity in a social context that was supportive both psychologically and technologically. The project has become internationally recognized as a model of teachers' professional development and of integrated, sustainable uses of technology in schools. Now the project is growing in community centers as well. *See <http://empoweringminds.spd.dcu.ie/> and <http://www.cs.uml.edu/~fredm/>.*

Everyday Learning researchers worked with people in various European communities. We took a community-centered approach partly because the lab was the flagship project in an urban renewal plan to develop a "digital district." We took this approach also because we believe that interactive media are best when the people who use them are involved in designing them. Ideally these people get involved from early idea phases through iterative prototype development.

This approach is widely accepted among producers of interactive media. It is compatible with recommendations from the recent RAND / Wallace Fund study for involving audiences in cultural offerings. The approach, and our overall philosophy, resonate with leading educational movements such as Constructionism, Reggio Emilia, LEGO's Next Generation Foundation, the Boston Museum of Science's National Center for Technological Literacy, and Harvard / Project Zero's Making Learning Visible and Museum of Learning initiatives. We also share principles with the National Science Foundation's new educational research agenda to seed Creativity Support Tools.

The idea that creativity promotes learning is well established in the realms of education and human development. Now it is catching on among people concerned with development at larger scales. Peter Senge characterizes the "learning organization" as a group of people who are continually enhancing their capabilities to create what they want to create. This idea has proved useful in businesses and schools, and now has become the basis for re-invigorating entire cities.

As we continue to grow from the industrial era through the information age toward a "knowledge society," we need fewer people to fit existing roles and perform pre-established tasks. We need more people who can think innovatively, solving problems and inventing new processes in a rapidly changing world. Writers such as Daniel Pink and Richard Florida, and analysts such as AEA Consulting and Angelou Economics, concur: as the "conceptual age" progresses, the thinking and work styles of those skilled in the creative arts are becoming increasingly valuable.

This view is influencing urban and regional development plans. Cities used to try to attract big companies as a strategy for growth. Now, say these advisors, they need to attract creative people. Cities are transforming themselves by supporting the arts, encouraging technology research, and welcoming diversity. Members of the "creative class" are driving the growth of their communities.

To maximize potentials of digital media in development, we need to go beyond skills with existing tools. Increasing the number of people who can use spreadsheets, search engines, word processors, content and inventory management systems, and other "information and communication technologies" can bolster the labor force and spawn digital media industries. But these are short-term measures.

In order to generate a sustainable knowledge base, people need to do more than using digital tools for creating budgets, project plans, movies, essays, and websites. People need to know how to make their own computer programs. Through programming they can develop fluencies with words, numbers, sounds, and images. They can also develop ways of thinking that are useful much more broadly.

In creating computer programs people think about more than an immediate goal: they learn principles that characterize many aspects of our physical and social experiences. The principles of variability and feedback are fundamental properties of computer programs and of dynamic systems everywhere. Many everyday phenomena – such as traffic, weather, economies, families and organizations – operate according to these principles.

By becoming fluent with principles of computation, more people could address pressing challenges in our changing world. They could model water scarcity, food resources, energy beyond fossil fuels, climate change, biodiversity, pollution, and human population growth. Such models – with the thinking that both leads to them and results from them – could help to promote understandings and sustainable ecologies of our natural, economic, and cultural environments.