How and why US universities fail to impart environmental literacy to all students

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Abstract

Purpose – This study aims to assess the spread of environmental literacy graduation requirements at public universities in the USA, and to highlight factors that mediate the adoption of this curriculum innovation.

Design/methodology/approach – The author analyzed the undergraduate general education curriculum requirements at all 549 public BA-granting higher education institutions in the USA between 2020 and 2022.

Findings – The study found that only 27 US public universities out of 540 have an environmental literacy graduation requirement, which represents 5% of universities and is substantially lower than previous estimates.

Originality/value – First, this study provides a more complete, more reliable and more current assessment of the graduation requirement’s presence at US tertiary institutions, and shows the number of universities that have implemented this innovation is lower than was estimated a decade ago. Second, it draws from the scholarship on the infusion of sustainability into the university curriculum to provide a comprehensive discussion of factors that mediate the pursuit and implementation of the graduation requirement. As well, it identifies factors that played a key role in one pertinent case.

Keywords Political economy, Curriculum greening, Universities, Environmental education, General education requirements, Environmental literacy

Paper type Research paper

1. Introduction

Since the 1970s there has been a growing recognition that higher education institutions (HEIs) have a critical role to play in solving our environmental challenges. Besides modeling how large organizations can effectively reduce their ecological impact, they have the power to provide the next generation with the values, knowledge, mindsets and practices that can help us solve our mounting environmental challenges. The recognition of their educational role is signaled by the 16 international conferences that addressed environmental education between 1975 and 2002 (Haigh, 2005). This includes the 1975 international environmental...
workshop held in Belgrade, 1977 intergovernmental conference on environmental education in Tbilisi (Georgia) and Moscow’s 1987 conference on environmental education and training (ibid).

One outcome of these meetings has been declarations and resolutions aimed at encouraging educational institutions to improve the environmental education they provide. For example, the charter from the 1975 Belgrade meeting proposed the goals of:

1. developing “a world population that is aware of, and concerned about, the environment and its associated problems;” and
2. providing citizens with the skills and attributes needed to improve human life and protect the environment (Environmental Education, 1975).

Importantly, there is evidence some universities have responded positively to these encouragements. For instance, in 1990 the presidents and chancellors of 20 universities, from 13 countries signed the Talloires Declaration, which committed their institutions to generating “expertise in environmental management, sustainable economic development, population and related fields” and ensuring “that all university graduates [be] environmentally literate and have awareness and understanding to be ecologically responsible citizens (ULSF, 1990).” Moreover, over the last 30 years, the signatories list has expanded to 520 HEIs in 57 countries, including 172 in the USA alone (ULSF, 2021a, 2021b).

Beyond signing declarations, many US HEIs have taken concrete steps, such as increasing their environmental course offerings and developing programs in environmental studies and/or environmental science (Brint et al., 2009; Collett and Karakashian, 1996a; Johnson, Ilhan and Frickel, 2020). Regarding the latter, in 2008 about half of US universities offered a major or minor in environmental and/or sustainability studies (McIntosh et al., 2008).

Having said this, while increasing environmental courses and programs is a significant step in the right direction, such initiatives have serious limitations. First, because many of the added courses are reserved for environmental majors (such as biology or environmental sciences), the courses are often inaccessible to nonenvironmental majors. Speaking to this point, Wolfe (2001) found that nonenvironmental majors are unable to take an environmental literacy course as an elective for their general education (GE) at 45% of US HEIs. Another problem is that when such courses are offered, they are most likely to be taken by students with a preexisting interest in environmental issues, as opposed to those who have yet to be deeply exposed to such issues and who most need it. Moreover, there is reason to believe some segments of the population, due to confirmation bias, will actively opt out of courses containing environmental content (Hess and Maki, 2019). Consequently, the vast majority of students graduate without gaining a sound understanding of how ecosystems function, how human systems impact them, how our collective beliefs and behavior are contributing to our environmental problems or what could be done to effectively address them (Coppola, 1999). In turn, the resulting environmental illiteracy makes it less likely these graduates will change their behavior, see through industry’s sophisticated greenwashing or adequately support policy geared toward effectively redressing and preventing environmental problems.

One way to address the problem and to improve the environmental literacy of all students is to add an environmental literacy GE requirement. Nancy Coppola (1999), a sustainability education expert, argues that this change would effectively address the problem because it would mean all graduating students would have to successfully complete at least one course designed to increase their environmental awareness and literacy. In addition, numerous scholars have found evidence suggesting such a requirement would improve knowledge, mindset and/or behavior (Benton, 1993; Fisher and McAdams,
2015; Moody and Hartel, 2007; Wang, Sommier and Vasques, 2022; Woodworth, Steen-Adams and Mittal, 2011). For instance, Woodworth et al. (2011) found that requiring such a course improved the ecological awareness of undergraduate students taking it, with the impact being greatest on students who entered the course with the lowest environmental concern. As well, Moody and Hartel (2007) report that the requirement at the University of Georgia led to increased knowledge, greater concern and behavior change.

In the 1990s there was hope environmental graduation requirements would spread across the United States, with Collett and Karakashian (1996b) going so far as predicting such a development would occur within a decade. In addition, research from that era suggests universities were moving in that direction, as an environmental graduation requirement was reported at 11% of public and private BA-granting institutions in the USA and 7% of public ones (McIntosh et al., 2001; Rowe, 2002; Wolfe, 2001).

There are two major limitations with the existing scholarship. First, while scholars tracked the HEIs’ adoption of this requirement in the 2000s, no one has assessed the situation since 2008. This is a serious lacuna for if HEIs have ceased making progress on the issue, it behooves us to know it and to investigate why that is the case. Second, the assessments that were previously carried out are unreliable because they were based on self-reporting from university officials and suffered from low response rates. Addressing these limitations is this article’s first objective. Toward that end, the author analyzed the GE requirements of all 549 public universities in the USA.

The paper’s other overarching objective is to illuminate factors that mediate the HEIs’ adoption of environmental graduation requirements. Toward that end, the article reviews the scholarship that discuss barriers to infusing sustainability into the curriculum, and discusses the University of Vermont case, which successfully implemented an environmental literacy requirement in 2015.

2. The scholarship on environmental graduation requirements
Environmental literacy is typically defined as having:

An awareness of and concern for the environment and its associated problems, as well as the knowledge, skills, and motivations to work towards solving current problems and preventing new ones (McBride et al., 2013, p. 4).

Universities have sought to improve student environmental literacy through various strategies. One is to increase environment-related courses and degrees, while another is to infuse environmental themes into nonenvironment courses (such as English or Sociology) (Brint et al., 2009; Collett and Karakashian, 1996a; Rowe, 2002). Still another is to require that students successfully complete an environmental awareness course as part of their GE graduation requirements (Hill and Wang, 2018; Rowe, 2002). It is the latter approach that is the focus of this paper.

This choice was driven by several factors, with pragmatism being one. It would be quite unwieldy to track all the environmental courses offered at all public universities, or to analyze all non-environmental courses for the presence of environmental content. In contrast, analyzing GE requirements at all public universities was a manageable project. Strategic consideration were another determining factor as a GE graduation requirement is the only strategy that ensures all graduating students will get exposed to basic environmental themes. While a multipronged approach (such as having an environmental literacy graduation requirement and infusing environmental themes in non-environmental courses) would be ideal, there is evidence that, by itself, an environmental literacy course...
increases environmentally responsible behavior (Moody and Hartel, 2007; Smith-Sebasto, 1995; Wolfe, 2001; Woodworth et al., 2011).

The author is only aware of three previous attempts to assess the presence of environmental literacy requirements at US universities. One is the National Wildlife Federation’s Report Card on Environmental Performance and Sustainability in Higher Education (McIntosh et al., 2001), which reported that 8% of HEIs have an environmental literacy requirement for undergraduate students. The other is Vicki Wolfe’s 2001 study, which electronically contacted chief academic officers at US institutions to ask whether they provide environmental education to students enrolled in nonenvironmental majors. Of the 1,172 schools she contacted (which included 84% of four-year schools), she received responses from 496 (representing 42.3%), and only 11.6% reported requiring an environmental literacy requirement of all students. The third is McIntosh et al. (2008) follow-up to the National Wildlife Federation’s 2001 report. That study examined environmental pedagogy offered at all US HEIs (including private universities, liberal arts colleges and community colleges) and reported that the percentage requiring the completion of an environmental awareness course had decreased to 4%.

A limitation with these studies is that they only captured a portion of the population universe and are, therefore, incomplete. For instance, Vicki Wolfe’s (2001) study did not contact all public universities and only obtained responses from 42.3% of the schools she did contact. Similarly, only 27% of HEIs contributed to the 2008 McIntosh et al. study. Another limitation is the studies’ reliance on self-responses, which introduces the potential for inaccurate data (either through respondent error or deliberate falsification), which undermines the validity and reliability of the results. A third limitation is that all three studies were completed at least 15 years ago, which prevents us from knowing how the situation has evolved since then. Addressing these three limitations with the existing scholarship was this study’s first objective, while identifying mediating factors was the second.

3. Methods
In the study’s first phase, the author analyzed the undergraduate GE requirements at all 549 public BA-granting tertiary institutions in the USA. These institutions were identified with the help of the Carnegie Classification of Institutions of Higher Education website, and used the following filters: “Baccalaureate Colleges,” “Masters Colleges and Universities” and “Doctoral Universities.” While the search results listed universities in Guam, Virgin Islands and Puerto Rico, these were not included in the analysis. Other exclusions were the Naval Postgraduate School and the Air Force Institute of Technology-Graduate School of Engineering and Management, neither of which provides a BA degree.

GE requirements could not be obtained from another nine institutions (these were small regional campuses of larger universities or online versions of universities), thereby leading to their exclusion and lowering the final institution count to 540.

The GE requirements were identified by conducting a search with one of the following keywords: “graduation requirements,” “core curriculum” and “general education requirements.” In the instances where those keyword searches were unsuccessful, the researcher obtained the information through the University’s catalog. In each case the author assessed the curriculum requirements for the presence of an environmental literacy requirement (which was sometimes referred to as a “sustainability” or “environmental awareness” requirement).

A typical core curriculum requires students to complete units in the following subjects:

- writing/composition;
- humanities and fine arts;
natural sciences and math; and
history, behavioral and social sciences.

To count as having an environmental literacy requirement, the university had to require students complete an “environmental literacy,” “environmental awareness” or “sustainability” requirement. In some cases, the university requirement had to be met by passing a specific course (such as Environment and Society). In most cases, however, students could satisfy the requirement through a range of different courses that address environmental themes. The typical “Natural Sciences” component did not count as an environmental literacy requirement because students could satisfy that requirement by completing courses that could be devoid of ecological content, such as astronomy, physics or chemistry.

The study’s second phase was geared toward accounting for the low number of universities that have implemented the environmental literacy requirement. Toward that end, the author consulted the scholarship on environmental literacy graduation requirements, which consisted of searching the Scopus database for each of the following keywords: “environmental graduation requirement,” “environmental curriculum requirement” and “environmental literacy requirement.” In addition, the following combination of keywords were searched:

- “environmental literacy” and “core curriculum”; and
- “environmental literacy” and “universities” and “requirements”.

These searches only returned 12 articles, with only three actually addressing environmental literacy requirements (Moody et al., 2005; Moody and Hartel, 2007; Woodworth, Steen-Adams and Mittal, 2011). To these were added four articles that are central to the issue (Hill and Wang, 2018; McIntosh et al., 2008; Rowe, 2002; Wolfe, 2001).

To expand the yield, the researcher broadened the search in two ways. First, a citation search was carried out on those seven articles, which consisted of using Google Scholar to track down all the articles that cited those works. The researcher only retained articles written in English and which were in the published literature, which yielded 476 articles. Then all abstracts were reviewed with an eye toward locating articles that addressed mediating factors. Second, the author used the Scopus database to identify articles that cover the integration of sustainability into the university curriculum, using the following search terms: “sustainability,” “curriculum,” “universities” and “barriers.” That search yielded 139 works. For both of these additional searches, the researcher only retained articles that addressed the integration of sustainability into higher education curriculum and set aside those that focused on the broader topic of campus greening.

The third phase of the study was to investigate a case study where the graduation requirement was successfully implemented. For this task, the author analyzed the University of Vermont, which successfully implemented the requirement in 2015. This was a pertinent case to analyze because it is a public university, it is a mid-size university (11,000 students), it is the best documented case and the faculty managed to implement the requirement fairly recently (2015). The author reviewed the literature on this case with an eye toward understanding the process that led to the implementation of the graduation requirement, highlighting the actions taken by key constituents (i.e. students, faculty and administrators) and the institutional characteristics that contributed to the favorable outcome.

A limitation of this research design is that the analyses were carried out by a single researcher. This should not have been significant in the first phase, where the focus was...
simply to identify whether or not institutions had an environmental literacy requirement. However, the lack of additional researchers may have limited the analyses of Phases 2 and 3, which were qualitative in orientation.

4. Results Phase 1: environmental literacy requirements at US universities

Out of 540 public universities, only 27 had an environmental literacy graduation requirement (see Table 1), with most occurring in what are typically considered the Midwestern or Eastern states. The total represents only 5% of public universities in the USA, which suggests there has been a decrease over time as the rate is 28% lower than the 7% rate Wolfe reported in 2001.

Besides the institutions with an environmental awareness graduation requirement, there were a handful of institutions that offered a sustainability course or stream as an option to fulfill a GE requirement (see Table 2). An example is the University of California at Santa Cruz, which has a “Perspectives” GE requirement that can be fulfilled by completing either “Environmental Awareness,” “Human Behavior” or “Technology and Society” courses. Another is Appalachian State University, which offers “global environmental change” as one of 11 possible themes students can pursue to fulfill the “Science Inquiry” requirement.

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<th>State</th>
<th>University name</th>
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<tbody>
<tr>
<td>CA</td>
<td>San Francisco State University (discontinued in 2021)</td>
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<td>CO</td>
<td>Colorado School of the Mines</td>
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</tr>
<tr>
<td>CO</td>
<td>Colorado State University</td>
<td>Yes</td>
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<tr>
<td>CO</td>
<td>University of Colorado at Colorado Springs</td>
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<tr>
<td>CT</td>
<td>University of Connecticut</td>
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<td>GA</td>
<td>University of Georgia</td>
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<tr>
<td>IA</td>
<td>Northern Iowa University</td>
<td>Yes</td>
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<tr>
<td>ME</td>
<td>University of Maine at Machias</td>
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<tr>
<td>ME</td>
<td>University of Southern Maine</td>
<td>Yes</td>
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<tr>
<td>MN</td>
<td>Bemidji State University</td>
<td>Yes</td>
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<td>MN</td>
<td>Metropolitan State University</td>
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<td>Minnesota State University – Mankato</td>
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<td>Minnesota State University – Moorhead</td>
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<td>MN</td>
<td>St-Cloud University</td>
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<td>MN</td>
<td>Winona State University</td>
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<td>NH</td>
<td>University of New Hampshire, Durham</td>
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<tr>
<td>NH</td>
<td>University of New Hampshire, Manchester</td>
<td>Yes</td>
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<tr>
<td>NY</td>
<td>SUNY College of Environmental Science and Forestry</td>
<td>Yes</td>
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<tr>
<td>OH</td>
<td>The Ohio State University</td>
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<td>VT</td>
<td>Castleton University</td>
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<td>VT</td>
<td>University of Vermont</td>
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<td>WI</td>
<td>University of Wisconsin – Green Bay</td>
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<tr>
<td>WI</td>
<td>University of Wisconsin – Stevens Point</td>
<td>Yes</td>
</tr>
<tr>
<td>WI</td>
<td>University of Wisconsin – Superior</td>
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</tbody>
</table>

Table 1. Universities with an environmental general education requirement

Source: Author’s own creation
third is The Citadel, where “Sustainability” is one of five streams students can pursue to satisfy their GE requirements.

These institutions should be lauded for developing these curricular innovations, which steers some segment of the student population toward environmental literacy. However, these are only partial successes as their GE requirements still allow the vast majority to graduate without engaging with ideas related to sustainability. For instance, even if an equal number of UC Santa Cruz students pursued each of the three “Perspectives” GE streams, two-thirds of students would graduate without taking coursework that would increase their environmental literacy.

5. Results Phase 2: accounting for the lack of progress
In trying to account for the lack of progress, it is important to start with Sarah Creighton (1999) point that universities are communities of people, which means university behavior reflects actions that internal stakeholders have or have not pursued on a given issue. Regarding curriculum issues, the major internal stakeholders are academics, students and administrators, each of whom can impact curriculum innovation in different ways. For instance, students can pressure academics and the university to add courses that address environmental issues, or they can resist efforts to do so (Hill and Wang, 2018; Vallée, 2016). Academics oversee the development and implementation of curriculum, and so are in a prime position to pursue and implement innovation. On the other hand, they can also obstruct the pursuit of innovation through organizational politics or refusing to alter curriculum (Moody and Hartel, 2007; Rowe, 2002). As for administrators, they can mediate academics’ willingness to pursue curriculum change by incentivizing the pursuit of innovation (e.g. by allowing curriculum innovation to count towards promotion and/or tenure decisions) or by refusing to provide resources that would be necessary for successful implementation (Barth, 2015).

<table>
<thead>
<tr>
<th>State</th>
<th>University name</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>University of California, Santa Cruz</td>
<td>“Environmental Awareness” is one of three options that can be taken to satisfy the “perspectives” option</td>
</tr>
<tr>
<td>GA</td>
<td>Valdosta State University</td>
<td>“Perspectives on the environment” is listed as one of the 7 options to fulfill the “perspectives” requirement</td>
</tr>
<tr>
<td>NC</td>
<td>Appalachian State University</td>
<td>“Global environmental change” is one of 11 possible themes they can pursue to fulfill the “Science Inquiry” requirement</td>
</tr>
<tr>
<td>NJ</td>
<td>New Jersey City University</td>
<td>Energy, Society and Sustainability is one of 15 options for the capstone course</td>
</tr>
<tr>
<td>NJ</td>
<td>Ramapo College</td>
<td>Sustainability as one of three categories that can be used to meet the “distribution” requirement</td>
</tr>
<tr>
<td>NY</td>
<td>Ithaca College</td>
<td>Sustainability is one of six themes students can pick to meet their “Themes and perspectives” requirement</td>
</tr>
<tr>
<td>OR</td>
<td>Portland State University</td>
<td>“Environmental Sustainability” is one of nine themes that freshmen can pursue</td>
</tr>
<tr>
<td>PA</td>
<td>Mansfield University of Pennsylvania</td>
<td>Sustainability as one three GE themes from which they need to pick two</td>
</tr>
<tr>
<td>SC</td>
<td>The Citadel</td>
<td>Students are required to complete courses in a stream and sustainability is offered as one of five streams they can select</td>
</tr>
</tbody>
</table>

Source: Author’s own creation

Table 2.
Universities offering a sustainability option for GE requirements
Of the three, it is academics who are the most important as they are the ones responsible for delivering the curriculum and are the ones who most often drive curriculum innovation (Barth, 2015). Moreover, in cases where the process is driven by other stakeholders, any proposed curriculum changes, let alone implementation, would require faculty support (de la Harpe and Thomas, 2009). Thus, it is particularly important to understand the institutional factors that might disincline academics from pursuing the process.

### 5.1 Institutional disincentives

A significant disincentive to pursuing environmental literacy requirements is that opportunities to alter the GE curriculum are quite rare, as universities typically only open up the process once a decade. Thus, if someone is interested in implementing a sustainability GE requirement, they would have to bide their time until the opportunity presents itself.

When such an opportunity finally presents itself other factors can dissuade academics from pursuing the innovation. One is the lengthiness associated with the process, which is exemplified by the University of Vermont case, where it took proponents five and a half years from the first proposal to successful implementation (Natkin, 2018). This means academics interested in pursuing an environmental literacy requirement must be ready to commit time and energy for an extended period of time, and for a process whose outcome is uncertain at best.

In addition, academics can be dissuaded by perceptions the process will be too difficult (Thomas, 2004). Aside from being time-consuming, pursuing a change to GE requirements can be bureaucratically and politically challenging, thereby requiring advocates have both a strong knowledge of the bureaucratic protocols and political capital. Academics without such things, or access to those who do, are likely to think twice about pursuing this curriculum innovation.

One powerful disincentive is working in a campus culture that does not prioritize curriculum greening or sustainability (Thomas, 2004). Academics working in such contexts are likely to feel they will not be rewarded for pursuing a GE requirement in sustainability, which would dissuade them from pursuing it (Lidgren, Rodhe and Huisingh, 2006). Moreover, one could argue academics at research universities are particularly likely to be dissuaded, due to the tendency of such institutions to strongly privilege research over teaching innovations, as reflected in their promotion criteria (Haigh, 2005). Faculty working in such contexts are likely to believe their teaching efforts will not be highly valued, which disincentives them from developing or advocating for any teaching innovations, let alone curriculum innovations that would require significant time, expertise and political capital. As Deborah Rowe (2002) points out, one way to switch the dynamic would be to count curriculum innovations toward tenure decisions.

A disincentive that is frequently mentioned in the scholarship are concerns about having adequate resources to successfully implement the requirement (Avila et al., 2017; Cowell et al., 1998; De la Harpe and Thomas, 2009; Kliucininkas, 2001; Rowe, 2002; Thomas, 2004; Vargas et al., 2019; Weiss et al., 2021). In previous work on the greening of chemistry courses, Vallée (2016) found that the curriculum-greening process is significantly mediated by access to resources, such as teaching buy-outs to develop new curriculum, lab space to test new potential experiments for the course, as well as funds with which to buy equipment for the new experiments and train graduate teaching assistants on the new curriculum. Similarly, if an environmental literacy GE requirement is successfully shepherded to approval, resources need to be allocated to develop and consistently deliver the courses, so that students can complete the requirement and graduate on time. In particular, existing staff need to be given time to properly develop the course, which would be significantly
aided with teaching buy-outs. If universities require that students pass a particular course to meet the requirement (as opposed to allowing students to pick from a selection of courses that meet the student learning outcomes), then additional academics need to be trained to teach additional sections of the course. Moreover, if additional academics aren’t available, then college deans need to approve new hires.

Although resource needs for an environmental literacy requirement are likely to be less than those required for greening chemistry courses, they are still quite real and a fear of not having such resources are likely to deter educational leaders from pursuing the curriculum innovation. This becomes increasingly true at larger institutions, such as those with over 20,000 students, where the consequences of failing would be more significant. Speaking to this point, one of Vickie Wolfe’s (2001) informants shares how such considerations came up at her mid-size research university in south central USA:

We have a [environmental awareness] course but to expand it into the realm of being required would require new resources to have enough faculty to teach this course to all of the new students that matriculate yearly.

Another potential disincentive would be resistance from colleagues, which can range from individual colleagues refusing to integrate innovations to organized political resistance. Such resistance would be present even in the best of cases, as exemplified by the University of Vermont case, where 32% of the senate faculty opposed the final vote (with 7% abstaining), even though advocates benefited from having strong student lobbying, a supportive Faculty Senate vice-president who was willing to shepherd the proposal through the bureaucracy, sufficient resources to implement the proposal and using an approach that was designed to increase buy-in across disciplines (Hill and Wang, 2018). Being aware of such resistance would disincentivize academics from pursuing an environmental literacy requirement.

Besides these barriers, others suggested by the scholarship include:

- a dearth of support from university leadership (Weiss et al., 2021);
- internal priority setting that did not emphasize sustainability (Weiss et al., 2021);
- a campus vision that fails to adequately incorporate sustainability vision (de la Harpe and Thomas, 2009);
- scant organizational structures devoted to sustainability (such as sustainability committees) (Avila et al., 2017);
- inadequate professional development on sustainability (Thomas and Nicita, 2002);
- a paucity of interdisciplinary collaboration (Adomßent al., 2019; Trechsel et al., 2018);
- a dearth of interdisciplinary competence (Vargas et al., 2019);
- the absence of interdisciplinary spaces that would encourage interdisciplinary collaborations (Weiss et al., 2021);
- the highly specialized discipline-centered higher education system, which conspires against interdisciplinary collaboration (Bardaglio, 2007; Haigh, 2005);
- academic freedom, which some have used to defend their opposition to curriculum changes (de la Harpe and Thomas, 2009; Molthan-Hill, Dharmasasmita and Winfield, 2016); and
- an inflexible curriculum (Weiss et al., 2021).
Sources of resistance from academic colleagues. While resource and bureaucratic factors will make it more difficult to successfully implement GE environmental literacy requirements, resistance from academic colleagues can doom those efforts, as such innovations would require cross-disciplinary support. Thus, it is important to identify sources of such resistance.

One source stems from disciplinary differences of opinion regarding what educational experiences students should be required to have before graduating (Jones, Trier and Richards, 2008; Natkin, 2018; Thomas, 2004). Along these lines, Thomas (2004) found some RMIT faculty members were concerned that the environmental knowledge would be inappropriate for their students and discipline. Likewise, Natkin (2018) reports that professional program faculty at the University of Vermont (UVM) initially resisted having the environmental literacy requirement apply to their program, as they too did not perceive that their graduates needed it.

While it was not mentioned in the scholarship, informal conversations with environmental staff at three different California universities revealed that another source of resistance are concerns about the tangible outcomes that might be produced by changes to GE requirements. For instance, adding an environmental literacy graduation requirement could lead to other course requirements being removed or de-emphasized, which could reduce student enrolments for the departments who taught the previously-required courses. Such tangible impacts could encourage threatened instructors to resist proposed changes to the GE curriculum, thereby turning the process into a heavily-contested battle. While some academics might relish participating in such battles, it is safe to say that many, if not most, would be daunted by such prospects.

The competitive element associated with GE requirements means that resistance can also emerge due to competing GE proposals. An example is the recent push to add a “diversity” or “cultural awareness” requirement to the core curriculum. Many US institutions now have such a requirement, with an example being the California and Colorado public universities, where 30 of 43 now have a “diversity,” “ethnic studies” or “cultural awareness” graduation requirement. Given that many faculty are concerned about overcrowded curricula (Lang, Thomas and Wilson, 2006), the push for other graduation requirement is likely to erode support for an environmental literacy graduation requirement.

Another source of resistance can be teased from Crow and Dabars’ (2015) critique of the American public university system, which highlights the remarkable curricular homogeneity across the landscape. They argue that this homogeneity can be traced to a natural disinclination for curricular innovation, which is driven by filioptism, which is defined as an excessive veneration of tradition. While filioptism is particularly apparent in the pomp and circumstance associated with graduation ceremonies, they argue it is also quite prominent with the curriculum, which has remained remarkably consistent over the last century.

Crow and Dabars (2015) attribute this filioptism to the role that prestige plays in academia. First, they argue that prestige is the dominant currency in academia, and that institutions orient their actions to that which will maintain, if not strengthen, their prestige. Second, they argue that the institutions with the most prestige in the USA are the Ivy League schools, who have resisted deviating from the liberal arts curriculum they developed and which has kept them on top of the pecking order over the last century. They also argue that high-ranking public universities (such as the University of California Berkeley, University of Wisconsin and the University of Michigan) have sought to draw on the Ivy League prestige by emulating their liberal arts core curriculum, and that these universities, in turn, have also become reluctant to tamper with anything that could undermine this
perceived source of prestige. Crow and Dabars further argue that this chase for prestige has extended to the less prestigious public universities, who have emulated the formula found at UC Berkeley and other top public institutions. The authors argue that this chase for prestige and legitimacy is one of the prime culprits behind the institutional isomorphism that has developed across academia, which has led different institutions to converge toward similar practices, curriculum and organizational structures, even when such practices, curriculum and structures were not the best fit for a given institution.

5.1.2 The combined effect of the obstacles at research universities. On their own, each of the aforementioned factors can discourage faculty from working to implement an environmental awareness requirement. Combined, however, they can exert a much more powerful disincentivizing effect. This is particularly true at research universities, where university leaders usually prioritize research over teaching.

5.2 External forces
Besides institutional barriers, scholars have also identified how the pursuit of sustainability curriculum can be shaped by external forces. For instance, Matthias Barth (2015) argues that government agencies, market forces and public discourse can influence universities via media, professional associations and accrediting agencies.

Regarding governments, Zumeta (2001) reports they can shape university behavior through calling for more accountability of universities, monitoring university outputs and aligning funding to specified outcomes. Building on that point, Hess and Collins (2018) examine how universities can be impacted by the configuration of power in state legislatures. They examined factors that mediate whether or not students would take a climate change course, and found that public university students in states with Republican-controlled state legislatures were significantly less likely to take at least one climate-change related course. They suggest this is due to the legislators’ funding impacts on public universities, as those in Republican-controlled legislatures are less likely to provide funding for new instructors or for developing environmental curriculum.

Building on Hess and Collins’ (2018) work, another way politicians can mediate curriculum initiatives is through legislative mandates about curriculum. For instance, legislation can require universities to install an environmental awareness graduation requirement, as occurred in Minnesota in the early 1990s when new legislation required every public university in the state to adopt such a graduation requirement (Hattan et al., 2009; Rowe, 2002). On the other hand, politicians can pass legislation that hinders or even obstructs efforts to institutionalize an environmental graduation requirement. For instance, in 1989 Arkansas lawmakers passed Arkansas Act 98, which stipulated that, starting in 1991, all public universities in the state must have general requirements that add up to 35 h and which allocate specified hours to seven academic areas: English (6), math (3), science (8), fine arts (3), humanities (3), US history or government (3) and social sciences (9). Similarly, Missouri lawmakers passed Senate Bill 997, the Higher Education Core Transfer Curriculum Act, which stipulates that, starting academic year 2018–2019, students must complete 42 semester hours distributed across the following five areas: math, written and oral communication, natural sciences, humanities and fine arts and social and behavioral sciences (DHEWD, 2022).

Another source of external pressure can come from centralized state boards of education, which can also impose curriculum requirements. For example, all Texas public universities have to use a 42-h core curriculum that the Texas Higher Education Coordinating Board designed for all undergraduate students in Texas. Similarly, in Alabama all colleges and universities are required to use the general studies curriculum (covering writing,
humanities, fine arts, natural sciences, math, history and the social and behavioral sciences) that was designed by the Alabama Articulation and General Studies Committee.

In other states, the political interference does not come from lawmakers or centralized school boards, but rather from the Board of Regents for a state’s system of higher education, who can also exert significant influence over the makeup of GE requirements. For example, universities in Louisiana have to conform to the GE requirements formulated by the Louisiana Board of Regents [English composition (6 h), math (6 h), fine arts (3 h), humanities (9 h), natural sciences (9 h) and social sciences (6 h)].

While the themes covered by such GE requirements are standard to a liberal arts education, the centralization of decision-making has led to the imposition of rigid frameworks, which have significantly constrained the educators’ ability to innovate in those states and have produced another important hurdle to implementing environmental literacy requirements.

To properly contextualize the phenomenon, it is also important to situate the political interference within its larger context. For instance, the orientation of lawmakers is itself subject to the context in which they find themselves. Given the capitalist political-economy in which the USA is situated, politicians will be ideologically predisposed to pursuing measures that support maximizing economic growth and, conversely, resisting initiatives that would sensitize students to industry’s and society’s impact on the environment, which could call into question the economic growth system.

Relatively, it’s important to emphasize that the majority of those sitting on university boards were politically appointed, with governors typically appointing all of them (as is the case in California and Louisiana) or most (as is the case in Florida, where the governor appoints 14 out of 17). These appointees will, invariably, reflect the interests, values and worldviews of the political elites appointing them. In turn, it is reasonable to assume the appointees will also be predisposed to sustaining a system that maximizes short-term economic growth, even when it conflicts with long-term sustainability. Thus, in states where the Regents exert significant influence over content, it is to be expected that university curricula will avoid having requirements that will sensitize students to environmental issues or compel them to question the status quo.

6. Results Phase 3: factors enabling success

While there are numerous potential barriers to implementing an environmental literacy requirement, there are also many institutions that have successfully implemented it. Reflecting on such cases can provide insights about how to overcome potential barriers. One such case is the University of Vermont, which implemented its environmental literacy requirement in 2015. In analyzing this case, I sought to identify how the key constituents (students, faculty and administrators) contributed to the outcome, and how their actions were mediated by the institutional context.

Students played a key role in this case, as they provided the initial push to have an environmental literacy graduation requirement. The process began with the Student Government Association passing a resolution in favor of adding a sustainability GE requirement (Hill and Wang, 2018; Natkin, 2018). Then student leaders lobbied the Curricular Affairs Committee to add an environmental literacy requirement, who invited them to present their case to the Faculty Senate. As well, student leaders actively participated in the ad hoc sustainability GE Committee that was organized to progress the issue. If students had not provided the initial impetus on the issue, the UVM faculty would not have pursued it when the GE requirements opened up in the late 2000s, which would have left the idea on the shelves for at least another decade.
A second key factor was the UVM faculty’s sympathy to student lobbying efforts. This included the sympathetic reception by the Curricular Affairs Committee, who provided students the opportunity to present their case to the Faculty Senate. The student proposal was also well received by the Faculty Senate, where the Senate vice-president became the proposal’s champion and took it upon himself to shepherd it through the complex bureaucratic process. Instead of ignoring or downplaying the students’ request for a sustainability requirement, which is likely to happen at many institutions, the UVM faculty supported the proposal and guided the students in the process of effectuating change. This case signals that while student pressure can create momentum for change, the effectiveness of that pressure is enhanced when there is sympathetic faculty and an issue champion who will be willing and able to successfully shepherd the proposal through the bureaucracy.

A third key element in this case was the Student Learning Outcomes approach the steering committee chose. The alternative approach to implementing a sustainability GE requirement consists of obliging every student to pass a particular course (such as Introduction to Sustainability), where the rewards of the requirement (such as increased student enrolments, new teaching lines, etc.) would be funneled toward the department housing that course. This contrasts sharply with the Student Learning Outcomes approach, which does not require that students complete any particular course, but rather that they complete a course that will help them acquire particular knowledge, skills, values and personal domain dimensions (see Table 3). This approach means the graduation requirement can be met through a variety of courses, which means numerous departments can benefit from implementing the environmental literacy GE requirement. This proved instrumental for winning over faculty who initially opposed the initiative (Hill and Wang, 2018).

While the SLO model fosters interdisciplinary inclusiveness, one drawback is that it requires the university to have sufficient resources to implement it. This was the fourth element that enabled UVM’s success as the University already had 102 environmental courses on the books. This pre-existing curriculum meant the University could implement the environmental awareness requirement without having to invest substantial resources to develop new courses.

The fifth key factor was the steering committee’s commitment to engaging with faculty from all disciplines, which included listening to and addressing their concerns. Part of those discussions consisted of communicating how sustainability could be germane to disciplines that are not inherently focused on environmental topics, such as English, Studio Art and Religion (Hill and Wang, 2018). In doing so they pointed to courses in those disciplines that

<table>
<thead>
<tr>
<th>Learning outcomes category</th>
<th>Student learning outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Students can have an informed conversation about the multiple dimensions and complexity of sustainability</td>
</tr>
<tr>
<td>Skills</td>
<td>Students can evaluate sustainability using an evidence-based disciplinary approach and integrate economic, ecological and social perspectives</td>
</tr>
<tr>
<td>Values</td>
<td>Students think critically about sustainability across a diversity of cultural values and across multiple scales of relevance from local to global</td>
</tr>
<tr>
<td>Personal domain</td>
<td>Students, as members of society, can recognize and assess how sustainability impacts their lives and how their actions impact sustainability</td>
</tr>
</tbody>
</table>

Source: Hill and Wang, 2018

Table 3. University of Vermont’s student learning outcomes for sustainability general education requirement
address sustainability, such as Art, Design and Environment for the Studio Art major and Religious Perspectives on Sustainability for the Religious Studies major (ibid). Another important aspect of their engagement efforts was communicating to doubters that the University already had a strong suite of courses touching on sustainability issues, and, thus, possessed the capacity to successfully implement the environmental literacy GE requirement (ibid).

Culture is another important element to consider. UVM has exhibited a long-standing commitment to environmental issues, as manifested by its early (1972) establishment of Natural Resource and Environmental Studies programs, its numerous sustainability courses (102) and its high rankings on sustainability evaluation frameworks (such as the Association for the Advancement of Sustainability in Higher Education’s STARS program, where UVM ranks in the top 12%) (AASHE, 2022; Hill and Wang, 2018; Natkin, 2018). In turn, this cultural commitment to sustainability undoubtedly encouraged faculty to support the student’s request for an environmental literacy GE requirement, which would have been seen as being in alignment with the university’s larger mission. Importantly, the institution’s commitment to environmental issues created a context where individual faculty members would have been led to believe their support of environmental curricular innovations would be recognized and perhaps even rewarded. As well, the institution’s long-term commitment to environmental matters is likely to have drawn environmentally-focused faculty to the University, thereby creating a faculty that would have been more predisposed to supporting the students’ initiative.

6.1 How to foster student support?
Given the significant role students played in the UVM case, it behooves us to consider how student participation can be fostered in other cases. For insight on this issue, I turned to Sarah Creighton (1999) Greening the Ivory Tower, which devotes a chapter to the role students can play in campus greening.

While one way to drum up student interest is to teach about sustainability issues, Creighton argues such efforts are enhanced when curriculum is combined with hands-on projects, where students can apply concepts to tangible aspects of campus operations. Another way to stimulate student interest is to employ them in short-term work-study jobs dedicated to environmental issues, which will give them tangible experience on the issues.

Creighton also encourages supporting student leaders who pursue environmental initiatives, whose example can motivate other students to pursue environmental actions. As well, staff can encourage student leaders to promote environmental efforts on student media, such as student papers, radio talk shows and television shows.

An additional recommendation is forging tighter links between student environmental groups and campus environmental groups, so that student groups can be more aware of how they can contribute to larger sustainability initiatives.

Lastly, Creighton emphasizes the important role student government can play in promoting sustainability efforts. One way they can promote sustainability efforts is to pass resolutions in support of pro-environmental behavior. This is quite pertinent to the UVM case, as the student government resolution was the first of many steps students pursued to bring an environmental literacy requirement to their campus.

7. Conclusion
More than two decades ago, it was predicted that most HEIs in the USA would implement environmental literacy graduation requirements. This article reveals how the situation has evolved over the last two decades by assessing the environmental literacy requirements at
all public universities in the USA. The study revealed that only 5% of these universities have an environmental literacy requirement. Not only does this demonstrate the curriculum innovation has not been spreading, it suggests there has been significant decrease from what was estimated to be the case 15 years ago.

To make sense of this stalled revolution, the article also discusses the numerous institutional factors and external forces that can disincentivize academics from pursuing such a curriculum innovation.

In addition, to give a sense of how such obstacles can be circumnavigated, the article discusses the University of Vermont case, where the innovation was successfully implemented in 2015. The latter suggests universities with a long-standing commitment to environmental issues would be particularly well-placed to pursue this innovation, and that success in this endeavor would be enhanced by fostering student support and using a Student Learning Outcomes approach, which would enable numerous departments to benefit from the curriculum innovation.

A limitation of this analysis is that it only focused on public universities. Thus, one way to build on it is to investigate the presence of environmental GE requirements at private research universities (such as Stanford and Harvard universities) and liberal arts colleges (such as Berea, Bowdoin and Reed colleges). Not only would such research help complete the US picture, the analysis could reveal variation between school types, which could point to other social forces or structures that mediate the adoption of environmental graduation requirements. Having said this, even if the problem was limited to public universities, it would still be a significant problem, as the public system educates 75% of the students in USA (Duffin, 2022).

Given that the data suggests fewer universities now have an environmental literacy requirement on the books, another way to build on this study would be to investigate cases where environmental literacy has been removed from the GE requirements, as has occurred in several institutions, including San Francisco State University, Humboldt State University and Dominican College. This would broaden our knowledge on the issue by helping us better understand the work that is required to maintain environmental literacy requirements.

References


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