DEVELOPING A FOCUS FOR GREEN BUILDING OCCUPANT TRAINING MATERIALS

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ABSTRACT

With the shift from conventional to green buildings a need emerges to train staff on how to work within them. Building occupants control many of the green building technologies, which makes it necessary to educate occupants on the differences between using a green building versus a conventional building in order to secure the green building's success. The breadth of information that is necessary for an occupant to know in order to change their behaviors to be in accord with the high performing building they occupy makes it necessary to use a systematic method to reduce the information provided in trainings. This study employs a decision matrix approach as an objective means to narrow the focus of the training. A case study is used to implement the methods developed in this study. A focus group evaluated the effectiveness of the decision matrix. Results from the focus group showed that staff was active in waste reduction behaviors, but not in energy efficient actions. This supported the outcome of the decision matrix in finding relevant, necessary information for the training.

KEY WORDS

green building, workplace training, occupants, sustainable behavior, MCDM

INTRODUCTION

The built environment has significant environmental impacts. In the United States, buildings use 38.9% of all energy consumption, produce 38% of the CO_2 emissions, and use 72% of electricity consumptions. The construction phase has impacts on land, waste production, and energy use, while the end of a building's life produces more waste and potentially leaves behind hazardous land. But it is the use phase of buildings that have the highest impacts. Lighting, heating, and cooling energy costs for a building during its occupancy phase accounts for up to 90% of the building's life cycle energy use (Kotaji et al., 2003). But the built environment does not have to be such a detriment to the natural environment. A more sustainable construction alternative exists.

Green buildings are a way to lessen the impacts of the built environment. Technologies exist that reduce the amount of resources and energy used by buildings. Vegetated roofs cool buildings, which reduces the energy use of the building (Santamouris et al., 2007), while improving the thermal envelope of buildings reduces the heating requirements and heating energy needs when compared to conventional buildings (Hamada et al., 2003). One study conducted by the General Services Administration (GSA) (2008) examined 12 of their Leadership in Energy and Environmental Design (LEED) certified buildings and compared them to conventional buildings with the same use. They found that these buildings use less energy and perform better than the Commercial Buildings Energy Consumption Survey (CBECS) averages. A similar study found that LEED certified commercial buildings perform an average of 24% better than the CBECS average and office buildings perform 33% better than CBECS averages (Turner et al., 2007).

Though these improvements to buildings can have an impressive change on how the built environment impacts the natural environment, there have been only a few studies on the role of the building occupants on maintaining and following the tenets

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set by the building they work or live in. Many of the technologies employed in high performing buildings are controlled by the occupants. Individual heating controls, window shades, indoor air quality, and waste reduction policies are all affected by user behaviors. The GSA research team (2008) noticed that many of the buildings they examined had excellent recycling programs, but observed that occupants did not always follow them. One building had to reduce their recycling to just paper because occupants used recycling bins as trash receptacles. The report suggests that although green policies and services are in place, these are only successful when they are promoted. This supports the idea that occupants need to be educated and trained on behaviors that will ensure the success of the green building.

Case Study

Many industry leaders are taking the steps to build buildings that are more sustainable then the conventional alternatives. The U.S. Green Building Council's (USGBC) LEED Green Building Rating System provides a list of suggested technologies and strategies to follow to build green. "LEED is a third-party certification program and the nationally accepted benchmark for the design, construction and operation of high performance green buildings" (U.S. Green Building Council, 2008). The University of Pittsburgh Medical Center (UPMC) is one of these industry leaders, as they have chosen to use the LEED Green Building Rating System to guide the design of the Children's Hospital of Pittsburgh's (CHP) new medical campus.

The hopes for the new CHP building are to have an energy efficient and low waste producing building. Specific LEED credits include: the site for the new building is located in a dense, urban area with nearby options for alternative transportation methods, the building uses smart systems for controlling room temperature based on occupancy and with individual thermal controls, low emitting materials, such as paints, carpets, and composite wood products, are to be used, and a new paperless policy will be implemented along with improved waste reduction and recycling programs. Many of the steps taken to green the CHP campus are maintained by building occupants. Therefore it is necessary to train staff on the green initiatives UPMC is taking as well as how to work within this new green building in order to ensure its success.

Learning Theory

As there are few studies related to the affect occupants have on the success of green buildings, there is also little research on the success of training green building occupants, but there is a large amount of information on how people learn. According to Bransford (1999), a few factors influence the ability to transfer general information to new situations. First, a threshold of prior learning must be achieved. Learners must all be at a minimum level of background or prior knowledge in order to understand and effectively incorporate any new information. Second, time spent learning is not in and of itself a measure of learning. It is how the time is spent. The average adult has an attention span of 20 minutes (Pike, 2003). This means that information must be provided in short periods of time. Also, relevant knowledge helps the learner to see beyond the information that is instructed on and put it into a bigger picture so that transfer may be made to new situations.

Research supports focusing the subject matter for the learner. Once the subject matter is introduced, the "why" behind this new knowledge must be provided before the student can reach expertise and mastery of the new information (Donovan & Bransford, 2005). Research since Bruner (1977) has found that educating on specific skills without clarifying their context and describing why it is important, will not succeed. These findings strongly suggest that a list of environmental rules and regulations should not be provided without the knowledge and information to help the learner understand why they are being asked to behave in this new way. However, most of this prior research examined student learners in classrooms and this study regards training in the workplace.

Research into learning specifically in the workplace is not too different from the research found on general learning. Billett (1996) conceptualized workplace learning as three forms: propositional (knowledge about), procedural (knowledge of how), and dispositional (values and attitudes). This separation helps one to target the training type based on the intention of the actions and skills being trained.

Once the complexity of workplace concepts increase, the need for greater understanding also increases (Berryman, 1993). At the same time, learners do not simply make sense of knowledge separate from themselves. Information is processed and internalized and meanings emerge from the combination of new knowledge and the learner's interpretation of it.

Purpose

Currently training materials are delivered to the staff of UPMC through computers in the form of PowerPoint-style slide presentations. This study thus needed to use the same method for delivering the sustainability training. If the LEED credits and the associated new technologies and policies, totaling over 40 items, are to be the basis for the staff training, then there is a large amount of information to provide to the occupants of the new CHP building. Considering that this amount of information exceeds the average adult attention span, building owners must balance the necessary amount of training while providing a succinct, informative training. Therefore, the purpose of this study is to determine focused, yet effective information for sustainability training materials. The first objective was to use a multi-criteria decision analysis (MCDA) approach to narrow sustainability actions to a manageable training quantity while maintaining training quality that addresses actions that most impact building performance. The second objective was to test the results of the MCDA against what was currently being done by CHP staff to evaluate how to provide a meaningful training.

METHODS

Preparing the List of LEED Credits Before Analysis

The recipients of this training are the clinical staff of CHP. For this study, clinical staff refers to all employees that work with patients in a professional capacity, including doctors, nurses, administrators, etc. The goal of the training was to prepare employees for their move into a new LEED certified building. Therefore, the training materials would focus on the LEED credits achieved by the new CHP building. This is a list of 41 initiatives.

To begin, an initial review of the LEED credits to be achieved by CHP was made to eliminate those that did not fit the focus of the training. A list of all of the LEED credits achieved and policies proposed by the new CHP building was compiled. Each credit in the list was broken down into behaviors associated with the credit, feelings staff may have about doing the behavior, users affected, and training type. Feelings ranged from positive to negative opinions workers might have after changing their behavior to support the new green building. Users affected were labeled as Operations Staff, Patients, and/or Clinical Staff. The training type was described as Noticeable, Behavior, and/or Transfer, referring to the impact the credit and associated behaviors would have on their day-to-day behaviors. This initial review reduced the list by eliminating any credits that did not affect clinical staff, was implemented only during construction phase, and was only a noticeable training type. For example, one of the LEED credits achieved by the project was "monitor CO_2." This credit was described to have no associated actions and the only associated feelings would be if something went wrong with the monitoring. All three users, Operations, Patients, and Clinical, are involved and the training type is Noticeable. Therefore, because this credit was only a Noticeable action, it was eliminated from the list of trainable credits. The final list of credits appropriate for the training totaled 30.

Multi-Criteria Decision Analysis

A multi-criteria decision making (MCDM) process, specifically the decision matrix, was used in this study to minimize the quantity of training topics. MCDM allows a designer to evaluate concepts with respect to customer needs and other criteria. The potentially subjective decisions are then quantified into strengths and weaknesses of the concepts, which can be ranked, allowing one or more concepts to rise to the top (Ulrich & Eppinger, 2008).

The decision matrix is a MCDM tool used for designing new products, creating software, or helping to rank investment options. Originally designed by Stuart Pugh (1990), it was intended as a way to better design products. His book created a framework for a structured and methodical design process. He developed a matrix system that ranked alternatives on criteria that were important to the project. This provided each alternative with a score that allowed a

TABLE 1. Sample set-up for a decision matrix.

	Criterion 1	Criterion 2	TOTAL
Alternative 1	$Value_x$	$Value_y$	Score 1
Alternative 2	$Value_z$	$Value_q$	Score 2

"winner" to emerge. This enables multi-dimensional decisions to have a distinct answer.

A decision matrix is set up as a list of alternatives and a number of different criteria by which to evaluate these options. Each criterion is evaluated as a weighted response. These weights are tallied and the options are then ranked. The evaluations are displayed as a grid. For example, the alternatives are listed in the first column, with each alternative occupying its own row. Across the top of the matrix are the different criteria on which the alternatives will be evaluated (Table 1). Each criterion has options along which it is rated. To perform the analysis, each alternative is assigned a value under each criterion. These values are summed to give each alternative a score, which can then be ranked.

Typically, brainstorming different alternatives begins the process of setting up a decision matrix. It is important to involve the client in the creation of the list of criteria to ensure that not only are basic design criteria included, but also the user's needs and expectations. Each criterion will then receive a number of possible values and/or weights. For example, if deciding what computer to buy, one expectation of the user would be to have an energy star certified monitor. Therefore a criterion would have the value of "is energy star certified" or "isn't energy star certified." In this case, "is energy star certified" would receive a value of 1 while "isn't energy star certified" would hold a value of 0. If this was the most important issue to the client, then "is energy star certified" could carry a higher weight, such as 2. Each alternative is then evaluated on the criteria and given corresponding values. These values are summed so that each alternative receives a score. Based on the scores the alternatives are ranked and the alternative with the highest score(s) are those which should be most considered.

Focus Group to Evaluate Current CHP Behaviors

Once the focus of the training was determined using the decision matrix approach, information for the training needed to be gathered. The information would be a list of sustainable behaviors that staff could do to support the intentions of the new green building. Researchers gathered a list of 50 sustainable behaviors that office and hospital workers could perform that matched the focus of the training. Behaviors were gathered from a number of resources that describe activities that reduce energy and waste in the workplace and hospital settings (California Integrated Waste Management Board, 1999, 2007). This list of behaviors was reduced by three considerations: is this action performed often, is the decision to act made by the user, and is the alternative clearly worse? For example, one behavior in the original list was "turn down the brightness setting on your monitor." The first question asked was if this was an action that could be preformed often. The answer was yes, as most staff use computers daily. Next it was determined if the decision was up to the user. The answer was yes, as most workers have personal computers, so how their personal workstation is set up is up to them. Finally the third question was asked; if the alternative is clearly worse. The alternative to turning down the brightness setting is comparable, as a higher brightness setting would use more energy. Therefore, because all answers were yes, this behavior was part of our final list. The evaluation process reduced the initial list of 50 sustainable behaviors to 23.

At this point, it was important to evaluate what CHP clinical staff members already know about these sustainable behaviors. It was necessary to determine what they are currently doing, what they would be unwilling to do, and why, such that training materials could directly address these concerns. Therefore a focus group was conducted to determine the level of sustainable behaviors being done by CHP clinical staff.

Participants for a focus group were recruited through the client. The focus group consisted of 6 volunteers. All participants were female nurses, each from a different department within the hospital. The client suggested these focus group participants as they were responsible for training in their department and were most likely to disseminate information to other workers. While the focus group is small in size and does not represent all clinical staff, the client made the assumption that these staff mem-

bers best represented the population of people who would receive the training.

One of the participants has worked as clinical staff for one to five years, one for five to 10 years, and the remaining for more than 10 years. All of the participants spent time outside at least weekly. Most participants had not received training on recycling or other sustainable/green policies. One person mentioned receiving training on these topics from both UPMC and from some other unspecified resource. Another person mentioned receiving information about recycling from her community. On average, the participants found the reduction of waste and energy consumption to be very important (an average rating of 4.5 out of 5).

Participants answered a number of questions regarding the 23 sustainable behaviors proposed. For each behavior, the participant was asked to answer if they were currently doing the behavior, willing to do it, or unlikely to perform a particular behavior. Also, participants were asked to rate their relative agreement or disagreement about the behavior. Using a Likert Scale (Likert, 1932) from 1 to 5, with 1 representing disagree and 5 representing agree, participants stated whether it was worth the effort, whether they had heard of it before, whether they knew how to implement the behavior, whether they thought it would help the environment, whether they knew how it would help the environment, whether it conflicted with other job requirements, and whether they had the authority to implement it.

FINDINGS

Focusing Training From LEED Credits Using a Decision Matrix Approach

The list of 30 credits determined to be appropriate material for the training exceeded a manageable number of training topics. The decision matrix approach was used to objectively choose a focus for the training. Four general focus areas were important for the training: level of impact, users, transferability, and education. These issues arose from conversations with the client. UPMC had a number of reasons for attaining LEED status for the new building. At the forefront were energy use and waste management, as well as their associated operating costs. Also, it was decided to focus the training on only clinical staff at this stage, as operations staff receives separate training on building operations. Finally, an interest of researchers was to examine the impact of the training on transfer of behaviors to non-work environments. Also, as to not overlap with topics that were the focus of current training efforts at UPMC, ongoing education efforts were examined.

These four focus areas were subdivided into detailed criteria. Within these criteria, a number of possible responses were assigned and with each a value, or score (Table 2). Stakeholders and researchers then gave each credit a value for each criteria listed. After the values were totaled, 11 credits had the top three scores of 11, 10, or 9 (out of a possible 13). For example, one credit in the list was "selecting water-efficient fixtures and appliances," the values for which are shown in Table 3. This credit received a score of 9, which means it was one of the 11 top credits from this decision matrix analysis.

After this initial ranking was performed, researchers found that a few of the criteria that were important to the client were not suitably represented. Therefore, weights were added to the corresponding responses. Three values were changed from the initial ranking shown in Table 2. For the "training already provided?" criterion, "no" was given a weighted value of 2. The researchers felt it was important to prevent staff from receiving repeated trainings, in order to strengthen the necessity of this training. For the "Potential for cost savings" criterion, the values of long-term payback and short-term payback were swapped, making "long-term payback" have a weighted value of 2 while "short-term payback" received a value of 1. As the training is about environmental impact, it was important to put less emphasis on the economic impact and concentrate more on the environmental responsibility of the action. Finally, the "Is this action/behavior easily transferred outside of building?" criterion was removed from the ranking. The client is concerned with the organization's environmental stewardship in the community and this idea was included in the training, but it was not a factor necessary to consider in the decision matrix. Researchers adjusted the values for each credit in the list based on the weighted responses to criteria. Again, the credits with the top three scores (12, 11, or 10 out of a possible 14) were taken from this weighted ranking. This provided a final list of 7 credits and initiatives. Again

TABLE 2. Criteria used for first decision matrix

Focus Areas	Detailed Criteria	Responses and Values
Level of Impact	UPMC priority	0 = low or none 1 = medium 2 = high
Level of Impact	Percent of operating budget	0 = 0% 1 = 1%–30% 2 = 31%–60% 3 = 61%–100%
Level of Impact	Potential for cost savings	0 = neutral 1 = long payback 2 = short payback
Level of Impact	Does this action impact building's energy use?	0 = no 1 = yes
Level of Impact	Users decision-making control	0 = no choice 1 = choices affect building performance
Users	Does this action affect clinical staff?	0 = no 1 = yes
Transferability	Action/behavior easily transferred outside of building?	0 = no 1 = yes
Education	Information availability	0 = nothing to teach 1 = general "green" concepts 2 = instruction on UPMC policies and procedures
Education	Training already provided?	0 = yes 1 = no

the credit "selecting water-efficient fixtures and appliances" is used as an example, the values for which are shown in Table 4. With weights considered, this credit received a score of 8, which means it was not one of the 7 top credits considered for the focus of the training.

Second Decision Matrix to Focus Training

With this more focused list of LEED credits and initiatives taken by CHP as training topics, there was one final issue that needed to be addressed. The client required that the training would concentrate on UPMC policies. Therefore, the top ranked credits were evaluated to determine if there was UPMC policy in existence for these initiatives. One final decision matrix was used to score the 7 highest valued credits based on whether there was policy information in place and if information in that policy had been provided to the research team. Table 5 shows the final ranking scores. Based on these scores, the training material's focus was to be on instituting a recycling program for paper and plastic waste and proper computer usage as a means for energy savings.

Results of the Focus Group

All participants of the focus group were already doing 4 of the behaviors, each of these being in the waste reduction category Table 6. There were 10 behaviors that more than half the participants were willing to do. A number of behaviors were reportedly not done by participants. Most of these behaviors were energy reduction initiatives. There were 6 behaviors that at least one person said they would be unlikely to do, spanning the recycling and energy use categories. On average respondents believe it is worth the effort to perform the suggested behaviors, except for two energy saving behaviors, but it was determined from the discussion portion that these behaviors were not properly understood. Three of the four recycling suggestions had been heard of before by all of the

TABLE 3. Sample ranking of one credit without weights

		Selecting water-efficient fixtures and appliances
UPMC priority	0 = low or none 1 = medium 2 = high	2
Percent of operating budget	0 = 0% 1 = 1%–30% 2 = 31%–60% 3 = 61%–100%	1
Potential for cost savings	0 = neutral 1 = long payback 2 = short payback	2
Does this action impact building's energy use?	0 = no 1 = yes	0
Users decision-making control	0 = no choice 1 = choices affect building performance	0
Does this action affect clinical staff?	0 = no 1 = yes	1
Action/behavior easily transferred outside of building?	0 = no 1 = yes	1
Information availability	0 = nothing to teach 1 = general "green" concepts 2 = instruction on UPMC policies and procedures	1
Training already provided?	0 = yes 1 = no	1
	TOTAL	**9**

respondents. The other suggested behaviors received scores that indicate that respondents had not heard of these behaviors before, except for a few that corresponded with specific UPMC policies. Focus group participants may have misinterpreted the researchers' intentions to understand the respondents' knowledge of these behaviors as sustainable actions and assumed we were asking if these policies currently exist within their institution.

Several of the measures used to understand the reasons behind the responses were correlated, indicating that some of the measures are evaluating the same thing. Based on a factor analysis, two factors were extracted: "It will help" and "I can do it". Knowing that it will help the environment was related to both already doing and unwilling to do the behavior. Believing that one can do it was only related to currently doing the behavior.

After completing the survey, there was an informal discussion with participants. Questions were intended to clarify any confusion with the survey and determine the participants' training expectations. Some of the suggested behaviors were foreign to the participants and thus confusing. Researchers recognized the need for clarification and that all suggested actions could be new information to trainees. Participants mentioned that, as nurses, they would like information that describes the statistical impacts of the suggested behavior changes. Also, most of the waste reduction behaviors suggested were currently being implemented. From our discussions and the results of the questionnaire it was apparent that the training should focus on energy reduction behaviors as these were less clear to participants and not currently being suggested to or practiced by staff members.

TABLE 4. Sample ranking of one credit with weights

		Selecting water-efficient fixtures and appliances
UPMC priority	0 = low or none 1 = medium 2 = high	2
Percent of operating budget	0 = 0% 1 = 1%–30% 2 = 31%–60% 3 = 61%–100%	1
Potential for cost savings	0 = neutral 1 = short payback 2 = long payback	1
Does this action impact building's energy use?	0 = no 1 = yes	0
Users decision-making control	0 = no choice 1 = choices affect building performance	0
Does this action affect clinical staff?	0 = no 1 = yes	1
Information availability	0 = nothing to teach 1 = general "green" concepts 2 = instruction on UPMC policies and procedures	1
Training already provided?	0 = yes 2 = no	2
	TOTAL	**8**

TABLE 5. Ranking scores of second decision matrix

2 = received building/policy information 1 = information available, not yet provided 0 = no building/policy information in place	**Rank**
Lighting is controlled by digital system and is based on number of people using an area and their schedule.	1
Instituting a recycling program for paper and plastic waste.	2
Paperless policy—administrative uses	1
Environmentally-preferred purchasing—procurement of recycled paper, energy-efficient equipment, or other green products	0
Building Automation System keeps the climate within a specified range based on an occupancy schedule.	1
Maximize use of daylight and views. Energy savings if lights are dimmed during daylight hours.	1
Proper computer usage as a means for saving energy	2

CONCLUSIONS

The breadth of information about the impact of conventional buildings and opportunities for green buildings to reduce these impacts could be overwhelming to green building occupants. This study suggests a method for focusing the information provided in training materials and tests the outcomes with a focus group. The method for developing training presented in this study provided a process for reducing the quantity of information available

TABLE 6. Results of focus group survey

		Percent of respondents claiming this is a current behavior (doing it)	Percent of respondents claiming they would not do this behavior (unwilling)	It is worth the effort to implement it	I have heard of this before	I know how to implement this	I think it will help the environment	I know how it will help the environment	This policy does not conflict with other job requirements	I have the authority to implement it
Reduce	Shorten Document size.	17%	0%	4.3	3.2	2.0	4.3	3.7	3.8	2.5
	Minimize memo writing	33%	0%	4.3	2.8	2.5	4.3	4.3	4.0	2.7
	Print Only the Pages You Need.	50%	0%	4.8	4.0	3.7	4.7	4.5	4.2	3.8
	Don't use a cover sheet for faxes	33%	17%	4.2	2.8	3.8	4.0	4.2	3.8	3.2
	Proof documents on screen before printing.	67%	0%	4.5	3.7	3.7	4.2	4.0	4.2	4.0
	Distribute memos electronically	100%	0%	5.0	5.0	5.0	5.0	5.0	5.0	4.3
	Take steps to reduce unsolicited mail	17%	0%	4.3	3.7	3.3	4.5	4.5	4.0	3.0
Reuse	Reuse envelopes by placing a label over the old address.	50%	17%	4.2	3.7	3.8	4.0	3.8	4.0	3.5
	Reuse file folders.	83%	17%	4.7	4.3	4.7	4.5	4.5	4.5	4.5
	Reuse paper that has been printed only on one side.	17%	17%	4.2	4.2	4.2	4.7	4.5	4.3	3.8
	Use reusable envelopes for interoffice mail.	100%	0%	5.0	5.0	5.0	5.0	4.8	5.0	4.7
	Use outdated letterhead for in-house memos.	17%	0%	4.0	2.7	3.0	4.0	4.0	3.0	3.0
	Shred newspapers and reuse for packaging.	0%	0%	4.7	3.5	3.0	4.5	4.5	4.7	2.8
	Donate old trade journals or magazines.	17%	0%	4.5	3.5	3.3	4.5	4.3	4.5	3.3
Recycle	Recycle paper	83%	0%	5.0	5.0	4.7	4.8	4.8	5.0	4.5
	Recycle cardboard	17%	0%	4.7	3.5	3.5	4.7	4.7	4.7	3.3
	Recycle aluminum cans	100%	0%	5.0	5.0	4.3	5.0	5.0	5.0	3.8
	Recycle plastic bottles	100%	0%	5.0	5.0	4.3	5.0	5.0	5.0	3.8
Energy Use	Use computer and monitor power management.	33%	0%	4.7	3.5	3.5	4.5	4.2	4.3	3.2
	Don't use a screen saver.	50%	0%	4.3	2.0	3.7	4.2	4.2	4.5	3.0
	Turn down the brightness setting on your monitor.	0%	33%	3.5	2.7	3.5	3.2	3.2	3.8	3.8
	Use a laptop instead of a desktop.	0%	0%	4.5	2.2	2.3	4.2	4.0	4.2	1.7
	Close unused applications and turn off your monitor when not in use for more than an hour.	0%	17%	3.5	2.3	3.8	3.7	3.3	3.3	3.7

about green building practices while simultaneously maximizing effectiveness of the training. This process provides an objective means of focusing on the information important to the client and instructors.

The decision matrix process minimized a list of over 40 LEED credits and initiatives achieved by the new CHP building to 2 main ideas: waste reduction and energy savings. A list of behaviors that would support theses focuses was developed and tested in a focus group to determine if staff were already doing these behaviors or if there was a need to train staff on waste reduction and energy saving behaviors.

Results from the focus group supported that one of the focuses derived from the decision matrix, energy reduction, was new information to the focus group participants and was pertinent to their daily activities as clinical staff. Most of the energy reducing behaviors suggested to the focus group participants were not practiced and many of these suggestions were new information to participants. This supports the validity of the outcome of the decision matrix. Staff members were already doing many waste reduction activities, especially ones that the individual had the choice to make. Waste reduction activities were not practiced only when it was out of the control of the individual to act. Waste reduction is important to UPMC staff, as seen by their current actions, which supports the outcome of the decision matrix in determining the issues that are most important to the client.

The next step for this study is to develop the training, based on the outcomes of the decision matrix and focus group. With a final focus of energy savings, the next step is to determine what type of information and what quantity of information should be presented in the training. For example, do participants need a greater amount of global environmental information to be willing to change their behaviors or will a list of desired sustainable behaviors inspire behavior change? Future research will also compare the ability of the training to influence occupants of conventional buildings to act in more sustainable manner.

ACKNOWLEDGEMENTS

We acknowledge funding from the University of Pittsburgh's Mascaro Center for Sustainable Innovation, the Heinz Foundation, and University of Pittsburgh Medical Center. We also acknowledge the participation and support of Allison Robinson Director, Environmental Initiatives, University of Pittsburgh Medical Center.

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