Trayless Dining Experiment

Environment 302
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Executive Summary

The purpose of our project was to determine the feasibility of employing trayless dining in residence halls by examining student interest, convenience, and potential resource and operational cost reductions. Trayless dining simply involves taking away the trays in dormitory dining halls. The major benefits of doing this include conserving resources such as water and food waste. By completing this project we hope that it will open the door to implementing trayless dining in all dining halls at the University of Michigan in order to conserve resources and increase awareness of the campus sustainability movement.

We designed and conducted a trayless dining pilot program from start to finish at the Mary Markley dining facility for a total of 15 meals during the month of March. Through surveying and personal interaction, we found that the majority of students interviewed (80%) stated that they found being environmentally friendly either "very important" or "important." With that in mind, we provided background information about the benefits of trayless dining with promotional posters and table tents, as well as conducting surveys before and after trayless dining was in effect at the Markley dining hall. We measured the success of the pilot through survey responses, as well as changes in waste generation and water use reduction.

Surveys and food waste measurements yielded both positive and negative results for trayless dining. Post survey results indicated that 49% of students surveyed felt "very satisfied" or "satisfied" about the amount of food waste they saved. 58% said they felt "very satisfied" or "satisfied" with the increased room on the tables. There were many comments about how people enjoyed helping the environment and several were pleased that they ate less food. Nearly three quarters (74%) of those surveyed were unsatisfied with the ability to carry food from the serving areas to the tables and in response to a question regarding the overall experience, 41% were unsatisfied. Major complaints were mostly in regards to difficulties in carrying food to the tables and having to make multiple trips to the serving area. Though a large percentage of students expressed dissatisfaction, these students also gave suggestions to how they felt trayless dining could improve. We strongly suggest addressing these student generated suggestions, making trayless a more positive and satisfying experience for those who felt otherwise.

The food waste measurement results indicated that there was 50.35 pounds less food waste during the week of trayless dining which translates into a savings of .105 pounds of food saved per person meaning there would be an annual food savings of 50.4 pounds per person every year. Since dining serves about 2.5 millions meals every year, that would be a 262,500 pound food savings per year if trayless were adopted campus-wide.

Upon concluding the trayless pilot, we believe that trayless dining can become a regular part of dining operations. The success of trayless dining is dependent upon increasing student satisfaction, which may be achieved by selecting appropriate dining halls, early implementation, modifications to increase convenience, and education on the diverse benefits of trayless. It will be necessary to assess residence halls for large percent incoming residents and smaller size of dining facilities. Implementing trayless at these select facilities will better ease students into the trayless dining experience. Introducing trayless dining during summer orientation will provide the opportunity to educate new students on the diverse benefits of trayless and discourage students from getting used to

the convenience of trays. Modifications are needed to improve student convenience such as adjusting dining hall serving areas to be closer to seating in order to make carrying plates easier. Guided by these suggestions, implementation of trayless at Michigan can be a positive, satisfying experience for students and can inspire sustainable living on the campus.

Project Goals/Objectives

The increase in environmental awareness on campus and student movements to achieve campus-wide sustainability within the university as well as the benefits of reducing costs and waste act as a motivator to bring trayless dining to the University of Michigan. On a basic level, we wanted to contribute to the growth in environmental stewardship and introduce this mindset to a larger portion of UM's population. Because so many resources go into dining services and a good percentage of UM students, faculty, and staff visit the dining halls, we wanted to design and implement a trayless dining pilot program in order to reduce post-consumer resource waste (e.g. food waste), as well as decreasing required maintenance resource use (e.g. water and detergent used to dishwashing) as well as saving time for employees. Throughout the process of our project, we wanted to determine if trayless dining is feasible for the university to implement as a standard dining operations procedure by analyzing actual resource use reduction during the pilot program process. By utilizing surveys, we wanted to incorporate student feedback in our analysis of the benefits and negative effects of removing trays from the dining halls. Because we would likely run into problems created by the removal of trays, we also wanted to look at potential modifications that could be made to make the implementation of trayless dining a less painful process for all affected by it.

Process Taken to Achieve Goals

Upon learning we would be carrying out the Trayless Dining project, we immediately began meeting weekly as a group and also with our project sponsor, Jeff Schroeder, the UM Housing Division's Sustainability Program Manager. The following list spells out the tasks accomplished in order to complete our project.

- Markley selected as our alpha site for trayless dining pilot
- Met with John Janulis and Jeni Dietch, Markley Hall Directors, and Nate Jones, Markley Dining Manager, to determine support for our project.
    - All were highly supportive and excited to see trayless dining happen in Markley. We had various meetings with housing and dining staff about the trayless experiment.
- Pre- and post-surveys designed and later reviewed by Elias Samuels of the Housing Research Office prior to submission of research application
- Approval granted from Housing Research Office
    - No changes required for our experiment design and both surveys.
- Advanced promotion took place in the form of hall-wide mass email to Markley residents, flyers in each hallway and in lobby, large posters outside dining hall entrance, and table tents on each table in the dining facility
    - Promotion began Tuesday, March 10th and continued throughout the pilot program period.

- Pre-pilot surveying to assess interest and support of trayless dining
    - Surveying began Wednesday, March 11th and concluded Friday, March 13th prior to start of pilot.
- Analysis of pre-pilot surveys gave us information about the importance of being environmentally friendly to residents, as well as measuring their acceptance to trayless dining in the Markley Dining Facility.
- Trayless dining pilot carried out following completion of pre-pilot surveys
    - Pilot began Monday, March 16th for breakfast and ended Friday, March 20th after dinner→ 15 meals total (breakfast, lunch, and dinner for 5 days)
- Exit polls carried out during the dinner hour Monday-Thursday (4 meals total)
    - We had a table set up at each dining hall exit with either 2 or 3 members of the group asking students to give feedback about their trayless dining experience.
    - We had information that gave more background on our project, as well as props that reflected resource use reduction facts (e.g. 6 empty gallon-sized milk jugs reflected that if a student were to go trayless for 13 meals a week, he or she would indirectly reduce water use by 6 gallons due to not washing trays; 40 lb bookbag represented the annual per person average amount of food waste reduction)
- Analysis of post-surveys and conversations helped to determine efficacy and support of trayless dining by Markley residents and staff members
    - We incorporated written comments, as well as verbal suggestions, as possible improvements that could be made to a trayless dining program or as strengths that our design and implementation of trayless dining had.
    - We spoke to dining staff regarding the positive and negative impacts of removing trays from the dining hall in order to gauge how trayless dining impacted those working in the facility.

Summary of Findings

To gauge the reception of the trayless dining experiment we conducted research before and during the experiment. The week prior to the experiment, interest surveys were conducted to gauge how the experiment would be perceived by residents. We stood outside of the dining hall entrance with 100 interest surveys and asked residents to fill them out as they went in for dinner. The interest survey consisted of three questions. These were our findings for the interest survey.

In response to question one of the interest survey, which asked “How important is being environmentally friendly important to you?” out of 100 people surveyed, 22% of residents answered “very important”; 58% answered “important”; 11% answered “neutral; 4% answered “unimportant”; and 5% answered “very unimportant”. (See Figure 1.) This told us that 80% of people surveyed found it at least “important” to be environmentally friendly.

In response to question two, which asked “I would accept the removal of trays from this dining hall in an effort to reduce waste, energy, and cost of operations.” out of 100 people surveyed, 21% of people answered “strongly agree”; 32% answered “agree”; 20% answered “neutral”; 17% answered “disagree”; and 10% answered “strongly agree”. (See Figure 2) These results showed that 27% of residents would not support the removal

of trays in the dining hall, even if removing trays would reduce waste and energy. For the most part, these results balance the results of the first question, as 80% of residents found it important to be environmentally friendly while almost 20% were either neutral or did not support the idea at all.

In response to question three, which said "If trayless dining was permanent at Markley, would the frequency that you would eat there be:" out of 100 people surveyed, 6% of residents answered "always"; 5% answered "more often"; 61% answered "about the same"; 26% answered "less often"; and 6% answered "never". (See Figure 3.) While these results could mean a significant decrease in resident who eat at Markley, as 32% of residents surveyed said they would either eat less often or never eat in the facility, the food counts from the week prior to trayless dining and the counts from the week of the actual experiment were not off by much. Michael Card, a student manager from Markley Dining Hall provided us with the food counts for the week before trayless. During the week of trayless dining there were 7037 people who ate in Markley, while the week before 7041 people ate in Markley—a loss of 4 people compared to the 26% of people who said they would eat at Markley less often.

During the actual experiment, we conducted trayless dining exit by the dining hall exits to gauge the satisfaction levels of the residents. Here were our findings.

We found that in response to a question asking how residents felt about their own food waste reduction, out of 113 people surveyed, 18% of residents answered "very satisfied"; 31% answered "satisfied"; 29% answered "neutral"; 29% answered "unsatisfied"; and 11% answered "very unsatisfied". (See Figure 4.)

In response to a question about increased room on tables out of 113 people surveyed 19% of residents answered "very satisfied"; 39% answered "satisfied"; 27% answered "neutral"; 8% answered "unsatisfied"; and 7% answered "very unsatisfied". (See Figure 5.)

In response to a question about the ability to carry plates and cups from serving station to table, out of 113 people surveyed 0% answered "very satisfied"; 5% answered "satisfied"; 21% answered "neutral"; 36% answered" unsatisfied"; and 38% answered "very unsatisfied". (See Figure 6)

In response to a question about the ability to carry plates and cups from table to return station, out of 113 people surveyed 2% answered "very satisfied"; 19% answered "satisfied"; 30% answered "neutral"; 22% answered" unsatisfied"; and 27% answered "very unsatisfied". (See Figure 7)

In response to a question about the overall satisfation with the trayless dining experience, out of 113 people surveyed 6% answered "very satisfied"; 20% answered "satisfied"; 33% answered "neutral"; 20% answered" unsatisfied"; and 21% answered "very unsatisfied". (See Figure 8). After receiving these results we acknowledg that 41% of student being at least unsatisfied with the entire experiment is a major concern and may make Dining Hall Managers hesitant about implimenting this in their dining halls. This is why we found the resident's comments extremely important as they would help us present ideas to the dining hall staff of how to improve the trayless dining experience for the future.

The exit surveys had three questions that allowed residents to provide comments about their experience with trayless dining. The first questions asked residents what they liked about trayless dining. The combined comments for this question revealed that most

residents like the idea of helping the environment by conserving energy and reducing food waste food waste, while some people absolutely hated it. Some comments we received where, “[I liked] the fact that it is helping the environment.”; “It made me take less food. I eat only what I can hold.”; “[I liked] nothing except for the fact that I was helping conserve resources.”; “[I liked] nothing really other than knowing it helps the environment.” Even the residents who initially claimed they did not like anything about the trayless pilot admittedly found something they liked.

The second question asked residents what they disliked about trayless dining. Most residents did not like that they had to make multiple trip to get food or to return their dishes. The fear of spilling food and the messes that were left on tables were also issues that were raised. The final question asked how residents thought the trayless dining experiment could be improved. Suggestions included having silverware closer to tables, hiring more workers to clean the tables, providing bigger and compartmentalized plates, and to not remove trays at all.

According to two of the student dishroom coordinators, the lack of trays allowed the dishroom staff to finish their work and leave 30-45 minutes each night of trayless. This alone can save human energy and increase the amount of money dining might save by closing earlier. Michael Card helped us in measuring food waste during Wednesday dinners of trayless dining and the week prior to the experiment. Table 1 shows the amount of food waste reduced by going trayless. During the week prior to trayless, there was 177.15 pounds of food waste after Wednesday dinner compared to a reduction of just 126.99 pounds of food we week of trayless— a savings of 50.35 pounds of food for one meal! This is about a .105 pounds of food savings per person. With a .105 pound reduction of food for one person for 3 meals a day for 5 days a week for 32 weeks in a year (that meals are served), there would be an annual food savings of 50.4 pounds per person every year. Since dining serves about 2.5 millions meals every year, that would be a 262,500 pound food savings per year which would be a huge savings for residential dining.

Enabling Forces/Opportunities

We have received support for a trayless dining pilot program from Jeffrey Schroeder, Coordinator of Sustainability and Management Systems, as well as support from Mike Lee, head of Residential Dining Services. Support from higher management is key to getting things implemented on campus. It is also important to have support from students. It would be a great opportunity to have the Student Sustainability Initiative (SSI) group on board. SSI helps students, administrators, faculty, and staff incorporate sustainability principles within the campus infrastructure and academic curriculum. Graduate and Undergraduate students designed this group to help shrink the gap between students and administration. SSI could not only help us make trayless permanent at Markley, but they could help make trayless campus-wide. We also found that employees were very supportive of trayless dining even though they had to deal with the complaints and misbehavior. Cooperation is key to a successful project and the Markley Dining Staff is ready to help with the change. Trayless dining is a great opportunity that is economically profitable and will help raise awareness of environmental and social issues.

Barriers/Constraints

Our trayless project encountered several barriers generated from the application process, timing of the pilot, students and Resstaff, and physical layout of Markley Dining Hall. Student safety is a priority for the UM housing department, and as such the department must approve any outside party interested in surveying dormitory residents. This approval process is consequently thorough and lengthy, postponing our pilot for several weeks. Fortunately our sponsor, Jeff Schroeder, was able to push our application through – our pilot may never have happened without his help. The application process will be a barrier for additional future trayless experimentation; however it will not likely affect any permanent implementation of trayless dining.

The timing and time constraint likely influenced the thoroughness of the trayless pilot. Residence hall meal menus are repeated on roughly a 60 day cycle. This meant that our two consecutive weeks of study did not include similar meal menus. We do not believe this affected the number of diners (week 1 with trays served 7,037, while week 2 without trays served 7,041) however it may have altered our food waste numbers. Food waste was measured during two consecutive Wednesday dinners, serving different entrees that likely did not have equal weights. Thus, we stress that our food waste assessment is a rough estimate, meant only to give a rough estimate of potential savings.

Student and ResHall staff attitudes were the largest barriers for our trayless dining project. Likely heightened by the late timing of trayless, students expressed strong affinity for trays and strong resistance to change. Though from strictly observational evidence only, we believe that peer pressure was highly influential. Students with in large groups appeared easily swayed to support or (more often) oppose trayless to follow the opinions of the vocal few of the group. Though observational only, this "power of the group" should be considered in future studies or implementation of trayless. Students also seemed heavily influenced by the attitude of their Resident Advisor (RA). Many were unabashedly opposed to trayless yet seemed unaware of the benefits trayless provides. As leaders and role models in the residence halls, RA's should be well-informed of the trayless dining movement and be able to provide information to the students instead of any negative, personal opinions.

Recommendations

We feel the positive impacts of trayless dining at Michigan cafeterias will be felt across campus, and we offer several suggestions regarding location, timing, materials, and staff for successful implementation. An assessment of each Michigan cafeteria should be made (regarding layout, size, etc.) to select those dining halls best suited for a positive trayless dining experience. From these optimal locations, residence halls with a large majority of incoming freshmen should be selected for trayless dining. We found the largest barrier for trayless dining to be student resistance to changing behaviors and attitudes. It is difficult for current students to transition from the convenience of trays. Therefore we suggest that trayless dining be implemented at residence halls with a high percentage of entering freshmen, from the moment they begin their dining experience during orientation. Freshman orientation provides a great opportunity to educate the incoming students of the environmental, social, and financial benefits of trayless. Following these suggestions will likely increase the success of trayless dining as incoming students will not be introduced to the convenience of a tray and will be well-informed of the positive impacts their actions have.

In response to patron suggestions during our trayless dining pilot, we recommend adjustments in the layout and dishware of trayless cafeterias for a more convenient dining experience. Trayless dining resulted in a balancing act for most patrons, so to alleviate this inconvenience the silverware should be relocated closer to the dining area. Without having to carry a fistful of silverware, diners have a free hand to make carrying food easier. Upon the next dishware re-purchasing, we also suggest the dining halls consider purchasing larger dishware, such as deeper soup/cereal bowls, to lessen the inconvenience of going trayless. The relocation of silverware and purchasing larger dishware are two materials suggestions that will heighten the success of trayless dining on the Michigan campus.

The third recommendation for trayless implementation is a change in dining staff routine. Time saved from decreased dishwasher loading can be best diverted to more frequent cleaning of dining tables. The second biggest concern for patrons participating in the trayless pilot was the significant decrease in table cleanliness. A quick wipe down of tables several times during meals will greatly increase the satisfaction of diners, not to mention dining hall sanitation.

The final recommendation concerns outreach to students, particularly those who oppose trayless. Though many students accepted trayless for the positive impact it had on the environment, an equal or greater number were not satisfied. A portion of this unsatisfaction (based on survey comments) stemmed from lack of awareness of trayless benefits. We believe education during freshmen orientation would help address this issue before the students even become regular diners. Mary Markley has several residence hall committees, one of which is concerned with environmental issues. This group, and others like it, could perhaps organize an informational session within trayless residence halls. Non-environmental benefits, particularly financial savings, may persuade students to accept trayless who may not be interested in environmental benefits. Reduced resource use ultimately means lower food, energy, water, and detergent costs, a savings that the diners could have a say in where it is invested. As trayless removes students' convenient trays, perhaps it can give something to the students in return, such as new menu items, larger serving dishes, or personal pizza stations. Thorough education on the varied benefits of trayless can address the diverse interest of students and hopefully gain acceptance from even the opponents.

Assessment of Project Outcome

Looking back at our original goals and plan of action for this project, we were able to achieve our proposed objectives. Planning and carrying out a pilot trayless experiment in Markley for a week allowed us to view the reduction in resources (specifically food waste) that removing trays created. By creating fliers and posters about the ecological impact that trayless dining has, we were able to raise awareness of environmental issues in students. We also did this by writing and distributing surveys about the trayless pilot to those students who were affected by it. The surveys and experiment also allowed us to test whether or not students would accept the idea of going trayless. These surveys informed us of student opinions both for and against trayless, and the associated difficulties this means for successful acceptance of trayless dining.

Our main goal was to explore the feasibility of trayless dining at Michigan and through our project we identified both enablers and barriers. We were able to use these

to generate suggestions that will likely increase the success of trayless dining, if implemented. We believe our project forecasts great possibilities for trayless at Michigan, but the sizeable negative response from students must be addressed. We hope these can be overcome with careful consideration to select the best dining hall(s), time of implementation and effective methods of education. Through the trayless project, we have spread awareness for campus sustainability, witnessed resource use reduction, sampled student opinion, and generated suggestions for successful trayless dining in the future of Michigan dining halls. Overall, we deem the trayless project a successful step towards implementing trayless dining at Michigan.

Lessons Learned

Through doing this project and carrying out a pilot trayless experiment in Markley, we learned a lot about what it would take to actually implement trayless dining campus wide. One of the major obstacles would be to overcome the negative feedback that we received through our surveys and through simply talking to diners. Nearly all struggled with making more trips to the serving areas and difficulties with balancing dishes. We have several suggestions to alleviate these concerns, but the answer lies in a change in mindset. All people involved, from staff to students, need to recognize the necessity of sustainable living. We realize this is a large-scale societal issue, but we hope trayless will be a vector with which the sustainable living mindset can spread. The benefits of trayless go beyond environmental, so perhaps we can reach out to those not yet in a sustainable mindset with the economical and social benefits. Once people accept trayless, for whatever reason, they may be more likely to appreciate sustainability benefits as well. Though it will take much time, effort, and education, we hope a sustainable mindset can be achieved campus-wide - and trayless dining can both inspire and thrive off of it.

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Appendix

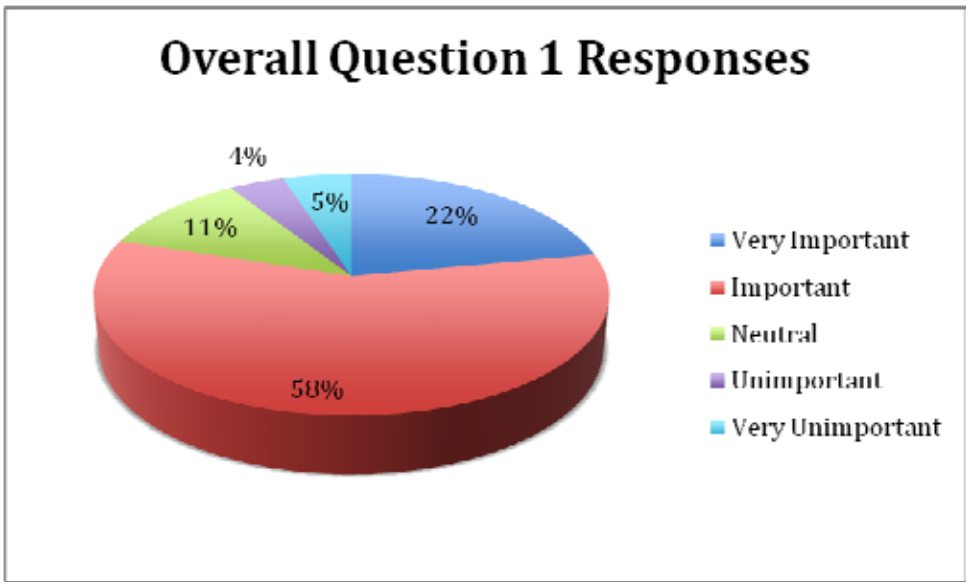

Figure 1. Pre-pilot student response to: "How important is being environmentally friendly important to you?"

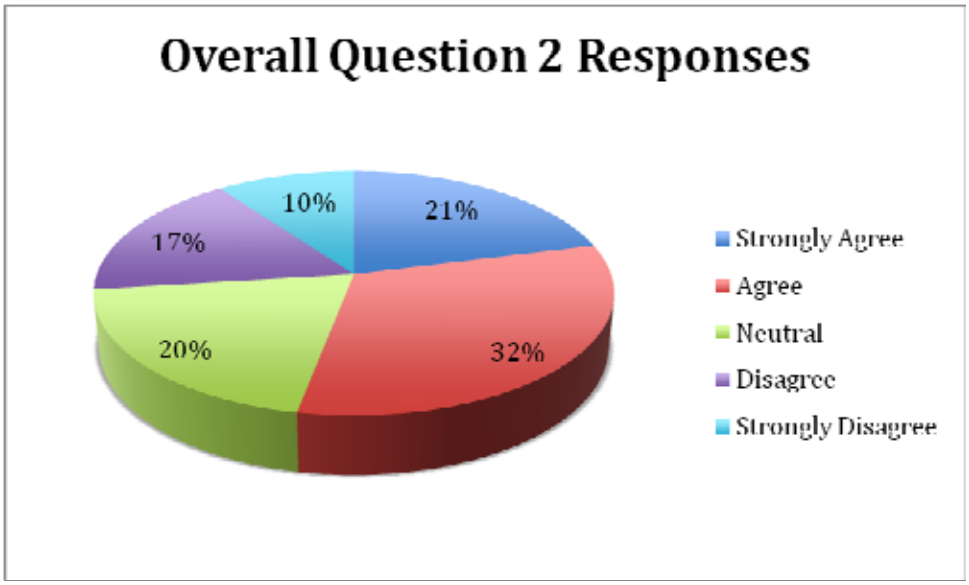

Figure 2. Pre-pilot student response to: "I would accept the removal of trays from this dining hall in an effort to reduce waste, energy, and cost of operations."

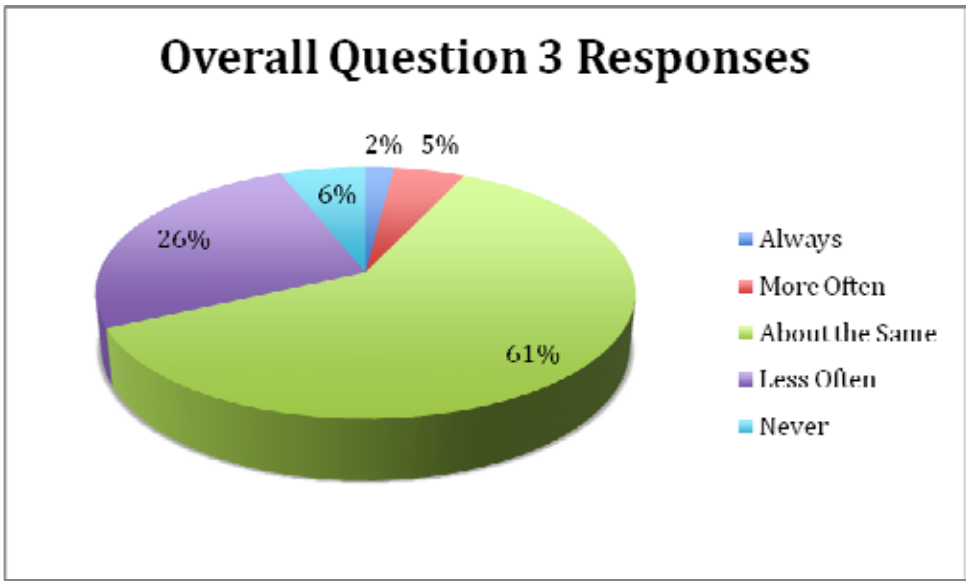

Figure 3. Pre-pilot student response to: "If trayless dining was permanent at Markley, would the frequency that you would eat there be:"

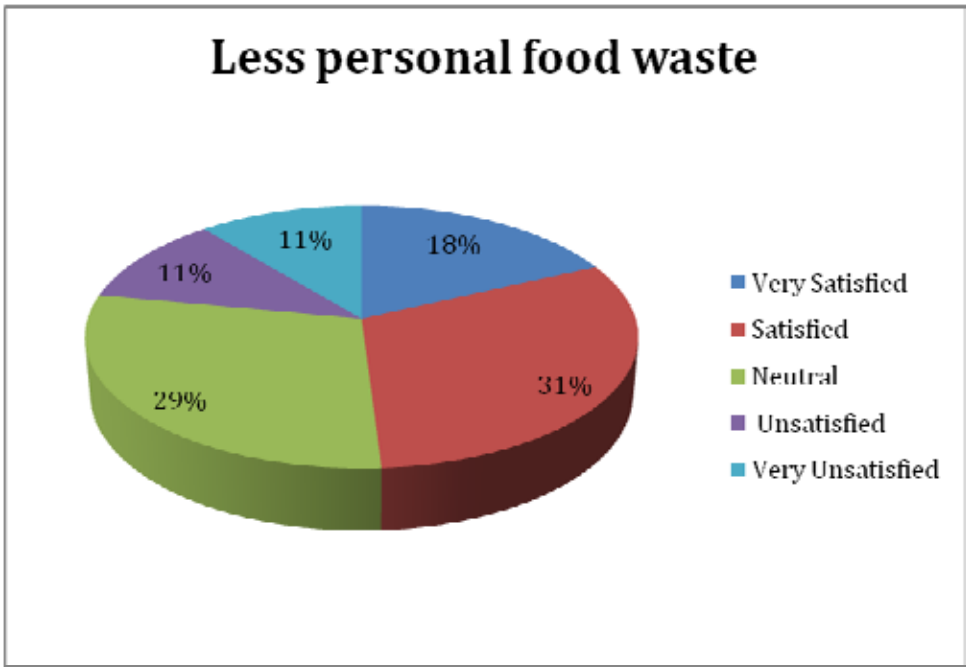

Figure 4. Post-pilot student satisfaction for reduction in personal food waste as a result of trayless dining.

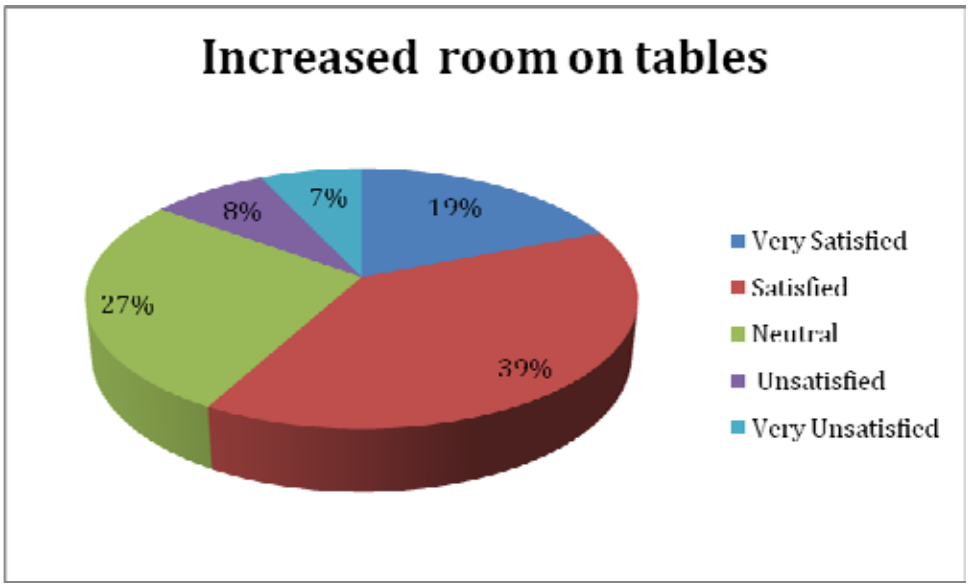

Figure 5. Post-pilot student satisfaction with increased room on tables as a result of trayless dining.

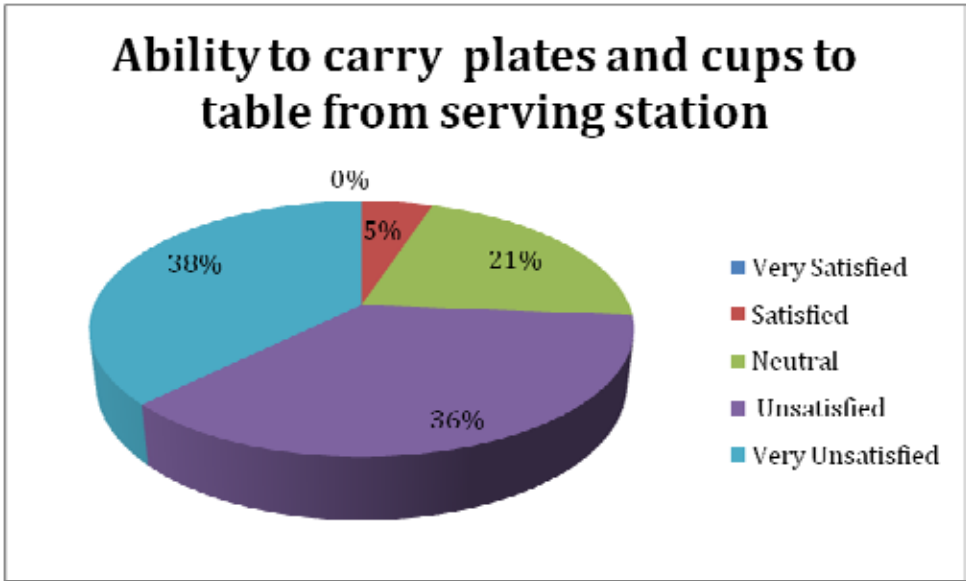

Figure 6. Post-pilot student satisfaction with ability to carry plates and cups to table during trayless dining experience.

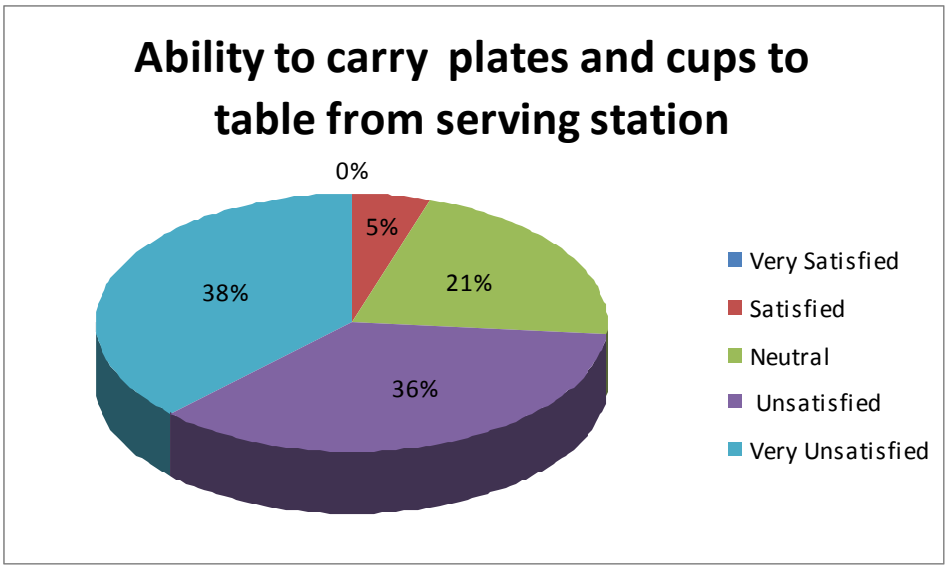

Figure 7. Post-pilot student satisfaction with ability to carry empty plates and cups to the return station during the trayless dining experience.

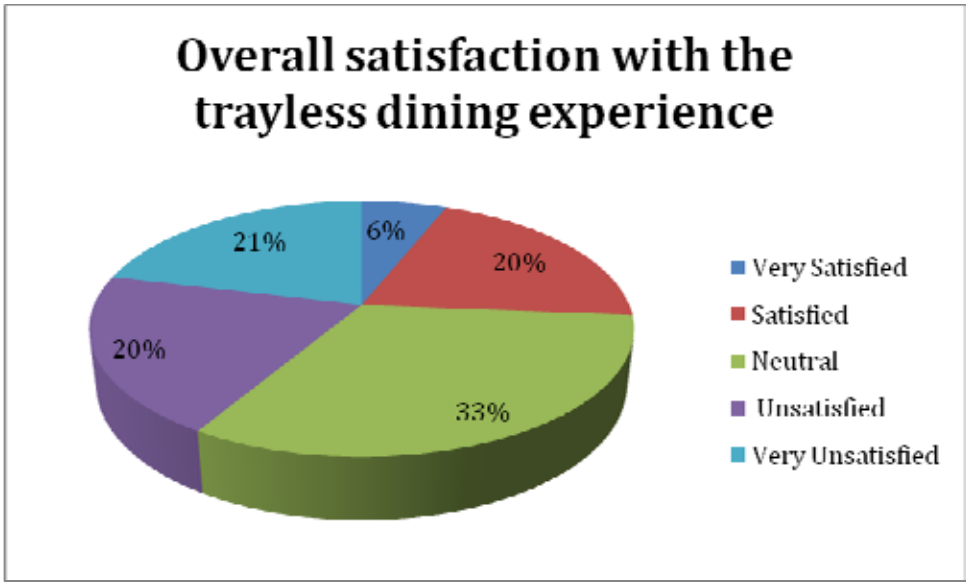

Figure 8. Post-pilot student satisfaction with trayless dining experience.

Savings of Solid Food Waste

3/11/2009 Waste pans from dinner served with trays	Pan Weight	3/18/2009 Waste pans from dinner served without trays	Pan Weight
1	8.205	1	14.05
2	9.6	2	16.135
3	13.18	3	18.26
4	12.07	4	14.625
5	14.095	5	11.645
6	11.42	6	15.59
7	11.29	7	11.605
8	13.045	8	9.315
9	12.48	9	10.74
10	12.925	10	4.83
11	9.04	11	0
12	13.925	12	0
13	11.54	13	0
14	15.59	14	0
15	8.745	15	0
Total:	177.15	Total:	126.795
Students Served:	627	Students Served:	713
Waste Per Student:	0.282535885	Waste Per Student:	0.1778331
Waste Saved:	50.355	Saved Per Student:	0.104702786
Saved Per Year:*	1611.36	Saved Per Year:*	3.350489139
* These numbers only reflect the food saved during dinner meals.			

Table 1. Solid food waste comparison from a dinner served with and without trays at Mary Markley dining hall.