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New2U Impact Report: Fostering Sustainability and Student Engagement at UMass

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New2U Impact Report: Fostering Sustainability and Student Engagement at UMass

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Executive Summary

This report presents a cost-benefit analysis of the New2U reuse and waste reduction program at the University of Massachusetts Amherst (UMass). Rooted in the university's strategic goals, New2U addresses the environmental impact of landfill waste generated during student move-outs. The program, initiated in 2014, has diverted 80,000 pounds of waste, saving 127 metric tons of carbon dioxide equivalent (CO₂e) by redistributing items through a tag sale during move-in.

Key challenges for New2U include staffing uncertainties, insufficient storage space, and the lack of a dedicated funding stream. However, the program significantly contributes to UMass's sustainability goals and engages over 2,500 students annually, supporting the university's ambition to be a zero-waste campus.

The analysis includes cost assessment of labor, outside services, supplies, as well as indirect costs. Benefits were assessed through the valuation of volunteer hours, avoided waste disposal costs, and environmental impacts. Highlight both quantitative and qualitative benefits.

Financially, the 2023 operating cost for New2U totaled \$87,759.26, while the benefits, including revenue, cost savings, and the value of opportunities created, amounted to \$26,291.40. However, the program's intangible benefits go far beyond financial metrics including the creation of volunteer and paid opportunities, improved student engagement, and contribution to UMass's reputation as a sustainability leader.

Introduction

Rooted in a legacy of leadership, the University of Massachusetts Amherst (UMass) aspires to foster positive impacts on society and instill in its students an unwavering dedication to creating a better and more just world (Strategic Plan, 2023). This commitment is not merely symbolic; it is woven into the fabric of UMass's strategic goals, which include the ambition to become a destination of choice for academically accomplished and socially responsible individuals (Goals, 2018).

Key to this mission is the New2U reuse and waste reduction program. This paper serves as a cost-benefit analysis of the program, exploring how it aligns with UMass's strategic objectives. I aim to assess New2U's impacts not only on the university's environmental footprint but also on its ability to attract and retain outstanding students from diverse backgrounds, in line with key goals outlined in the UMass strategic plan (Strategic Plan, 2023).

New2U Program Overview

Colleges, including UMass Amherst, produce enormous landfill waste, contributing to greenhouse gas emissions and pollution. UMass generates 1,600 tons of landfill waste each year which results in emissions equivalent to powering almost 897 homes for a full year. One of the peak periods for waste generation on campus is during annual move-outs when students leave their residence halls and return home. Students regularly leave behind items which oftentimes end up in dumpsters destined for the landfill. New2U, a program established in 2014, helps address this issue by collecting items during Spring move-out and reselling them at deep discounts during Fall move-in via a massive tag sale. As of 2022, New2U has diverted 80,000 pounds of waste, saving 127 metric tons (MT) of carbon dioxide equivalent (CO_{2e}) from being released into our atmosphere. This is equivalent to taking 28 gas-powered vehicles off the road for a year. (Simmons, 2022)

New2U faces key challenges, including staffing limitations, a lack of reliable storage space, and the absence of a dedicated funding stream (Simmons, 2022). The loss of New2U would be felt deeply by students who engage with the program; last year alone over 2,500 students visited the tag sale, and more than 3000 items were purchased for reuse. Loss of the program would also hinder UMass's own sustainability goals, especially its Sustainability Integration goal to be a zero-waste campus (Small, 2017).

New2U Organizational Structure

The New2U program at UMass involves three key departments: Operational Services, The Office of Waste Management (OWM), and Sustainable UMass. Operational Services coordinates move-in and move-out for approximately 14,000 students every Spring. OWM

operates the Waste Recovery & Transfer Facility and historically supports New2U but has varying involvement due to staffing limitations. Sustainable UMass, with two full-time staff members, manages New2U planning and execution (Simmons, 2022).

New2U has succeeded in reducing waste during move-out, which aligns with UMass's carbon reduction goals while also engaging and supporting students from a variety of backgrounds. It deserves greater recognition and support from the university administration to ensure the continuity of this impactful program.

Purpose Statement

The purpose of this paper is to examine the financial implications, environmental impacts, and potential for positive social change of the New2U program, and to provide a nuanced understanding of how it aligns with and supports UMass Amherst's strategic vision.

Methods

Costs Methods

This project began with an exhaustive list of costs associated with New2U, separated into sections Spring 2023, Summer 2023, and Fall 2023. Direct costs were gathered from invoices wherever possible, and estimates were made using the following methods when invoices were unavailable.

Labor hours for paid staff were calculated based on full-time equivalent (FTE) which is a unit that is equal to the number of hours a full-time employee works for an organization. The basic calculation is $FTE = \frac{\text{Total Hours Worked}}{\text{Total Working Hours}}$ for any given period (What Is Full-Time Equivalent (FTE), 2023). UMass considers a full work week to be 37.5 hours and employees work 52 weeks a year, therefore 1 FTE unit equals 1950 total working hours ($37.5 \frac{\text{hours}}{\text{week}} \times 52 \frac{\text{weeks}}{\text{year}}$). To convert the total FTE units into a dollar amount, the total FTE units were

multiplied by the annual salary of the staff persons. For the Sustainable UMass department, this average annual salary was \$74,000 per year and for the OWM and Special Projects department, it was \$68,000 per year (based on the average salary for the job title "Maintenance Equipment Operator I").

For example, if two Sustainable UMass employees worked 131 total hours you could find the total cost to pay them using the following equation:

$$FTE = \frac{\text{Total Hours Worked}}{\text{Total Working Hours}}, FTE = \frac{131}{1950} = 0.0672 \times \$74,000 = \$4,972.80$$

131 hours of work by the two Sustainable UMass employees cost the University \$4,972.80. It is important to note that before August 13, 2023, the Sustainable UMass department had only one full-time staff member along with a graduate student working 30 hours per week. On August 13, 2023, the graduate student was hired as a full-time staff member.

The Sustainable UMass department hires paid interns over the summer and the value of their work was calculated by multiplying their total hours worked by their hourly pay rate.

Indirect costs were calculated using the Facilities and Administrative Costs Rate (F&A rate) negotiated by the University and the Department of Health and Human Services. The rate for the period from July 1, 2022, through June 30, 2027, is 32%, given that New2U falls under Other Sponsored Activities on-campus (University of Massachusetts at Amherst, 2022). Once total direct costs were calculated it was multiplied by 0.32 to determine total indirect costs. This indirect cost covers New2U's use of university-owned property including printing services, building space, vehicles, and OWM supplies.

Benefits Methods

After valuing costs, benefits were assessed. Where possible, the benefits and their impacts were calculated directly using the methods below.

Volunteer hours were valued using a rate derived from Independent Sector, where the main assumption is that the "value of volunteer service is based on the average earnings of

private sector workers” excluding farm workers and management positions. As of April 2023, the value for volunteer time is \$31.80 (Independent Sector, 2023). The total volunteer hours were multiplied by this rate to find the total benefit value of volunteer labor.

The New2U program diverts 10,000 pounds of usable items from the landfill waste stream each year according to calculations from the New2U Integrative Analysis performed by Laurie Simmons in 2022. The avoided costs from this waste diversion were calculated by multiplying the tipping fee (the cost per ton that UMass is charged by a waste hauler to pick up and transport waste to a landfill) which is currently \$115 per ton by 5 tons (10,000 pounds) to calculate savings per year. Not only are there financial benefits but there are environmental impacts as well, given that the waste was diverted and did not need transportation, processing, or time to break down there are emissions savings incurred. Based on calculations performed by the EPA, recycling material instead of landfilling it saves 2.89 metric tons of CO₂e per ton of waste (U.S. EPA, 2023). Assuming the reuse of the items does at least the same (if not better) means that 5 tons diverted from a landfill equals at least 14.45 metric tons of CO₂e emissions avoided. Through my research, I could not find a more accurate calculation to determine how the reuse of items equates to emissions avoided.

The program also helps students save money on dorm-room essentials and prevents them from needing to drive to local big-box retailers to purchase these items. The financial impact of this was measured using calculations from the New2U Integrative Analysis performed by Laurie Simmons in 2022 (see Appendix A). Additionally, emissions avoided were calculated based on the round-trip distance of 7.4 miles from the center of campus to the popular big box chains in Hadley, MA. Multiplying the round-trip distance by the number of students who participated in the New2U tag sale last year gave us a total estimate for miles avoided. Assuming 25.4mpg (the average mpg for a 2021 vehicle) I was able to find the total gallons of gas avoided. This led to me calculating the financial impacts (the number of gallons multiplied by the current price per gallon) as well as the environmental impact (number of gallons avoided converted to metric tons of CO₂e avoided) of avoiding these transportation needs.

However, most of the benefits of this sustainability program are intangibles, such as improved student engagement or job creation. Despite an extensive literature review, I was not able to identify a clear method of valuing an intangible like student engagement. I had to explore other ways to value these intangible benefits. For some of these, it was determined how many

opportunities would be created by New2U. For other benefits, I determined the number of new products that would not need to be produced because students could buy them secondhand at the New2U tag sale. Finally, I needed to consider how this program impacts the university's reputation and standing as a sustainability leader.

In cases where there was not a calculable financial impact, I referenced the Global Impact Investing Network's IRIS+ system, a standardized metric tool for assessing intangibles like volunteer time or job creation (Global Impact Investing Network, 2023). Each metric within IRIS+ has a clear definition and best practices on how to measure the impacts of a metric, for example, Volunteer Hours are defined as the "number of hours worked by non-employee volunteers who supported the organization during the reporting period" (GIIN Iris+, 2022). Using a standardized system to measure impacts ensures consistency and allows for comparison of impact information.

Results and Discussion

Throughout the results and discussion section, I will be using anecdotes from students who recently completed a survey about their experience with New2U at UMass.

Costs Results

See Appendix B, C, and D for the full list of costs.

I identified three different categories for New2U costs: labor, outside services, and supplies. Labor is paid work provided by any UMass department, outside services are provided by contracted businesses, and supplies are goods that were purchased specifically for the operation of New2U.

The top costs for New2U in 2023 were Sustainable UMass staff labor, hiring movers, and renting tents for the Spring collection and Fall tag sale. These costs made up almost 25% of the total costs for the year. Within the top 25%, more than half of the costs were for labor. This is indicative of the program's intensive planning process and highlights the critical contribution that the Sustainable UMass staff makes each year to run New2U. The program's reliance on

external services for executing key operations is also evident, with the most expensive outside service being hiring movers.

Other notable costs were the labor hours provided by OWM and student interns, as well as the mattress pad recycling service used in the Spring to appropriately discard student mattress pads and toppers.

The total cost for operating New2U in 2023 was \$87,759.26.

Benefits Results

See Appendix E and F for the full list of benefits.

As mentioned in the Methods section, I initially planned to convert all benefits to a dollar figure so that I could “compare apples to apples” and more easily analyze the relationship between costs and benefits. However, after an extensive literature review, I was not able to find consistent methods for financially valuing these intangibles, so I decided to use quantitative valuing wherever possible, and qualitative valuing in all other cases.

The quantitative results include the financial and environmental benefits, as well as the number of opportunities created by New2U.

There are three categories of financial benefits. The first is revenue which is comprised of the tag sale profits and the profit from textile recycling. The total revenue for 2023 was \$11,433.80, with \$11,000 from the tag sale and the remainder from our textile recycling partner, Baystate Textiles, who pays UMass \$120 per ton of textiles. The second category of financial benefits is cost savings due to avoided fees which total \$575 for the approximately 10,000 pounds of waste diverted by New2U. The final category for financial benefits is the equivalent dollar value of the internships and volunteer opportunities created by the program. To calculate the impact of the opportunities created by New2U, I found the total pay of the 2023 interns, \$4,156, as well as the total volunteer hours value, \$6,900.60, for a total of \$11,056.60.

The environmental benefits include 14.5 MT CO₂e emissions avoided from waste diversion and 6.7 CO₂e emissions from avoided driving. The total avoided emissions of 21.2 MT CO₂e is equivalent to removing almost 5 gas-powered cars from the road for a year. The environmental benefits of New2U are not purely quantitative and I will expand on this in the qualitative analysis.

Based on past volunteer data and paid intern information I determined that New2U helps create over 50 volunteer opportunities and between two and four paid intern positions each year. These are all opportunities for students to get engaged on campus, make an impact on UMass's sustainability initiatives, and gain experience working with others.

The qualitative results include student well-being and engagement, impacts on international students, the effect on UMass's reputation, and the environmental impacts of reuse.

Students can expect to save \$660 if they choose to furnish their dorm room with New2U items instead of newly purchased products (Simmons, 2022). In 2023 students saved a total of \$2566 on gasoline when they chose to shop at New2U instead of driving to a local retailer. A survey from Gallup and the Lumina Foundation found that financial barriers are the biggest reason that adults in the U.S. are not currently enrolled in a higher education program (Gallup, 2023). Given the financial stresses of student life, it is hugely impactful for students to get deeply discounted items on campus. One student responded to the New2U survey and said that furnishing their suite "at prices that were affordable for everyone in the house with different financial situations... helped us make our house a home" and helped to support their student experience at UMass. Another student simply stated that New2U "provides affordable things in a really expensive living area. I like that it saves me money".

Student engagement can help support student success, according to a University of North Texas assessment which found that engagement results in a 16% difference in retention compared to zero engagement (Sara Hillis Ousby, 2021). This is extremely valuable for UMass to recognize the engagement opportunities that New2U creates, from volunteer hours to making purchases or donations to the tag sale. Students recognize the value that the program brings, with one New2U survey respondent noting that it was nice to know New2U is there if they need it, and that they can donate items in good condition instead of throwing them in a dumpster.

The New2U program is particularly advantageous for international students, who often face challenges with extensive travel. Due to the logistics involved, bringing dorm room furnishings from their home country may not be feasible or desirable for them. Moreover, these students sometimes lack local resources or support to visit big box stores. Common barriers include a lack of transportation and the difficulty of transporting large items, such as mini-fridges, via the local bus system.

In contrast to local students who may have personal vehicles or nearby family support for shopping, international students often lack these resources. Despite these challenges, international students represent a significant revenue stream for UMass, contributing substantially to the local economy – up to \$157 million in 2022. Consequently, UMass must provide adequate support for these students to thrive on campus if the university aims to retain and attract more international students in the future.

New2U impacts the university's reputation in several ways. First, it brings value to rating systems like STARS, The Princeton Review's Green Schools, and Sierra Club's Cool Schools which rank colleges based on their sustainability efforts. Prospective students reference these lists when choosing which school to attend. According to a survey by the Times Higher Education 46% of students considered whether a school was environmentally friendly when choosing what university to enroll in (Advance HE, 2023).

Secondly, New2U helps UMass fulfill its legacy of leadership as a leading reuse and waste reduction program. Other schools have created similar programs, and New2U was one of the first of its kind. New2U also strengthens UMass's legacy as a sustainability leader, serving as a cornerstone in an ever-broadening number of sustainability initiatives found on campus.

Finally, New2U impacts UMass enrollment numbers and may help to reduce student departures by granting financial flexibility, opportunities to engage, and knowledge that the school is committed to creating a better and more just world.

The total benefit from operating New2U, including revenue, cost savings, and the value of opportunities created, amounted to \$26,291.40.

Discussion

To better understand how the costs and benefits interact with one another, I used the logical framework to map inputs, activities, outputs, outcomes, and impacts. See Figure 1, below. (The Toolkit, n.d.)

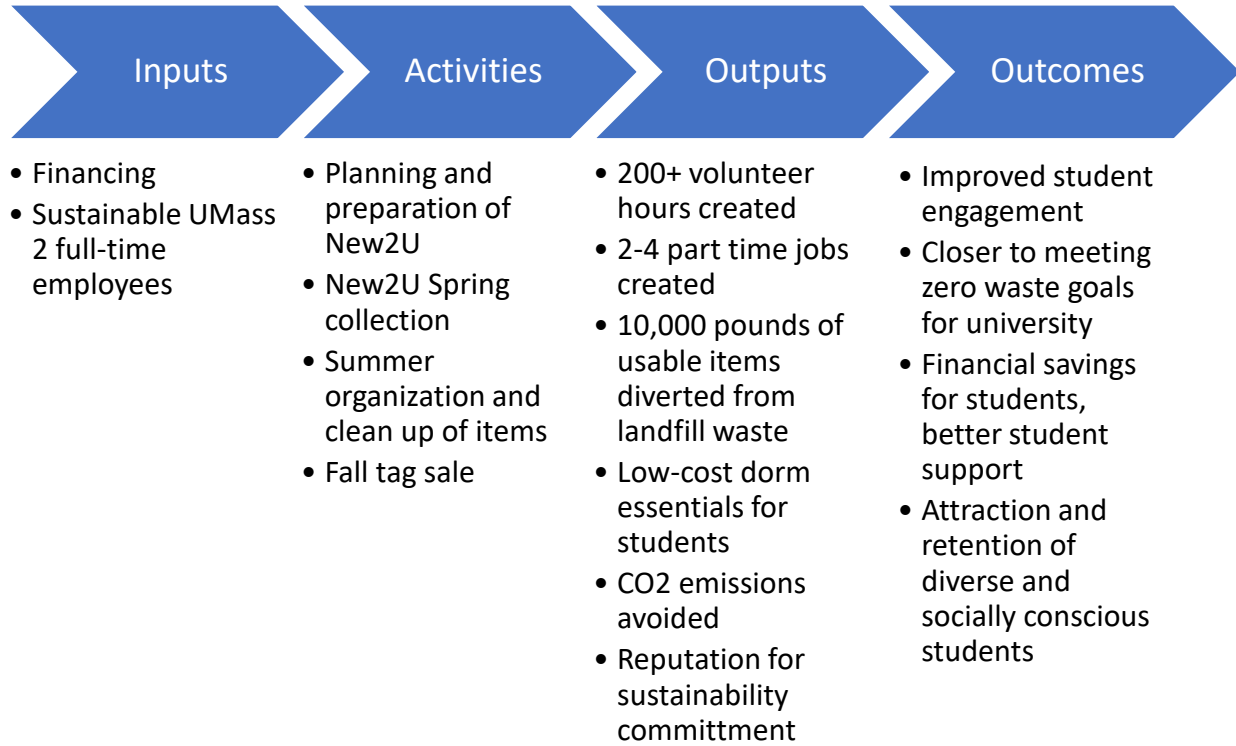


Figure 1: Logical Framework of New2U

Through financing from the university and the dedication of the two full-time Sustainable UMass employees, New2U is planned and executed. This execution includes the Spring collection, Summer organization and clean-up of items, and the Fall tag sale. These activities create a variety of outputs including over 200 volunteer hours generated, the availability of low-cost dorm essentials for students, and an improved reputation for UMass as a sustainability leader. These outputs help UMass to capture outcomes aligned with its strategic goals including progress towards becoming a zero-waste campus and the attraction and retention of diverse and socially conscious students.

The program's positive influence on the university's waste stream aligns directly with achieving a zero-waste campus, making New2U a pivotal element in this sustainability journey. Overall, the program's transformative impact helps UMass attract a diverse pool of socially responsible students and solidify its reputation as a sustainability leader.

New2U aligns with the university's goal to reduce emissions and create value for students through volunteer and paid opportunities, contributing to a better and more just world. By decreasing pollution, providing low-cost supplies to students, and fostering engagement, New2U enhances campus life.

For instance, if the 2,590 students who shopped at New2U last year had fully furnished their rooms with reused goods from the tag sale, they could have collectively saved \$1,709,400. These individual contributions accumulate into significant impacts because they reduce the cost of attending college which is a known barrier for lower-income students. In fact, according to a report titled America's Unmet Promise: The Imperative for Equity in Higher Education, only 7% of students in the lowest income quartile obtained a secondary degree compared to 60% in the highest income quartile (Witham, 2015). Reducing the cost of university is key to attracting lower-income students, and students of all backgrounds.

Moreover, New2U supports UMass's position as a sustainability leader in higher education, reflected in ratings by major sustainability systems such as STARS, The Princeton Review's Guide to Green Schools, and Sierra Club's Cool Schools. Such recognition is increasingly influential in attracting socially responsible students, as shown by a Times Higher Education survey where 82% of prospective international students expressed a desire to live in a way that aligned with sustainability and 7% of respondents agreed that a university's "commitment to, and reputation for, sustainability" was the most important factor when deciding which schools to apply to (Advance HE, 2023).

To better understand the impact of New2U, more research is needed to understand how the reuse of items relates to avoided CO₂e emissions. A good place to start that deeper research is through the excellent work of Reuse Minnesota, who attempted to identify the value of research in two different reports, one in 2020 and another in 2022. They utilized two different consulting firms to complete these reports and there may be something Sustainable UMass can learn from their methodology.

Additionally, further collaboration with the International Programs Office should be pursued to better understand the value of New2U for international students, how many of them utilize the program, and how it could more effectively serve them. One international student said in their New2U survey response that the program could be improved by extending the tag sale across multiple days or even offering an online option for tag sale shopping. This is an

opportunity for UMass to better support its international students, especially those arriving for their first year at the university.

Conclusion

New2U emerges as a vital component of UMass's sustainability initiatives, aligning with the university's strategic vision. Despite facing challenges, the program has demonstrated tangible benefits, both financial and environmental, while fostering positive student experiences and engagement. The program's impact extends beyond cost savings, influencing UMass's reputation as a sustainability leader and supporting its goals of attracting diverse and socially responsible students. Recommendations for future research include a deeper exploration of the program's impact on CO₂e emissions and enhanced collaboration with the International Programs Office to better serve international students. In conclusion, sustaining and enhancing support for New2U is crucial for UMass to advance its commitment to environmental responsibility, student well-being, and leadership in sustainability.

Appendix

Appendix A

New2U Cost Savings for Students

Item	New2U price	Retail (Target)	Cost Savings \$	Cost Savings %
Mini-fridge	\$30	\$190	\$160	84%
Microwave	\$25	\$70	\$45	64%
Futon	\$20	\$150	\$130	87%
Lamp	\$5	\$15	\$10	67%
Standing fan	\$7	\$30	\$23	77%
Rug (med 5x7)	\$5	\$40	\$35	88%
Plastic storage drawers (large)	\$5	\$25	\$20	80%
Full length Mirror	\$4	\$10	\$6	60%
Hangars (8pk)	\$1	\$3	\$2	67%
Dining kit incl. (1 bowl, plate, cu	\$1	\$3	\$2	67%
Utensils (4/\$1)	\$1	\$2	\$1	50%
Backpack	\$3	\$25	\$22	88%
Broom/mop/swiffer	\$3	\$15	\$12	80%
Shower Caddy	\$3	\$10	\$7	70%
Bicycle	\$25	\$210	\$185	88%
TOTAL	\$138	\$798	\$660	savings on total room furnish: 83%
				avg. per item savings: 74%

“Table highlighting the significant cost savings to students furnishing a dorm room with typical essentials from New2U vs. from a popular nearby retailer (Target), representing a cost savings of \$660 or 83% off retail (Table created by author. Sources: target.com; New2U shared one-drive)” (Simmons, 2022).

Appendix B

New2U Costs: Spring 2023

New2U Costs: Spring 2023		
Description	Category	Cost
Staff hours (Sustainability office) Spring Planning	Labor	\$ 18,180.00
Staff hours (Sustainability office) Collections/Move-Out	Labor	\$ 4,971.00
Staff hours (OWM)	Labor	\$ 4,080.00
Staff hours (Special Projects)	Labor	\$ 1,700.00
Box truck rental	Outside Service	\$ 693.27
Movers w/ trucks	Outside Service	\$ 19,700.00
Collection tent rental	Outside Service	\$ 6,045.00
Golf Cart Rental	Outside Service	\$ 963.75
Mattress Pad/Topper recycling	Outside Service	\$ 2,000.00
Meal tickets	Outside Service	\$ 140.00
Gloves	Supplies	\$ 75.00
Sanitizer	Supplies	\$ 70.00
Liner Bags	Supplies	\$ 65.26
Contractor Bags	Supplies	\$ 326.30
Duct Tape	Supplies	\$ 50.88
Command Strips, Snacks for volunteers	Supplies	\$ 65.09
Printing	Supplies	\$ 175.00
T-shirts	Supplies	\$ 950.00
Spray paint (for tshirts)	Supplies	\$ 41.97
Laminating	Supplies	\$ 50.99
Bottled water (4 cases)	Supplies	\$ 24.20
Signage (Category Signs)	Supplies	\$ 1,335.61
Total Direct Costs		\$ 61,703.32
Total Indirect Costs		\$ 19,745.06
Total Costs		\$ 81,448.38

Table showing New2U costs descriptions, categories, and amounts, as well as Total Direct Costs, Total Indirect Costs, and Total Costs for Spring 2023.

Appendix C

New2U Costs: Summer 2023

New2U Costs: Summer 2023		
Description	Category	Cost
Staff hours (Sustainability office)	Labor	\$ 7,096.41
Intern hours (Garret, Patrick - team leader)	Labor	\$ 2,856.00
Intern hours (Ryan Grits)	Labor	\$ 1,300.00
Staff hours (OWM)	Labor	\$ 680.00
Total Direct Costs		\$ 11,932.41
Total Indirect Costs		\$ 3,818.37
Total Costs		\$ 15,750.78

Table showing New2U costs descriptions, categories, and amounts, as well as Total Direct Costs, Total Indirect Costs, and Total Costs for Summer 2023.

Appendix D

New2U Costs: Fall 2023

New2U Costs: Fall 2023		
Description	Category	Cost
Staff hours (Sustainability office)	Labor	\$ 7,115.38
Staff hours (OWM)	Labor	\$ 680.00
Tent rental	Outside Service	\$ 5,131.00
Table rental	Outside Service	\$ 643.40
Pizza Delivery - Newman Cafe	Outside Service	\$ 54.00
Truck rental	Outside Service	\$ 349.75
Misc Recharge	Supplies	\$ 60.00
Supplies from Staples	Supplies	\$ 40.00
People counters	Supplies	\$ 10.00
Printing	Supplies	\$ 40.00
Total Direct Costs		\$ 14,123.53
Total Indirect Costs		\$ 4,519.53
Total Costs		\$ 18,643.07

Table showing New2U costs descriptions, categories, and amounts, as well as Total Direct Costs, Total Indirect Costs, and Total Costs for Fall 2023.

Appendix E

New2U Benefits: Quantitative

Quantitative Benefits		
Description	Dollars	Other units*
Revenue		
Revenue from Fall Tag Sale	\$ 11,000.00	
Textiles recycling trailer (Spring 23)	\$ 433.80	
Savings		
Usable items diverted from landfill waste stream	\$ 575.00	14.45 Metric Tons CO2e Avoided
Savings per student from furnishing dorm with New2U Items	\$ 660.00	
Fuel savings from getting items on-campus	\$ 2,566.00	6.7 Metric Tons CO2e Avoided
Opportunity Created		
Jobs created	\$ 4,156.00	2-4 paid part-time jobs
Volunteer hours created	\$ 6,900.60	200+ volunteer hours
		*Specified in individual cells

Table showing quantitative benefits of New2U, with a column for dollar amounts and a second column for benefits measured in other units.

Appendix F

New2U Benefits: Qualitative

Qualitative Benefits	
Description	Impacts
Points toward school sustainability ratings because of New2U (e.g. STARS , The Princeton Review's Guide to Green Schools, Sierra Club's Cool Schools)	Reputation
New2U's value as a leading program of its type	Reputation
UMass reputation as a sustainability leader	Reputation
Impact on enrollment numbers	Revenue
Reduction in student departure	Revenue
Impact on international students	Student Wellbeing
Value of avoiding production of new goods through reuse of goods	Financial & Environmental

Table showing qualitative benefits of New2U.

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