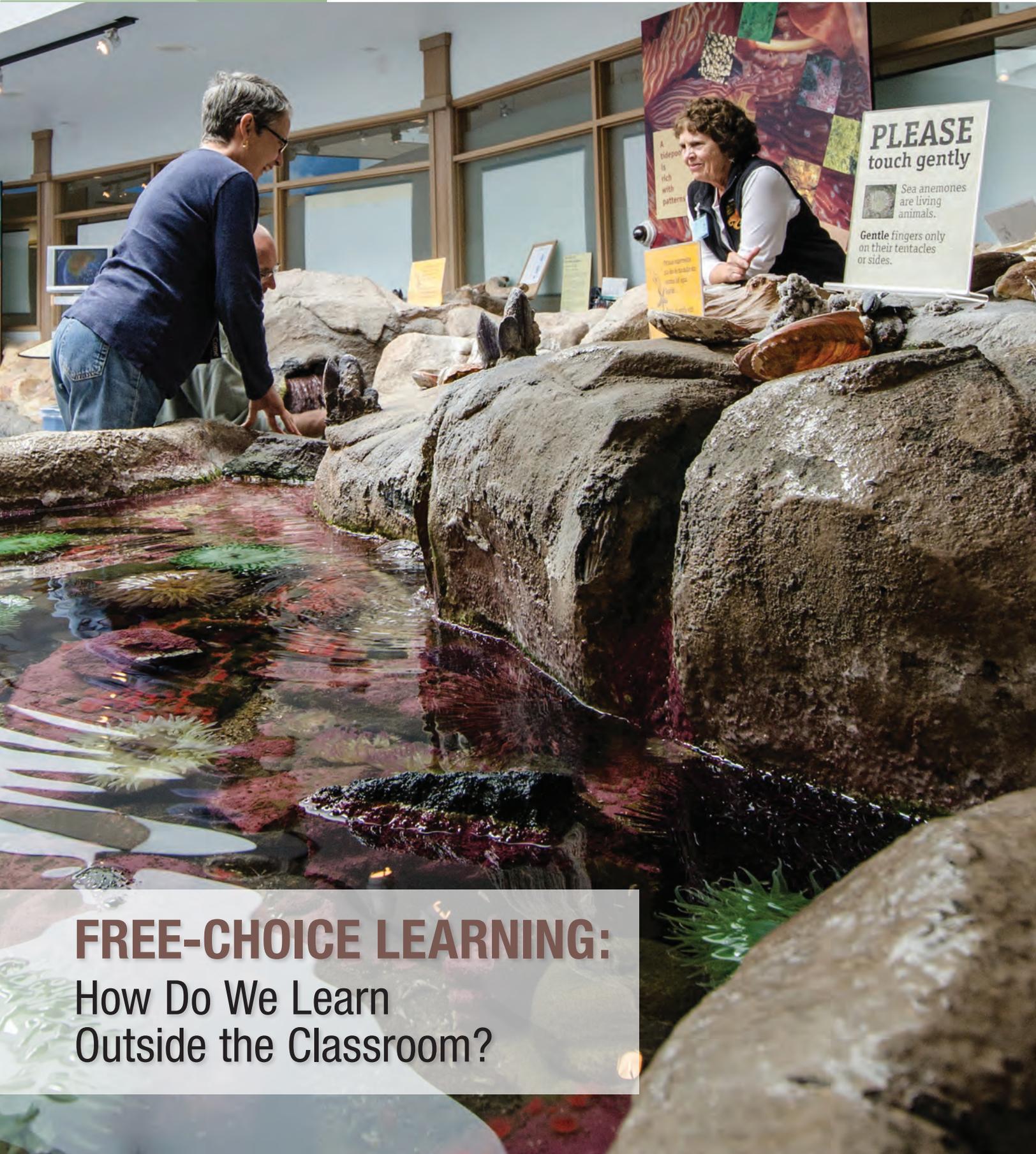


confluence

OREGON SEA GRANT

AUTUMN 2012 | VOLUME 1 NUMBER 3



FREE-CHOICE LEARNING:

How Do We Learn
Outside the Classroom?

FROM THE DIRECTOR

In our first issue of *Confluence* last winter, we told you about a \$2.6 million, five-year grant Oregon Sea Grant had received from the National Science Foundation to study free-choice learning—how people learn throughout their lives, beyond the classroom. Thanks to that generous grant (the largest in our 40-year history), our free-choice learning lab is up and running at Oregon State University's Hatfield Marine Science Center in Newport, and the lab is already delivering some fascinating research results. You'll read about some of those results—and get a behind-the-scenes peek at how the lab operates—in our main story, "What Makes People Want to Learn? Free-choice learning research comes of age."

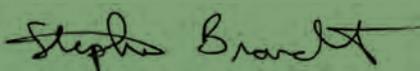
Our second story in this issue, "Questing for Fun and Knowledge," takes you on an actual Quest with Cait Goodwin, director of Oregon Sea Grant's popular Quests program. What's a Quest? According to Goodwin, it's a kind of self-directed educational treasure hunt. If Questing sound a bit like free-choice learning, that's because it is; kids and adults alike enjoy learning about the environment while solving the puzzle and finding the "treasure." After reading Nate Gilles' entertaining account of his Quest with Goodwin, you'll want to experience one too.

You may have heard about the massive concrete and steel dock that washed ashore on Oregon's Agate Beach last June, but did you hear about Oregon Sea Grant's role in dealing with it and other Japanese tsunami debris? It's all here, in a piece titled "Oregon Sea Grant works with others to coordinate tsunami debris response."

Speaking of large objects floating in the ocean, OSU's Northwest National Marine Renewable Energy Center recently deployed a wave energy test platform off Yaquina Head, and Oregon Sea Grant's Pat Kight was there to capture the event in words and pictures. Read about this latest development in wave energy—and Oregon Sea Grant's historical and ongoing connection with it—in the "Confluence Connections" section.

Finally, we have a story about the ocean literacy symposium we sponsored in Newport recently, "Understanding the Ocean's Influence on You and Your Influence On the Ocean." More than 350 school teachers, administrators, scientists, and guests attended the symposium, which was supported by a Math-Science Partnership grant from the U.S. Department of Education.

And, as always, you can learn more about these topics and others by visiting *Confluence* online: seagrants.oregonstate.edu/confluence



Stephen B. Brandt
Director, Oregon Sea Grant



IN THIS ISSUE:

What Makes People Want to Learn? 3

Free-choice learning research comes of age

Oregon Sea Grant reshapes education and ocean literacy effort to focus on free-choice learning ...6

Animal encounters..... 7

Questing for Fun and Knowledge 8

An educational treasure hunt with Oregon Sea Grant's Cait Goodwin

Confluence Connections..... 10

Wave energy test platform deployed off Oregon coast

Symposium helps teachers understand the ocean

Oregon Sea Grant works with others to coordinate tsunami debris response

Learn More! 12

On the cover: At OSU's Hatfield Marine Science Center visitors talk to volunteer Kath Malarkey about the tidepool touch tank. A camera (left of Malarkey) lets researchers observe the interaction to study how people learn in free-choice settings.

CONFLUENCE: *The junction of two or more rivers; an act or process of merging; from the Latin word "confluere," meaning "flow together."* We chose the name *Confluence* to reflect the merging, or flowing together, of Oregon Sea Grant's three "rivers": research, education, and engagement. Integrating the three supports our mission of helping people understand, rationally use, and conserve marine and coastal resources.

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Sea Grant is a unique partnership with public and private sectors, combining research, education, and technology transfer for public service. This national network of universities meets the changing environmental and economic needs of people in our coastal, ocean, and Great Lakes regions.

Mark Farley (left) and Shawn Rowe in the Free-Choice Learning Lab



What Makes People Want to Learn?

Free-choice learning research comes of age

BY NATHAN GILLES

The long, rectangular office packed with computer monitors and servers looks more like a storage closet than a control room. But this cramped space is where the magic happens.

On a large screen in front of them, Dr. Shawn Rowe and Mark Farley watch a collage of moving images: a family of four enters the building; a man places \$5 in the donation box; a young girl reaches into a tank filled with tide pool creatures, and her face lights up as she touches one.

In total, video feeds from 37 cameras at the Hatfield Marine Science Center (HMSC) Visitor Center whirl on the screen in the de facto control room. Is this some kind of surveillance system? Nope. It's a National Science Foundation-funded effort to study how people learn in their free time when they have choice and control. Called the Free-Choice Learning

Lab, this ambitious project is just the latest development in a decade-long effort by Oregon Sea Grant to encourage the study and application of free-choice learning, an innovative new approach to understanding why people choose to learn.

"Free-choice learning is about the 80 to 90 percent of our lives that's not spent in formal learning environments," says Rowe. Comprising anything from an educational hobby such as astronomy to what's called "value-added" entertainment (think: reading a science-based magazine, watching a documentary, or going to a museum), free-choice learning is all the learning we do outside the classroom, which is most of

our lives. It's a new spin on an old concept, and one that's only recently being studied again.

At the turn of the 20th century, educational psychology was coming into its own. Thinkers like Jean Piaget and John Dewey were studying how people learn, and what motivates them to learn. And, as they observed, learning can happen anywhere, at any time, for anyone. To these thinkers, learning wasn't just about school learning, it was everything else as well. After World War II, all that changed.

"Because of the Cold War, Sputnik, the space race, and the need to train scientists and engineers, learning research shifted to the classroom," says Rowe. And with the shift, learning research changed. "Adult learners fell off the radar; learning that happens in the family context fell off the radar; and learning that's self-motivated fell off the radar."



Visitors at OSU's Hatfield Marine Science Visitor Center in Newport, Oregon, try out the new wave tank.

Today, Rowe says, only a fraction of educational research focuses on non-classroom learning, which is now lumped together in the term “informal learning.” But since 2003, Oregon Sea Grant (OSG) has been teasing apart the diversity of learning and learners from the “informal” lump.

To do this, the OSG is encouraging the study and development of free-choice learning. OSG helped create a graduate program in the subject. And it's transforming the HMSC Visitor Center into a free-choice learning research laboratory. The center, with its numerous interactive exhibits from a touch tank to hand-cranked tsunami wave tanks, has proven to be the perfect spot to set up the lab. Although research into free-choice learning has been happening at the center for a decade—using the tried-and-true method of taking notes while following visitors around—the new effort is far more high-tech.

Funded with a National Science Foundation (NSF) grant, Rowe and Farley's Free-Choice Learning (FCL) Lab uses an integrated audio-visual monitoring and recording system that employs advanced facial recognition software to study visitors' responses to HMSC's exhibits. According to Farley, the facial recognition software and its algorithms will soon be able to track individual visitors as they move from exhibit to exhibit. This, along with timing

how long a visitor stays at each spot, will help researchers gauge whether or not the visitor is learning, and what he or she likes learning about. And that's just the beginning. In the future, Farley sees the system becoming much more sophisticated.

According to Farley, the FCL Lab could one day be so sophisticated its computers could read people's facial expressions, again in an effort to measure learning. This will lead to a better understanding of how people learn, and the added input could also mean better exhibit designs, as well as a very personalized Visitor Center experience. The day will come, he says, when the FCL Lab's computers and algorithms will be smart enough to adjust material on digital displays for the individual users. “So when an eight-year-old interested in tide pools reads something [on a digital kiosk], it [content] will automatically be made for an eight-year-old interested in tide pools.” However, even before this happens, Rowe suspects scientists and theorists will queue up to use the center's resources, which they will be able to do either at the center, or remotely from their computers, phones, or tablets. And the more researchers use the center, the more complex the FCL Lab's algorithms become, and the better the facility becomes. But right now, it's a work in progress.

“The cameras literally went in a week

ago,” says Rowe (speaking in late July). For the past six years, Rowe has led the free-choice learning effort at the center. With a bushy beard, dark-rimmed glasses, and hair pulled back in a ponytail, Rowe looks like a guy you might jam with in a weekend band (which he does—he plays guitar). Mark Farley is project manager and technology developer on the NSF grant. Farley is a former contractor specializing in multimedia. Both men are quick to laugh, an invaluable trait when trying something new and innovative.

“Everything has had lots of issues,” says Farley, chuckling. Mounting the cameras was a “real pain.” The spacious HMSC Visitor Center just wasn't built for cameras placed in the intimate manner researchers require for studying human subjects. The cameras themselves—which are designed for wide-angle surveillance—are perhaps not the best hardware for the job, admits Farley, but there weren't many other options. So the FCL Lab team got creative.

To optimize the cameras' positions, Farley and Rowe measured and mapped the 18,000 square feet they would cover, breaking up the space into 36-inch squares, or roughly the area of an average person's foot stance. It was a tedious task, but one that would later pay out big. There've been other problems as well such as making sure the FCL Lab follows all the rules for research involving human subjects. Rowe says his team is working closely with Oregon State University's (OSU) Institutional Review Board—which oversees research involving human subjects—to make sure the project is doing everything right. So far it has the Board's blessing. But the biggest issue, by far, has been how exactly the FCL Lab is going to model all the data that's expected.

“It was smoking brains for a couple of weeks,” says Farley. “I mean, we struggled profoundly to create a system for collecting data.” Here's the problem: because the FCL Lab will be used by researchers from a variety of backgrounds, the team needed a data-collection system that won't privilege one discipline over another. The model's

theoretical assumptions had to be unbiased, open-minded, and “theory-neutral.” The only problem is, many disciplines use theories that don’t play well together. What the team needed was a unifying model that could act as referee.

“So we asked ourselves,” says Rowe, “what if you were a sociologist doing feminist research on family dynamics? What kind of data model would help your research that wouldn’t be too overloaded with another theoretical framework? And would that also work with, say, a Freudian?” Rowe thought he had found such a model. He tested it. “It failed miserably,” he says. So Rowe, Farley, and several grad students cooked their brains on the problem for a few more weeks...and then a few more weeks...but nothing seemed to work. And the pressure mounted.

Other institutions had tried to design projects similar to Rowe and Farley’s, but had failed. However, Farley says their defeat wasn’t due to a lack of will or

“Free-choice learning can happen anywhere,” says Falk. “It’s not about whether you’re in a school or not, it’s about choice and control. And the research shows that with...even modest amounts of choice and control, learning increases.”

learn when it’s socially meaningful to do so. “When we started to use that as an organizing framework, it all fell into place,” says Rowe. Only it didn’t quite, so the team leader combined activity theory with pieces from cognitive psychology. And Rowe and Farley also turned to the theories of free-choice learning’s creators, John Falk and Lynn Dierking, two research mavericks who have spent decades revolutionizing educational theory—and who were instrumental in getting OSG on the free-choice learning path.

Dr. John Falk is an OSG professor of free-choice learning in the Department of Science and Mathematics Education at

OSU. As a co-founder of the study of free-choice learning, Falk has criticized some schools’ rote teaching methods. Today, he’s still lukewarm on formal education, and arguably an odd fit for academia. Falk admits school was never really his thing. “Frankly, I was bored a lot,” he says. But the innovative researcher is quick to point out that free-choice learning is not about

whether you’re in a school or not, it’s about choice and control. And the research shows that with choice and control—even modest amounts of choice and control—learning increases.” For Falk, this understanding came from personal experience.

As an undergraduate at the University of California-Berkeley, Falk was an inconsistent student. He tried when he wanted to, and at other times not at all. Then he experienced something that changed his life. One summer, he taught biology to middle schoolers, and Falk says he saw kids that normally didn’t flourish in school excel in camp, including himself. And he thought he knew why. If the kids were anything like him, Falk reasoned, they didn’t like school because at school they didn’t have choice and control over what they studied. Camp was different. There, the kids chose what they wanted to learn, and that meant they wanted to be there. It also meant they actually learned. “And I realized I was interested in education, but not schools, because schools aren’t wonderful places for kids to learn, they’re only wonderful places for some kids to learn some of the time.”

When he pursued his graduate degrees, Falk combined his love for biology with his new interest in what the NSF was calling “informal learning.” In 1986 he founded the Institute for Learning Innovation in Annapolis, Maryland, which focused on learning outside of school. This would eventually bring Falk to OSU and Sea Grant, but not before another important development.

Dr. Lynn Dierking is free-choice learning’s co-creator. Like Falk, she’s also an OSG professor at OSU, and like Falk, she discovered her calling after she taught a summer biology course. And although she says biology still is a passion, “The bottom



Mark Farley (left) and Shawn Rowe work on strategies to enhance learning in the Free-Choice Learning Lab at OSU’s Hatfield Marine Science Center.

technical know-how. “They didn’t create a good system for collecting the data,” he says. So to find their theory-neutral model, Rowe and Farley rifled through theories, eventually settling on one Rowe learned in graduate school, activity theory, which starts with the premise that people

demonizing schools, it’s about looking at what makes people want to learn. For Falk, that comes down to two basic things: choice, and control.

“Free-choice learning can happen anywhere,” says Falk. “Schools, valleys, mountains, anywhere. It’s not about

Oregon Sea Grant reshapes education and ocean literacy effort to focus on free-choice learning

In spring 2012 the Oregon Sea Grant (OSG) Education Program changed its strategic focus and adopted a new name: the Free-Choice Learning Program.

This new strategic direction reflects a growing awareness of the importance of self-directed learning across the lifespan and an understanding that nearly all our current educational activities are, in fact, free-choice learning experiences.

The goal of OSG's Free-Choice Learning Program is to develop opportunities for learners of all ages and experience levels in marine and aquatic sciences through high-quality marine science programming; research, assessment, and evaluation; and professional development for educators. We expect to learn from our own free-choice learning education programs.

Promoting sustained, long-term learning about marine and aquatic sciences in the 21st century requires rethinking how universities, organizations, and educators traditionally engage professional and public audiences. New models for OSG Extension and Education based on how learners deploy choice and control across different work, school, and leisure contexts can help us better serve existing audiences while reaching new and underserved audiences where and when they need it.

Many OSG Extension and Communication activities are also, in essence, free-choice learning. What we learn about how others learn, and how the knowledge they acquire influences their decisions, is already reshaping our work—and that of our peers. For example, OSG Communications has already produced a series of Public Science Communication and Practice publications, demonstrating how social science research techniques can help people better understand and use science information.

line is, I fell in love with teaching.” She also fell in love with learning how people learn.

When Dierking and Falk met in 1983, the two found they had a lot in common. They became close collaborators, and then much more. They married in 1990. Dierking later joined Falk at his institute. There the two studied self-directed learning in informal environments. In the process,



and in teaching those biology courses. So in the mid-1990s, the two created a new term that got past the Manichean world of “formal” versus “informal.” The new term focused instead on those elements essential for learning: choice and control, and personal identity. Their new term was free-choice learning.

In 2002, Falk and Dierking's innovation caught the eye of Bob Malouf,



John Falk (left) and Lynn Dierking

they developed a number of theories about why people choose to learn. One particular theory, that learning is essentially identity driven, would later be invaluable to the HMSC team. Falk explains the theory this way: “At a very basic level, all learning revolves around a very egocentric perspective on what's important.” It gets a little more complicated than that, but essentially people learn what they want to because it's important to how they see themselves. With this in mind, in the mid-1990s Falk and Dierking decided to dismantle something that bothered them to no end.

“Informal learning” had always made Falk and Dierking a little uneasy. They suspected policy makers didn't take the term seriously. The logic went: Why would someone sponsor informal learning, when formal learning sounded more important? The term also didn't get to the heart of the self-directed learning the two had seen in their years of research

then-director of OSG. That year, Falk was part of a team that recommended that OSG adopt a free-choice learning research agenda. The following year, Malouf set in motion the Visitor Center's transformation into a free-choice learning laboratory, including the creation of Rowe's current position with Dierking on the team that vetted Rowe for the job. In 2006, OSG hired Falk and Dierking full time. Today, OSG is a leader in the study of free-choice learning, with a graduate program in the field and a steadily evolving Visitor Center. Falk and Dierking's work would also provide much-needed help in the FCL Lab team's search for the “theory-neutral” data collection model. Farley's love of games would provide the rest.

“The whole brain-smoking project is right here,” says Farley pointing to a map on a large, circular table in front of him. The map represents the sections of the science center the 37 cameras film. The map

is gridded—broken-up into small squares representing the intensive measuring done earlier—and on it are people, well, sort of. Actually they're figurines from the fantasy role-playing game Dungeons & Dragons (D&D). To be precise, there's a wizard, a dwarf, an elf, and a human warrior. The figures aren't from just any D&D set, they're from Farley's personal collection—which he reluctantly admits. And this isn't just a map; it's the theory-neutral model.

One afternoon, Farley and a free-choice grad student named Kate Stofer were beating themselves up over the data dilemma when, according to Stofer, Farley got out the graph paper and started drawing a map of the science center. "We began thinking about the problem spatially," says Stofer, "which, in retrospect, seems obvious, because going to Hatfield is a physical experience." This, she says, got her and Farley on the same conceptual page.

But it wasn't the theory-neutral model, not yet. Moments later, the final piece walked in, when another graduate student

popped his head into the room and, seeing the graph paper, asked, "Hey, what are you guys doing, playing Dungeons & Dragons?"

Farley remembers laughing. The graph paper did look a lot like a D&D dungeon map. Then it hit him. "Wait!" he said, "That's exactly what we're doing."

In a flash, Farley realized that the D&D game, which gives attributes and actions to its characters—be they dwarves, elves, wizards, or humans—worked with Rowe's activity theory framework and could easily plug into a variety of theories from cognitive psychology to social psychology. It also fit nicely with Falk and Dierking's ideas about learning being identity driven. One of Falk's models in particular—which ascribes motivations and actions to learners male or female, young or old, educated or uneducated—fit neatly with Farley's knowledge of D&D. He started jumping up and down. He knew they had it. "We raced down the hall to tell Shawn [Rowe]," he says. The next day, Farley

brought in the D&D figures.

Rowe and Farley have now tested their theory-neutral model on fellow researchers—including Rowe's wife, Dr. Olga Rowe, a sociologist at OSU. She proposed studying how gender affects the way parents respond to science explanations from their kids. Unlike earlier attempts, this time it worked; the model appears to be truly theory-neutral. And with that final piece, the FCL Lab team breathed a very big collective sigh of relief. Farley and Rowe see their project succeeding where others have failed. Rowe's philosophical take on the experience is that it's a good example of—yep—free-choice learning. "It's fun, exciting, a little scary. And that's where learning happens."

ANIMAL ENCOUNTERS

Putting free-choice learning research to work

People love getting up close and personal with animals in a zoo or aquarium. Everybody seems to want to pet a baby goat at a petting zoo or touch a sea star or an urchin in an aquarium touch tank. And touching these creatures has to lead to learning, right?

Almost every zoo, nature center, and aquarium in the United States and, increasingly, science centers and natural history museums, offers visitors the opportunity to interact directly with live animals. Besides the fact that visitors enjoy such experiences and seek them out, such interactions can be powerful, transforming experiences supporting the missions of informal education and promoting a conservation ethic among visitors. At the

same time, providing these experiences requires carefully balancing positive experiences for visitors with beneficial conditions for animals. This requires a huge investment in infrastructure, training, and husbandry.

For the past four years, Oregon Sea Grant has funded learning researchers at Oregon State University and California State University-Long Beach to document what happens at one of these common animal encounters—the touch tank. Videos of families made during visits to one of four Pacific Coast aquarium touch tanks were collected and analyzed to better understand what families were doing at the exhibit, and to quantify the learning that results from these experiences.

What we've discovered from this research is the learning that happens at touch tanks goes far beyond identifying and caring for animals. Families are also



practicing new observation skills, having deep discussions connecting to prior experiences and knowledge, and engaging in evidence-based debates. Further, information gleaned from the project has generated a set of recommendations for aquariums and zoos that range from design concepts to ideas about how staff and volunteers can deepen the science learning at such exhibits.

Questing for Fun and Knowledge

An educational treasure hunt with Oregon Sea Grant's Cait Goodwin



Cait Goodwin parks her car in front of the Yaquina Head interpretive center. Outside it's pouring, but a little rain won't stop her.

Goodwin's kind, enthusiastic eyes always seem to be smiling. As she pulls her hair away from her face, her expression seems to say, "Let's go."

I'm here to write about Goodwin and her Oregon Coast Quests Program. Since her beginnings with Oregon Sea Grant in 2006, the educator and biologist has helped write more than 25 of these self-directed educational treasure hunts called Quests, on subjects ranging from the Yaquina Bay estuary's ecology to the history of the local cemetery. But Goodwin doesn't want me to just write about Quests; she wants me to experience them.

Quests, she tells me, are about finding clues in the world around you, clues that spell out secret messages leading to hidden boxes containing small rewards. Quests are also self-directed. As Goodwin puts it, "You do them when you want to, with whom you want to." And Questing is about learning something new, and perhaps gaining a greater appreciation of the world around you.

The tradition of Questing dates back 150 years to Dartmoor, England, where locals invented a pastime they still call "letterboxing." Think of countryside jaunts where men, women, families, and even large groups seek out clues leading them to hidden, weatherproof containers, or letterboxes. In letterboxing and in Questing, the treasure is a special stamp. In both, the stamps are collected in journals. But Questing takes the English pastime a step further. Quests are educational as well as fun.

In the 1990s, a Vermont educator brought letterboxing across the Atlantic, transforming it into Questing. Goodwin hails from this tradition, which also puts a premium on community involvement and, most importantly, exploring the natural world—something Goodwin says many people, particularly children, don't do enough.

That's why Goodwin established the Oregon Coast Quests Program. Over the past five years, she's helped produce 25-plus Quests for locations in three counties, in tandem with local schools,

members of the park service, and local governments. And Questing has caught on. Schools and parks have started creating their own Quests—which, Goodwin says, is the point. "It's boring if I write them all; it's better to have lots of different voices involved."

Today's Quest will explore the natural landscape around Yaquina Head.

Goodwin reads from a worn copy of *The Oregon Coast Quests Book*, the biennial publication published by Oregon Sea Grant compiling her and the coastal community's Questing efforts. Our goal, she says, is to finish this statement:

"At _____ Head, the _____ of _____ and the wise _____ of resources helps _____ the _____ of the _____ coast for future generations. Help us preserve these _____ through the practice of _____."

Goodwin reads our first clue: "Outside the Interpretive Center, look at what the doorway bears." I walk over to the Center and look around. Above the door is the word "Yaquina," our first clue. Goodwin

writes it down. Goodwin tells me a letter from each clue will in turn spell out the location of our Quest's hidden box. In her book, the clue spaces are made of squares like in a crossword. The 'U' in YAQUINA falls in a gray square; it's our first clue to find the box.

Not all Quests are the same, she tells me. Not only do they take place at different locations and cover diverse subjects, Quests are unique in other ways. Some use natural markers to guide "Questers"—which means they have to be periodically updated as nature changes. Today's Quest is a little different. It relies on plaques marking important spots on a nature trail surrounding the Yaquina Head lighthouse. It also illustrates Goodwin's penchant for rhyming. Today's whimsical balladry is a Goodwin original.

"As you follow the verse, collect the words as 'clues.' At the end you'll find a box and a statement o'er which to muse." And, we might add, a stamp, which for many Questers is the pot of gold at the end of the clue-filled rainbow.

Goodwin has given me a copy of the Quests book, which I plan on stamping once we find the hidden box. As we walk, she shows me the collection of stamps adorning the back of her book.

The stamps come in various colors and designs. Our Quest's stamp, printed in bright-green ink, is a wave with the word "Stewardship" surrounding it. But, she tells me, it's not about the stamps. "The real treasure is being outside."

We get three more clues—PROTECTION, WILDLIFE, and MANAGEMENT—and head through a small tunnel underneath a road leading to the historic Yaquina Head lighthouse. On the other side is a panoramic ocean view.

We're standing on a cliff overlooking the Pacific. To our left is Newport's

Agate Beach. From here, the beachgoers are no bigger than fleas. "To your right," she says, "on a good day you can see the lighthouse." Today, all I see is gray. Still, even with a drizzling, overcast sky, it's a spectacular view. We get another clue, and start up a large hill covered in wildflowers and short pines.

Being outside provides educators with multiple opportunities to encourage their

als, especially children, go Questing on their own. That's one reason Quests have become so popular with schools.

We are now heading downhill toward a small cove. "You're nearly at the end!" reads Goodwin. "Now read the whole statement to determine the last clue. What word fits here best and helps find the box, too?"

The whole phrase now reads: "At YAQUINA Head, the PROTECTION of WILDLIFE and the wise MANAGEMENT of resources helps PRESERVE the FEATURES of the OREGON coast for future generations. Help us preserve these SPECIAL LANDMARKS through the practice of _____."

I think about it a little. Goodwin gives me a hint, "The Quest is called the Yaquina Head _____ Quest."

"It's 'stewardship,'" I say. "The practice of STEWARDSHIP." The letters now spell out a message revealing our hidden box's location: "UNDER ROCKS."

We head toward the cove. I spy a series of conspicuous rocks and move in closer. Crouching down, I notice a hole under the largest rock. I reach inside. To my surprise, my hand finds a small, plastic container. It's the box! I pull it out and open it. Inside, I find the stamp and a small,

waterproof notebook. On the book's pages, Questers have written about their experiences. I add my thoughts:

"Cait, Thanks for being my guide. I had fun. —Nate"

I put the notebook back in the box and we start to head back up the hill, when Goodwin turns to me and says, "Oh, you forgot to stamp your book!"

"Oh no," I say. I start to head back to the box, but stop. I look around at the natural beauty surrounding us and realize: I already have my treasure.



Cait Goodwin

Quests are about finding clues in the world around you, clues that spell out secret messages leading to hidden boxes containing small rewards.

students' curiosity and interests. Along with doing website development and helping Oregon teachers create science-based curriculum—her other jobs at Sea Grant—Goodwin has helped facilitate many a quest with local schools and community groups. As she explains it, while Quests are, at heart, about self-directed learning—which doesn't require extra help—it's still beneficial to have guides, or facilitators, around. Be they teachers or parents, facilitators can help foster more learning than might happen if individu-

CONFLUENCE CONNECTIONS

Wave energy test platform deployed off Oregon coast

One of the first public wave energy testing systems in the United States began operation in August off the Oregon coast near Newport. It will allow private industry and academic researchers to test new technology that may help advance this promising form of sustainable energy.

Ocean Sentinel is a \$1.5 million device developed by the Northwest National Marine Renewable Energy Center, or NNMREC, at Oregon State University. The device was towed to the Center's designated testing site two miles offshore from Yaquina Head by OSU's R/V Pacific Storm, and attached to a battery of mooring anchors that will keep it in place.

It's a major step forward for the future of wave energy, and is performing its initial tests on a wave energy device called "WetNZ," developed by private industry.

The creation of this mobile wave energy test facility has been needed for years, experts say, and it will be used by many companies and academic researchers in the quest to develop wave energy technology, measure and understand the wave resource, and study energy output and other important issues.

"The Ocean Sentinel will provide a standardized, accurate system to compare various wave energy technologies, including systems that may be better for one type of wave situation or another," said Sean Moran, ocean test facilities manager with NNMREC.

"We have to find out more about which technologies work best, in what conditions, and what environmental impacts there may be," Moran said. "We're not assuming anything. We're first trying to answer the question, 'Is this a good idea or not?' And if some technology doesn't work as well, we want to find that out quickly, and cheaply, and the Ocean Sentinel will help us do that."

The Oregon Sea Grant connection

From early proof-of-concept testing to ongoing public engagement and education, Oregon Sea Grant is playing a part in efforts to develop renewable energy from the ocean waves—while minimizing the conflicts with other ocean uses.

Starting in 2003, Sea Grant seed money helped fund pioneering scientific and engineering work by OSU researchers Annette Von Jouanne and the late Alan Wallace that demonstrated the motion

of waves can be harnessed to generate electricity.

Within a few years, renewable-energy companies from the U.S. and abroad were banging on Oregon's doors, filing multiple permits with the federal Energy Regulatory Commission for commercial-scale projects off the Oregon coast.

Coastal communities, torn between the desire for clean, sustainable energy and an even more compelling desire to protect their livelihoods and the marine environment, responded by filing their own permit applications in an effort to have some control over where offshore energy farms might be located.

Oregon Sea Grant helps coastal communities understand the pros and cons of marine renewable energy, navigate the regulatory and permitting maze, and serve as their own advocates. In addition, we conduct research demonstrating the human dimensions of energy production, and educate the public about the complex issues involved.

Oregon State University's Annette von Jouanne, along with Oregon Sea Grant's Flaxen Conway and Kaety Hildenbrand, are co-recipients of the 2012 National Sea Grant "Research to Application" Award for their efforts of behalf of wave energy in Oregon.



Oregon State University researchers set up the wave energy testing buoy Ocean Sentinel near Newport, Oregon.



Jeffrey Basinger

Visitor Center volunteer Alan Perrill demonstrates a new wave power installation at Hatfield Marine Science Visitor Center during the second annual Ocean Literacy Symposium.

Symposium helps teachers understand the ocean

More than 350 school teachers, administrators, scientists, and guests gathered in Newport recently for the second annual Lincoln County K–12 Ocean Literacy Symposium, “Understanding the Ocean’s Influence on You and Your Influence On the Ocean.”

The August 29 symposium, part of the Lincoln County School District’s annual Improvement Days for school teachers and administrators, was sponsored by Oregon Sea Grant, Oregon State University’s Hatfield Marine Science Center (HMSC), the Oregon Coast Aquarium, and the Lincoln County School District. Origin-

nally aimed at Lincoln County School District teachers, the symposium was expanded this year to include teachers from Tillamook County and the Linn–Benton–Lincoln Education Service District.

After convening at Newport High School in the morning, participants fanned out to the

HMSC, the Oregon Coast Aquarium, the Newport bayfront, Yaquina River estuary, and other locations for hands-on breakout sessions exploring a variety of marine science topics, curricula, and teaching tools. Topics ranged from ocean conservation to coastal tsunami hazards, spanning disciplines such as biology, oceanography, and marine engineering, and included ocean-related activities and lessons for all grade levels and academic specialties, from science to music and physical education.

The goal was to build understanding among coastal students of the essential principles of ocean literacy:

- The Earth has one big ocean with many features

- The ocean and life in the ocean shape the features of the Earth
- The ocean is a major influence on weather and climate
- The ocean makes Earth habitable
- The ocean supports a great diversity of life and ecosystems
- The ocean and humans are inextricably connected
- The ocean is largely unexplored

The symposium grew out of a three-year, \$900,000 per year Math–Science Partnership grant from the U.S. Department of Education, administered via the state of Oregon Department of Education. The project teamed the Lincoln County School District with scientists, informal science educators, and science education faculty at several academic, non-profit, and government science institutions to develop, implement, and evaluate teacher professional development and student learning experiences that focus on ocean literacy and aquatic and marine science.

Oregon Sea Grant works with others to coordinate tsunami debris response

When a giant floating dock (see photo) washed ashore on a central Oregon coast beach in early June 2012, dozens of federal, state, and local entities were already working on ways to inform and prepare Oregonians for the arrival of much more debris from the devastating 2011 earthquake and tsunami in Japan.

Early on, Oregon Sea Grant (OSG) did what it does best: partnering with other organizations to educate coastal residents on what to expect, and building coalitions to respond to the impending debris problem. Jamie Doyle, OSG Extension faculty based on the south coast, took on program responsibility for tsunami debris activities; and others—invasive species

expert Sam Chan, coastal hazards specialist Pat Corcoran, Bill Hanshumaker and the other scientists and educators at the Hatfield Marine Science Center in Newport—added their expertise.

With NOAA coordinating debris observation and monitoring along the entire Pacific Coast, Oregon’s Department of Environmental Quality and the Oregon Parks and Recreation Department (which is responsible for the state’s 363 miles of coastline) are leading cleanup and response planning in Oregon. OSG, meanwhile, continues to lend its scientific, educational, and public engagement expertise to the effort, and has joined with organizations such as Surfrider,



Jeffrey Basinger

SOLVE, and CoastWatch to form the Oregon Marine Debris Team to assist with debris monitoring, identification, cleanup, and public information.

OSG also led a regional effort to coordinate federal and state responses to the invasive species threat associated with tsunami marine debris and held a two-day workshop for more than 90 participants. In addition, OSG is funding projects to help identify the potential invaders that came with the dock.

To learn more about tsunami debris efforts, visit seagrant.oregonstate.edu/earthquakes-and-tsunamis/tsunami-debris



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You can learn a lot more about the topics covered in this issue of *Confluence* by visiting seagrants.oregonstate.edu/confluence

Free-Choice Learning...

- At *Confluence* online, you can learn more about what goes on behind the scenes at the Free-Choice Learning Lab by reading the FCL blog.
- Find out what else has been happening with regard to free-choice learning at the Hatfield Marine Science Visitor Center by reading “Lessons from the Magic Planet” in Oregon State University’s (OSU) Terra magazine.
- Besides being co-founder of the term “free-choice learning” and one of its leading researchers, John Falk is also the Transitional Director of OSU’s Center for Research on Lifelong STEM (Science, Technology, Engineering and Math) Learning. At *Confluence* online you’ll find a link to more info about Falk’s STEM activities.
- Interested in becoming a free-choice learning educator? At *Confluence* online you can read about Oregon State University’s E-Campus (online) Master of Science Degree in Free-Choice Learning.



A young lady enjoys her Oregon Coast Quest.

Quests...

Want to know more about Oregon Coast Quests? You’ll find links to more information—including how to subscribe to the Quest News e-newsletter—at *Confluence* online.

Wave energy...

Oregon Sea Grant has been involved with wave energy since 2003, and has produced several publications and videos on the topic. Find links to those resources at *Confluence* online—and learn how wave energy works!

Tsunami debris...

At *Confluence* online you’ll find links to sites with information on Japanese tsunami debris and cleanup efforts; how you can volunteer to take part in debris response, monitoring, and cleanup; the latest news about invasive species found on tsunami debris; and a lot more.

Ocean Literacy...

Read a more in-depth piece at *Confluence* online about the Ocean Literacy Symposium, written by Oregon Sea Grant’s 2012 summer science communications fellow, Jeff Basinger.

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