Accelerating Energy Efficiency One Hour at a Time: The Internal, External and Social Returns of Online Education Programs

Andrea Minniear Cherney, Energy Center of Wisconsin

ABSTRACT

How has the Energy Center of Wisconsin's online education approach to knowledge transfer fueled change in thought and practice among building professionals, program planners and decision makers? Has the combination of convenience, accessibility and variety of online programs made a difference in the professional lives of our learners? Drawing from our experience with a suite of more than 100 online programs reaching more than 14,000 viewers per year, we examine the internal, external and social returns we have achieved by producing online education programs with rich media technology. We highlight our return on engagement and the steps viewers are taking to implement new technologies and practices, addressing the potential impact of this behavior on energy use and other factors, and we illustrate our findings with profiles of three distinct online programs. It is part of our mission to provide our industry with innovative education, and through our online programs we are helping to grow intellectual capital and turn knowledge into action.

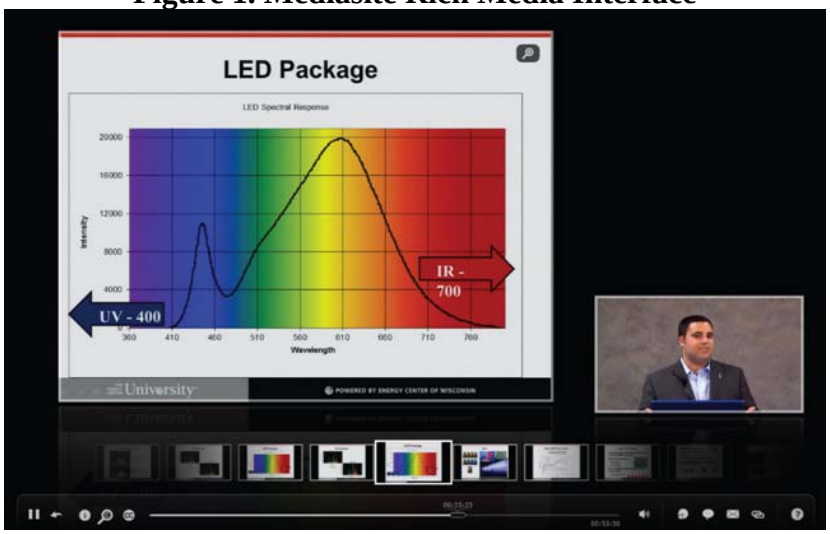
Introduction

Continuing education is critical to building a knowledgeable community of practitioners and thought leaders that can meet the energy and environmental challenges we face. Building professionals, especially, require access to expertise and unbiased research in order to accelerate the implementation of efficient technologies and practices. Buildings represent more than 50 percent of the nation's wealth, 5 percent of the nation's total employment, and new construction and renovation projects amount to more than $800 billion annually, according to the National Institute of Building Sciences (Colker 2011). But time for professional development is a precious commodity in the workplace. How can education providers facilitate knowledge transfer without compromising productivity?

Online education at the Energy Center of Wisconsin has been helping to fill this need, providing our audience with the convenience and accessibility of live and on-demand video webinars. Tim Berners-Lee, creator of the World Wide Web, said "the actual explosion of creativity, and the coming into being of the Web was the result of thousands of individuals playing a small part" (Berners-Lee, 1998). The same can be said for the online education phenomenon as more organizations see the value of reaching a global audience with a virtual universe of learning opportunities. For many organizations in the energy industry, online education is just a small addition to the established process of delivering classroom training. For example, many simply capture a classroom session on audio or video for future use. Others use tools that offer PowerPoint slides along with audio over the telephone. The Energy Center, however, made a significant investment in time and technology to develop a portfolio of online courses using Mediasite, a rich media tool created by Sonic Foundry that combines audio, video, interactive polling and Q&A elements (Figures 1 and 2), a very effective approach that serves different learning styles—spatial, linguistic, logical, musical, kinesthetic and interpersonal—as

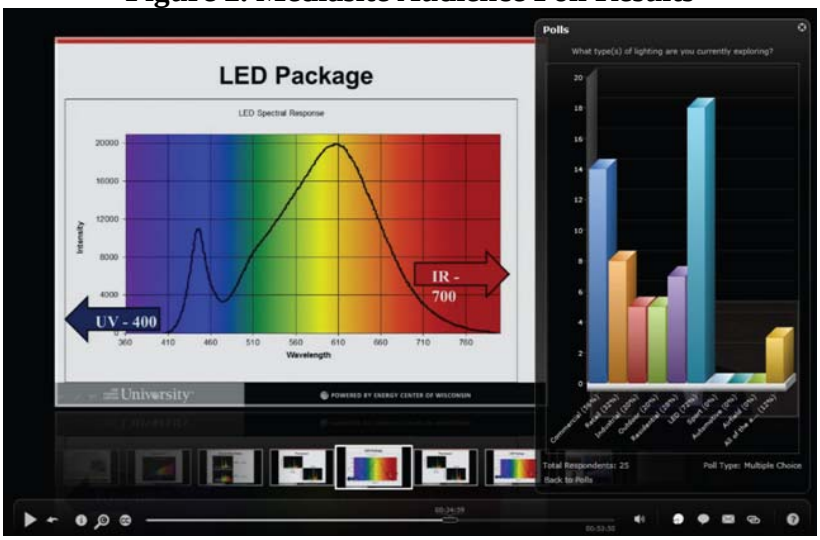
defined by Howard Gardner's theory of multiple intelligences (Gardner 1983). We began using Mediasite in 2007 to supplement our live training series and deliver courses to utility customers with limited budgets for travel and training. We found that using rich media to display the presenter as well as the presentation engaged our online audience more than audio-only tools. Rich media creates a "sense of place" for viewers, as if the speaker were presenting directly to them in the same room. The interface also gives participants control over their online environment, allowing adjustments to screen-size, orientation of the video screen, PowerPoint, and audio levels (Minniear Cherney and Schiedermayer 2010). All of these characteristics cater to multiple intelligences (Table 1).

Figure 1. Mediasite Rich Media Interface



Source: Energy Center of Wisconsin 2010

Figure 2. Mediasite Audience Poll Results



Source: Energy Center of Wisconsin 2010

Table 1. How Rich Media Serves Multiple Intelligences

RICH MEDIA CHARACTERISTIC	INTELLIGENCES SERVED
Interface controls	visual-spatial; kinesthetic
Video: speaker's image	visual-spatial; interpersonal
Audio: speaker's voice	verbal-linguistic; musical
PowerPoint images, graphs	visual-spatial
Closed-captioning	verbal-linguistic
Polls for survey and quiz questions	kinesthetic; mathematical-logical; interpersonal
Q&A chat and instant feedback from moderator	interpersonal; kinesthetic
Links to recommended readings and tools	kinesthetic; verbal-linguistic

KEY
verbal-linguistic: well-developed verbal skills and sensitivity to the sounds, meanings, rhythms of words
mathematical-logical: ability to think conceptually and abstractly; discerns logical, numerical patterns
musical: ability to produce and appreciate rhythm, pitch and timber
visual-spatial: capacity to think in images and pictures, to visualize accurately and abstractly
bodily-kinesthetic: ability to control one's body movements and to handle objects skillfully
interpersonal: capacity to detect and respond appropriately to the moods, motivations and desires of others

Source: Energy Center of Wisconsin 2010

Online education has become a core part of our business and we have dedicated ourselves to developing an award-winning application of rich media and increasing our fluency in audio-visual technology. Our use of Mediasite has earned three awards for innovation: two in the field of rich media (Sonic Foundry's 2010 Global Reach Award and 2011 Rapid ROI Award) and one in the field of energy efficiency education (Midwest Energy Efficiency Alliance's 2011 Inspiring Education Award). This dedication has also resulted in a variety of returns on our investment.

Defining Internal, External and Social Returns

How do we know our training programs are beginning to make a difference? It is always a challenge to prove the value of learning as much of the focus is usually on the attendee satisfaction survey, a tool that does not address whether the information was put into practice or had any impact (Wilson 2004). By looking at three types of returns—internal, external and social—we can obtain a more complete picture of the value a particular effort brings to an organization and its customers. For the Energy Center's online education programs, we define these returns by drawing from research on interface design and usability conducted by psychologists Randolph Bias and Deborah Mayhew (2005). **Internal ROI** includes improvements to the process of developing online education courses. By reducing staff time needed to produce each course, for example, we can focus on continuous improvement and innovation. **External ROI** occurs when the customer's experience with online courses is improved, impacting direct measures such as reduced technical support emails during webinars and increased website usage. Indirect measures such as customer satisfaction and increased brand awareness are also part of our external ROI. This increased brand awareness has led to

more funding to develop new online course content. **Social ROI** is the perception held by stakeholders (webinar viewers) that online courses provide value, even without the justification of quantifiable data. By gathering qualitative feedback from our webinar viewers, we can start to attribute changes in thought or practice to specific programs.

The concept of **return on engagement** has been popularized as a way to measure the value of investing time and energy in social media efforts. A dimension that falls under external ROI, we use return on engagement to describe the way we leverage trust and reciprocity to create ties with our online stakeholders (Askanase 2011). In the social media realm, according to Askanase, examples of this leveraging effort include "online authenticity and transparency, real sharing of organizational thinking and decisions, fans helping each other within a shared group and organizations asking fans for their opinions." Part of the Energy Center's mission is to provide objective information in an innovative, accessible manner. We also have a history of successful collaboration with stakeholders. By delivering data-driven research, inviting feedback on an ongoing basis and using that feedback to improve our programs, we are establishing trust among our growing community of online learners and building stronger relationships with them. We must now pave the way toward connecting our viewers with each other. Social media, the next frontier for our online programs, will take us in new directions and create even more value for our learners.

Assessing Internal and External ROI

We have several years of financial and other quantitative data to assess both the internal and external ROI for our overall online education approach. For example, from 2009-2011 we achieved a 64 percent reduction in staff time and expenses to deliver each webinar; 77 percent more on-demand webinar views due to increased awareness of our on-demand catalog; an electronic mailing list of more than 91,500 contacts receiving webinar notifications; and 91 percent more revenue generated from new contracts, registration fees and sponsors. Many of our quantitative measures are also reliable indicators of audience engagement. For example, registration for online courses shows us the impact of our marketing efforts, how useful the topics may be to our audience and if we are hitting the mark—are we targeting the appropriate contacts with our promotions?

A rule of thumb according to Sonic Foundry, the provider of our rich media tool, is to expect about half the number of individual viewers as registrants (50 percent participation rate) for free webinars. This is true for our webinars when we look at registration numbers versus individual live viewing connections, but because we open up our webinars for group viewing (multiple people watching a broadcast in a group setting via one connection), we see high participation rates when we take into account these viewing groups (Table 2). Group numbers are self-reported via the sign-in form upon joining a webinar and we verify validity by following up to find out more about particular groups (e.g., a professor showing a webinar in class).

Table 2. Participation Rates for Free Webinars on Buildings and Energy Use

Webinar	Registrants	Live Viewers	Participation Rate (viewers/registrants)
Scouting for Residential Electricity Savings	868	917	106%
Hybrid Geothermal Systems: Less Is More	992	971	98%
DOE Commercial Lighting Solutions series (2 webinars)	2,851	2,296	81%
LED Lighting: Fact and Fiction	1,069	833	78%
Advanced Lighting Guidelines Online series (2 webinars)	1,293	979	76%
Examining Window Retrofit Options	561	341	61%

Source: Energy Center of Wisconsin 2011

In addition to live participation rates, we also measure use of our on-demand recordings by tracking views and the percentage of content watched (Table 3). This allows us to pinpoint the most popular topics among our viewing audience and monitor continued interest (or declining interest) in the content we deliver. For this same group of webinars we find that lighting seems to be the most consistently popular topic, with the largest average number of on-demand views per month. We do not see much variance in the amount of each presentation viewed among these topics. Because many of our webinars are approximately 60-90 minutes long and about 15 minutes are devoted to introduction and Q&A, we are not surprised by the average amount watched. We infer from these results that viewers are most likely zeroing in on the technical content presented.

Table 3. On-Demand Views of Free Webinars on Buildings and Energy Use

Webinar	Average On-Demand Views Per Month	Average Portion of Webinar Viewed
LED Lighting: Fact and Fiction	189	71%
DOE Commercial Lighting Solutions series (2 webinars)	178	65%
Advanced Lighting Guidelines Online series (2 webinars)	103	66%
Hybrid Geothermal Systems: Less Is More	88	70%
Examining Window Retrofit Options	56	72%
Scouting for Residential Electricity Savings	27	67%

Source: Energy Center of Wisconsin 2012

Webinars with a practical application for our audience of building professionals have the highest average number of live viewers per webinar (Table 4). Viewers are seeking information they can use on the job to increase the efficiency of the homes and buildings they design, construct, remodel, audit, retrofit and monitor. Energy policy topics are also popular; our audience of decision makers appreciates the opportunity to learn about the potential of energy efficiency and the impact of decoupling on utilities, for example. By polling viewers during our live broadcasts and following up afterward to gather additional feedback, we are aware of what they need to stay informed and maintain their credentials.

Table 4. Live Webinar Viewers by Topic Area

Webinar Topic	Total Live Viewers	Number of Live Webinars in Series	Average Number of Live Viewers Per Webinar
Buildings and Energy Use	10,859	20	543
Energy Policy	2,023	4	506
Bioenergy Research	975	3	325
Community Program Planning	1,187	4	297

Source: Energy Center of Wisconsin 2011

Assessing Social ROI: Survey Results

Although the measurement of our internal and external ROI is important to funders and internal stakeholders, it is the social ROI from the perspective of our viewers that reveals the impact our webinars are beginning to have on thought and practice. In January 2012, we conducted an online survey to learn how our webinars are starting to make a difference in the personal or professional lives of our viewers. The survey consisted of these questions:

1. Please select the webinars that have influenced you in thought and/or practice in your workplace, home, or other environment. (We provided a list to choose from.)
2. What changes have you made based on what you learned (technologies or tools implemented, adjustments to processes, changes in behavior, etc.)?
3. Have you realized any cost savings, energy savings, or other benefits from these changes? Yes [if yes, go to Q4] or No [if no, skip to Q5]
4. Please describe these savings or benefits.
5. What feedback have you received from colleagues, personnel, or others regarding the changes you've made?
6. Please share anything else about how Energy Center webinars have made a difference for you.
7. Feel free to share any other comments with us.
8. Optional: please provide your contact information so we can follow up with you. (First name, last name, email address.)

Out of 6,601 webinar viewers who received our emailed request to participate in the survey, we received 238 responses for a 3.6 percent response rate. This was not statistically significant enough to warrant rigorous quantitative analysis, but on a case study level the comments we received helped us better understand the perceived value of our online training. We analyzed this feedback to assess which webinars had the biggest impact, according to our viewers. Responses to open-ended questions helped us understand how useful our content has been and what types of behavioral changes and other actions are taking place. We offered no incentive to survey recipients, so we were somewhat surprised by the detailed responses we received. We feel that viewers responded because of our "free to watch" model—we offer free viewing for most of our webinars and require a fee only if viewers want to receive continuing education credit. This model seems to have garnered a loyal group of viewers and reflects our growing return on engagement. Our first free live webinar on daylighting in 2009 reached an international audience because of our global reputation as a provider of daylighting information

through the Daylighting Collaborative. Since then we have continued to reach viewers beyond our borders so we were very pleased to see the diverse geographic mix of survey respondents representing 37 U.S. states, the District of Columbia and four other countries (Argentina, Canada, Greece and Mexico).

We received feedback on a cross-section of webinars that are geared toward each of our main audiences—building professionals, executive-level decision makers and program planners. Each of the webinars included in the survey follows one or more of these approaches: to deliver **technical "how to" information** (e.g., buildings and energy use); **provide food for thought** and generate discussion (e.g., energy policy topics); or **illustrate concepts with case studies** (e.g., community program planning, bioenergy research). We asked viewers to select the webinars that have influenced them in thought and/or practice in their workplace, home or other environment (Table 5). We found that survey respondents most often selected webinars that offer some type of continuing education credit, a very important benefit to our audience of building professionals. More training is being delivered online as professional organizations require their members to obtain continuing education to maintain credentials, for example. Again, we see that lighting topics continue to rank high among viewers. We also found that our non-CEU webinars on hybrid geothermal research, energy policy and bioenergy research also were reported to have an impact; we infer from these results that even though credit was not offered, viewers felt the presentations were valuable.

Table 5. Webinars with Most Impact as Reported by Survey Respondents

Webinar	Date of Live Broadcast	Number of Respondents Reporting (of 238 total respondents)	CEUs Offered
LED Lighting: Fact and Fiction	November 2011	108	✓
Hybrid Geothermal Systems: Less Is More	September 2011	60	
Advanced Lighting Guidelines Online series (2 webinars)	June 2011	47	✓
Daylighting Fundamentals and Tools series (2 webinars)	April 2011	41	✓
DOE Commercial Lighting Solutions series (2 webinars)	January/February 2011	40	✓
An Interview with David Goldstein: The Promise of Energy Efficiency	September 2011	32	
Energy Efficiency's Great Potential	September 2009	28	
The Financial Effects of Energy Efficiency on Utilities: A Closer Look at Decoupling	October 2009	28	
Specifying LED Products in a Changing Market	May 2011	24	✓
Rethinking Biogas: An Emerging Energy Source in the Midwest	September 2010	23	
Anaerobic Digestion and Biogas Use in Food Processing (Great Lakes Region)	November 2010	22	
Scouting for Residential Electricity Savings	January 2010	22	
SSL Technology and LED Lighting	September 2010	20	✓

Webinar	Date of Live Broadcast	Number of Respondents Reporting (of 238 total respondents)	CEUs Offered
Biogas: Developing a Statewide Plan for Wisconsin's Opportunity Fuel	October 2010	20	
Examining Window Retrofit Options	October 2011	19	✓
Assessing Your Impact: Evaluating the Effectiveness of Community Energy Initiatives	May 2010	18	✓
Building Rating Systems: A Comparative Analysis	November 2010	15	✓
Mastering Infrared Thermography	November 2010	15	✓
Impact of Passive Building Design for Northern Climates	October 2009	14	✓
Effective Action: The Basics of Energy Program Design	July 2010	14	✓

Source: Energy Center of Wisconsin 2012

Webinar registration data shows us that we have many repeat viewers, but we wanted to assess what portion of our audience felt that more than one webinar had made an impact. Among survey respondents, 36 percent indicated that one webinar had the most impact on thought and/or practice. But more significant is the percentage of survey respondents indicating that they found more than one webinar influential: 22 percent chose two webinars; 15 percent chose three webinars and 20 percent chose more than three. (Seven percent did not identify any webinars). Not only have we seen the number of repeat customers grow over the years, but we now know that they are finding value in multiple webinars, though choice patterns are not very predictable as the delineation of our different viewing audiences has become somewhat blurred. Building practitioners are also interested in energy policy, program planners want to learn about hybrid geothermal applications, and so on.

We also asked survey respondents to tell us how they put into practice what they learned from the webinars they viewed. We created a categorized breakdown of qualitative responses to the question about changes made based on what was learned. We found that the webinars effectively increased awareness and understanding of concepts and technologies, which tells us that we are most likely accomplishing our learning objectives. But we also see an extension of the learning that is taking place as respondents reported that they educated others or made more informed recommendations directly to clients (Table 6). As noted earlier, many of the webinars reported to have the most perceived impact address lighting technologies. Future investigation of specific projects through one-on-one interviews with viewers may help answer the question that many educators face: can energy and cost savings be attributed to the information learned via online education programs?

Table 6. Post-Webinar Activities Reported by Survey Respondents

Type of Activity	Percentage Reporting	Comment Example
Educated others; made more informed recommendations to clients	23%	"Helped me in forming a breakout session on this topic for our utility trade ally meetings"
Developed greater awareness of concepts/ideas	21%	"Having technical knowledge helps me ask better questions about our options when managing energy savings performance contracts"
Learned how to better use the technology/tool	18%	"Better able to judge suitability of LED lamp configuration and light direction"
Further explored the concept/technology	13%	"Researched more info on LED lighting and am more capable of advising my residential real estate clients"
Installed/plan to install more efficient technology	10%	"Experimenting with LED lighting in non-work areas"
Made no changes yet	8%	N/A
Changed/adjusted protocols	4%	"[I've made] adjustments to interior lighting specifications, better use of daylighting when designing buildings"
Added idea to list of future projects	3%	"For future geothermal systems, will consider benefits of hybrid system"

Source: Energy Center of Wisconsin 2012

When asked to report whether the webinars resulted in any cost savings, energy savings or other benefits, responses were split—half said yes, half said no. We then gave the respondents the opportunity to describe their experiences. Many respondents reported energy and cost savings from making energy efficient upgrades to lighting, installing daylighting controls, using smart strips to control phantom load and adjusting power management settings on computers. Others reported being better equipped to influence clients to implement, or consider implementing, an efficient product or practice. Some product manufacturers indicated the webinars help them keep up with technology changes and offer better products, enhancing sales.

We also invited viewers to share feedback they had received from others regarding any changes made as a result of the webinars they viewed. Responses show a similar pattern to the question asked about benefits from viewing webinars; respondents mostly commented on being able to educate others or being more informed. Finally, we asked viewers to share any additional comments about our webinars. Several mentioned that they appreciate the convenience of anytime access, the high quality of the content, the effectiveness of the rich media interface and the opportunity to stay current on topics in our industry while building a knowledge base. We also learned that some viewers find the cost of obtaining CEUs through our webinars to be a drawback. The results of this survey—from identifying the most popular webinars to pinpointing changes in thought and practice—have helped us gauge the social ROI of our overall online education approach. Now we turn our attention to the ROI of three specific webinars that ranked high among respondents.

Internal, external and social returns at the program level

After we identified the webinars that were reported to have the most impact (Table 5), we pondered what made these particular programs successful. All of the Energy Center's online

productions use the same rich media tool, are approximately the same length and are reaching a consistent group of viewers (with new viewers added to the mix each time, depending on marketing reach). Because we determined earlier that our "how to" webinars are the most widely viewed, we are not surprised that these webinars are reported to have the most impact as well. We selected the following three programs for analysis because they ranked high among survey respondents, were singled out for additional comments and because each uses a different financial model, which can affect viewer numbers, engagement and perceived value.

LED Lighting: Fact and Fiction (broadcast November 2011; free to view, pay for CEUs). Many of our previous webinars addressed lighting topics on a deeply technical level and consistently achieved high viewership. Because of the confusion surrounding lighting products—LED in particular—and requests from viewers for ongoing training on lighting in general, we knew we would reach a large audience with a webinar that addressed LED lighting concepts at a high level. Aware of concerns such as reliability, over-promised products, system life and significant performance variation (Narendran 2009), we wanted to give viewers an overview of LED and empower them with resources to help them understand industry standards and compare products. This webinar was presented by a local lighting expert to 833 live viewers (mostly comprised of engineers, consultants, contractors, architects, energy service providers, educators, designers and others). Ten of those viewers paid to receive CEUs.

Internal ROI: We worked with a seasoned presenter who developed her own content as part of the overall speaker fee. Because the presenter was nearby, there was also no extra travel cost associated with this webinar. This allowed us to host a greater number of participants without adding to the overall production cost. *External ROI:* This webinar achieved a 78 percent participation rate (goal for free webinars is 50 percent; goal for paid webinars is 75 percent). We also secured revenue from registration fees for CEUs. *Social ROI:* Many respondents mentioned that this webinar encouraged them to make more efficient lighting choices, research the topic further, address clients' concerns and assess feasibility of LED technology for different applications.

Hybrid Geothermal Systems: Less Is More (broadcast September 2011; free to view, no CEUs offered). Based on requests for geothermal information we had received over the years, we knew this innovative topic would be of interest to a mixed audience—both practitioners and decision makers. This free webinar was presented to 971 live viewers by an energy engineer on the Energy Center staff. He discussed the hybrid geothermal approach and revealed the results of a study that examined three working hybrid systems to assess how and why they were designed, how well they are now working and lessons learned along the way. He also highlighted tools and resources to assess the benefits of implementing hybrid geothermal systems. The largest portion of the viewing audience was comprised of building design professionals (45 percent) and energy efficiency/environmental professionals (31 percent) as indicated by a live poll.

Internal ROI: Because the research was funded by the U.S. Department of Energy and other agencies, the content had already been developed and presented to a live audience preceding the webinar. Like the LED webinar, we were able to accommodate a large number of participants within our budget. Also, using an in-house expert avoided extra fees associated with speaker travel and related expenses. *External ROI:* This webinar achieved a 98 percent participation rate (goal for free webinars is 50 percent). The presenter also had approximately 80 conversations as a result of the webinar (emails and phone calls), responding to questions asked

during and after the webinar and addressing geothermal issues viewers inquired about in the months following the webinar. He also received some inquiries for work on other people's projects and three requests to repeat the presentation in a live setting. *Social ROI:* Comments from viewers indicated that the content inspired them to consider the hybrid geothermal approach when making design decisions or to research the topic further.

Daylighting Fundamentals and Tools (series of two webinars presented in April 2011; pay to view and receive CEUs). Our very first live webinar in 2009 addressed the topic of daylighting at a conceptual level. We have since retired that broadcast in order to offer updated, more technical content and introduce our current in-house daylighting experts to our online audience. We created a series of two webinars, one on the fundamental concepts of daylighting and another on daylight modeling tools. The webinars were co-presented by an energy engineer and an architect on the Energy Center staff to an audience comprised mostly of architects, engineers, designers, manufacturers and facility operations managers.

Internal ROI: Because several Energy Center daylighting and modeling research projects were currently underway, the webinar production budget benefited from existing presentations that needed just a bit of tweaking to adapt them to an online format. The presenters and the webinar team could focus on marketing the event and recruiting a sponsor to offset costs. *External ROI:* This webinar series had 42 paid registrants and 251 total viewers (individuals and groups), achieving a participation rate of almost 600 percent. The "pay to view/pay for CEUs" model results in the most registration revenue and a more targeted audience, which generates a more focused Q&A session during the broadcast, benefiting presenters and viewers alike. Although the presenters had only five follow-up conversations as a direct result of the webinars, they presented this material at two additional speaking engagements for approximately 60 additional attendees. We also received a request to re-air the second broadcast for a group of lighting professionals. Our webinar sponsor—a product manufacturer—benefited from answers to market research polls conducted during the live broadcast. We often recruit sponsors for our trainings (both live and online) to help cover our costs. Material presented is not influenced by the sponsors, but we do offer the option to poll our online audience with a few market research poll questions. We do not focus on one particular product brand, and sponsors are acknowledged only at the beginning and end of the webinar. *Social ROI:* Comments reveal that viewers felt empowered with knowledge and were inspired to apply what they learned to future projects.

Conclusion

Combining statistical analysis with qualitative feedback will inform our approach as we develop new programs. In order to maintain an efficient feedback loop and continue to assess the return on engagement we are achieving with our webinars, we rely on live polls and a simple feedback form to hear from our viewers, learning about their information needs and how to improve our process. We respond accordingly, making viewers aware of the changes we have implemented based on their feedback. We use these feedback methods and viewing statistics as a predictive tool to help shape what we do in the future rather than justify what we have done in the past (Wilson 2004). We are making progress toward using the responses we receive to identify the behavior we are trying to influence, and we plan to adjust the training objectives to match. Envisioning the change we want to effect with a particular program will ensure that a measurable dimension is in place before, during and after a webinar.

Going forward, this ROI analysis tells us we should offer more webinars on topics related to buildings and energy use; provide presenters and viewers with a seamless way to communicate after a webinar (through a Q&A blog, for example); keep viewers engaged through our high media production quality, and until we are able to control the audio/visual quality for presenters in other locations, continue to use local experts live in our studio; and finally, focus on business development, seeking sponsorships or contracts to keep registration free or at low cost for programs offering CEUs. Looking at the different returns on investment for our overall online education approach and these three specific programs is helping us frame our future thinking. We have a clearer idea of what our viewers need and how they are applying the information they learn. We also see the benefits our programs bring to the Energy Center—creating more webinars every year leads to a more efficient production process; exploring a wide variety of topics broadens our intellectual horizons; and reaching more viewers increases awareness of our organization's research efforts and educational opportunities.

References

Askanase, D. 2011. "It's All About Return on Engagement: Design and Measure It," Community Organizer 2.0 Blog, retrieved February 27, 2012, from http://www.communityorganizer20.com/2011/08/10/its-all-about-return-on-engagement-design-and-measure-it/.

Berners-Lee, Tim. 1998. *The World Wide Web and the "Web of Life."* http://www.w3.org/People/Berners-Lee/UU.html. MIT/ERCIM/Keio: World Wide Web Consortium (W3C).

Bias, R.G. and D.J. Mayhew. 2005. *Cost-Justifying Usability: An Update for the Internet Age*. San Francisco, Calif.: Morgan Kaufman Publishers.

Colker, R.M. 2011. "Where Are We Going? Insights on the Evolving Building Community," *Preparing for the Future: Upcoming Trends and Recent Changes in Continuing Education (Special Edition Workshop)*. http://www.aia.org/education/providers/AIAB091847. Washington, D.C.: American Institute of Architects.

Gardner, H. 1983. *Frames of Mind: The Theory of Multiple Intelligences*. New York, N.Y.: Basic Books.

Minniear Cherney, A. and K. Schiedermayer. 2010. "Small Footprint, Big Impact: Supercharging the Workforce with Interactive Online Education," *Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings*. Washington, D.C.: American Council for an Energy-Efficient Economy.

Narendran, N. 2009. *Overview of Recent Technology: Trends in Energy-Efficient Lighting*. http://www.sari-energy.org/pagefiles/what_we_do/activities/rceel/presentations/2.Overview_of_%20Recent_Technology_Trends_in_Energy-Efficient_Lighting.pdf Troy, N.Y.: Lighting Research Centre, Rensselaer Polytechnic Institute.

Wilson, D. 2004. *Measuring and Proving the Value of Learning*. http://www.elearnity.com/A555F3/research/research.nsf/bf25ab0f47ba5dd785256499006b15a4/e0c3c1859f5eefa8802570a6004d92ce/$FILE/Proving%20Value%20Exec%201A.pdf. Gloucestershire, U.K.: ELearnity Limited.