

Transforming Higher Education: A Practical Plan for Integrating Sustainability Education into the Student Experience

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Abstract

This paper introduces a comprehensive plan for integrating sustainability education into the practices of nearly any college or university. Best practices in sustainability education including green orientation, first year education, graduation requirements, interdisciplinary education, the campus as a model sustainable community, and sustainability-focused academic programs are combined to construct a comprehensive, easy-to-replicate strategy that administrators, faculty, staff, and students could use to improve sustainability education efforts at their own institutions.

Keywords: green orientation, first year education, graduation requirements, interdisciplinary perspectives, sustainable campuses, sustainability-focused academic programs

Introduction

Sustainability has exploded onto the higher education scene within the past few years. Student affairs professionals, faculty, business officers, campus planners, and the national associations for these and many other campus personnel have made sustainability the focus of recent conferences, publications, and trainings. The call for sustainability has come from state systems of higher education (e.g. the University System of Maryland Sustainability Initiative), the U.S. Senate (via the Higher Education Sustainability Act), and even the United Nations (via the Decade of Education for Sustainable Development, 2005-2015). Local, national, and international attention to sustainability becomes more focused each year as our global predicament becomes clearer—exponential growth of the human population and our unyielding consumption of finite resources are unsustainable and are causing profound damage to our global ecosystem. A new way forward is needed.

Government, industry, aid organizations, and other groups of people around the world are looking to institutions of higher education to create sustainable solutions to environmental, societal, and economic challenges. Between December 2006 and April 2010, more than 680 American colleges and universities answered that call by pledging to “green” their operations and set goals for eliminating their contributions of global warming emissions through the American College and University Presidents’ Climate Commitment. Some institutions, including Arizona State University, the University of Georgia, and the University of Maryland, have made significant efforts—such as developing new academic programs, creating graduation requirements, and training faculty on how to integrate sustainability across the curriculum—to educate all their students about sustainability and prepare graduates to be thoughtful citizens of a planet in peril.

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Despite the calls for involvement and the strong response from the higher education community, college and university leaders have surprisingly few resources from which to draw ideas for comprehensive sustainability education strategies. Some scholars have called for broad integration of sustainability education across the various curricula of colleges and universities (Chase & Rowland, 2004; Creighton, 2001; M’Gonigle & Starke, 2006; Orr, 1994; Rappaport & Creighton, 2007). Professor David Orr (1994) suggests that colleges and universities can breathe new life into the liberal arts by approaching sustainability from every social, cultural, political, and artistic angle. Liberal arts graduates would be valued for their broad, creative, and critical ways of thinking about local and global issues. Orr’s larger point—and the motivation for this paper—is that sustainability offers a conceptual framework for addressing today’s problems and that students in *every* discipline must be engaged in conversation about sustainability and action to help reshape society.

In this paper, I offer a comprehensive plan for integrating sustainability education into the practices of nearly any college or university. The programs described herein are currently in practice at higher education institutions throughout the United States, however, I know of no university that employs all programs simultaneously. The intent of this paper is to string together best practices in sustainability education to construct a comprehensive, easy-to-replicate strategy that administrators, faculty, staff, and students could use to improve sustainability education efforts at their own institutions.

The plan is based on an extensive literature review, best practices in sustainability and environmental education, and my experience developing educational programs at the University of Maryland. As the Campus Sustainability Coordinator, my work centers on the idea that all students should be introduced to the concept of sustainability early in their college careers, be continually prompted about how their work relates to sustainability, and reside in a campus community that is committed to modeling sustainability so that they can live the experience as well as learn about it. I summarize a vision of an academic institution that is deeply committed to preparing students to create solutions to reduce some of the world’s biggest problems. Educating all students about sustainability should not be a goal of only a few select colleges and universities which have strong environmental traditions; rather, comprehensive sustainability education is an essential pursuit for any college or university that desires to be relevant in the 21st century.

Sustainability Learning Outcomes

In education, “learning outcomes” are statements of what students are expected to understand, do, and/or appreciate at the conclusion of a learning experience. “Experiences” are not limited to time or space; they can occur in or out of the classroom and span anywhere from a moment to an entire college career or lifetime.

Like many concepts, sustainability is nebulous and lacks explicit learning outcomes. After the president of the University of Maryland signed the American College and University Presidents’ Climate Commitment in 2007, University administrators convened a 55-member committee to create a plan for reducing the campus’s greenhouse gas emissions and integrating sustainability into the University’s mission of teaching, research, and service. This large and diverse group of faculty, staff, and students took it upon themselves to develop a list of sustainability learning outcomes that would guide discussion about opportunities to integrate sustainability in the curriculum. Table 1 lists the draft learning outcomes.

Table 1. Learning Outcomes for Sustainability Education

Drafted by the University of Maryland Climate Action Plan Work Group

Students will:

Understand:

- The meaning of sustainability (the ability to meet the needs of the present without compromising the ability of future generations to meet their needs)
- The fundamental issues of sustainability, including:
 - Modern society's dependence on fossil fuels
 - Human population growth
 - Habitat destruction/loss of biodiversity
 - Economic development versus economic growth (growth is inherently unsustainable because it relies upon a never ending supply of resources through the economic system)
 - Perceived connection between material consumption and happiness
 - Climate change
 - Linear systems versus closed loop systems
 - Differences between non-renewable and renewable materials
 - Limits of Earth's natural resources
 - Increasing demand and diminishing stock of fresh water
 - Food (origins, health/nutrition, sustainable agriculture)
- The implications of population growth on the environment, economy, and society
- The concept of a carbon footprint and ecological footprint and the factors that affect both
- That sustainability involves complex social, cultural, political, economic and scientific issues
- The definition of carbon neutrality
- The impact of sustainability in maintaining economic, physical, and social health

Do:

- Live sustainably
- Seek work that will contribute to a more sustainable society
- Engage in an informed conversation on issues of climate change and sustainability
- Calculate one's own footprint
- Make informed decisions on lifestyle changes

Appreciate:

- The inter-relation between humans and the natural world
- That sustainability is a moral and ethical obligation
- The opportunity to grow our economy with green jobs
- The fragile nature of life on earth
- Individuals' responsibility and government actions are both needed to solve the climate crisis

The draft learning outcomes developed by the Climate Action Plan Work Group may not be comprehensive enough to satisfy the interests of all environmental educators and yet may be too broad to implement in undergraduate general education. Some of the items are also controversial and have profound implications for our current global economic model. Still, the knowledge, skills, and values presented here provide a model for higher education which is, at least with regard to transformative environmental education, somewhat lost in the fog—most American colleges and universities are not doing enough to prepare students to create a sustainable future. The educational strategies presented below, including green orientation, first year education, graduation requirements, interdisciplinary education, the campus as a model sustainable community, and sustainability-focused academic programs are meant to provide each student who matriculates through this new curriculum a deep and comprehensive understanding of the challenges we face and will help them be prepared to make a meaningful contribution to developing a more sustainable society.

Green Orientation

Colleges and universities should demonstrate their commitment to sustainability on students' first day on campus, which occurs for many students during the summer before their first year of college. New student orientation programs are generally one- to two-day campus visits when incoming students register for classes, learn about campus services, and begin to become inculcated in the student culture of their chosen college or university. If sustainability is to be part of the campus culture, then it deserves attention during orientation.

Countless ways exist for orientation leaders to integrate sustainability into their programs and professional and student staff members should be encouraged to find creative ways of engaging new students in sustainable behaviors. Over the past few years, the Orientation Office at the University of Maryland has made great strides toward infusing sustainability into the New Student Orientation Program.

First, to address food waste generated from meals, the Orientation Office coordinates with the Department of Dining Services to collect waste for compost during orientation meals. Orientation staff also work with caterers to replace non-biodegradable plates and cutlery with compostable alternatives. Using well-labeled bins for compost, recycling, and trash, new students learn that separating disposable material and composting food waste is part of student life at the University.

Second, The Orientation Office saves roughly 300,000 sheets of paper each summer by using an online “virtual folder” that has all the fliers and resources students typically receive during the orientation program. This online resource also reduces the amount of preparation time required for each orientation session, makes it much easier to update information, alleviates the problem of students losing the paper version of these folders, and saves money.

Third, to drive home the concept that sustainability is an important part of campus life, Student Orientation Advisors perform a high-energy and entertaining skit about adopting sustainable behaviors as Maryland students. The skit—a sequence of three humorous scenes acted out by Student Orientation Advisors—encourages students to turn off lights and electronic devices when they leave their rooms, to recycle term papers, and to dine-in at the dining hall instead of using disposable take-out containers. According to one unpublished survey, the

sustainability skit is the most memorable of the green elements in the new student orientation program.

First Year Education

Research shows that students are able to recognize connections to sustainability in their classes and learn from their surroundings if they have a solid foundation in the core concepts of sustainability (Gottlieb & Robinson, 2002). These concepts—including human population growth, limits on resource consumption, and consequences of exceeding carrying capacity—should be built into required first year courses, if they are offered.

The first year course serves a traditional role of introducing students to services on campus, helping develop study and time management skills, discussing issues of diversity, and addressing responsible behaviors. However, the courses could also deepen students' understanding of sustainability and encourage interdisciplinary solutions to real-world problems (Rowe, 1999). First year courses could be designed to connect students with nature, be it through class field trips or by encouraging outdoor extracurricular activities, which is shown to increase environmental literacy among youth (Culen & Mony, 2003). The specifics of how sustainability would be integrated into these courses are best left to individual institutions and faculty. Because of the large number of first year seminar classes at the University of Maryland, I decided to employ a peer-educator model in order to take advantage of the free labor of energetic students, but another model may better suit your institution. The important take-home message is that students should have a foundational knowledge of sustainability by the end of their first year.



Student Sustainability Advisors teach interactive lessons about how sustainability affects students, their studies, and future career prospects.

Beginning in 2008, I worked with a small group of exceptional university juniors and seniors to develop and teach an interactive lesson about how sustainability affects students, their studies, and future career prospects. These peer-educators, who are known as the Student Sustainability Advisors, presented a 60-90 minute lesson to 19 first year seminar classes (approximately 400 students) and received rave reviews from the students and their instructors. The lesson—which focuses on population growth, resource consumption, and sustainable solutions—is largely discussion-based and utilizes multi-media technology. The program expanded in fall 2009 when a new group of advisors presented the lesson to 32 first year classes, reaching

approximately 640 students. The ultimate goal for this lesson is to make it a core component of first year education so that all at University of Maryland students are prepared to consider how their studies and lifestyles mesh with the values of sustainability.

Graduation Requirement

General education requirements for undergraduate degrees have changed at some colleges and universities to include an in-depth focus on sustainability, including an environmental literacy component as well as a civic engagement/social responsibility component (McIntosh, Cacciola, Clermont, & Keniry, 2001; Wolfe, 2001). In order to graduate, students must have at least one course that focuses in-depth on how to create a sustainable environment and a more humane society. Like the sustainability components of new student orientation and first year classes discussed above, a semester-long sustainability-focused course should be mandatory for all students.

Environmental literacy is an important component of sustainability education and, as such, was the focus of two national studies that looked at the extent to which sustainability concepts have been incorporated into higher education. For *A Survey of the Environmental Education of Students in Non-Environmental Majors at Four-Year Institutions in the USA* (Wolfe, 2001), chief academic officers at four-year institutions were surveyed to examine the extent to which their institutions provide for the environmental education of students in non-environmental majors and to identify various approaches for increasing environmental literacy at the college level. In this survey, environmental literacy was defined as “a basic understanding of the concepts and knowledge of the issues and information relevant to the health and sustainability of the environment as well as environmental issues related to human health” (p.2). Of the nearly 1,000 institutions that responded to the survey, 11.6 percent indicated that an environmental literacy course was required of all students and 55 percent reported that such a course was not required but was available and countable toward the institution’s general education requirements. In other words, only 11.6 percent of institutions require environmental literacy for their graduates and, worse yet, at 45 percent of the institutions, non-environmental majors do not have the option to include environmental courses as electives for part of their general education requirements.

The National Wildlife Federation’s Campus Ecology Program conducted a separate survey entitled *State of the Campus Environment: A National Report Card on Environmental Performance and Sustainability in Higher Education* (McIntosh et al, 2001). This survey of both two- and four-year colleges showed that only eight percent of higher education institutions had an environmental literacy undergraduate requirement, and another five percent had this requirement for most of their students. An additional three percent were planning to build in this requirement in the future. Mark Van Putten, President and CEO of the National Wildlife Federation explained the situation:

While a number of colleges and universities stand out for educating students in all disciplines about sustainability, the survey found that, unless they are majoring in biology or environmental studies, students in many institutions may complete their studies without gaining basic environmental literacy. (McIntosh et al, 2001 p. iii)

Both studies, Wolfe (2001) and McIntosh et al (2001), had large samples and yielded similar findings, so it is reasonable to conclude that approximately one in ten higher education institutions in the United States had an environmental literacy graduation requirement for all students in 2001. In the past nine years since these studies were published, the percentage of

schools with such a requirement may have increased considering the growing national and international concern for the natural environment during that period.

Research shows, not surprisingly, that college-level environmental courses do increase students' environmental literacy (Benton, 1994; McMillan, Wright, & Beazley, 2004; Rowe, 1999; Ryu & Brody, 2006; Smith-Sebasto, 1995; Wolfe, 2001). Students at the University of Georgia, which has an environmental literacy graduation requirement, report increased environmental knowledge and awareness because of the requirement (Moody & Hartel, 2007). Research also shows that taking as little as one environmental course may increase students' adoption of environmentally responsible behaviors (Benton, 1994; McMillan, Wright, & Beazley, 2004; Rowe, 1999; Ryu & Brody, 2006; Smith-Sebasto, 1995; Wolfe, 2001). This finding is important because behavior change, not just knowledge, should be the ultimate goal of environmental education.

Although there is clear evidence that environmental courses increase environmental literacy and encourage environmentally responsible behavior (Benton, 1994; McMillan, Wright, & Beazley, 2004; Rowe, 1999; Ryu & Brody, 2006; Smith-Sebasto, 1995; Wolfe, 2001), more research is needed to determine the level of environmental literacy required for students to understand how to live truly sustainable lifestyles, if that sort of understanding can even be reached through environmental education. Moody and Hartel's (2007) study shows broad support for the environmental literacy requirement at the University of Georgia; however, half of the faculty surveyed said students are environmentally illiterate. Even if all students were typified as being environmentally literate, this does not necessarily mean they are prepared and committed to lead more sustainable lives and promote a sustainable society. Sustainability education experts such as Orr (1994, 1995) and Rowe (1999) say that sustainability and environmental literacy must become the premise for all education. A required course in sustainability is a step in the right direction but one course is not enough to expect that students will understand complex relationships between environment, society, and economy. Students need to continue to learn about sustainability throughout their years in college.

Interdisciplinary Perspective

If higher education is responsible for developing leaders who are equipped to create a sustainable society, then students must understand how the lessons they learn—in art, philosophy, history, science, engineering, and every other discipline—can contribute to a more sustainable society (Orr, 1994). This integration across the disciplines helps students think critically about their local environment, fosters interdisciplinary learning and problem solving, and prepares students to find solutions to complex 21st century problems. Students need to encounter sustainability issues in many, if not all, of their courses (Orr, 1994; Rappaport & Creighton, 2007; Rowe, 1999). A few universities, including Tufts University, Northern Arizona University, Emory University, and the University of Maryland have created faculty development programs to encourage the integration of sustainability across the curriculum.

In 1990, the first such faculty development program was pioneered at Tufts University. Faculty members attended the Tufts Environmental Literacy Institute (TELI) to learn how their work relates to sustainability issues and how to teach sustainability through their courses (Rappaport & Creighton, 2007). Northern Arizona University (NAU) created a similar program in 1995 called the Ponderosa Project, named after the ponderosa forest adjacent to the NAU

campus. Between 1995 and 2004, more than 100 faculty members attended the two-day Ponderosa Project workshop and sustainability was integrated into 120 courses across the curriculum (Chase & Rowland, 2004). The workshop was facilitated by four resource experts who were faculty members from different disciplines familiar with sustainability. The first day of the workshop was a mixture of presentation and discussion to introduce “sustainability as a concept and provide as many openings to the topic as possible” (Chase & Rowland, 2004, p.96). The second day of the workshop was dedicated to working with resource experts to integrate sustainability into course curricula and to discussing what students would learn because of the revisions (Chase & Rowland, 2004). The Ponderosa Project became the model for the faculty development program at Emory University called the Piedmont Project, named for the Georgia piedmont (Barlett, 2004).

In 2009, I created the Chesapeake Project for University of Maryland faculty who are interested in finding unique ways of teaching about sustainability across the disciplines. The name of this initiative represents two ideas: (1) that the University of Maryland is joining a network of other colleges and universities that are making strides to integrate sustainability throughout their curricula and (2) that Maryland faculty will use ecological, social, and economic examples from around the Chesapeake region to help our students see the connection between curriculum and place.



The Chesapeake Project was created for University of Maryland faculty who are interested in finding unique ways of teaching about sustainability across the disciplines.

Central to the Chesapeake Project is a two-day workshop designed to help University of Maryland faculty integrate sustainability across all academic disciplines. Participants learn about core concepts of environmental, economic, and social sustainability from resource experts—faculty from environmental science, sociology, and business—who help the participants integrate sustainability into their existing courses. Through taking these revised courses, students have the opportunity to explore sustainability through multidisciplinary lenses in order to gain a more comprehensive understanding of the subject. For instance, an art professor might lead a class discussion about sustainable materials or a math professor might frame math problems as they relate to the declining oyster population of the Chesapeake Bay.

Results from the first workshop were very encouraging. From the 26 faculty (23 participants and 3 resource experts) who attended, 33 courses were revised to include sustainability. Courses that now include some form of sustainability activity, assignment, or discussion include History of American Art To 1876, Printmaking, Molecular Genetics,

Marketing Principles and Organization, Management Consulting, Kinesiology for Dancers, Planning for Cities, and Black Theatre and Performance, among others. Furthermore, all but one workshop participant said they were motivated to integrate sustainability into *all* of their courses and 17 of the 26 participants said they will make pedagogical changes because of the workshop. Finally, the faculty participants requested that the Chesapeake Project be turned into a faculty learning community instead of just a one-time workshop. To foster that community, a couple of the resource experts and I began hosting monthly “brown bag” luncheons.

Faculty development workshops like the Chesapeake, Piedmont, and Ponderosa projects are easily replicable and highly adaptive to unique educational settings. More importantly, they successfully bring together educators from varied disciplines to discuss sustainability issues and build collaborative bridges between distinct areas of study and sustainability issues. Funding is helpful to provide faculty stipends and meals, but expenses can be kept to a minimum if faculty do not require monetary compensation for their participation. A great resource for faculty or staff who want to develop a workshop on their campus is the Association for the Advancement of Sustainability in Higher Education’s Sustainability Across the Curriculum Leadership workshops, which are hosted twice each year.

Campus as a Model Sustainable Community

Greening campus operations are a critical piece of the campus sustainability movement. Institutions are striving to reduce environmental impacts and operating expenses by replacing lighting fixtures, bathroom faucets, heating and cooling equipment, and other inefficient energy and/or water systems, especially if there is a relatively short payback period on the initial investment. Energy conservation and greenhouse gas emissions reductions are the primary foci for the more than 680 colleges and universities that have pledged to become carbon neutral; however, many schools are also involved with projects that are less carbon-focused such as creating on-campus organic farms, developing zero-waste operations, and building stronger connections between campus and the surrounding community.

Colleges and universities are being transformed into *living laboratories*—models of healthy and productive communities we hope graduates will recreate throughout the world (Orr, 1994). Sustainability principles are evident in facilities design, energy production, waste management, purchasing practices, investment criteria, and other operational areas of the campus. Here, students have the opportunity to participate in the process of greening the campus and learn from their surroundings. Of course, many sustainable practices are invisible, so it is important that facilities managers take the time to create permanent signs or other means of educating students about sustainable features.

Campuses are essentially small communities; many opportunities exist for students to get hands-on experience with campus operations that they can then apply in “the real world.” In fall 2009 at the University of Maryland, the Office of Sustainability, Facilities Management Energy Office, and Office of Fraternity and Sorority Life collaborated on an energy awareness and conservation project called *Energywise UM*. The purpose of the project was to educate building occupants about electricity consumption, provide tips on how to conserve energy, incentivize conservation, and monitor progress. The Office of Sustainability recruited a team of student interns to pull data from the University’s energy data management system, construct weekly

energy reports, interface with building occupants and facilities managers, and analyze the impacts of specific interventions on energy performance.

Beyond some impressive results in energy conservation, *Energywise UM* is an example of an interdisciplinary learning project. Engineering and science students explained how to analyze energy data, a psychology student used her knowledge of behavior change to design strategies for incentivizing conservation, and a political science student employed her skills to creatively manage the team of interns. Many interdisciplinary student teams work on sustainability projects at the University of Maryland and at schools around the world. Administrators and educators should consider how to utilize student interest in sustainability to create projects that mutually benefit both student learning and campus operations.

Sustainability Major, Minor/Certificate, and Graduate Program

The focus of this paper has been on creating a learning environment where *all* students receive an orientation to the campus culture of sustainability, an introduction to sustainability concepts as part of first year education, opportunities to explore sustainability issues through a graduation requirement, and holistic out-of-the classroom learning experiences by living on and participating in a model sustainable community. These initiatives, if well implemented, should increase students' environmental literacy and encourage environmentally responsible behavior (Benton, 1994; McMillan, Wright, & Beazley, 2004; Rowe, 1999; Ryu & Brody, 2006; Smith-Sebasto, 1995; Wolfe, 2001). Still, students may need a much deeper understanding of the interaction of environment, society, and economy if they are to make the sort of meaningful impact many scholars believe is needed.

In the past few years, there has been a significant increase in sustainability majors, minors/certificates, and graduate programs at colleges and universities in the United States and Canada. According to the Association for the Advancement of Sustainability in Higher Education (2009), 14 institutions now offer a Bachelor's degree in sustainability, 18 offer a minor, 25 offer a certificate, and 14 institutions offer a Master's and/or Ph.D. in sustainability. These programs, all of which are interdisciplinary, are preparing students to be leaders in industry, government, and education. Year by year as the planet warms and resources become scarcer, the value of people with this specialized training is becoming clearer. Between 1998 and 2007, the number of clean energy jobs grew nearly two and a half times faster than overall jobs (Pew Charitable Trusts, 2009), making the case that this is a skills set in demand.

Although graduate programs in sustainability may only ever exist at a limited number of institutions, a minor or certificate in sustainability should be offered at every university. The problems humanity faces will not be solved by engineers and scientists alone. Students in every discipline need to understand how their chosen career paths can contribute to a more sustainable society. A minor or certificate should be an option for students who want to explore how their major field of study relates to sustainability. These programs would provide a solid conceptual framework of sustainability, allow flexibility so that students can take sustainability-related courses that already exist within their majors, and offer a capstone experience where students could complete a thesis or project on how they—as social scientists, physicians, lawyers, teachers, politicians, etc.—will help usher in a better future.

Conclusion

The proposals I set forth in this paper are not a lofty plan for higher education reform. All of the strategies discussed—green orientation, first year education, graduation requirements, interdisciplinary perspectives, sustainable campuses, and sustainability-focused academic programs—are being implemented at various colleges and universities, large and small. Aside from what can be a sizable investment in faculty and staff time, the operating expenses of some of these programs can be minimal (e.g., the Chesapeake Project, graduation requirements, and sustainability-focused academic programs), some program can be free (e.g., sustainability integration in first year education), and some may even save money in the short-term (e.g., green orientation and energy conservation efforts) or long-term (e.g., a sustainable campus).

Very few if any institutions have employed all these strategies simultaneously, but to do so would transform the student experience. An institution with a comprehensive approach to sustainability education is a place where students are part of an academic environment where they see the connections between disciplines and work collaboratively to find interdisciplinary solutions to real-world problems. They experience living in a low-carbon, resource-smart community and can therefore look at society through new lenses. They are inspired to find new and creative ways to further green their campuses and actively seek opportunities to share what they learn with communities beyond their institution. Creating this sort of institution is certainly ambitious, but it is achievable if individuals take ownership of specific programs and work together (with learning outcomes in mind) to coordinate sustainability initiatives.

Faculty, staff, and students exist at every college and university who are passionate about sustainability and eager to find ways to make a difference. This interest and energy needs to be channeled into bringing about transformational educational experiences that students both want and need and upon which the fate of our environment, society, and planet may very well depend. In my work at the University of Maryland, I have learned that leadership can come from anyone. If you are inspired to initiate your own sustainability program, find a few like-minded people and jump in where it makes sense for you and your institution. You will be surprised by how many people learn about what you are doing and want to help.

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