# Participatory Development of Key Sustainability Concepts for Dialogue and Curricula at The Ohio State University. *Sustainability* 2015, *7*, 14063-14091

**Clair Bullock * and Gregory Hitzhusen**

School of Environment and Natural Resources, The Ohio State University, 2021 Coffey Road, Columbus, OH 43210, USA; E-Mail: hitzhusen.3@osu.edu

**\*** Author to whom correspondence should be addressed; E-Mail: bullock.106@osu.edu; Tel.: +1-513-237-4653.

**Supplementary A**

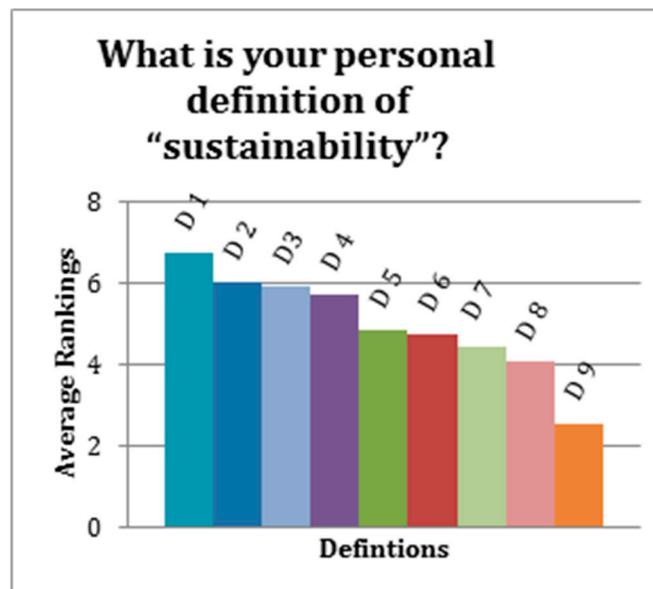**Curriculum Recommendations**

Definition:



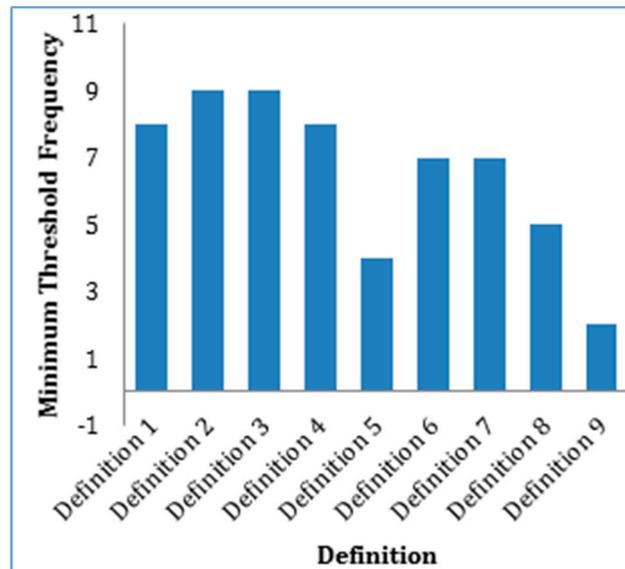**Figure S1.** Definitions of Sustainability.

**Figure S2.** Minimum Threshold Frequency for Sustainability Definitions.

"Sustainability is a condition that allows humans and other species to flourish and thrive in perpetuity within the carrying capacity of the earth, and in which individuals are not burdened unjustly by the actions of others. To achieve this sustainable condition, we must act in a way that perennially guards against significant risks to survival, which in part means finding a balance between the environmental, social, and economic components of a system. This balance is necessary if we are to flourish and thrive in the present without compromising the ability of future generations to do the same".

The curriculum should focus on the following tenets of environmental stewardship:

o   Ecology (Ecosystem Services, Ecological Bottom Line, Cycles, *etc.*)
o   Biodiversity (Biodiversity (Trophic Levels, Species Interactions, *etc.*)
o   Energy (Energy (Production, Extraction, Use, Alternatives, *etc.*)
o   Overconsumption (Consumer Culture, Buying Local, Planned Obsolescence, *etc.*)
o   System Interconnections
o   Climate Change
o   Resource Management (Sustainably Managing Resources, Tragedy of Commons, *etc.*)
o   Water (Access, Cost, Runoff, Pollution, *etc.*)
o   Life Cycles (Where Products Come From/End Up).

The curriculum should focus on the following tenets of social stewardship:

o   Justice/Equity (Environmental Justice, Social Justice, local and international examples, *etc.*)
o   Community (Importance of Community/Building Strong Communities)
o   Culture (Different Cultures Perceive Sustainability Differently)
o   Consumption (How Our Consumption Affects Others)
o   Power Structure/Status (Political Economy, Fundamental Cause Theory, *etc.*).

The curriculum should focus on the following tenets of fiscal stewardship:

o Growth (Reevaluating Growth and Progress)
o Externalities (Prices Reflecting Total Cost, Properly Valuing Resources, Price Signals, Internalizing Externalities, *etc.*)
o Markets (Markets and Consumer Incentives, Redistributive Mechanisms, Subsidies, Cap and Trade, Rebound and Substitution Effects)
o Value/Wealth (Redefining Wealth, Valuing Social and Environmental Factors Equally)
o Social Impacts (Capturing Social Welfare in the Market, Effect of Externalities on Social).

The curriculum should focus on the following tenets of sustainability as a whole:

o Systems Thinking (Students Need to Think of the System as a Whole, Everything is Connected)
o Critical Thinking/Bigger Picture (Critically Assessing Claims, Looking at the Bigger Picture, Paying Attention to the Impact of Your Actions, Recognizing Challenges of Sustainability—It Is Not All Black and White)
o Societal Change.

The curriculum should highlight the following sustainability initiatives at OSU:

o Educating Future Global Citizens (EEDS major, SENR courses, FLC)
o Energy (25% of OSU's Electricity Generated by Wind, Energy Efficiency Building Standards)
o Waste (Zero Waste Initiative, Composting and Recycling Programs)
o Community Involvement (Weinland Park, Community Gardens)
o President's Climate Commitment
o Research (Around 400 Faculty Researchers in Energy, Environment, or Sustainability)
o Student Support (Encouraging Student Leadership in Sustainability ex) CocaCola Grants).

The curriculum should highlight the following areas for student involvement:

o Student Organizations
o Chosen Area of Study (EEDS, Sustainability Courses, Incorporating Concepts in Any Discipline)
o Research (In Energy, Environment, or Sustainability, CocaCola Sustainability Grants)
o Lifestyle Changes (ex. Altering Consumption Patterns)
o Volunteer Opportunities (Zero Waste, BuckiServe, *etc.*).

Areas in which OSU could improve:

o Institutionalizing Sustainability Into the Curriculum (We should integrate sustainability into teaching university-wide, so that sustainability is a component of courses taught in all different majors. A General Education course or a multidisciplinary seminar related to sustainability would be helpful)
o Communication and Promotion of Sustainability Efforts (OSU could do a better job at promoting its many programs and initiatives and then demonstrating in a clear way their connection to a larger sustainability commitment)
o Community Involvement/Social/Environmental Justice (The concept of environmental justice and integrating sustainability into surrounding areas could be improved; we could do a better job

at focusing on who is outside the borders of the university, by getting more deeply involved with community work and enhancing our social fabric)

o Embracing Sustainability Culture (Instead of just meeting the bar, we need to exceed it; OSU could be a leader in developing the next set of standards for sustainability. We have signed on verbally to the sustainability discourse, we just need to get to the point where sustainability is our culture).

## Supplementary B

### *Informed Consent Form:*

Thank you for participating in this project. As a reminder, the purpose of my research and of this interview is to establish a common set of sustainability principles to be used in an online, voluntary curriculum targeted at raising sustainability literacy. You are being asked to participate in this research because you have been identified as a key stakeholder in the sustainability efforts at The Ohio State University. Involvement in this study is voluntary (no payment or monetary incentive is offered) and there will be no penalty should you choose to withdraw your responses, decline to answer any question, or quit the interview at any time. These questions will be non-confidential, so if you are uncomfortable at any time with what is being asked and you do not want to be associated with your response, please tell me immediately. I urge you not to answer if you feel you would be compromising yourself or putting yourself at risk in any way. You have the option to make additional comments anonymously by putting them in the Principal Investigator's mailbox (Dr. Gregory Hitzhusen, 210 Kottman Hall, School of Environment and Natural Resources). The interview process will go as follows: First, I will ask some background information to better understand your position. Then, I would like to begin the sustainability conversation using the questions I sent you via e-mail. Your responses will be used for my research and will be included in my thesis. This interview should take between 60 and 90 min. After the interviews, I will compile the responses and follow up with you to ensure what you have told me has been understood correctly and you do not have further information to add. Afterwards, I will further refine the responses from all participants, and contact you again, requesting that you rate the responses in order of importance to you. I will then send out the results of these ratings to all participants to indicate the findings of my research. I will also send the compiled results to the Office of Energy Services and Sustainability (ESS). Once ESS receives the proposed content, your responses may be additionally used in the collaborative process of brainstorming, creating, and refining the curriculum, which will not be a part of my research but will be informed by it.

By signing, you are confirming that you have read the above and agree with the terms of the consent form.

_____     _____     _____

Printed Name                                   Signature                                   Date

If you have any additional questions, as well as concerns or complaints about the study, please contact Dr. Gregory Hitzhusen (614-292-7739). Thank you again for your participation in this research.

*Recruitment E-mail:*

Good Afternoon!

My name is Clair Bullock, your name was given to me by _____ as someone I should contact. I am an undergraduate student working on my senior honors thesis, which is to develop the content for a sustainability curriculum at The Ohio State University. As you may know, a need has been identified by the university to develop a working definition of "sustainability" and to raise sustainability literacy on campus. These needs could potentially be met through a sustainability curriculum, so the goal of my research is to discover the most appropriate content for that curriculum. I will do this by interviewing key sustainability stakeholders at OSU in a participatory fashion to ensure there is investment and collaboration in the final content recommendation. You have been identified as a person who I may want to include in the process given your expertise or involvement in OSU's sustainability efforts. The interview should take between 60 and 90 min, and I will ask a series of questions about sustainability, as well as a few questions regarding your background. I have attached the questions here if you are interested in reviewing them prior to the interview, should you agree to participate. I would love to get your perspective on sustainability at OSU, so please let me know if you are interested in participating and would have time to meet with me for an interview.

Please be aware that involvement in this study is voluntary and if you choose to participate, there will be no penalty should you choose to withdraw your responses, decline to answer any question, or quit the interview at any time. This interview is for research purposes, and you will receive no direct benefits from or compensation for your involvement.

If you have any questions, please feel free to contact myself (bullock.103@osu.edu) or my advisor, Dr. Gregory Hitzhusen (hitzhusen.3@osu.edu). Thank you for your time, I hope to hear from you soon!
Best,

Clair Bullock

*Interview Questions:*

Background:

1. What is your position title/specialization?
2. How long have you been at the University?
3. How long have you been involved in sustainability?

Research Questions:

1. What is your personal definition of sustainability?
2. What do you think the most important tenets of environmental stewardship, social stewardship, and fiscal stewardship are?
3. What is OSU doing about each?
4. How can students get involved in each?

5. What could OSU be doing better in terms of sustainability as a whole, and in terms of each section of stewardship?

6. Do you have any recommendations for other key sustainability stakeholders that I might interview? If so, do you mind if I use your name as a reference?

**Supplementary C**

**Sustainability Definitions:**

**Brundtland Commission Report: (6)**

-The Brundtland Commission's definition, which is that sustainable development implies meeting the needs of the present without compromising the ability of future generations to meet their own needs.

-I don't mind the Brundtland Commission Report's definition. But the future generations will never have the amount of fossil fuels we have now—there's a limited amount, so keeping that amount at the same level is a worthless goal. Trying to use what we have currently to develop the next peak in resources for future generations should be the goal.

-The ability to achieve your goals without compromising the ability of others to achieve theirs, in both the present and the future.

-The common definition implies meeting the needs of the present without compromising the capacity of future generations to meet their needs. However, this definition isn't worded in a way that gives us any insights into how to become "sustainable". What are "needs" and who gets to decide what is a "want" and what is a "need"? We can't even use resources in a way that doesn't compromise the ability of people in developing countries to meet their needs at present—how can we expect to do this for all people of future populations?

-Sustainability isn't about sacrifice and returning to the pioneer days lifestyle. It's making all this stuff that we enjoy available to future generations.

Summary: The Brundtland Commission Report's definition: sustainable development implies meeting the needs of the present without compromising the ability of future generations to meet their own needs.

**Contrasting Strong *vs.* Weak: (2)**

-We have that concept of strong *versus* weak sustainability, where weak sustainability is simply not depleting our resources, and strong sustainability is not only not depleting our resources, but improving our stock of resources as well.

-One valuable way to think about it is through the "weak" sustainability and "strong" sustainability perspective. To me, one of the most important questions we need to ask is how we can achieve a style and standard of living that can persist without damaging the life support systems of the planet— and do so while being socially just. One approach is by living largely as we do, just much more efficiently. This would mean no major changes in our lifestyles, just better technology to help us reduce our environmental impacts and energy use. This is the easy, "no-sacrifice" approach and, from one perspective it appears to be the approach that has the most chance of being adopted—but maybe not the best chance of actually being sustainable. The second way is to change the structure of our society, change norms, change infrastructures, change our culture. This would be much more

dramatic change and would require us using less of everything…. Changing the way we view work and money and community. This doesn't necessarily have to be a "sacrifice" because by changing some of these things we gain in some ways (health, happiness, human relationships, well-being) even if we lose in others (less convenience, less money, less material goods). The latter approach will be a much tougher sell—but very well may be the only true path to "sustainability".

Summary: Weak sustainability is simply not depleting our resources, and strong sustainability is not only not depleting our resources, but improving our stock of resources as well.

### To Maintain: (6)

-It's important to convey the idea of using the resources in a good way to maintain our society.

-Simply put, sustainability is the idea that however we live can be maintained. Whatever we're doing, we can't destroy ourselves.

-Maintaining the environment and the material conditions of our work and our culture.

-I think of it as the ability to maintain the state of being of something. As a noun, it is the state of being able to continue indefinitely into the future. We're all talking about the three legs: the environmental, the economic, and the social, but the word "sustainability" really just means that something can continue indefinitely.

-The capacity to maintain economic prosperity, human well-being, and environmental integrity now and for generations to come.

-Sustainability is using the mix of resources that are available at that time to maintain the ecosystems, economy, and society at a certain level, and to maintain our standard of living. Our standard of living relies on ecological services so you have to maintain the natural environment, too, you can't just focus on humans.

-I support Merriam-Webster's definition of sustainable: 2a: of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged

Summary: Sustainability is using the mix of resources that are available at that time to maintain the ecosystems, economy, and society at certain level, and to maintain our standard of living.

### Continued Existence: (4)

-Engagement with and stewardship of global systems in ways that promote continued existence of life on the planet.

-Sustainability is about identifying social, technical, economic, and political systems and structures that guide humanity in a way that will ensure our long term survival.

-To me, one of the most important questions we need to ask is how we can achieve a style and standard of living that can persist without damaging the life support systems of the planet—and do so while being socially just.

-Be here tomorrow. So whatever we do, we have to make sure that we exist tomorrow, whether that means consuming resources at a slower rate than they're created, or financially making enough money for an organization to continue. Because ultimately, you can't do anything sustainable unless you're here.

Summary: Sustainability is about identifying social, technical, economic, and political systems and structures that guide humanity in a way that will ensure our long term survival. Whatever we do, we have to make sure that we exist tomorrow, because ultimately, you can't do anything sustainable unless you're here.

### To Flourish: (1)

-[Ultimately, I think] sustainability is a condition that allows humans and other species to flourish in perpetuity within the carrying capacity of the earth and in which individuals are not burdened unjustly by the actions of others.

Summary: Sustainability is a condition that allows humans and other species to flourish and thrive in perpetuity within the carrying capacity of the earth and in which individuals are not burdened unjustly by the actions of others.

### To Preserve: (2)

-I think of sustainability in terms of how we can preserve the biodiversity on earth now and still encourage the organisms that are living on it—whether that may be humans, insects, fish, *etc.*

-Sustainability is a conscious recognition of mankind that the most important thing for our ability to exist is the preservation of our Earth.

Summary: I think of sustainability in terms of how we can preserve the biodiversity on earth now and still encourage the organisms that are living on it—whether that may be humans, insects, fish, *etc.*

### Triple Bottom Line/Variations: (7)

-I think of sustainability in the three areas: the human, natural systems, and economic components. There should be a recognition that you need those three components, and the nexus of those is where you are sustainable and can meet the needs of each system over the long term. Ultimately, that nexus is something we determine: what is the state of the natural environment that we want to maintain?

-I think people, planet, profit, is a fine starting point.

-Sustainability means economic sustainability, environmental sustainability, and cultural sustainability. All three have to be considered.

-When I think of sustainability, I also think of the 3-legged stool, or the triple bottom line, which describes sustainability in 3 dimensions: the environmental, economic, and social/ ethical/equity dimensions. We need to think about all 3 if we have any chance of whatever system we're talking about being sustainable.

-My personal definition would emphasize looking at more than just the standard resource economist's definition of non-declining overall wealth (financial, natural, and social capital) over time. We need to have a discussion of what certain thresh holds and boundaries are, and we should respect those boundaries. For instance, asking the question, "how much climate change is acceptable?"

-The capacity to maintain economic prosperity, human well-being, and environmental integrity now and for generations to come.

*Alternatives to Triple Bottom Line:*

-Instead of separating it into social, environmental, and fiscal [which cannot be done], I see sustainability in terms of scale, equity, and efficiency. So first, we have to ask what the absolute scale is and what it should be relative to, given the Earth's ecosystem constraints. Second, given that we have these natural and economic and physical assets, what is the equity aspect of that? Both are moral decisions that need to be made by citizens using a deliberative process. Lastly, given that we've decided how things should be shared and we've decided what the total impact should be, how can we be most efficient with the resources that we do use? So there is a scale issue, a justice or social dimension, and a resource efficiency dimension

-[In a presentation by The Natural Step] there was a slide that went beyond the triple bottom line, where traditionally sustainability is three interacting rings. They suggest that the rings are nested, where society is within the environment and economy is within society. The triple bottom line puts a business spin on things which is only a subset of what sustainability really is.

Summary: Sustainability can be separated into three areas: the environmental, social, and economic components. There should be a recognition that you need all three components, and the nexus of those is where you are sustainable and can meet the needs of each system over the long term.

## Balance: (2)

-Sustainability is about balance—but a balance of a lot of forces. We are out of balance in a number of ways, and it's only now starting to become clear how many, but that's the first challenge. You have to identify *why* and *how* we are out of balance in order to determine how to get things in balance.

-A condition of a planet and civilization where everyone can flourish and thrive, and that requires that we not be depleting resources or damaging the environment or the ecosystems in order to create wealth. It may not mean even that we're growing, ideally, in a sustainable condition, populations of humans and plants and animal species are in balance with the carrying capacity of the earth.

Summary: Sustainability is about the balance of different forces. We have to identify *why* and *how* we are out of balance in order to determine how to get things in balance for sustainability.

## Consciousness and Caring: (6)

-I personally think of it as an oath to do no harm.

-To me, personally, I feel like sustainability is a fortunate byproduct of a life well lived—both individually and collectively.

-Sustainability is about improving the quality of life for everybody (Debra Rowe).

-Sustainability is about caring about neighbors, the environment, future generations, all of it. I think all activities and actions that people associate with sustainability for me just boil down to caring.

-Sustainability and well-being are not two separate things, they are actually the same. If you focus on human well-being and you focus on what's important for people, then that will get you towards sustainability.

-If sustainability is anything, it's about thinking forward and thinking about building a culture over a period of time.

Summary: Sustainability is about caring about neighbors, the environment, and future generations. It is about improving the quality of life for everybody.

**Sustainability Tenets:**

**Environmental:**

*-Agriculture (3)*

o Pollution/Runoff
o Food/Food Access

　o Food deserts
　o Environmental impact in terms of trophic levels (ex. It makes a bigger impact to produce 1 lb of chicken than 1 lb of beef)

*-Biodiversity (3)*

o When it comes to biodiversity: understanding the basics of tropic levels, species interactions, how ecosystems are composed, and why it's important to maintain them as best we can, since we don't fully understand how they work. Consider the airplane rivet example. How long do you want to fly on a plane when you keep removing rivets, not knowing which one will be the one what causes the whole plane to crash? That's kind of what we're doing now [with loss of biodiversity], and we don't know which rivet will be the last piece.

*-Climate Change (4)*

o The twin issues of climate change and biodiversity loss, which are related. If climate change isn't tangentially related to what is being discussed in terms of sustainability or biodiversity loss, then we aren't going to get anywhere.
o Climate change and its global effects (loss of habitats, more severe weather patterns, loss of biodiversity, rising sea levels, *etc.*)

*-Ecology (7)*

o The health of our ecosystems is everything.
o A huge problem is we legislate when things are dying, not in order to just keep things flourishing. We need to pay attention to the flourishing and let that flourishing be our goal.
o Environmental sustainability is about not harming the ecological processes and allowing ecological functions to continue as they are. To the degree that we are interfering with that, we're reducing the ability of the environment to continue indefinitely into the future.
o Ecosystem services and how everything has to be in balance. All the components of our ecosystem have roles; everything is in the ecosystem for a reason. It's a chain, take one link out of a chain and the chain no longer operates.
o There is an ecological bottom line, and it is critical. Traditionally it has been thought that it would all work itself out. But no, there is an ecological bottom line, and we need to take it seriously.
o We need to understand that as humans and as a society and economy we exist within the larger biosphere and earth ecosystem which imposes certain constraints and limits on what we can

do. The ecosystem imposes constraints, and the natural implication is that we need to work hard to understand what those constraints are.

o I think understanding the basics of ecosystem functioning (which is a very broad term) is also important. We need to understand the components of ecosystems that we rely on for most of our lifestyle.

o Understanding how the natural world works. If we don't know how it works then we can't adjust our lifestyles or socioeconomic systems accordingly. Water cycles, impacts of climate change on precipitation, glacial retreat, changes in monsoon patterns, *etc.*—we need to understand our natural system in order to adapt for the changes coming in those systems, and to mitigate what is already happening.

o Understanding how you measure the natural stock of environmental capital.

o Measurement and flows—replenishment and replacement from a systems standpoint.

o When it comes to curriculum, students need to know basic environmental science, basic ecology and basic evolutionary theory.

o All of the other organisms have biodiversity and competition and each one balances the other out so no one species in the system will overtake the other. Whereas humans tend to take over whatever we want. So, protecting sustainability comes down to humans understanding that we can't do whatever we want. We need to value other organisms to be as important, if not more important than, humans.

*-Energy (5)*

o Use

    o (The biggest driver of climate change is energy use)

    o We need people to spread out their energy use. The peak stuff is the dirtiest and worst stuff you can use. If the peak can be smoothed out and pushed out into other times of the day, we can spread out the energy demand and have the best and cleanest facilities happening all the time. The big deal with alternative energy sources is they're not reliable enough, so we just stick to coal. So we need to focus on storage devices and spreading out the load. Energy infrastructure will drive environmental sustainability.

o Impacts of personal energy use (leaving charger plugged in)

o Production (Hydroelectric and coal power generation)

o Extraction

o Externalities

o Alternatives

*-Environmental Sensitivity (1)*

o Another tenet is to connect people with the natural world and orient them towards the natural world so they have a basic sensitivity to it. Without that environmental sensitivity we do not have the behaviors and attitudes that are necessary for change. When people are so disconnected and they don't have sensitivity to the natural world, we're in trouble.

*-Land use change (1)*

o The most significant driver in the loss of species and ecosystems around the world is conversion of natural spaces into human developments (farmlands, cities, *etc.*),

*-Life Cycles (4)*

o Considering life cycles is important. In many communities, lots of money and energy has been spent getting plastic bags outlawed. This helps the litter and wildlife problems, yes, but if you consider the life cycle of paper [compared to plastic]—it isn't that great either, with the harvesting of trees and processing of pulp, *etc*. It's not worth the energy that you spend worrying about it. There are costs that don't always offset the benefits. It is important to understand what is material or significant. [So] the effort instead needs to be in [the life cycle:] what we buy, how we buy it, and how it's packaged so we generate less in the first place.

o All the industrial background processes that we don't pay attention to [so extracting the minerals and getting the power to do that, and then making them into something] have a profound impact on local environmental conditions (in developing countries mostly—we don't want to dig up 800 acres of land here to get minerals for a cell phone).

o I think the most important thing to consider is being conscientious about where resources come from. For example, the long and complicated process of turning coal into safe and reliable electricity. There is time and cost and expense associated with each step in that route. From the time the coal is burned to the time the light is emitted, we only have around thirty percent efficiency through the entire process. So the less light you consume, the greater the efficiencies you get back all the way up stream to the source. Being conscious about those use decisions sends home the point of sustainability.

o The fact that consumption behavior influences the social sustainability of other communities is really important to consider. So, that means knowing where products come from. It doesn't just appear on the shelf, it's made somewhere; how does it get there? We should understand the life cycle of food, materials, everything.

*-Overconsumption (3)*

o We have too much, and we still think we need to grow. Look at the business world; if you're not growing you're not a successful business. We need to maintain where we are and learn to live with a little less

o Consumer culture/Planned Obsolescence (the reason things fall apart in a set amount of time because it's explicitly designed that way. Products are designed so that they become obsolete, so people have to buy more).

o Consuming Local

o Students should understand why and how and the rate at which we consume—and how to deal with it.

o If you want to address overconsumption, you have to address work hours and pay. If you give people money, they will spend it, and things will expand. So we need to rethink how we value time, and try to operate at a slower pace where possible. We spend too much time in the pursuit of income and wealth.

*-Resiliency (3)*

o Resilience has to do with the system being able to respond to perturbations and being able to return to its original state of being.

o The more resilient a system is, the less efficient it is, and people always want efficiency. Ecosystems need to be redundant and resilient, though; if there is one bird that can pollinate the fig tree, which is a keystone species, then there's a cascading effect when that one bird dies. A resilient ecosystem has to do with functional overlap. The fig tree needs two pollinators, so an overlap of functions is needed among species—which is inherently inefficient because that means two people are doing the same thing. Efficiency in the business world has to do with pulling apart overlap so you don't have any wasted effort and therefore wasted cost. So the more efficient you get by having no overlap and no two people doing the same job, the less resilient you get—since if there's a shock to the system and people quit, then you have more turmoil. Resilience and sustainability are very closely linked. So I think efficiency might hurt the sustainability cause in a way.

o You need some redundancy in systems up to a point. You just can't be so efficient that everything has to go perfectly all the time because it doesn't.

o Building resilience to turbulent change and uncertainty

*-Resource Management (2)*

o Sustainable management of a resource does not mean setting aside the resource and making it off limits for public use. It means not harvesting more than what can be reproduced in new growth.

o Tragedy of the Commons

o Knowing how to work with natural systems and processes in a regenerative fashion as opposed to a depleting fashion.

o We should look at the system itself and how it works instead of imposing things from the outside—we can work with the natural processes rather than trying to figure out how to externally impose resources on those processes to fix them.

*-Scale (1)*

o It's important to understand how different environmental processes act at different local, regional, and global scales and how they interact with each other. For example, the processes of carbon cycling and nutrient cycling and climate change—they're important global issues. [And] water quality for example, that's more of a localized scale issue.

*-Spatial/Temporal Effects (3)*

o Depending on where you live, your footprint will be very different.

o The science of time—if you don't have a certain perspective on geologic time, it's very hard to deal with atmospheric questions like climate change or questions about evolution or extinction or biodiversity. If we're fooled by short term analysis, one of the features that could get us in trouble is the notion of a tipping point. Yes, things could level out, but if we are already close to a tipping point then we're still in trouble.

o Temporal difference between actions and impacts

*-System Interconnections (4)*

o Recognizing that decisions that students make have impacts in places they wouldn't imagine. Ultimately, the decisions people make about the phone they purchase can have impacts on social sustainability in communities in China.

o Ecosystem services and how everything has to be in balance. All the components of our ecosystem have roles; everything is in the ecosystem for a reason. It's a chain, take one link out of a chain and the chain no longer operates.

o We need critical thinkers that understand that one aspect of sustainability affects the others all the time.

o Cause and effect

*-Transportation (1)*

o Students should know about environmental impacts of transportation, whether it's by car, biking, or sharing more pedestrian friendly designs of our cities and neighborhoods.

*-Uncertainty of systems (5)*

o We don't really know all the answers.

o Chaos or complexity—understanding that these aren't mechanistic systems, rather they are stochastic and accidents happen.

o Tipping Point- We think that things are moving along gradually and that's reassuring to us, but science shows us that we can feel like things are gradual and then we can reach a tipping point and suddenly everything is destroyed.

o There are thresh holds we have to pay attention to, and there's a total scale of our impact that we have to be within so we don't have things that are irreversibly lost.

o Systems Coupling

   o Interactions/Cascading Effects-Changes in one component affect changes in another, resulting in unexpected and unanticipated outcomes. So if you change something internal to the natural system, it will also affect the other two systems. "If you pull this thread, it will have unintended outcomes somewhere else." That outcome could be good or it could be bad, but at least we should know that they exist.

   o I'd focus on systems and feedback. How do the various physical and biological systems interact with one another in the big picture? I'd want students to come away with the higher-level concepts of systems and feedback and problems and issues like chaos or complexity.

*-Waste (4)*

o Waste Stream (Where our stuff comes from and where it goes).

o E-waste disposal (Equipment generally goes into a container ship and it's dumped on the shore of China or India or Africa, or people burn stuff off of it for the metals, and are then exposed to horrible toxins as a result)

o Nuclear waste disposal

o Importance of reusing, recycling, composting

-*Water (4)*

- o Freshwater use, replenishment rate
- o Access
- o True cost of water
- o Availability worldwide
- o Condition of our water resources
- o Protection of our water resources
- o Nutrients in our water
- o Surface water runoff and pollution of surface water
- o Wetland services

**Social:**

-"Stewardship" is a problematic term and I wouldn't use it.

-The word stewardship has a connotation of management and conscious direction. I think it is hard to manage social systems, and it may not be wise.

-For me, sustainability is a social and cultural issue. So [other] questions follow from how we understand it beginning as a social issue.

-*Community (3)*

- o Actions affect others downstream
- o Reconnecting with our human nature to be a part of a community. I think that humans are so far removed from what it means to actually be a human that we don't even know what the word means anymore. But if we were doing things that were best for our community all the time—that would inherently be something that would support the Earth.
- o The idea of community (within OSU, around OSU, and the term in general—what it is, and why it's worth valuing) is important.

-*Consumption (1)*

- o The fact that consumption behavior influences the social sustainability of other communities is really important to consider. So, that means knowing where products come from. It doesn't just appear on the shelf, it's made somewhere; how does it get there?

-*Culture (2)*

- o We're not going to get very far in cultural sustainability if we can't listen to how people perceive their environment and our shared environment. So a key issue is the ability to see science as a product of culture and to understand that there are other ways of viewing the world.
- o Students should be exposed to the ways that different cultures view humanity's place in the world.

-*Development (1)*

- o What developing and developed means. There's the idea of leapfrogging that developing nations will leapfrog over developed nations instead of replicating what they're doing now.

*-Justice/Equity (14)*

o   Justice and equal opportunities promote a society that continues into the future.

o   The social side pertains more to justice and equity than stewardship.

o   When we talk about the social dimensions of sustainability, we have to take into account equity and justice.

o   I think the way we live should be just and fair. We somehow have to figure out how to take things that are out of sight and out of mind and make them real. We live off in our own country and ship our pollution elsewhere and don't have to know what's going on, we just keep on chugging. We are burdening people who don't deserve it at all and don't have the power to stop us, and that is a sign we are not being truly sustainable.

*Equity:*

o   Equity, which is really about making sure there are equal opportunities for all members of a society to thrive. That might have to do with the structural characteristics of a society that disadvantage certain groups of people through no fault of their own. For example, if the wealth is very concentrated in one area, there won't be equal opportunities for all. Understanding how society is structured and understanding how that affects the opportunities of different members is important for social sustainability. We need to understand whose voices are translated into laws and policies, and who is ultimately listened to.

o   Equity, meaning we have to get rid of externalities. Businesses depend on profit to externalize their costs (internalizing the cost of dealing with the environmental consequences and health issues is just not profitable). We need to get rid of externalities so that prices reflect costs.

o   With a lot of environmental problems we have to ask ourselves, "how are the resources [and benefits] distributed, and are they distributed equitably?" I'm not saying equally, but equitably. So then you have to ask the question "what is just?" That has to be a consideration too.

o   Wealth Distribution

o   [The idea of] winners and losers and unequal exposure to problems and unequal benefits from infrastructure/drawing on natural resources.

o   Assuring equity in access to opportunities for personal fulfillment

*Justice:*

o   Justice, and doing the right thing because it's the right thing to do.

o   The World Business Council for Sustainable Development has a tagline: "businesses can't survive in a world where societies are broken or dysfunctional." We need prosperous people to buy the products and services.

o   If you have rampant social and cultural injustice, you're unlikely to be able to sustain business practices and infrastructure; such things have a way of not faring very well in unrest and revolt.

o Injustices are just a sign of inadequate sensitivity to the well-being of others, human and non-human.

*Social justice:*

o Students should know about social justice, and understand it on an international scale. We are too insulated here from recognizing the impact our lifestyles have on people around the world. It is important for students to recognize that what appear to be simple choices to us (*i.e.*, protect biodiversity, do what you can to reduce carbon emissions) are choices that involve very critical tradeoffs in other parts of the world (*i.e.*, protect biodiversity at the expense of my ability to grow food for my family).

o Workers around the world face a variety of social injustices, including low wages, poor working conditions, and lack of access to education

*Environmental Justice:*

o Any attempt for people to look at the environment and look at the conditions in which people live and try to make it more humane is about environmental justice

o Environmental justice at a global level as well as at a national level and the history that goes into that, such as institutional racism (the idea that institutions are developed in a racist technocratic way and that perpetuates inequalities).

-Ex) it's a justice issue that not everyone has access to water. It's a social justice issue that because of the way we do construction, when it rains hard, there is more runoff in urban areas going straight to rivers so you get more flooding down the river. Also the quality of water going in, it may be okay here but if we keep adding agricultural pollution, it affects the water [in communities] downstream).

-Ex) if we are getting energy from coal, what happens in communities where you burn the coal? What are the implications of mining where you get the coal like in West Virginia with mountaintop removal?

-Ex) Ewaste disposal: Equipment generally goes into a container ship and it's dumped on the shore of China or India or Africa, or people burn stuff off of it for the metals, and are then exposed to horrible toxins as a result.

-Ex) Food is a huge social justice issue. Not everyone has access to good food; in urban areas you have food deserts so if you're lower income you don't have as much access to good nutritious food as you would if you were a more affluent person with better resources.

-Connecting uncertainty to people's livelihoods and well-being. Natural resources are used and their extraction is necessary for the livelihood and quality of life of some people, but in some cases it also takes away from quality of life. You have to wonder what sustainability is from the human side; do the communities have the opportunity to have a voice in the process?

-Climate Change- there are a lot of examples of how climate change creates unrest and often leads to conflict in social systems.

-It's also important to know about shifting costs. So, going back to the Pacific Northwest example; we stop harvesting wood in US, but we still need to harvest because the demand hasn't changed, so we go somewhere else. and often we go somewhere where the harvest is

cheaper with fewer environmental regulations and fewer human labor regulations. So now we end up with situations where endangered forests are being destroyed for our lawn furniture, and there are unsafe conditions with low paid workers and we contributed to that. There are massive implications for social systems there because they were engaged in an indigenous lifestyle that is being decimated, or their lifestyle is being sold off to a higher bidder. The idea of exporting our environmental cost is an important thing to think about.

-Part of the social aspect of sustainability is being able to achieve your goals without compromising others' ability to achieve their goals. For example, we know we have a finite supply of coal and oil and natural gas, however we need their products (like petroleum) for transportation, energy, production, *etc.* By using petroleum for these things, we're impinging upon someone else's ability to use it for more urgent things in the future (like medicine to save lives). So to me, one example of being socially sustainable would be to determine that petroleum is too valuable to use for transportation.

*-Measuring Social Benefits (1)*

o A lot of the social things with sustainability we don't have good metrics on, [but we] can't discount social value just because we don't have the metrics for it. People need to be educated that the benefit of a lot of our actions is not necessarily tangible—it is emotional and psychological well-being. For instance farmers markets; if you looked at them based on economics and resource use, they might not make sense—things are grown on a small scale and driven from Delaware to Clintonville, so there are transportation costs and also production costs (farmers have to buy fertilizer at retail rates because they buy in small quantities). So the big value there is the sense of community (which is a social good and it's hard to measure). People are paying higher rates, so farmers markets might not make sense in any other way. But people are willing to pay more because they are buying a sense of community. Sure, there may be variety of choice or a little better quality, but ultimately, they pay for the sense of community. And you know people feel that social benefit—that's why they're so popular. When you do stuff at a small scale, the economics go out the window, but the social benefits skyrocket.

*-Power Structure/Status (4)*

o The idea that some people who assert their values come from areas with political power, votes, and money, but don't have to face the consequences of the decisions that are made. We have to weigh the costs of preservation. There are serious negative costs—which are potentially okay, but if you're making a legitimate decision, then you should take them into account and find that they're worth it.

o We need to be attentive to the political economy questions, and understand why certain people are benefiting and why others aren't. Why are some solutions on the table and some aren't? Some level of economic goals need to be maintained, and these decisions are a function of who is in power. Every interest needs to be represented effectively and solutions need to be articulated in a way that they represent the diverse needs of the population.

- o Fundamental cause theory, which states that those who are the most socially vulnerable are always in the worst places, meaning there's a fundamental cause for the health inequalities among those vulnerable people.
- o For me, it's about reorienting the characteristics we associate with status. Right now and throughout history, status is associated with wealth and consumption. But if we can reorient the way we think about status and prestige, that might help change our social system in a way that has a lower environmental impact through lowering consumption.

*-Problematizing (1)*

- o From a social system, we have to see that sometimes things aren't problematized properly. Some problems don't have to do with the environment, they have to do with the economic structure. If the problem is that people don't have jobs, then what they need is a job, not a community garden. Sometimes, environmental solutions are band-aid solutions to bigger social problems.

*-Temporal (2)*

- o Separation results in time is a pretty big thing. We expect immediate or short term results but we may not know the outcomes for the long term. For example, in some places in Pennsylvania, the oil and gas companies will come in and say they'll maintain the roads for x period of time, which they do, but they don't account for afterwards. So in the short term it sounds good because communities don't have the tax base to maintain the roads as well as they would like, but then when the companies leave the community, things aren't in good shape. There is a temporal difference between actions and impacts.
- o Time discounting, and how and when people's time discount rates vary and change over time.

**Fiscal:**

-This wouldn't be the word I'd use, I'd use economic.
-The term "fiscal" seems narrow, I would think more along the lines of economics.
-I'd use either "economic" or "business"
-Sustainability will never work if there is no economic sense. Environmentalists have to realize that you have to take economics seriously.

*-Externalities (6)*

- o It is important that the enterprises producing and people buying are taking care of externalities. A lot of environmental problems can be boiled down to the fact that externalities aren't being paid for and people and countries do things that pass off the cost to other people who aren't part of the bargain, and aren't getting anything from it in return. Take pollution, for example—producers don't have to pay the cost, or put it in the product and make the product more expensive. Instead, it affects people who aren't even involved. If you can get the externalities paid for by the people in the transaction, a lot of stuff would take care of itself. If things cost more, people would consume less.

o We struggle in that we have created systems that don't make it easy to recognize the full impact of our decisions. If food was priced according to the impact it had, it would be priced very differently. When it comes to greenhouse gases, everyone thinks of vehicles as a primary cause—which is good. But they don't think about power or other travel (like planes), and those carbon footprints are big.

o I think having an understanding of the full cost and externalities is the most important thing economics can teach us. We need to be living off of interest rather than drawing down capital, and making profit to sustain the future in order to generate net benefit over and above the capital. We should focus on long term profit.

o We have to get rid of externalities. Businesses depend on profit to externalize their costs (internalizing the cost of dealing with the environmental consequences and health issues is just not profitable). We need to get rid of externalities so that prices reflect costs.

o Prices have to reflect costs of all activities, products, and services. Energy, food, transportation, buildings, water, electronics (computers), *etc.* all do not currently reflect true costs.

o If we had to pay for all the costs associated with the goods we use every day, then the cost of the raw materials to make the product, the cost of the environmental damage caused by the production, and the cost of health care for employees who manufacture the product would all go into calculating the true costs of the product.

o We just need to pay the cost. It should be part of the education that we are mortgaging the future. And that's not a guilt trip, it's a fact. It's irresponsible.

o Resources are valued properly when the cost of something reflects the embedded costs associated with its production, plus profit. Costs are so externalized that you're not paying the full cost of what you're getting. We can't properly value a resource if we aren't internalizing the externalities.

o Asking, "what are the resources that went into the process, what are the hidden costs, and how do we bring them into play?" will help us understand the true cost of an item.

o Carbon emissions and cap and trade are market mechanisms by which we can create exchanges and achieve goals by bringing cost into play and creating incentives for people to act differently.

o We need economic figuring—the ecological bottom line has to matter economically, which will never work by valuing everything according to the dollar value. Aesthetic must weigh in as well so we can eliminate the externalities. Things need to cost what they really cost.

o There is too much externality. We're not valuing natural resources except for when they have monetary value.

o Price signals—An example is gasoline—$4 a gallon is cheaper than the full cost of that gallon. We are so dependent because the price signal doesn't make us do anything; we make choices based on artificial price. The real price is reflected in the production and use of gasoline as it causes damages to the environment and people that aren't in the exchange.

o We have to figure out a lot more actively where the line is that we can't cross because we are encouraging greed and injustice. We need to be able to say this is not just and it is unfair and it is unmerciful. That should be able to count, because people aren't always going to buy your numbers and your calculations.

o Some of the cost of the food in a grocery store is being deferred onto the below living standard wages that the migrants who pick the food earn, onto the diesel that drives the food here, and the quality of life of the animals the food derived from. All that stuff is subsidizing our food and making it cheaper. We don't think it's cheap, but it is.

o The importance of fiscal sustainability is understanding that there are no absolutes and everything has a total cost. So not just considering operating costs or physical costs, but also the costs on society, the planet, and on your life span.

*-Growth (3)*

o Using what we have. Growth is not always good—More is not always better—in fact, in most cases, more is *not* better. The idea that you have to be growing and making more money and increasing profits is not sustainable; you can't increase indefinitely. There has to be a goal, and when we reach that goal, we are satisfied.

o I think that there is often too much emphasis on [being] the biggest and the best in America. That's where growth imperative comes from. Everything has to be growing and expanding and everything needs to get bigger to hold our place. It seems like we live in a world where nothing is ever "enough." That kind of thinking is dangerous.

o I think we need to start reconsidering the way we measure progress; sustainable development is not necessarily about economic growth

o The challenge for businesses is how to reconcile the affect that the pursuit of pure economic growth has. How do you train business-people to accept the concept of limits and of "enough" or "sufficiency"? In business, if you don't grow, you die—and that's a problem because it makes growth an imperative and there are physical limits on the planet that preclude us from pursuing unceasing growth.

o The discussion in America (not only in America, but primarily) has been narrowed in a way that has made [the term sustainability] very compatible with straightforward, capitalistic, economic, growth-oriented policies. So the attitude has become that sustainability without economic growth is impossible.

o Using resources, like fossil fuels, can create economic growth. However, future generations may be disadvantaged if the current generation overuses these resources. If we do not want to disadvantage the next generation, renewable resources such as fish, soil, and groundwater must be used no faster than the rate at which they regenerate.

*-Historical Perspective (1)*

o The history of corporations being seen as people to the government.

o It would be helpful to state how we've done capitalism in the past, and then look into whether or not we can do capitalism right.

*-Markets (3)*

o I want people to understand the mechanics of markets and investment, both public and private, but I want those to be taught in a context that always sees them as part of a system that includes fiscal, environmental, and social elements.

- o Markets and incentives, and individual consumer incentives and how we weigh long and short term management of both personal and public finances.

- o Markets distribute; they're efficient. But they have to be subject to constraints such as scale and equity, and be able to function within them. For instance, if income goes above a certain level, you get taxed. That is a redistributive mechanism that speaks to the equity issue, and markets function within those constraints. We're good at efficiency and allocations, and not so good about constraints. If we aren't conscious, the result will be that incentives will be wrong and businesses will over consume and over pollute, as will individuals.

- o In terms of sustainability and business, I would just say don't stop at efficiency. Don't stop at how to design businesses to use less water and energy. Because while efficiency is good to a degree, it's not everything, and I think it leads to a lot of rebound effects and substitution effects (rebound effects are when you buy something that is more energy efficient, but then use it more so you don't end up saving much energy. Ex) you buy a prius but then drive it more because it's cheaper to operate and uses less fuel per mile… Substitution effects are when you use the money you save on gas by driving a prius to make a purchase that offset the benefit of the prius (*i.e.*, fly around the world for a vacation). Because of these effects, we aren't going to be sustainable from efficiency alone.

*-Profitability (1)*

- o Economic sustainability is most commonly defined as long term profitability. It is not enough to simply have cost=revenue or to be continually expanding; what is considered most sustainable is being profitable in the long term.

*-Social Impacts (2)*

- o A lot of times the way I think of economics is how it impacts the social system ex) what is the living wage of the people that are being forced to put our products together? It's cheaper to import wood from Brazil because of the lack of environmental regulation compared to here, so you have to know workers weren't being treated well, weren't being paid enough, and the environmental protection wasn't great.

- o Also the idea of capturing social welfare in the market. This means shifting the marginal benefit curve from individuals and private organizations up to where the social benefit curve is, so that you get all environmental, social, and fiscal benefits.

*-Stability (1)*

- o Fiscal sustainability consists of fiscal arrangements that are relatively impervious to market and funding fluctuations or other corners of the market

*-Value/Wealth (2)*

- o Refocus what it really means to be economical and wealthy. We need to redefine our definitions of value and wealth.

- o It is important to know that things can be material and valuable on the creativity and innovation side, and not necessarily make fiscal sense. For example, at the Waste Not Center, businesses and individuals could donate things that they would [normally] throw out. The fiscal analysis

showed it costing [the Center] $1000 to divert a ton of waste from the landfill, whereas it costs $40 to dump a ton of waste in the landfill. [So there was no fiscal value in saving waste from the landfill.] The real value there was the Center was getting supplies to teachers that they couldn't buy, and kids were able to create things out of them. Fostering innovation; that was the real value. This art could have sparked in a student the creativity to change the world, making it extremely valuable [even without making fiscal sense].

## Sustainability as a Whole:

*-Critical Thinking/Bigger Picture (9)*

- There are so many myths surrounding energy efficiency and sustainability, so critical thinking is key. Students need to analyze—don't jump on or off the bandwagon. Be a skeptic.
- Not acting is acting, so students need to [learn to] ask tough questions about how to arrive at decisions when we know that we don't know science fully. So asking questions like how do I decide who to trust, what to read, issues like that.
- Another key thing is looking at the bigger picture. [For example,] a lot of people think green biofuels are awesome, but a lot of them take more energy to make than it takes to get oil, so it's actually a loss to the environment—corn ethanol is an example.
- In all of these dimensions, I find myself recommending paying attention. It is important to stop and figure out what the heck is going on, and what the impacts of your actions are. Pay attention. We forget we are inside something larger than us that was a gift to us.
- Students should know what matters in the overall scheme of things. Students need to understand what the options are, and what the costs of those different options are, and learn how to pick the ones that have the best economic, social, and fiscal benefit.
- Students need to know it's not all black and white—variations and disagreements about sustainability are everywhere, even within disciplines.
- In terms of this curriculum, people need to get beyond the superficial baseline belief of what sustainability really is. Students should recognize that it's much bigger than a superficial definition. An example of that would be in ENR 2300, looking at the case study of the spotted owl controversy. Most people come into the class with a belief that logging is bad and should be stopped, but that's pretty superficial. The demand for wood isn't going to go away necessarily unless we make other big changes. So, that's just moving the demand for wood elsewhere, and it's resulting in social destruction, meaning stopping logging isn't necessarily that sustainable. Recognizing all the challenges is important and we often don't. People need to think more critically about what sustainability means and what backs it up, especially in terms of geographic and systemic connections.
- We should focus on what the term sustainability actually means, not focus on turning people into sustainable people. It's more valuable to understand what exactly sustainability entails. This should be a class that talks about the topic and the perspectives and the details of sustainability to prepare students for the fact that it will come up again and again in their future.
- Students should be exposed to ideas of how to critically assess claims about these things and the information coming in. The sustainability issue can easily become a value-laden topic, so

the university's role should be based on critical thinking and evaluation. We don't want to brainwash students into doing good actions. We want them to come away with critical thinking, that may lead them to good actions, but the important part is the thinking that got them there. If people are critically thinking, not just swallowing a line of reasoning without being critical, we can be happy about that. These claims evaluations aren't really taught at OSU, but they have to be part of the education process.

o There are lots of things to be said about all of those, but I would say that the common denominator is stewardship. And what does that mean? So who are we responsible for and accountable to and what is the time frame in which we are conducting stewardship? Until you've answered those questions, all you're memorizing is definitions, you're not tackling the problems.

*-Education (3)*

o I think that education is the #1 thing, not just in terms of sustainability but in general—people need to be educated. If you educate people about what they're doing, I think they'll change.

o From a sustainable development perspective, I think education—in general—is critical. Particularly women's education. There are opportunities to solve a lot of political, economic, and social problems when you educate women.

o It is important to educate students and citizens who will be good stewards and keep this conversation going.

o There needs to be life-long learning about sustainability issues.

*-Limits (2)*

o I think within all the systems [environmental, social, and fiscal], it's important to get the idea that there are limits to those systems. For example, wealth is not inexhaustible and it can't always be created—and it's the same thing with social systems and natural systems. None are inexhaustible; there are limits to growth and success.

o I think it's important to get students exposed the idea of the bio-physical limits and the long-term outcomes of a socio-economic system that pursues (and requires) growth. There certainly isn't full consensus on this (there are still economists who argue that there are no limits or that they can be avoided)—but this debate is one that students should be familiar with.

*-Preventative culture (3)*

o As we become aware that there's so much to do, we have to let things go. So that the things we put our time and energy and money into make a difference. A lot of people make a big deal about turning water off when they brush their teeth. The habit and awareness part is good, but the amount of water saved is a drop in the bucket, literally. Similarly, endangered species cost so much more to get off the list than just to prevent them from getting on it in the first place. But we don't have a preventative culture.

o At least it's good that we pay attention when the environment is so bad that we're facing ecological disaster, but it would be good to pay attention to beauty and flourishing and

abundance of the natural world rather than treating the world in a way that we take care of it just so we can survive.

o The application of the precautionary principle is important [which basically says] instead of assuming things are fine for sustainability, being more cautious and testing things and being open to making changes instead of realizing after a catastrophe "oh, that was what we needed to change".

o It would be nice if we could have a transition strategy from how we are now to how we will be 75 years from now instead of just having destruction and throwing up our hands. For that, we have to change the political and business institutions. We have so many incentives and practices in place that encourage local and independent decisions (for instance, I drove here this morning alone) that could be translated into sustainable decisions. The whole community is laid out for the automobile; our power system is fueled by fossil fuels. As a solution, some people just want to cut everyone off over night, but that isn't practical—we need a good transition plan. Humans seem to only react to crisis, but we have to get there.

*-Societal Change (1)*

o I just think you have to start making sustainability important at a young age. We have to start with preschoolers and kindergarteners, and then maybe in 20 years we will have a different mentality. Our politicians aren't going to encourage these changes; no one will get reelected if we say "it's time to live with less. Make sacrifices. Consume less. Use lights less. Drive less." That won't be pushed for, so we need a change in society and a change in thinking.

*-Systems Thinking (5)*

o Students need to think of the system as a whole.

o We should think of sustainability from a systems approach.

o The biggest thing students should be aware of is systems thinking, which means that everything is connected to everything else so changing anything has consequences farther than what you may have predicted.

o I think you should have those three components, and then an "integrated sections" part where you look at things like how the economy relies on the ecosystems, how society relies on the economy and ecosystems, and how they all impact each other. There should be some place at the end or beginning to show how they're all united.

o Understanding the interdependence of these different spheres.

*-Tradeoffs (2)*

o Everything cannot be equally traded off.

o Everything has a tradeoff and we must be aware of that. Having the foresight to think about what the tradeoffs might be with proposed technology and policy *etc.* most things involve important tradeoffs for someone.

**What is OSU Doing about Each?**

**Environmental:**

*Ecosystem Services:*

o   We got rid of the dam and are letting the Olentangy go back to its native state, which is a good example of how we are committed to sustainability and environmental issues and are doing things about both. Some people see the dam removal on the river as a disaster, but in a few years it will look much better, so I think that's a good learning thing; like, this is what it takes to get a natural system back to some version of the way it was after so much human activity.

o   Olentangy river restoration and dam removal

o   Wilma H. Schiermeier Olentangy River Wetland Research Park has been given the Ramsar designation of international importance (it is the only Ramsar site out of a university in the US)

o   Working to restore the ecology of campus back to a more natural state—the land before we were here.

*Educating future global citizens:*

o   The university is encouraging growth in education as far as courses targeted towards environmental issues.

o   On the academic side, we are probably still at the infancy level of inserting sustainability into the curriculum. However, there are some sustainability courses in various departments and there's a faculty committee that will formally look at whether or not there should be a requirement in the curriculum—and if so, what that would look like for each student.

o   The university was lacking on the academic side but I think EEDS and the individual sustainability courses and SENR sustainability efforts are filling that gap.

o   Faculty and Professional Learning Community on Sustainability Across the Curriculum.

o   We do education through residence halls.

o   Contests between dorms (Blackburn and Norton) to see who was more "environmental" in terms of energy, water, *etc*.

o   ENR Scholars' "No Impact Week".

o   We work to bring in speakers, like Steve Kellert or KrochetKids.

o   There is a small course called the FYE sustainability series for first year students and the university is developing one for 2nd year students through the STEP program.

o   Educationally and curricularly, there are lots and lots of one-offs. And dozens of classes where students will learn some part of something that could be called sustainability.

o   The curricular efforts through SENR.

o   there are lots of environmental sciences programs and there are a number of environmental studies programs.

o   EEDS major (6).

o   SENR's Carbon Sequestration Center.

- o ENR 2367 course, which focuses on sustainability projects and uses the Campus as a Living Laboratory approach, so the projects actually get implemented in some cases.
- o SENR's Australia study abroad, which deals with social, environmental, and economic sustainability.
- o Sustainability and Business classes.
- o Sustainability knowledge assessments.

*Energy:*

- o 25% of our electricity is generated by wind
  - o as far as we know, at the time it was the largest ever actual purchase of wind energy by a university or a non-utility in the US.
- o We currently have 50 megawatts worth of wind which was a 15 % reduction in our emissions profile.
- o Effective management of energy and the reduction of energy use
- o There is a campus wide-energy efficiency improvement of all buildings that need it (also stated under infrastructure)
- o We are constantly examining opportunities for renewable energy.
- o We built the geothermal field which will offset some heating and cooling costs.
- o We have a lot going on
- o We're making decisions about where to invest funds, where to buy energy, paying for buildings that are LEED certified, installing geothermal on the Oval, a lot of decisions are about energy and physical operations.

*Food:*

- o The Heirloom Café in the Wexner Center has a local foods focus
- o Waterman Farm, a student farm that grows, harvests, and sells its produce as well as composts

*Infrastructure:*

- o There are a lot of people who run the physical place trying to make facilities, operations, and development more sustainable.
- o 50 year framework plan for campus.
- o The university has a green build policy, and the new buildings have to be LEED certified so they will be more energy efficient, water efficient, and an overall better environment for our students and community.
- o There is a campus wide-energy efficiency improvement of all buildings that need it.

  -The additions on South Campus are much more efficient, due to materials and LEED requirements. The new north dorms will be the benchmark of energy efficiency because they're not attached to anything old. There is also the CBEC building, which will have more meters and monitors than any other building on campus.

- o Green buildings like the 4H Center

- o Green roof on Howlett Hall, the first green roof on campus
- o Ideas to make [West] campus into a green campus.
- o A lot on the operational side
- o The Med Center is incorporating a healing garden with biophilic design

*Transportation:*

- o We have the bus system that I've seen that runs on natural gas or renewables
- o More bike trails
- o Trying to create a pedestrian-friendly environment.
- o A lot of our decisions revolve around the transportation system
- o There is the goal to be vehicle free, with an outer belt around campus where parking will be. Ideally it will be fast enough transportation in for students and people to get to class and work from off campus.
- o Woodruff was slimmed to make driving more and more inconvenient.

*Waste:*

- o The Zero Waste effort at the stadium, which diverts 90% of waste generated. That brings sustainability to a hundred thousand people throughout the football season (11)
  - o It shows people that OSU is serious about sustainability. It's especially good when people come from all over for the football games, things like Zero Waste become educational tools. If they can see what we're doing and see the impact we're making, that's a good thing.
  - o It is becoming a goal for the whole university with classrooms, dining halls, *etc.* and is also spiraling into the Worthington school district—it has had a ripple effect.
- o We're moving now towards more composting opportunities on campus, and composting in one of the dorms as a pilot program.
- o Composting in dining halls on campus
- o Composting in the Union
- o The Union and Kennedy Commons have pulpers for composting, and the Blackwell, faculty club, and Fawcett Center also collect organics.
- o The recycling program is visible and organized. There's the all-in-one bins, [and there are recycling bins in offices instead of just trash cans.]
- o We have a massive recycling program for a university our size. While we don't recycle everything, just being able to have an all-in-one container is remarkable (2)
- o All the containers everywhere are starting to raise awareness among a lot of different populations—not just students but faculty and staff as well.
- o We're working to expand the recycling program and range of numbers accepted on campus (2)
- o 100% of the copier paper used by the university contains post-consumer recycled content
- o E-steward certification
- o I like what OSU is doing in conjunction with the surplus unit on campus.

**<u>Social:</u>**

*Community Involvement:*

- o -The university is very involved in Weinland Park (8)

  - the university has a lot of classes which are engaged with Weinland Park and the university district neighborhood
  - I know there is somewhat of a partnership with Weinland park and I get the sense that there are pieces there but my impression is that there isn't a tight link with the campus and the surrounding communities.
  - We do a lot of neighborhood development stuff—the millions of dollars going now to Weinland Park

- o Ohio State has made several commitments to the surrounding communities to improve the way of life for our neighbors.
- o We also want to be good neighbors, and try to think about how we fit into Columbus, Ohio, the Midwest, *etc*. Part of that is communicating what we're doing and what we have planned and how we can work together. For example, we worked with the City of Columbus on the city-wide curbside recycling program.
- o Ohio State has also developed a partnership with the Ohio Department of Rehabilitation and Correction to support their efforts to reduce recidivism and improve rehabilitation. There are also many programs across campus for community service, diversity, and equity.
- o We've had a service learning round table initiative for almost 30 years. A lot of it is educational, so working with various schools in the Columbus system but also neighborhood organizations and community gardens, *etc*.
- o There are a lot of good things happening off campus in addition to the good things happening here.
- o A lot of students are doing volunteer work in the community (community gardens, *etc.*). I think there is a lot being done.
- o There are local groups like the community computer lab (which is in a church called 16th and Summit), which is free for anyone who wants to use it.
- o I would say also the presence of the university as an employer in the community is a big component of the social justice area because we are providing jobs to the community.

*Cultural Diversity:*

- o The university does a lot in terms of cultural diversity.
- o Study abroad —[which exposes] the student population to other cultures and parts of the world and other ways of living.
- o USAID Teacher Education Consortium projects in Indonesia and Brazil
- o The Global Gateway Offices

*Promoting Social Awareness:*

o   We bring in speakers that relate to the social component like KrochetKids

o   Promote social awareness academically, by offering AFAMAST and WGSST classes

o   Bucks for Charity (which raises money annually for environmental, health, and human service agencies).

*Purchasing:*

o   The purchasing department requires that 15% of our purchases have to be made from a minority business enterprise. There's also a preference to buy things from Ohio or from states surrounding Ohio. That connects to the local economy and an attempt to improve lives around the area.

**Fiscal:**

o   I don't really know. In my small view, it seems like we're trying to spend more money and build bigger buildings. I don't know that we're spending money on the sustainability issues.

*Reducing Costs:*

o   Ohio State is investing in several projects that will reduce our costs today on operations.

o   At the operations level, we are constantly looking for ways to save the university money and save our energy cost. This benefits us in that it conserves resources for betterment of the environment but also it saves the university dollars.

o   Efforts to recycle are saving the university money on fees for waste removal

o   Saving money on energy efficiency with building metering and auditing

o   Working on surplusing, getting people to reuse things like e-waste

o   We are saving money and being wiser about using resources.

**MISC:**

*Administratively*

o   The One Framework Plan (2)

o   The President's Climate Commitment (President Gee signed the Climate Commitment to be climate neutral by 2050) (7)

o   The President's and Provost's Council on Sustainability efforts (2)

o   AASHE STARS system

o   University-wide, there has been an explosion of interest in sustainability

o   We won the Enviance award

*Research:*

- o   In terms of research, we have faculty from all departments interested in sustainability, so through their own research area they're addressing sustainability, whether from the business side, architecture side, engineering side, humanities side, you name it. Everyone can get involved.
- o   We have around 400 faculty members doing research across campus that has something to do with energy, the environment, or sustainability. Our goal is to try to mesh those three areas together as much as possible. We think that the issues of energy, environment, and sustainability are broad enough and large enough that we're going to need lots of people from many different backgrounds to work with one another to begin to solve the problems. On our website, we have a database of all of the researchers on campus that we know of. You can search by name and topic and figure out who's doing what and where.
- o   In terms of research, we are doing as much (or more) as any other place in the world. There are over 400 faculty members that do energy and environment-related research. For example, we have found a way to remove the carbon from coal before it is burned and perhaps even make the carbon a marketable product [instead of a toxic waste product]. We also have faculty members looking at water's use in energy, shale and hydraulic fracturing, *etc*.
- o   Students are doing research in the area of technology and e-waste
- o   There's a lot of good research related to sustainability.
- o   Byrd Polar Research Center

*Student Support/Leadership:*

- o   I think OSU is also doing a good job with developing student leaders and giving students opportunities to practice in whatever areas of sustainability they're interested in. The Coca-Cola grants for sustainability are an example of this. Some of those initiatives include the garden behind the Wexner Center, development of a bike clinic, development of a course for the removal of Honeysuckle along the Olentangy River.
- o   Coca-Cola student sustainability grants
- o   We also support student organizations, so whenever they have initiatives we provide staff and whatever assistance they need. The students do a great job with initiatives like dump and run.
- o   The university also sponsors students to go to conferences (like the AASHE conference in Nashville)
- o   Some of the student clubs are already integrating and having collaborative meetings amongst clubs so students are making things happen that way.
- o   Countless student organizations that are environmentally focused and participate in things like Scarlet, Grey, and Green
- o   There are a number of active student organizations.
- o   There's a tremendous number of student groups, which makes it evident that this is a big issue and students themselves care and want to do something about sustainability
- o   Net Impact Certification (2)
- o   CFAES Sustainability blog

- o Earlier this year, OSU got a million dollar grant from the board of regents as a part of a larger program for trying to get internships in Ohio for Ohio students. They engaged 80 companies who said they'd provide 400 internships, and on company time, the students could take 2 online courses. So sustainability is the focus of one of those 10 courses.
- o In the EEDS major we have interns working with city hall to start measuring sustainability indicators with city of Columbus, so we're starting partnerships with the city.

**How Can Students Get Involved?**

*Being aware:*

- o By doing anything. [Students can] all make a contribution, no matter their background. Sustainability is about everything. It's fundamentally reorienting the way we live, which requires changes at every level in every field, in everything. Students need to have an understanding of the problems and what we think is needed to start addressing them so that as they pursue a career, they can incorporate that into what they're doing. If we have people dispersed throughout the system who are aware and making small contributions in their own way, then that is what is important.
- o Getting involved in sustainability doesn't have to mean joining an organization or becoming an EEDS major or doing a river clean-up. It means learning what you want to learn but understanding enough about the challenges we face when it comes to sustainability to be able to incorporate that when it comes to your career and the way that you live your life.
- o I think it's really about speaking up when something feels wrong or you don't know something. In summary: Be curious. Ask questions. Do something. And share it with somebody else. Think critically of your own life; is what you're doing making you happy now and will it make you happy tomorrow? And If it's not, do something differently.
- o Another level of involvement would be students working collectively to make system wide changes. Students can also work to change the broader system outside of the university, like the state or the national government laws (Amnesty International is an example of system wide change).
- o Demand OSU be greener by raising awareness
- o I think if nothing else, the first and most important thing students can do is talk to their friends and neighbors and colleagues about the issues they're interested in. If we come from different backgrounds and talk about a particular issue, we might find common ground, but wouldn't find that unless we engaged in the discussion in the first place. It is important for students to talk to one another to break down those barriers.

*Certifications:*

- o Net Impact Certification (3)
- o Work to obtain Green Buckeye Certification for their office/department/unit (2)

*Challenges/Competitions: (2)*

- o [Other opportunities for getting involved include participating in things like] the Solar Decathlon house, the University Business Plan Competition in Fischer, the clean energy student challenge, *etc*.
- o Students work on competitions like EPA P3 (student design competition for sustainability) and rainworks challenge

*Chosen area of study:*

- o Major or minor in something related to sustainability
- o EEDS (3)
- o Look at your courses and figure out ways to incorporate and work on sustainability issues as much as possible.
- o Various classes that are engaged in sustainability (5)

  - o such as ENR 2367, ENR 3470, HCS 5194, environmental justice courses, *etc*.
  - o Students can take ENR 2367, where students put together sustainability projects and present them in front of key sustainability officials at the university. Students have the opportunity to try and implement the projects at the end of the course.

- o Regardless of what they're doing, they can challenge themselves about how to integrate sustainability principles into whatever they're passionate about and chose to eventually study and work on.

  - o Students should be putting pressure on their faculty and advisors. I don't care if they're science or engineering or math or dance. Students need to ask their professors "where's the sustainability of the thing you're teaching me? How can I make this career more sustainable?"
  - o If you're an architecture student, how can you bring sustainable design into your architecture? If you're a city planner, how do you plan sustainably?

- o Ask professors to focus their research papers, projects, *etc*. on sustainability
- o Participate in Capstone programs (2)
- o Through a GE
  - o the information would get to students from all over the place who wouldn't otherwise know about environmental things.

- o SENR sustainability study abroad program
- o There's been a lot more activity at the intersection of voluntary and academic. I think activities that try to connect academic programs to professional development are really healthy and really useful.
- o Co-curricular activities
- o ENR Scholars
- o Discovery themes (sustainability is a huge part of that)

*Classes: (3) (faculty-initiated)*

- Through discussing sustainability in classes

  - you can tell students to volunteer but they don't really know what to do from there unless you bring them together as a group and show them all the things that they can do and let them choose. So, I think classes are a great way to reach them.
  - I think having groups talk in classes is important. Teaching students about innovations and what people are doing is important so that they know how to get involved. I think the best way to do that is through a class that they have to show up to.
  - you could incorporate the concept of sustainability into a couple of GE classes as a section or two and I think you would get more students that way (as opposed to starting a new class). We already have the student base, so we should probably just take the things that are working now and work sustainability into them.

*Community Involvement:*

- Look locally—find out what's happening in your institution. E-waste is a big part of our education, regardless of what discipline. People should know more about what OSU is already doing, and they should also be thinking about what they could do next and in addition. The process for capturing the fine earths is really awful—a horrible mining process that requires tons of ore for small amounts of final product.
- Environmental organizations in the community; get off campus. Nearly every environmental organization has a local chapter and there are others like The Highlands Nature Sanctuary and the Metroparks, all with very different kinds of missions.
- Students could be more active in their community.
- I think it's important to connect with your peers and your community. So do things that bring you closer to your neighbors

*Events/Talks:*

- Attending seminars and talks
- Attending lectures that occur on campus (for example, SENR seminar series)

*Internships:*

- Internships working with organizations outside of OSU to help students get involved and prepare for a career.
- Getting involved through an internship that's somehow related to sustainability
- Students can also work directly in ESS or in OEE, or can be paired with faculty interested in energy and the environment.
- [There are also involvement opportunities outside of OSU]; for example, some students are working at the city of Columbus Mayor's Office of Environmental Stewardship.

*Lifestyle Choices:*

o   I want students to see the bigger picture. Don't buy a new product because it's battery powered when you have one that already works. Recycling ends up being the solution then, because it's something we can do, but it's superficial because it's only a small part of a large solution. I'm not saying not to recycle, I'm just saying that recognizing the life cycle of a product is important and students should realize that recycling is only a small piece. It's lifestyle choices that are the big things.

o   They can participate directly through the choices that they make, by taking shorter showers or limiting electricity use.

o   Simply do their part by recycling and being good environmental citizens

o   Consumption (3)

  o   Making consumer decisions according to your values. Ex) using certification systems

  o   I think the best way to get involved is through consumerism, because we do it on a daily basis. Engaging in sustainability through making better choices like reusing stuff, shopping at thrift stores, *etc.*

  o   To live in the most environmentally sustainable way, one thing you can do is reduce consumption of all products

o   Asking what is in our investment portfolio, how much are we invested in green things, how much are we not, and how could we do better?

*Research:*

o   Research in energy, the environment, or sustainability (3)

  o   OSU, unlike most universities, encourages and enables a vast amount of undergraduate research. The Buckeye Bullet is the premier example. Students representing a diversity of backgrounds were responsible for designing it, building it, funding it, and getting their sponsors.

  o   Many professors are open to taking on students as interns or research assistants

o   Coca-Cola grants for sustainability (3)

  o   if you're interested, you apply and we select 3–4 and they get the funding.

*Student organizations: (15)*

o   (The Sierra Club, Growing Green, Engineers Without Borders, Ecological Engineers, Net Impact, USG Sustainability Committee)

  o   Students can search the Ohio Union website and the OEE website and talk to people to find out if there are different groups on campus that are doing things they're interested in. The count this semester is around 80 student organizations that are related to the energy, environment, or sustainability conversation.

- One thing we've been trying to encourage students to do is to not re-invent the wheel; instead, find the wheels we have and work with them. Students increase their power and effectiveness by working together.
- If students don't want to join a group and they don't want to do a specific research project or are unsure, they should just go to some meetings and events and hang out and listen and absorb what's going on. There is a lot to be gained just from being a participant in things.

- Student farm , part of which is student run, so students who are interested in food issues and agriculture can get involved.
- I feel like the most effective things that students will do are participating in things where you're doing good stuff: growing food, teaching life skills, and actually doing it all at a local level (Growing Green). So when you do other things in life you're drawing on an experience base and it's more meaningful.

*Volunteer opportunities:*

- Pay it Forward
- BuckiServe
- River Clean-Ups
- Local Matters
- Service Learning Projects
- The Zero Waste Initiative (4)
- Residence halls provide a good opportunity for involvement
- Green representative in each of the residents halls

**What Could OSU be Doing Better?**

-*Campus as a Living Laboratory (2)*

- I think the campus could be used as a living laboratory a little better because there are some neat things that are happening like the rain gardens and green roof that a lot of students don't know about.
- Campus as a living laboratory should work to remain on campus so that students have the opportunity to understand the nuts and bolts of facilities and operations.

Summary: Better utilize the concept of Campus as a Living Laboratory

-*Communication and Promotion of Sustainability Efforts (12)*

- I think we are doing very well with working together, so I'd just say it's important to continue doing that.
- Making sure that we always have a clear, concise message to students needs to be an ongoing goal.
- I think Ohio State could do a better job at demonstrating the connection of its many programs and initiatives to "sustainability"

- OSU is still in an early stage of learning how to take an integrated approach to sustainability. Efforts are fragmented across different colleges.
- I don't know if we tell in a unified voice all the things that we're doing related to sustainability or the environment. There's a lot of great stuff going on and I don't know that it's been talked about in the right way to get students interested and understanding of what's going on at OSU.
- I think we have this multi-headed monster. There are all these things happening and I have a hard time even knowing what exactly we're doing. One office has sustainability in the title, and so does another, but not another. In terms of what's out there, I'm massively confused, and I feel like the emphasis is not always in the place that it should be. So making it clear who's who and how to connect.
- OSU would benefit from a genuine trans-disciplinary initiative that would encourage integrated education and research in sustainability.
- There have been interesting individual initiatives, but for the most part, they're not tied together or understood as part of a larger sustainability commitment.
- I don't think we're very good yet at taking a truly broadly interdisciplinary academic approach; we're still more silo-d with the problems which respect none of our disciplines.
- There is no question that among individual departments, units, and researchers, people are making contributions. But as an institution, we haven't managed to connect the operational, academic, research, and educational aspects of sustainability together.
- Where do I think we're not trying to do enough? I really think it would be in the integration of the three (environmental, social, and fiscal).
- The single most important thing we can do to improve is to communicate better. So not just communicate to the world what we're doing, because we do a good job of that, but we have to communicate with one another. As a university we should be doing better to communicate with students about what we're doing. Being able to communicate with students, the surrounding community, and also with ourselves is critical.
- Better integration between the sustainability office and the students on the education side.
- There isn't that much of a coherent vision for how [sustainability in the curriculum] should work or how students can find that. But that's typical of OSU; as big as we are, you have everything and no one can find it.
- Most students don't know about the wetlands facility or the student farm, so no one goes over there. OSU is at fault there, because the students don't know. We don't seem to promote those things as much as we could.
- I think the campus could be used as a living laboratory a little better because there's some neat things that are happening like the rain gardens and green roof that a lot of students don't know about.
- Ultimately, I just think students need to see more examples of things we practice and be able to take part in them.
- It seems like some stuff isn't located where it should be, for example the Office of Energy and Environment. It seems hidden away and we need to make things more prominent.

- o I think that academic leadership could do more to promote academic work that has a focus on sustainability, both faculty research and courses for students. And faculty could make those choices for themselves as well.
- o The One Planet banners that they had created last year should be on every light pole. On the signs where you enter the campus from a public street, there should be something about sustainability on those signs to help brand the university (maybe they could use the One Planet branding?). We need to remind people more and make it top of mind.
- o You have to show people how sustainability works because it's just a word that people don't understand. We need to have big projects always going on so people can see them, and it would be nice if students could get involved, like how they have students involved in Zero Waste, so that they have ownership of it.

Summary: OSU could do a better job at promoting its many programs and initiatives and then demonstrating in a clear way their connection to a larger sustainability commitment. There is no question that among individual departments, units, and researchers, people are making contributions—but as an institution, we haven't managed to connect the operational, academic, research, and educational aspects of sustainability together.

-*Community Involvement/Social/Environmental Justice (5)*

- o I think OSU is internally focused, and not really concerned with the communities around the area, but they have a really strong impact—they need to be able to do both.
- o The concept of integrating sustainability into surrounding areas could also be improved; we could do a better job at focusing on who is outside the borders of the university. We should be thinking in a more programmatic way about how we could reach beyond our borders to make sustainability happen in a systematic fashion. So things like the work in Weinland Park, or working with the City of Columbus to develop a partnership on sustainability issues. We need integrative collaboration between researchers and policy makers to make that stuff happen.
- o There's a lot of concern with issues of cultural and social justice on campus but not much of it specifically embraces issues of environmental justice that I am aware of, or that encompasses other species in any discussion of justice
- o I don't think of OSU as having done too much in terms of social stewardship/justice.
- o The social stewardship and environmental justice aspects do need to be improved. We need to get involved more deeply in community work, enhance our social fabric and be in tune with the social community and our surroundings. it really is important (and possible) for students to get involved.
- o OSU is doing better in stewardship of the physical campus than in stewardship of its intellectual and community assets.

Summary: The concept of environmental justice and integrating sustainability into surrounding areas could be improved; we could do a better job at focusing on who is outside the borders of the university, by getting more deeply involved with community work and enhancing our social fabric.

*-Critical Thinking (1)*

- o [In the discovery themes we define sustainability] in ways that don't question what it is that we're sustaining perhaps as critically as that might be questioned.

Summary: We should be questioning more often what it is that we're sustaining.

*-Embracing Sustainability Culture (5)*

- o At OSU, we have signed on verbally to the sustainability discourse, but the practice has lagged way behind—we haven't internalized it, really.
- o We have to get to that tipping point where sustainability is our culture, we aren't there yet.
- o Instead of just meeting the bar, we need to exceed the bar, or even establish new bars. Based on expertise and research, OSU could be a leader in developing the next set of standards of sustainability. And it's not all just about energy and resource efficiency, which is a lot of what it focuses on currently (reducing waste and level of energy)—it's also about sustainable consumerism and thinking about our own lifestyle changes and choices. Everyone can agree we need to be more efficient, but to decrease our scale is a different conversation. Everyone doesn't agree on the scale and the equity dimensions like they do on efficiency, but sustainability does push us in a direction of smaller scale and more equity. OSU should be a leader in those two aspects.
- o What we need is a dynamic for change, which means that we need models and to think about crossing boundaries and we need a deliberative context for making sustainability decisions. Deliberative context means [that] there are alternative pathways that we can follow, so we are presented with a set of choices, and rather than saying "here is the sustainability plan for OSU," you'd have several scenarios and teams of people to determine these scenarios. Those alternatives would be public, and part of the mission of the university would be to foster the social, analytical, and political skills for deliberating about the alternatives.
- o If we show that what we have here now is good and we can make it work and we don't have to keep building bigger and expanding, that would really encourage sustainability.
- o The notion of adaptive management, where you try something and you learn from it and you test things out. That is a model that we haven't internalized, and that's something that needs to happen, not just in wildlife management or restoration work but deeply in social institutional terms as well.
- o Divestment would be helpful, since it's really leveraging our consumer power.

Summary: Instead of just meeting the bar, we need to exceed the bar, or even establish new bars; OSU could be a leader in developing the next set of standards for sustainability. We have signed on verbally to the sustainability discourse, but we haven't internalized it, really. We need to get to the point where sustainability is our culture.

*-Energy (1)*

- o I think we could always be working towards shying away from "Big Energy"

Summary: I think we could always be working towards shying away from "Big Energy"

*-Green Space (1)*

o More green space would be good.

Summary: It would be good to have more green space.

*-Institutionalizing Sustainability into the Curriculum (11)*

o Maybe a goal would be to identify some areas that would have the greatest impact on sustainability (engineering, architecture, city and regional planning—those are all areas that are doing things that have a big impact on sustainability outcomes) and build sustainability into their curriculum a bit better.

o Integrate sustainability into teaching university-wide. For example, take engineering students and have them consider greenhouse gas emissions from an engineering perspective.

o I think the ideal thing would be that sustainability is a component of courses taught in all different majors. So if you're an architecture student, you have a class on sustainability and it ends up being a piece of all of your courses. That requires hiring faculty with that mindset that can integrate sustainability into their teachings and put that process together.

o The university can improve sustainability by providing opportunities for sustainability education to students. There's a percentage that might change their activities and the way that they do them if given the knowledge and information.

o My hope is that a curriculum could eventually be developed with some commonalities and philosophies that we can approach so sustainability could be applicable to different people in different areas.

o Putting something like a multidisciplinary seminar in open the option category would be good.

o Getting it institutionalized into the curriculum is the important piece (2)

o Maybe create a capstone that is synthetic and lets us look at behavioral problems versus structural problems. This could address the approaches to achieve goals, as well as understand structural and economic issues.

o There are very few [programs] that incorporate the arts and humanities, which I think are a big part of people's engagement with their environment and the vision for what they think their environment would look like. We have a number of units that do a pretty creditable job at bringing together the environmental and social sciences but we don't have anything that brings in the arts and humanities.

o A General Education course

  ▪ The next step has to be a General Education requirement where every student is required to take one sustainability course out of a handful.

  ▪ A sustainability GE. Students will never get everything in one class, but that's true with any subject. It's important to have a start, something to build from, something to incorporate into what they're studying and how they're living. They need to be getting it everywhere—teaching sustainability needs to be a community effort.

  ▪ It would be great if we get a sustainability requirement in the curriculum.

  ▪ We're doing a lot— within our own silos we talk about sustainability but I think there's a huge opportunity that's missed in terms of the bigger picture. We're not doing

enough—we have good intentions but the roadblocks of a GE class are getting in the way of important things happening.

- The biggest impact we can make is through the students. If you have a GE where you talk about integration and every student has some background knowledge and appreciation for sustainability, that's a huge impact. So teaching students how they personally impact sustainability and how they can mentor and guide others back to world sustainability.
- A GE would be helpful. If we want people to be sustainable and move our world forward, we need a little education at least.

Summary:

-Integrate sustainability into teaching university-wide, so that sustainability is a component of courses taught in all different majors.

-A General Education course or a multidisciplinary seminar related to sustainability would be helpful.

*-International Involvement (2)*

- I think the biggest opportunity now is through online education and having a mechanism for allowing people in the developing world to have access to higher education. We are here to be creating and disseminating knowledge for the good of everybody.
- There is a real opportunity to have a bigger international presence [in outreach and involvement] from a social and environmental justice perspective.
- The international study abroad programs could be better focused on sustainability.

Summary: There is a real opportunity to have a bigger international presence, for example providing online education to those in the developing world, focusing international study abroad programs more on sustainability, more international outreach in terms of environmental justice, *etc.*

*-Policies (1)*

- We've been doing behavioral change stuff for 30-40 years, so clearly that's not going to work. Instead, we need to change the rules. For example, creating policies that require we reduce the waste stream of a residence hall by a certain amount [rather than relying on behavioral change].

Summary: Instead of relying on behavioral change, we need to change the rules. For example, creating policies that require we reduce the waste stream of a residence hall by a certain amount.

*-Student Involvement (5)*

- It would be helpful to provide more funding for student groups that are interested in sustainability so that they could put on events and raise awareness.
- It would be useful to employ some kind of faculty liaison to help students in different areas with their sustainability projects
- We need to give each student an opportunity to engage in extracurricular, co-curricular, and curricular activities before they graduate.
- Our goal is to start to encourage students to communicate with one another. The idea is, one: we have to create situational awareness so they know what's going on, two: encourage them to

talk to one another about what they want to do, and three: help them with whatever they need to do what they want to do.

- o A service requirement for students. Perhaps require students to get involved in the neighborhood and surrounding schools and provide several categories to choose from, and have sustainability be one of them.
- o In the dorms, students don't get the price signals to decide to change their behavior, so the university should create some kind of incentive for students. For example, some of the dorms could get a measuring device so students can know how much energy they're using.
- o Students should be more involved in seeing how high level decisions are made and the calculations that go into them.
- o I'm not so sure students are advocating and organizing as effectively as they could to hold the administration's feet to the fire on this stuff. I don't necessarily think people are resisting, we accept things the way they are.

Summary: Facilitating Student Involvement ex) Providing more funding for student groups, employing a faculty liaison to help students with their sustainability projects, making a sustainability service requirement for students, *etc.*

*-Transportation/Infrastructure (5)*

- o We should encourage alternative modes of transportation—do we really need as many cars as we have on campus? We should encourage more biking, less driving, less parking, and less pollution.
- o We can be working better in the realm of transportation and infrastructure. The university can be implementing initiatives to help improve building standards and doing things to make it safer and easier to ride bikes.
- o One thing we do a really poor job of here is transportation. We should work with the city better to integrate the bike and bus systems; there are a lot of neighborhoods that could be better connected to campus.
- o There could be more preferred/convenient parking spaces for low emission vehicles (like they have in the garage next to Fisher). We could reserve something like the ten spaces closest to the door for low emission vehicles.
- o We could challenge ourselves in terms of physical development and infrastructure

Summary:

-We should encourage alternative modes of transportation, *i.e.*, work with the city better to integrate the bike and bus systems
-We could challenge ourselves in terms of physical development and infrastructure

*-Waste (2)*

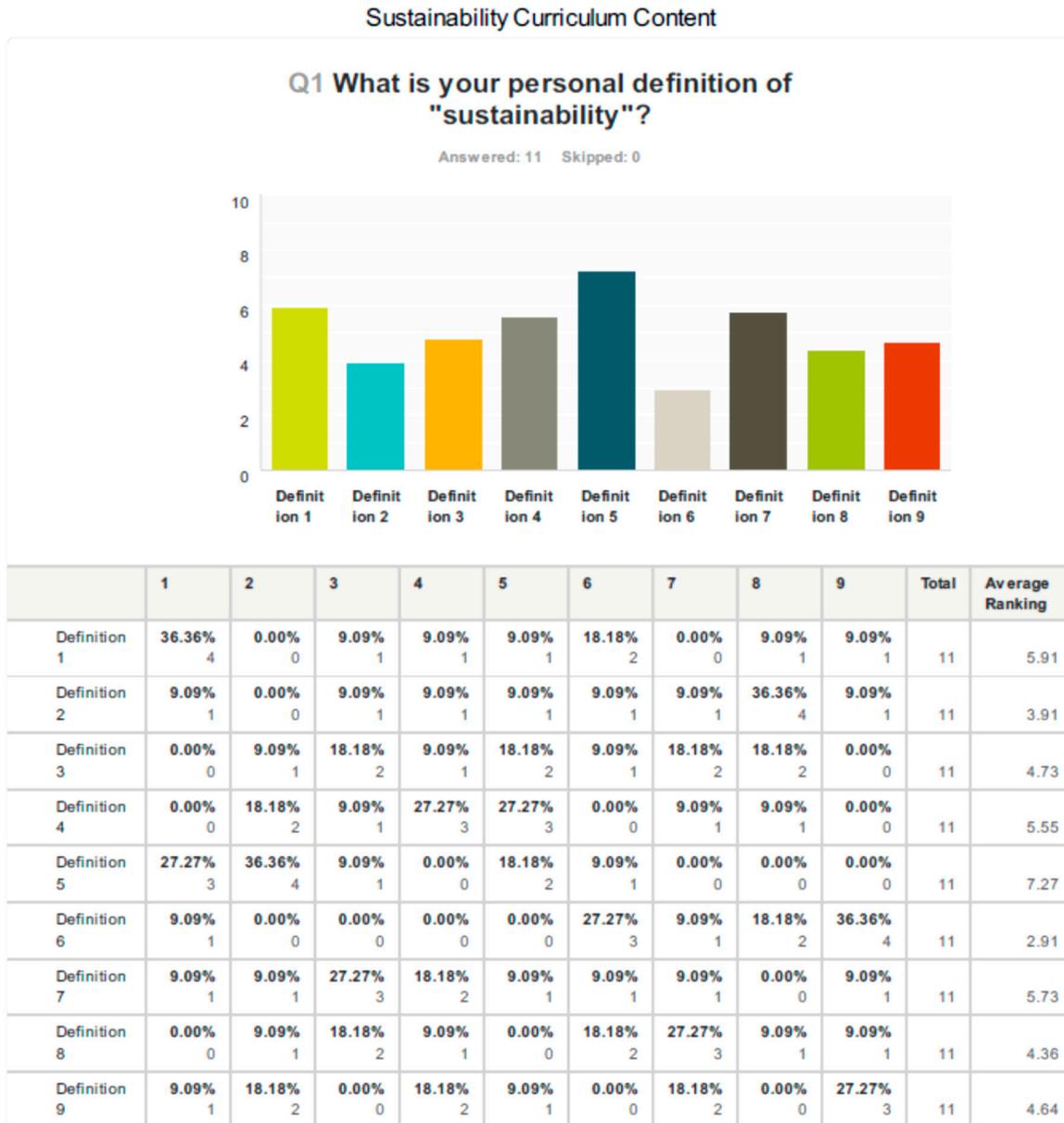- o Better signage on the trash cans and recycling bins. We still have a ways to go with trash cans in the rooms—who knows what's recyclable? Not everything in Columbus is recyclable, let alone here. They're working hard at it, though.
- o I think the greatest problem now is with personal e-waste items, so trying to find a functional way to get rid of my 4 cell phones that sit at home. OSU should develop a robust personal

e-waste management system for OSU people and invite the communities around us to be engaged in that.

Summary: There could be better signage on the trash cans and recycling bins. There should also be a personal e-waste management system for OSU.
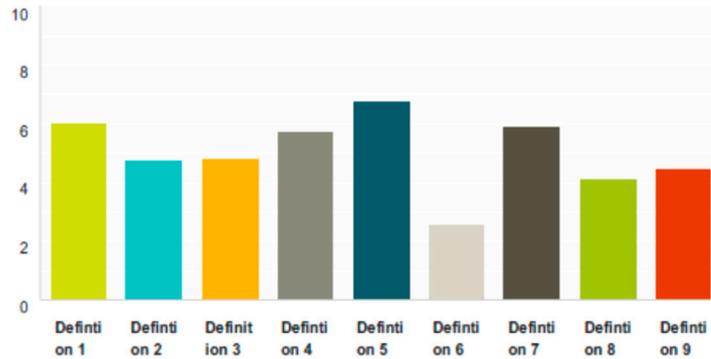
**Supplementary D**

**Full Survey Results**



Sustainability Curriculum Content

Q1 What is your personal definition of "sustainability"?

Answered: 11   Skipped: 0

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total | Average Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Definition 1 | 36.36% 4 | 0.00% 0 | 9.09% 1 | 9.09% 1 | 9.09% 1 | 18.18% 2 | 0.00% 0 | 9.09% 1 | 9.09% 1 | 11 | 5.91 |
| Definition 2 | 9.09% 1 | 0.00% 0 | 9.09% 1 | 9.09% 1 | 9.09% 1 | 9.09% 1 | 9.09% 1 | 36.36% 4 | 9.09% 1 | 11 | 3.91 |
| Definition 3 | 0.00% 0 | 9.09% 1 | 18.18% 2 | 9.09% 1 | 18.18% 2 | 9.09% 1 | 18.18% 2 | 18.18% 2 | 0.00% 0 | 11 | 4.73 |
| Definition 4 | 0.00% 0 | 18.18% 2 | 9.09% 1 | 27.27% 3 | 27.27% 3 | 0.00% 0 | 9.09% 1 | 9.09% 1 | 0.00% 0 | 11 | 5.55 |
| Definition 5 | 27.27% 3 | 36.36% 4 | 9.09% 1 | 0.00% 0 | 18.18% 2 | 9.09% 1 | 0.00% 0 | 0.00% 0 | 0.00% 0 | 11 | 7.27 |
| Definition 6 | 9.09% 1 | 0.00% 0 | 0.00% 0 | 0.00% 0 | 0.00% 0 | 27.27% 3 | 9.09% 1 | 18.18% 2 | 36.36% 4 | 11 | 2.91 |
| Definition 7 | 9.09% 1 | 9.09% 1 | 27.27% 3 | 18.18% 2 | 9.09% 1 | 9.09% 1 | 9.09% 1 | 0.00% 0 | 9.09% 1 | 11 | 5.73 |
| Definition 8 | 0.00% 0 | 9.09% 1 | 18.18% 2 | 9.09% 1 | 0.00% 0 | 18.18% 2 | 27.27% 3 | 9.09% 1 | 9.09% 1 | 11 | 4.36 |
| Definition 9 | 9.09% 1 | 18.18% 2 | 0.00% 0 | 18.18% 2 | 9.09% 1 | 0.00% 0 | 18.18% 2 | 0.00% 0 | 27.27% 3 | 11 | 4.64 |

Sustainability Curriculum Content

## Q2 What is your personal definition of "sustainability"?

Answered: 11    Skipped: 0



| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total | Average Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Defintion 1 | 36.36% 4 | 0.00% 0 | 0.00% 0 | 36.36% 4 | 0.00% 0 | 9.09% 1 | 0.00% 0 | 0.00% 0 | 18.18% 2 | 11 | 6.00 |
| Defintion 2 | 0.00% 0 | 27.27% 3 | 0.00% 0 | 0.00% 0 | 18.18% 2 | 18.18% 2 | 27.27% 3 | 0.00% 0 | 9.09% 1 | 11 | 4.73 |
| Definition 3 | 0.00% 0 | 18.18% 2 | 9.09% 1 | 9.09% 1 | 18.18% 2 | 9.09% 1 | 18.18% 2 | 18.18% 2 | 0.00% 0 | 11 | 4.82 |
| Defintion 4 | 0.00% 0 | 27.27% 3 | 9.09% 1 | 18.18% 2 | 18.18% 2 | 18.18% 2 | 0.00% 0 | 9.09% 1 | 0.00% 0 | 11 | 5.73 |
| Defintion 5 | 36.36% 4 | 0.00% 0 | 27.27% 3 | 9.09% 1 | 9.09% 1 | 9.09% 1 | 0.00% 0 | 9.09% 1 | 0.00% 0 | 11 | 6.73 |
| Defintion 6 | 9.09% 1 | 0.00% 0 | 0.00% 0 | 0.00% 0 | 0.00% 0 | 0.00% 0 | 27.27% 3 | 27.27% 3 | 36.36% 4 | 11 | 2.55 |
| Defintion 7 | 9.09% 1 | 18.18% 2 | 18.18% 2 | 9.09% 1 | 27.27% 3 | 0.00% 0 | 9.09% 1 | 9.09% 1 | 0.00% 0 | 11 | 5.91 |
| Defintion 8 | 0.00% 0 | 0.00% 0 | 18.18% 2 | 18.18% 2 | 0.00% 0 | 27.27% 3 | 9.09% 1 | 9.09% 1 | 18.18% 2 | 11 | 4.09 |
| Defintion 9 | 9.09% 1 | 9.09% 1 | 18.18% 2 | 0.00% 0 | 9.09% 1 | 9.09% 1 | 9.09% 1 | 18.18% 2 | 18.18% 2 | 11 | 4.45 |

Sustainability Curriculum Content

## Q3 As an extension of Question 2, please indicate your absolute threshold of definitions to be included in the curriculum. For example, if you think your top four are of similar or equal weight and absolutely must be included in the curriculum, please list your threshold as 4. If all nine are imperative, please list your threshold as 9. If there is one definition that you think captures your idea of sustainability sufficiently, please list your threshold as 1. You may use this space to provide additional feedback as well.

Answered: 11    Skipped: 0

Sustainability Curriculum Content

## Q4 What do you think are the most important tenets of environmental stewardship?

Answered: 11 Skipped: 0
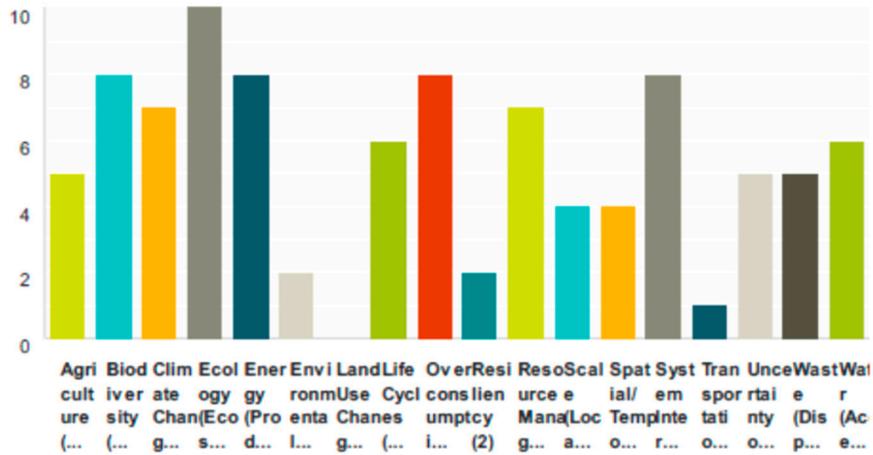


| Answer Choices | Responses | |
|---|---|---|
| Agriculture (Pollution, Runoff, Food Production/Access, etc.) (3) | 45.45% | 5 |
| Biodiversity (Trophic Levels, Species Interactions, etc.) (3) | 72.73% | 8 |
| Climate Change (4) | 63.64% | 7 |
| Ecology (Ecosystem Services, Ecological Bottom Line, Cycles, etc.) (7) | 90.91% | 10 |
| Energy (Production, Extraction, Use, Alternatives, etc.) (5) | 72.73% | 8 |
| Environmental Sensitivity (Empathy/Connection for/to Nature) (1) | 18.18% | 2 |
| Land Use Change (1) | 0.00% | 0 |
| Life Cycles (Where Products Come From/End Up) (4) | 54.55% | 6 |
| Overconsumption (Consumer Culture, Buying Local, Planned Obsolescence, etc.) (3) | 72.73% | 8 |
| Resiliency (2) | 18.18% | 2 |
| Resource Management (Sustainably Managing Resources, Tragedy of Commons, etc.) (2) | 63.64% | 7 |
| Scale (Local, Regional, and Global Environmental Processes) (1) | 36.36% | 4 |
| Spatial/Temporal Effects (Locational Footprints, Short/Long Term Analysis) (3) | 36.36% | 4 |
| System Interconnections (4) | 72.73% | 8 |
| Transportation (1) | 9.09% | 1 |
| Uncertainty of Systems (Tipping Point, Thresholds, Cascading Effects, etc.) (5) | 45.45% | 5 |
| Waste (Disposal, Recycling, Compost, etc.) (4) | 45.45% | 5 |
| Water (Access, Cost, Runoff, Pollution, etc.) (4) | 54.55% | 6 |
| **Total Respondents: 11** | | |

Sustainability Curriculum Content

## Q5 What do you think are the most important tenets of social stewardship?

Answered: 11   Skipped: 0
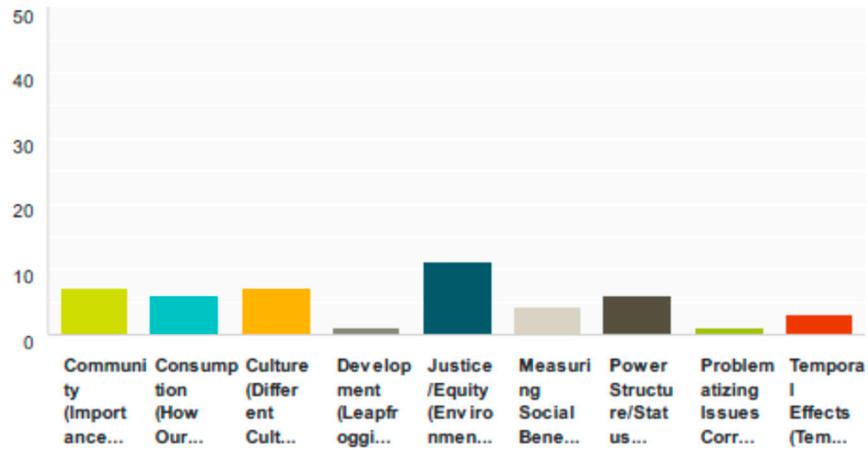


| Answer Choices | Responses | |
|---|---|---|
| Community (Importance of Community/Building Strong Communities) (3) | 63.64% | 7 |
| Consumption (How Our Consumption Affects Others) (1) | 54.55% | 6 |
| Culture (Different Cultures Perceive Sustainability Differently) (2) | 63.64% | 7 |
| Development (Leapfrogging) (1) | 9.09% | 1 |
| Justice/Equity (Environmental Justice, Social Justice, local and international examples, etc.) (13) | 100.00% | 11 |
| Measuring Social Benefits (Social Benefits Can Outweigh Economic Losses) (1) | 36.36% | 4 |
| Power Structure/Status (Political Economy, Fundamental Cause Theory, etc.) (4) | 54.55% | 6 |
| Problematizing Issues Correctly (1) | 9.09% | 1 |
| Temporal Effects (Temporal Difference Between Actions and Impacts, Time Discounting) (2) | 27.27% | 3 |
| **Total Respondents: 11** | | |

## Sustainability Curriculum Content

### Q6 What do you think are the most important tenets of fiscal stewardship?

Answered: 11   Skipped: 0
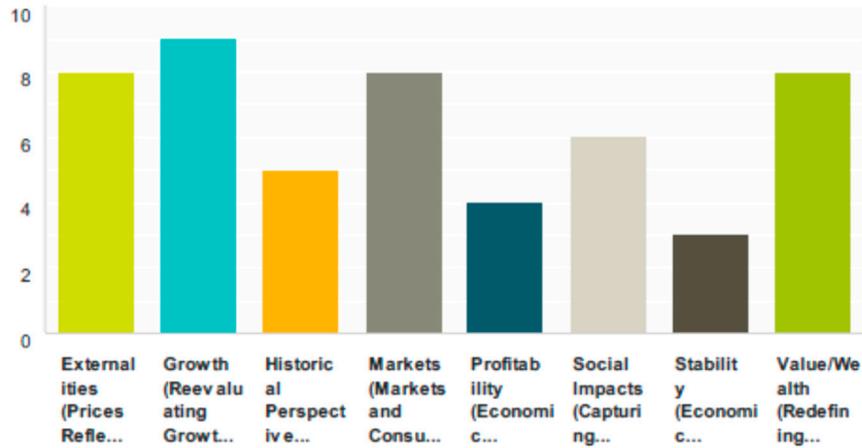


| Answer Choices | Responses | |
|---|---|---|
| Externalities (Prices Reflecting Total Cost, Properly Valuing Resources, Price Signals, Internalizing Externalities, etc.) (6) | 72.73% | 8 |
| Growth (Reevaluating Growth and Progress) (3) | 81.82% | 9 |
| Historical Perspective (History of Capitalism, Corporations as People) (1) | 45.45% | 5 |
| Markets (Markets and Consumer Incentives, Redistributive Mechanisms, Subsidies, Cap and Trade, Rebound and Substitution Effects) (3) | 72.73% | 8 |
| Profitability (Economic Sustainability Means Long Term Profitability) (1) | 36.36% | 4 |
| Social Impacts (Capturing Social Welfare in the Market, Effect of Externalities on Social) (2) | 54.55% | 6 |
| Stability (Economic Sustainability Means Impervious to Market Fluctuations) (1) | 27.27% | 3 |
| Value/Wealth (Redefining Wealth, Valuing Social and Environmental Factors Equally) (2) | 72.73% | 8 |
| Total Respondents: 11 | | |

Sustainability Curriculum Content

## Q7 What do you think are the most important tenets for sustainability as a whole?
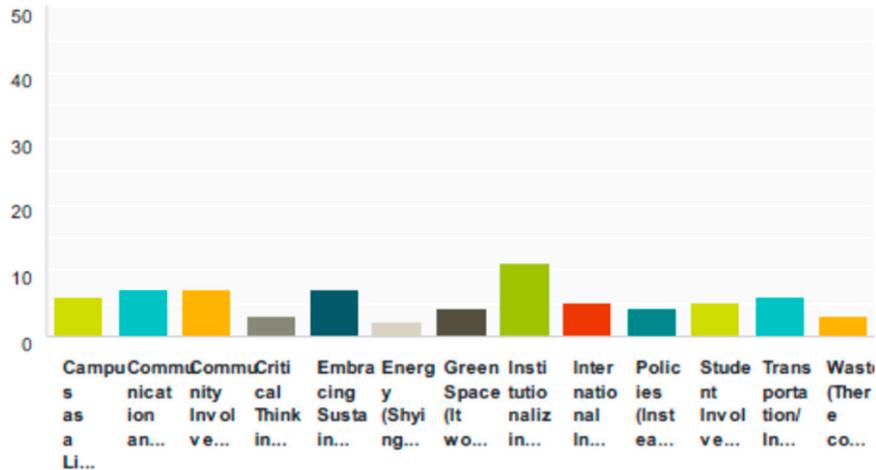
Answered: 11    Skipped: 0
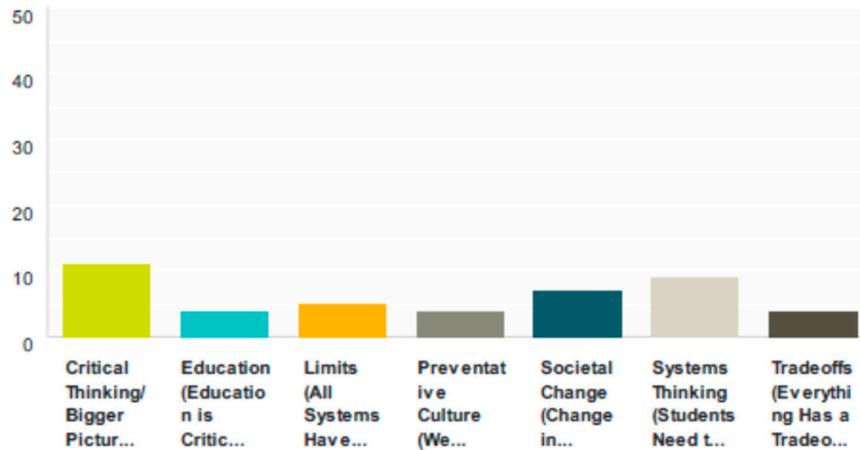


| Answer Choices | Responses | |
|---|---|---|
| Critical Thinking/Bigger Picture (Critically Assessing Claims, Looking at the Bigger Picture, Paying Attention to the Impact of Your Actions, Recognizing Challenges of Sustainability– It Is Not All Black and White) (9) | 100.00% | 11 |
| Education (Education is Critical to Advance Sustainability Efforts) (3) | 36.36% | 4 |
| Limits (All Systems Have Limits, None Are Inexhaustible) (2) | 45.45% | 5 |
| Preventative Culture (We Should Apply the Precautionary Principle Instead of Only Ever Reacting to Crisis) (3) | 36.36% | 4 |
| Societal Change (Change in Society/Thinking is Necessary for Sustainability) (1) | 63.64% | 7 |
| Systems Thinking (Students Need to Think of the System as a Whole, Everything is Connected) (4) | 81.82% | 9 |
| Tradeoffs (Everything Has a Tradeoff, Everything Cannot be Equally Traded) (2) | 36.36% | 4 |
| **Total Respondents: 11** | | |

## Sustainability Curriculum Content

### Q8 What do you think OSU could be doing better in terms of sustainability?

Answered: 11   Skipped: 0



| Answer Choices | Responses | |
|---|---|---|
| Campus as a Living Laboratory (OSU could better utilize the concept of Campus as a Living Laboratory) (2) | 54.55% | 6 |
| Communication and Promotion of Sustainability Efforts (OSU could do a better job at promoting its many programs and initiatives and then demonstrating in a clear way their connection to a larger sustainability commitment) (11) | 63.64% | 7 |
| Community Involvement/Social/Environmental Justice (The concept of environmental justice and integrating sustainability into surrounding areas could be improved; we could do a better job at focusing on who is outside the borders of the university, by getting more deeply involved with community work and enhancing our social fabric) (4) | 63.64% | 7 |
| Critical Thinking (We should be questioning more often what it is that we're sustaining) (1) | 27.27% | 3 |
| Embracing Sustainability Culture (Instead of just meeting the bar, we need to exceed it; OSU could be a leader in developing the next set of standards for sustainability. We have signed on verbally to the sustainability discourse, we just need to get to the point where sustainability is our culture) (5) | 63.64% | 7 |
| Energy (Shying away from Big Energy) (1) | 18.18% | 2 |
| Green Space (It would be good to have more green space) (1) | 36.36% | 4 |
| Institutionalizing Sustainability Into the Curriculum (We should integrate sustainability into teaching university-wide, so that sustainability is a component of courses taught in all different majors. A General Education course or a multidisciplinary seminar related to sustainability would be helpful) (11) | 100.00% | 11 |
| International Involvement (There is an opportunity to have a bigger international presence, for example providing online education to those in the developing world, focusing international study abroad programs more on sustainability, more international outreach in terms of environmental justice, etc.) (2) | 45.45% | 5 |
| Policies (Instead of relying on behavioral change, we need to change the rules. For example, creating policies that require we reduce the waste stream of a residence hall by a certain amount) (1) | 36.36% | 4 |
| Student Involvement (We should work on facilitating student involvement ex) providing more funding for student groups, employing a faculty liaison to help students with their sustainability projects, making a sustainability service requirement for students, etc.) (5) | 45.45% | 5 |
| Transportation/Infrastructure (Challenging ourselves in terms of physical development and infrastructure, and encouraging alternative modes of transportation) (5) | 54.55% | 6 |

9 / 10

| | | |
|---|---|---|
| Waste (There could be better signage on the trash cans and recycling bins. There should also be a personal e-waste management system for OSU) (2) | 27.27% | 3 |
| **Total Respondents: 11** | | |