

## RECYCLING ATTITUDES AND BEHAVIORS ON A COLLEGE CAMPUS: USE OF QUALITATIVE METHODOLOGY IN A MIXED-METHODS STUDY

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*Many universities are strengthening existing programs and developing new ones to encourage environmentally responsible behavior. Michigan State University is expanding its recycling program, and researchers are conducting a phased, mixed methods study of faculty, staff, and students to understand their behaviors, values, and attitudes regarding recycling. The first phase consisted of focus groups with students and operational and technical staff. As reported in this paper, the focus groups revealed that students and staff profess pro-recycling attitudes but encounter barriers to recycling on campus. Additionally, we found staff participants to be deeply committed to an educational mandate including pro-environmental components. The results provide a basis to develop further lines of inquiry on campus and inform the development of new recycling initiatives.*

**E**nvironmental scholars have closely examined the connections between pro-environmental attitudes and behavior (Borden & Schettino, 1979; Dwyer, Leeming, Cobern, Porter, & Jackson, 1993;

Hines, Hungerford, & Tomera, 1986; Newhouse, 1990; Wysor, 1983). Early simple linear models suggested that people with pro-environmental attitudes also engaged in pro-environmental behaviors (Kollmuss & Agyeman, 2000). However, these

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models quickly proved inadequate, and researchers developed more complex models that included such factors as barriers to and incentives for participating in pro-environmental behaviors (Hines et al., 1986; Meinhold & Malkus, 2005).

Because individuals' participation in recycling initiatives may be identifiable behavior, it can be compared with people's attitudes and examined in a variety of contexts. While scholars have investigated people's demographic characteristics as predictors of their recycling participation (Ewing, 2001; Ferrara & Missios, 2005; Howenstine, 1993; Oates & McDonald, 2006), these studies have contradictory findings. Other scholars have found that social factors, especially recycling opportunities and convenience, are accurate predictors of recycling participation (Carlson, 2001; Derksen & Gartrell, 1993; Kelly, Mason, Leiss, & Ganesh, 2006; Tonglet, Phillips, & Read, 2004). Studies of university recycling programs found similar predictors for participation (e.g., Kelly et al., 2006). However, Kelly et al. reported: "A contrast [exists] between undergraduate students recycling sometimes on campus against general staff and postgraduate students (and to a lesser extent, academic staff) recycling on campus frequently" (p. 53). This finding invites further inquiry.

The Vice President for Finance and Operations of Michigan State University (MSU) launched an environmental stewardship initiative as part of MSU's Boldness by Design strategic plan that includes, among other things, an effort to improve campus recycling. An environmental stewardship team advises the initiative. As part of this team, a group of faculty and students are studying the recycling behaviors, values, and attitudes of faculty, staff, and students to help administrators make decisions about the design and implementation of recycling facilities, infrastructure, and programming. While this arrangement incorporates a research component into a matter of campus policy and practice, it also creates tension between rigorous academic work (which requires time) and quick turnaround for operational action plans. Our recycling behavior research team uses a phased approach to address this challenge.

The focus group study presented in this article is the first phase of our team's larger multiple-methods study. We organized the study to learn from diverse campus populations about how they understand the current recycling system, how they participate in it, and their suggestions for its improvement. Later phases of this

project will broaden and deepen our understanding of the knowledge and behaviors of students, faculty, and staff across the campus.

## **Method**

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### *Research Questions*

Our team's recycling research efforts center around two main goals: (a) to inform the university about the state of recycling on campus, and (b) to broaden the body of knowledge available about campus recycling programs. From these goals we first developed three overarching research questions to guide our work: 1) What are the recycling knowledge, behaviors, values, and attitudes of the three principal groups of MSU campus community members (faculty, staff, and students) and how do these characteristics vary within and between groups? 2) What do the attitudes, behaviors, knowledge, motivations, and barriers suggest for efforts to increase recycling participation at MSU? 3) What potential approaches and techniques may be most effective for improving recycling behavior on the campus? This paper provides a response to the first research question.

### *Research Design: Mixed Methods*

The research questions illustrate the range of issues we plan to uncover through this project. Thus, we aim to triangulate qualitative and quantitative methods. We chose methods that would best answer the research questions comprehensively from various angles. Henderson (1991) explained that using qualitative and quantitative methods simultaneously can help investigators understand the different perspectives that participants have about the research questions.

The overall project has several phases and utilizes data from four sources: (a) focus group discussions, (b) individual interviews, (c) a short faculty survey, and (d) a detailed web survey of all campus groups. As mentioned, this paper discusses the findings from the first phase, in which we held focus group discussions in search of answers to our first research question about recycling knowledge, behaviors, and attitudes. The focus group findings provide a preliminary understanding that helps guide the interviews and surveys in the subsequent phases of the study. The triangulation of methods allows earlier phases to influence and strengthen later ones, as each stage of the project builds on and expands earlier findings. Thus, additional phases will allow us to deepen and broaden our understanding of the

research questions we have begun to explore with these focus groups, which in turn will guide the next research steps.

### *Phase One: Focus Groups*

We organized the focus groups to learn from diverse campus populations about how they understand the current recycling system, how they participate in it, and their suggestions for its improvement. Previous studies suggested that attitudes and convenience are both important to recycling participation (Kelly et al., 2006; Meinhold & Malkus, 2005; Newhouse, 1990; Perrin & Barton, 2001; Schultz & Oskamp, 1996; Scott, 1994). Thus, we examined these aspects of campus recycling through the perspectives of MSU students and staff in nine focus groups held in the fall of year one.

### *Participants*

In conducting research about the MSU community, the research team recognized four important stakeholder groups on campus: faculty, clerical-technical staff, operations staff, and students. These categories include individuals who are regularly on campus for a sustained time period and thus will likely use the recycling program. The focus groups did not include faculty members due to the difficulty of recruiting them to participate in this type of research and the university administration's request for quick results. Later phases of the project include faculty surveys. These focus groups elicited information from groups of students and groups of staff.

We separated staff into two categories: clerical-technical staff and operations staff. Clerical-technical staff are those staff members who work in an administrative capacity, either as office assistants, subject or department specialists, information technology and computer developers, financial officers, or managers. Operations staff members are those people involved in the operation and maintenance of the university, including custodial staff, maintenance and grounds workers, and housing and food services personnel. We also separated operations managers from hourly operations staff to gain a variety of perspectives. We made these divisions so that responses from a range of members from each stakeholder group could be included and to allow for open, unrestricted discussion among individuals from similar groups. This consideration was particularly

important in the case of operations staff and managers because it is important to avoid mingling individuals with different levels of power or expertise in an open discussion like our focus groups (Krueger & Casey, 2000).

We recruited clerical-technical staff members using telephone invitations. Using a sample stratified by college, we randomly selected staff members from each college and screened each individual to eliminate participants with extensive recycling knowledge. Due to MSU policy, staff members could not receive monetary payment for participation in research activities. Therefore, we compensated staff by providing lunch during the sessions.

We stratified operations staff lists by department and building. These staff members received invitation letters and chose whether to participate (self-selected), which ensured willing participation and protection of identity from supervisors. As an incentive, the hourly staff members received release time from their work. Operations staff members do not have the freedom to set their own schedules and needed their supervisors' endorsement in order to participate. Therefore, we designed our sampling procedures around these constraints. We held one focus group with four high-level building managers (senior operations staff) to understand the challenges of running campus-wide programs. These participants also received release time from their duties to participate. Since operations staff participants are a particularly vulnerable population, we did not record these conversations to help further protect their anonymity and to encourage open discussion about the positive and negative aspects of their jobs as it relates to recycling.

We stratified student participants by class (freshmen and sophomores as underclassmen; juniors and seniors as upperclassmen) because we recognized that upperclassmen are more likely to live off campus and perhaps have more experience with the campus program than newer students. We telephoned students from two randomly generated lists from the registrar's office, one of 500 underclassmen and another of 500 upperclassmen. We asked each student a series of questions to determine his or her eligibility and did not include students who had significant experience with recycling issues, such as volunteering with a student environmental organization.

We offered students \$20.00 for their participation in the focus groups. This cash may not

have been enough incentive because recruitment was extremely difficult, and many students hung up the telephone or refused to participate. We recruited most of the underclassmen participants using the telephone as discussed previously. However, we were less successful in recruiting upperclassmen participants in this way. Therefore, we used personal contacts to fill the upperclassmen focus groups, as long as the students passed the screening process. These students came from diverse backgrounds and represented several different college departments just as intended through the development of the random selection and screening process. None of these students had previous involvement in an environmental organization, stood out as "experts," or had particular familiarity with recycling issues. We do not believe this recruitment irregularity is a significant problem in the context of our findings. Thus, a range of individuals who did not have much background knowledge about recycling issues participated in each focus group, yet each group elicited important insights and opinions.

### *Credibility*

Throughout the research process, we took several steps to collect dependable data. We focused on understanding and recording the participants' responses accurately. To accomplish the first, both the moderator and assistant moderator asked participants to further explain several issues during the focus groups. We also paraphrased participants' responses and asked them to correct our interpretations. Other members of the research team viewed the focus groups through a video monitoring system to ensure moderators and assistant moderators were appropriately guiding and clarifying the discussion. Thus, we can be confident that we understood the focus group participants.

To make certain we recorded the discussions accurately, we hired professional transcribers to provide hard copies of our audio-recorded sessions. The moderator and assistant moderator took detailed notes in each session, as did other research team members who observed each focus group. We integrated the transcripts, all of our combined notes, and session observations into an overall summary for each focus group. In this way, we made certain we had an accurate recording of the focus group discussions.

In addition to accurate data gathering, we used great care in the analysis of the data in order

to get credible results. We thematically coded the focus group transcripts and notes to unitize the data into useable categories (Maxwell, 1996). First, one of us devised a coding system using three transcripts. Then, the other researchers independently coded three other transcripts with the draft coding list. Three researchers (our coding team) then compared codes, line by line, in the three newer transcripts (Henderson, 1991). The coding team noted discrepancies during this comparison, and the rate of error was extremely low, occurring in less than 10% of cases. Most discrepancies involved one researcher overlooking one code in a particular section of the transcript. Thus, through this process of feedback (Maxwell, 1996), we reached a consensus about how the transcripts should be coded for accurate analysis. Finally, we compared the summaries of each focus group to the coded transcripts for consistency between the themes found in the transcripts and the sessions themselves.

### *Organization and Logistics*

We aimed our focus groups to uncover the full variety of on-campus recycling experiences and attitudes and compared them within and between campus populations. We moderated each focus group so that all participants had an opportunity to share their experiences. Participants also completed worksheets about their environmental and recycling attitudes, the materials they do and would like to recycle, and the bins they would like to use. These worksheets recorded participants' views and stimulated deeper discussion.

## **Results**

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### *Attitudes*

Participants were directed to discuss their general environmental attitudes, their current recycling behaviors, and barriers to their participation in recycling at MSU. While all of the participant populations voiced consistent positive general environmental attitudes and specific attitudes toward recycling, their reported participation in recycling initiatives varied. Many student participants noted, while they felt generally pro-environmental, environmental issues were not high priorities for them. For example, one underclass student noted: "I don't think too much about the environment." Similarly, an upperclass student stated: "I never thought about [environmental action]." However, when asked about what environmental topic concerned them, they mentioned a variety

of issues, including littering, deforestation, global warming, water pollution, nuclear waste disposal, landfill crowding and seepage, invasive species, air quality, and the development of anti-pollution standards for third world nations. Thus, they were clearly aware of many contemporary environmental issues. Students were generally hopeful and seem to believe that society can address environmental problems, as demonstrated by an upperclass student: "I think that we've just gotten lazy because we have so much land and I think there are a lot of things that we can do to solve that problem." Others specifically focused on recycling and supported increasing these programs at MSU. One underclass student said: "A lot of stuff that's in the landfill doesn't even need to be there." Students in each focus group argued that MSU could do better at recycling, echoing one student: "I think an important [issue] would probably be doing more recycling around campus and stuff; that would be pretty cool."

Staff members generally also held pro-environmental attitudes. They voiced concerns about a variety of environmental issues: air pollution, climate change, water quality, landfill space, and over-consumption. They argued for more state intervention in environmental action. A clerical-technical staff member stressed: "I'm really for [in favor of] recycling and reusing materials." An operations staff member likewise acknowledged: "Although money is important, the environment is important, too." Another operations staff member noted: "Recycling is actually very useful." She wanted to see more recycling at MSU. One was frustrated with what she saw as a lack of environmental consciousness on campus: "You would think that at a university, people would care about the environment."

Additionally, operations managers and staff perceived recycling (and other pro-environmental action initiatives) as part of the university's educational mandate. Said one manager: "We do a disservice to students without any programming or community building [around environmental issues]—we need research and education." Similarly, another described programs to reuse rather than throw away items when students vacate dormitories at the end of the year: "We fulfill an education mission with the reuse [program] and give clothes to charity." Finally, a building worker noted: "We say we want students to be environmentally literate but we don't provide them with the things they need to be good environmental citizens." This wide-reaching staff commitment to

environmentalism and recycling as part of the educational mandate of the university is not found in the literature and bears further study.

### *Behaviors*

Our various stakeholder populations participated differently in recycling at MSU. Students appeared to participate the least. Underclassmen in the focus groups reported recycling newspapers in the print media recycling bins they see around campus, cardboard in the dormitories with cardboard compactors or dumpsters, and they reported returning cans and bottles to stores for deposit returns. This discussion highlighted that certain dormitories had highly active recycling programs and that these dormitories had hall governments and other student organizations, while other students reported little or no recycling efforts in their dorms. Students also perceived the cafeteria staff as not fully recycling reusable items. Upperclassmen reported less participation in recycling at MSU than underclassmen.

Students also seem to recycle rarely off-campus. Only a few students knew about local community (i.e., East Lansing) drop-off points (primarily one near campus, which was recently removed), and none participated in East Lansing curbside recycling, possibly due to lack of knowledge. These students commonly mentioned leaving deposit containers on their porches for local "can guys" who collect them for the cash, but some participants reported returning cans for the cash themselves.

Most clerical-technical staff members reported participating in some recycling in their departments or buildings. Clerical-technical staff members noted that recycling of white and colored paper is common in their offices. Others stated they could recycle magazines and newspapers in their departments or buildings and had seen special pick-ups for telephone books at certain times of the year. In these academic offices, recycling personnel usually picked up materials. Said one clerical-technical participant: "We have a box for books [and] magazines and whenever they pick up paper, we just let them know to pick up the box." Some clerical-technical staff members mentioned they can specifically request that recycling personnel come to their offices and remove telephone books, magazines, and other recyclables throughout the year. One participant even informed us batteries can be recycled in her building. Operations staff participants discussed

recycling as one of their job duties but did not discuss their personal participation in recycling programs.

### *Barriers and Inducements*

Much of the focus group discussions focused on why participants did not participate in recycling at MSU. Focus group participants reported barriers to recycling on campus, including: (a) access, (b) convenience, (c) knowledge, (d) physical limitations, and (e) institutional bureaucracy. Not all participants responded negatively, however. Some felt induced and enabled to participate in recycling programs that were easy to use and included meaningful incentives.

*Access barrier.* Both students and staff participants stated that there were insufficient recycling opportunities on campus. Undergraduate students in the focus groups noted there were numerous places to put trash around campus, but no recycling bins. One woman explained: "When you're walking through campus, it's just all trash cans, like you don't have an option." They noted while some people do not always recycle their newspapers where there are bins, other recycling opportunities are not as common or well-known. Plastic recycling is not available in any residence hall. One participant explained: "For water bottles, we throw them away because we actually, we don't have a place to recycle them. I don't actually know around here where you can take them."

The students suggested that they will use bins for white or mixed papers or newspapers if they see them, but otherwise they will throw these items away. They noted this lack of options especially during move-out where they suspected they would likely have a large quantity of recyclable material. Commonly, the lack of transportation to take recycling to a facility concerned many students. They often threw away return-deposit cans because they could not transport them to a store. A participant shared his frustration: "My car is at the commuter lot; I'm not going to take the bus, get my car, drive to a recycling center. You'd think they would have some kind of option, like at a dormitory."

Upperclassmen also noted their perception of a lack of recycling options in the city of East Lansing, where MSU is located. Some noted that while East Lansing may have a curbside program, they believed that their status as renters precluded their participation or they noted that they had

never heard about such a program in the first place. Said one renter:

I lived in [an apartment building] for two years and then I moved to like a private landlord in a house and [in the apartments] you don't recycle or anything; they don't even tell you there's a recycling center! I didn't know until I moved to a house and my landlord said, "Your recycling center is right down the street." I had no idea.

Respondents echoed this student's frustration when noting they had been unable to participate in city recycling programs.

*Convenience barrier.* The participants noted that recycling convenience was very important to participation. One undergraduate revealed: "I like to try and be environmentally friendly when I can, yet I also really enjoy the convenience of like disposable silverware and plateware and things." Others agreed with this sentiment and noted that without kitchen facilities and more space, they could not use reusable dishware. Students also noted they were more likely to dispose of recyclable items than go out of their way to find or go to a recycling bin. One noted that he would not carry a recyclable container, even one with a deposit, back to the dormitory: "I'm not going to hold onto a bottle all day just to put it in the recycling bin." Another student shared: "Everybody's like, 'Oh yeah, garbage is bad, recycling is good,' but it's really hard to get somebody to like put an effort into doing it [recycling] unless it's in front of their faces." Some students discussed the deposit as an incentive for recycling and suggested that while some students will use the deposit to make money, others will not find the 10¢ per can worth the hassle of returning it.

Clerical-technical staff members had quite different recycling experiences on campus. They expressed a common insight that recycling, especially recycling paper, was easy because the recycling bins are right next to the trash bins in their office space. Thus, for clerical-technical staff, recycling paper seems easy: "The trash can is right here and the recycle [bin] is right there [next to it]." They did note, however, that when someone moves out of his or her office, there is a vast quantity of material, which is difficult to sort or to recycle.

*Knowledge barrier.* Students voiced frustration with their lack of information about recycling both on campus and in general. They felt that it was difficult to read the small recycling descriptions on containers and too complicated to

understand which types of papers and plastics are recyclable. Noted one:

That's the other thing, recycling is kind of complicated when you go beyond cans and bottles because I know there's a code and everything and sometimes they [recycling programs] won't accept it, sometimes they will. One thing we usually neglect, and I definitely neglect on campus, are the shampoo bottles and things because I know that those, a lot of those qualify for some type of recycling. They have some code on the bottom, but I don't even know how I would go about recycling them so all that goes in the trash as well.

Another added: "A lot of people don't recycle things that they should because they don't think they're recyclable." Participants also noted that few people really know how important recycling is, either for the university or the environment at large. Only two student participants had seen MSU recycling trucks or information posted throughout the campus.

Clerical-technical staff members also encountered a lack of information and confusion. While they are often required to shred confidential papers, they were uncertain whether shredded papers could be recycled. Many understood that shredded paper had to be thrown away. They also did not know how and where to recycle less common materials, such as electronics, plastics, and batteries.

*Physical barrier.* Respondents found the lack of space to store recyclable materials a major problem in recycling on campus. One student vented: "There's not a lot of space to recycle all those detergent bottles, soap bottles; there's just not the space to store that stuff." Similarly, operations staff members noted a lack of space in many dormitories for recycling collection centers. When recycling materials amass, they attract pests, which further complicate the dormitory functioning. Said one operations staff member: "We can't have stuff lying around because it attracts termites and cockroaches."

*Institutional barrier.* Participants reported a lack of administrative support for recycling and a lack of institutional coordination in current recycling efforts. These foci dominated the operations focus groups because operations staff are primarily concerned with recycling in the buildings. For instance, clerical-technical staff members reported the administration requires paper copies of

electronic forms and records, which increases paper consumption and waste. Primarily, however, operations staff members have the responsibility for running recycling programs. They explained that while expanded recycling programs would increase their workload, without additional funding from the administration they would have to replace some of their other responsibilities. One manager stated: "There is lip service from above. We hear, 'You run it,' [the recycling program] but we get no help from above!"

Operations groups especially noted the chaotic organization of the recycling program and lack of communications between the recycling program and other operations departments. One building worker noted recycling materials would "mound up" because the recycling pick up schedule was unclear: "Sometimes [the recycling] gets thrown away because it's overflowing [the storage space]." Another agreed: "Recycling does not come often enough [to pick up items from the buildings]."

Managers expressed they get little assistance from residential hall administration. Said one: "No one will take responsibility for recycling and stuff; they should be helping!" Another continued: "Too often the programs start, but then they say, 'You guys can do it in operations' because it's our job to clean out bugs and stuff. This happens a lot." A third added: "We have personal commitment to do recycling and if we try to handle this, we'll give 100%. But we need a directive and money to do it right!" These institutional barriers concerned operations staff and managers a great deal.

## **Discussion & Implications**

These focus groups have given the research team a much better understanding of the recycling attitudes and behaviors of the MSU community. Carlson (2001) and Kelly et al. (2006) suggested that the social norm for recycling is well established as people want to recycle more. However, the differences between the various MSU populations offer some interesting implications. While all groups voice similar environmental attitudes, clerical-technical staff reported recycling more than students and operations staff. These discussions also uncovered many of the barriers to recycling at MSU and to pro-environmental action in general.

First, we noted that all participants generally held pro-environmental attitudes. However, students were less likely to recycle than the clerical-technical staff participants who could describe

a much wider variety of recycling opportunities. This observation supports Kelly et al.'s (2006) finding that students participate less than other campus members. However, where Kelly et al. found that academic staff was less likely than other staff to recycle, our focus groups suggested that clerical-technical staff members (what Kelly et al. described as academic staff) have the highest participation rates. We found that it is easier for clerical-technical staff members to recycle than for students. This is so because clerical-technical staff members do not have to bring their recycling to a collection point far from their place of work; a wide variety of recycled materials are collected in their departments. This arrangement is consistent with Carlson's (2001) finding that convenience of opportunities is a predictor of recycling behavior. Since clerical-technical staff members had more and easier opportunities to recycle, they reported recycling more often than students.

Interestingly, while they also held pro-environmental attitudes, operations staff perspectives seem to differ greatly from those of the other participants. They voiced concern about designing an efficient recycling system that accounts for the complexities of college administrative departments, the different facilities on campus (e.g., labs, dormitories, athletic facilities, classrooms, offices, and cafeterias), and the challenges of constantly shrinking budgets. They voiced passionate devotion to improving recycling and wanted the university to recognize its educational mandate to give students a more thorough grounding in environmental action, beginning with recycling. This educational mandate perspective has not been addressed in previous studies of attitudes and uncovers an area that deserves further study.

Second, much discussion focused on barriers to recycling. Uncovering such constraints is essential in designing future recycling initiatives at MSU. In addition to the lack of bins and the small number of materials accepted across campus, students and staff reported barriers to participation and identified lack of information about how and where to recycle, minimal space to store recyclable materials, lack of meaningful incentives, and previous failed experiences with recycling programs. This finding provides MSU administrators with information about what needs improvement in developing new programs and initiatives. This study clearly demonstrated that effort mediates the relationship between attitude and behavior in recycling as Derksen and Gartrell (1993), Domina and Koch (2002), Tonglet et al. (2004),

and others have reported. If MSU administrators want to increase recycling participation, the recycling program must be more convenient and easier to understand.

Finally, since participants understood recycling differently, education about recycling must address these different perceptions. Students and staff suggested that underclassmen are the best target for increasing recycling participation because they are new to the campus and more willing to make an effort to keep it clean. They considered higher level students as already entrenched in non-recycling habits. This observation offers considerable implications for behavior change strategies, including education and marketing aimed at lower level students. It also suggests that researchers need broader awareness about the specific knowledge students and staff require in order to understand recycling.

### **Limitations and Future Research**

The focus group study encountered limitations. First, we conducted the study under severe time constraints. Second, the small sample of participants limited the generalizability of the findings to the entire MSU population. Third, these group discussions were focused on describing current behaviors and attitudes, thus limiting our ability to draw prescriptive program implications.

*Time constraint.* Throughout this study, the research timeline challenged us. The MSU administration required quick results to begin actions so we needed to plan the focus groups, write the scripts, recruit participants, and implement the focus groups rapidly. In future research, it would be beneficial to have time to reflect about the data collection while in the process and improve the focus group facilitation and scripting. Time and pace of research have been challenges throughout the project.

*Generalizability constraint.* We conducted the focus groups with stratified sections of the MSU population providing variety and breadth of experience. However, due to the small number of participants, it is not possible to determine how typical any of the results (i.e. the pro-recycling attitudes, institutional barriers) are in the larger population nor can we prioritize one or another response based on its comparative frequency in the population. Also, due to challenges in recruiting student participants, the resulting self-selection means the participants may have been more concerned with environmental or recycling issues than those who did not participate.

*Description constraint.* We conducted these focus groups as a first attempt to understand the knowledge, attitudes, and behaviors of MSU students and staff about the issue of recycling on campus. This study was primarily descriptive and thus provides a weak basis for prescriptive program recommendations. However, the research team is using the focus group results to design in-depth interviews that will focus on developing mental modeling of MSU constituencies' knowledge and attitude factors as well as help us develop a large campus-wide survey of attitudes and behaviors. Our ongoing research will allow us to overcome these constraints and make stronger recommendations for MSU administrators' new program designs.

Having analyzed the focus group data, we are now engaged in additional study to gain a deeper, more generalizable understanding of recycling knowledge and experiences across campus. We are interviewing MSU students to develop mental models of their recycling knowledge. Mental models are psychological representations of real or hypothetical situations based on people's perceptions and level of knowledge (Morgan, Fischhoff, Bostrom, & Atman, 2002). An expert mental model depicts a collaborative effort of local recycling experts and an extensive review of the literature. A sample of MSU students and faculty members were interviewed by a single researcher from a protocol based on the concepts in the expert model to capture their mental models of recycling. As the next step, program recommendations are made based on what was known and unknown by the non-expert (students and faculty) compared to expert knowledge. The individual open-ended interviews allow subjects to reveal unique perspectives that may have been suppressed in group discussions. Also, the faculty population was not involved in the focus group research. Similarly, alternative methods of recruitment for these interviews may include different types of students, more fully exploring the range of experiences in the population. These in-depth interview methods complement our focus groups and other strategies and will allow a deeper understanding of how MSU constituencies perceive and understand recycling on campus.

Other phases of the recycling research project generalize the MSU community's recycling attitudes and preferences. To accomplish this, we have developed a campus-wide on-line survey in order to: (a) understand better the range of attitudes and behaviors within and between

community groups, (b) to generalize the mental models and focus group findings in the entire MSU population, and (c) to conduct a choice experiment to understand the program attributes participants prefer. Individuals ( $N = 15,648$ ) from across the campus community will be invited to participate based on a stratified random sampling design. The results of this survey will inform the design of the new recycling program and help shape communications efforts to promote recycling at MSU. The survey allows respondents to choose between a variety of recycling options, determining not only the most popular options, but the ones each constituency prefers. The survey contains items from the World Values Survey (European Values Study Foundation and World Values Survey Association, 2006), a tool for understanding environmental attitudes used in a variety of European and American studies. The inclusion of the World Values Survey enables us to compare these measured attitudes of MSU community members within and among distinct populations (including undergraduate and graduate students, faculty, and staff) and between the MSU population and other global populations. Thus, the collection of large-scale survey data will allow us to generalize attitudes and behaviors in the MSU populace while discovering the distinct differences between various sub-populations of the MSU community.

The focus groups discussed in this paper have allowed us a unique glimpse into the attitudes and behaviors of MSU community members regarding environmental issues and recycling. We have uncovered general pro-environmental attitudes among our students, and especially our staff, and a renewed commitment to imparting environmental knowledge as part of the MSU educational mandate. We have discovered barriers to recycling on campus that must be addressed for new recycling initiatives to succeed. Finally, we confirm previous studies in recognizing the effect of effort and convenience as mediators in the relationship between pro-recycling attitudes and participation in recycling programs. Additionally, the focus groups have given us important direction in designing the upcoming phases of the study. Thus, the focus groups are the first stage in this detailed, multi-method study of recycling behaviors and attitudes at MSU. The findings here will allow the MSU environmental stewardship team to continue improving MSU's campus sustainability in collaboration with all members of the MSU community.

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