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A comparative study of sustainability management education in China and the USA

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This study investigates differences between business schools in different institutional settings, using top-ranked Chinese and US business schools as the bases of analysis. To assess the divergent educational approaches, this study investigates the (1) number of sustainability-related courses per school, (2) design and arrangement of sustainability-related course curricula, (3) content of sustainability-related courses, and (4) teaching methods in sustainability-related courses, across differing institutional settings. The findings reveal differences in the curriculum designs of the two countries, which likely reflect differences in their local institutional settings and their interpretations of sustainability. This study offers several implications and recommendations for further research.

Keywords: sustainability; management education; curriculum design; top Chinese business schools; top US business schools

Introduction

Universities worldwide have introduced management education related to sustainability issues, to promote sustainable development and raise students' awareness. For example, one management education mandate cites the necessary ability to respond to the challenges facing business and society (Gentile and Samuelson 2005). Thus, management education aims to teach students to manage the interdependence between and mutual benefits of business and wider society (Cotton et al. 2007; Gentile and Samuelson 2005). Even if management education does not change students' behavior, prior research shows that university curriculum does increase students' sensitivity to management issues (Thomas 2005).

As Porter and McKibbin (1988) indicate though, what universities teach students is largely a function of their curricula. Approaches to sustainability-related issues are diverse and vary across nations and cultures (Brown et al. 1987; Enderle 1997; Matten and Moon 2004; Navarro 2008). The scope of social responsibility can be quite narrow or very broad (McWilliams, Siegel, and Wright 2006), and resultant actions largely reflect the chosen definition. Because universities' unique institutional environment leads them to respond to sustainability in varying ways, this study adopts legitimacy theory and attempts to determine the extent of the differences in management education approaches to sustainability.

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Theoretical perspectives on sustainability

The complex term 'sustainability' encompasses a vast array of topics, including stakeholder perspectives, innovation (Porter and van der Linde 1995), and legitimacy theory. Sustainability does not have a universal definition. Different societies have different conceptualizations and requirements of sustainability (Brown et al. 1987). Matten and Moon (2004), in their attempt to define corporate social responsibility (CSR), note the use of multiple synonymous terms, including sustainability, and business ethics. Defining sustainability is very similar to defining CSR, in that it represents an umbrella term that overlaps with some and is synonymous with other definitions that describe the relationship between business and society (Matten and Moon 2008; Walshe 2008). Sustainability is associated with the integration of social and environmental factors into business activities (Wu et al. 2010); it moves beyond compliance. However, the extent of sustainability remains at the discretion of the individual firm (Matten and Moon 2008). The integration of social interests and financial performance also is critical to making sustainability viable for business communities; from a strategic perspective, Elkington (1994) maintains that the challenge of sustainability is turning today's stakeholders into tomorrow's customers. Freeman (1984) also advocates stakeholder management, and Berman et al. (1999) suggest that business concerns must pertain to potential financial gains. Despite assumptions of a trade-off between firms' social responsibility and profitability, the sustainability of firms' social responsibility actually requires synergy between social and business interests (Gupta 2006). Thus, the link between sustainability and financial rewards is critical. Van Marrewijk (2003) accordingly argues that the definitions of CSR and corporate sustainability should reflect organizational development, awareness, and ambition. The European Commission defines CSR as a corporate contribution to sustainable development (Kleine and von Hauff 2009). The link between these terms thus emerges from a stakeholder approach (Kleine and von Hauff 2009; Van Marrewijk 2003).

In another sense, Porter and van der Linde (1995) argue that innovation is crucial to sustainable social responsibility. The more efficient the production system, the better the financial return, due to less pollution and waste. Porter and van der Linde also suggest that firms' environmental responsibility should not be treated as a cost burden, but rather as a potential area for greater competitiveness.

To be competitive though, firms need both material resources and technical information, as well as social acceptability and credibility in their social environment (Scott 2008). The organizational environment comprises technological and material imperatives, along with cultural norms, symbols, beliefs, values, and rituals (Suchman 1995), and the organization remains constantly subject to socially constructed expectations and practices (Scott 2008). Because an organization is more than just a machine that transforms material input into output (Scott 1987), when consumers become more environmentally conscious, organizations respond by pursuing legitimacy for their operations. Business schools, as social organizations, similarly take public perceptions of social trends into consideration in their curriculum design.

Unlike material resources, legitimacy cannot be combined or transformed into new output, and its value accrues only when it is visible to outsiders (Scott 2008). Suchman (1995, 574) thus defines legitimacy as the 'generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions.' This

socially constructed perceptual phenomenon, which requires congruence between the behaviors of the organization and the shared values of some social group (Suchman 1995), also is highly context dependent (Vidaver-Cohen and Bronn 2008) and provides a type of social contract that insures the inclusion of social preferences in organizational performance measures (Cormier, Gordon, and Magnan 2004).

Finally, legitimacy includes three main dimensions that comprise 12 types: pragmatic (exchange, influence, interest, and character), moral (consequences, procedures, persons, and structures), and cognitive (predictability, plausibility, inevitability, and performance) (Deephouse and Suchman 2008; Suchman 1995). These three dimensions imply that organizational activities adhere to socially constructed norms, values, beliefs, and definitions (Suchman 1995). Thus, organizational legitimacy is more notable for its absence than its presence (Pfeffer and Salancik 1978), such that organizations draw negative attention and attacks from stakeholders when they act illegitimately (Deephouse and Suchman 2008). To align goals with those of collective audiences and to obtain or maintain legitimacy, an organization thus must take actions and inform wider society about those actions (Cormier, Gordon, and Magnan 2004).

Sustainability management education

Porter and Kramer (2006) consider it essential for organizations to find a reference point when promoting CSR; the most critical reference point for business schools is their students. When organizations implement CSR, they also choose specific social issues and related agendas (Porter and Kramer 2006), to create roadmaps for CSR objectives. A business school's curriculum design, as one such roadmap, results from the interplay of cultural characteristics and the institutional setting. That is, cultural traits assume a significant role (Gambini 2006). Both the culture characteristics (e.g. place and sociocultural factors) and institutional settings (e.g. government and demographics) should affect the promotion of sustainability (O'Neill et al. 2009).

Cultural differences

The concept of sustainability traditionally entailed mainly environmental issues, but more recent conceptualizations include other factors, such as sociocultural considerations (Dempsey et al. 2009). Sustainability, CSR, and ethics often appear together in related domains (Singer 2007), because a person's ethics help him or her interpret whether any particular action is acceptable and appropriate (Stanwick and Stanwick 2009), usually through a concern about others (Gupta 2006). For business schools, ethics might entail the corporation's ethical role in society to act responsibly (CSR) while also trying to preserve resources for future generations (sustainable management) (Christensen et al. 2007).

Embedded in various economic, political, and cultural systems (Hui 2008), business schools, as organizations, are affected by such influences. Plunkett, Atner, and Allen (2008) define an organization as an entity managed by people to achieve stated goals, but because people with different backgrounds have different perceptions and values, the failure to recognize differences might compromise educational and informative efforts (Gambini 2006). In addition, people from different cultural backgrounds have different perceptions of ethics and sustainability (Gambini 2006; Rawwas, Swaidan, and Isakson 2007). Wong, Long, and Elankumaran's (2009)

empirical study confirms that cultural differences influence students' perceptions of the role of CSR for business, as do cross-cultural factors (Hui 2008). In particular, cultural differences affect the nation's sustainability strategy and management educational practices (Weaver 2001). However, existing empirical studies largely ignore the possible interaction between current sustainability education, such as course curriculum designs, and the surrounding economic or cultural system (Ferrer-Balas, Buckland, and de Mingo 2009).

Institutional environment differences

Government agencies, professional and accrediting bodies, and interest groups or other sources of public opinion must have substantial institutional status to influence organizations (Weaver, Trevino, and Cochran 1999). Prior research also suggests that business schools with different backgrounds diverge in their sustainability-related curriculum design (Christensen et al. 2007; Matten and Moon 2004), possibly due to institutional influences (Evans, Trevino, and Weaver 2006). The institutional environment, together with the pressures derived from that environment and the values and interests of members, influences an organization's structure (Weaver, Trevino, and Cochran 1999). Thus, according to Malott (2003), the sustainability effort of a university cannot be understood without considering the macrosystem in which it operates. Because a university's strategy is contingent on its institutional environment (Malott and Martinez 2006), a business school's curriculum design reflects the interplay of its organizational values and its institutional environment.

Business schools operate in a market-driven environment (Wilkins and Huisman 2011), in which social expectations play an important role. Their curriculum design should reflect their commitment to sustainability, while also influencing the perceptions of university stakeholders, such as students and the general public. Therefore, legitimacy is crucial for business schools. Legitimacy may work differently in various national, regional, or even local settings. In some cases, there might even be within-nation diversity related to the issue of sustainability education (Page and Collins 2010). Although evaluations of legitimacy vary across cultures, stakeholders, institutions, organizations, industries, and time (Bansal and Clelland, 2004; Ruef and Scott 1998; Vidaver-Cohen and Bronn 2008), legitimate schools ultimately enjoy a greater latitude to pursue daily routines and objectives. A more legitimate school probably attracts top students and more funding. In this sense, ranking mechanisms can reconfirm and reinforce a business school's existing position, assumptions, and values (Wedlin 2010). Rankings not only define what is appropriate, proper, and desirable, but also bridge views of management education (Wedlin 2010). Even if local settings influence each business school, rankings should shape the development of management education overall.

Study problem and purpose

A business school, as an organization, must cater to various elements of its institutional environment, in terms of culture and national economic development. In light of the differences in institutional environments, business education likely varies across different settings, such as China vs. the USA. However, the extensiveness of these differences and their effect on actual curriculum design has not been studied previously.

Education curriculum analyses have increased tremendously in recent years (Aspen Institute 2008; Christensen et al. 2007; Evans and Marcal 2005; Higher Education Academy 2008; Matten and Moon 2004; Murphy et al. 2009; Schoenfeldt, McDonald, and Youngblood 1991; Segalas, Ferrer-Balas, and Mulder 2010; Wu et al. 2010), and such analyses of sustainability education can provide important insights. Although the studies differ in their findings, scope, and perspectives, overall they suggest that even as business schools attempt to integrate sustainability-related content into their curricula, they have not made sustainability a core course (Christensen et al. 2007), and teaching methods are diverse (Matten and Moon 2004). Murphy et al. (2009) indicate that most undergraduate education is not comprehensive with regard to sustainability, and Allen et al. (2008) similarly find that sustainability-related courses tend to be available only to upper undergraduate and graduate students. Business schools often offer both stand alone sustainability courses and core courses that integrate sustainability (Allen et al. 2008). However, cross-national comparisons are lacking; most samples are based on Europe (Matten and Moon 2004), the USA (Evans and Marcal 2005), or Australia (Wright and Bennett 2011). Although some studies provide comparisons based on accreditations or school ranks (Christensen et al. 2007; Wu et al. 2010), the samples still tend to consist of western universities, without representation from Asia or other areas.

The existing discourse on sustainability thus offers significant potential for further analysis. The definition and scope of sustainability are open to interpretation, because sustainability as a social construct is highly dependent on the culture and institution. Approaches to sustainability differ in various institutional settings, such as schools with different ranks, varying stages of economic development, and accreditation affiliations. Cultural difference also influences business schools' sustainability curriculum designs (Evans, Trevino, and Weaver 2006), because cultures reveal unique perceptions of sustainability. Unlike previous empirical studies, which consider the perceptions of students from different nations' on CSR in business education (Wong, Long, and Elankumaran 2009), this research investigates differences between business schools in different institutional settings, using the top-ranked Chinese and US business schools as the basis of analysis. The comparison highlights components of their educational approaches, namely, the (1) number of sustainability-related courses per school, (2) design and arrangement of sustainability-related course curricula, (3) content of sustainability-related courses, and (4) teaching methods in sustainability-related courses. This study uncovers the extent of the institutional differences between the USA and China by collecting and analyzing data from these countries' major business schools.

Method

To analyze business schools from different institutional backgrounds in terms of their sustainability-related curriculum designs, the study compares business school curriculum designs from China with those from the USA. This choice is appropriate for several reasons. China and the USA are the largest emitters of greenhouse gases; in 2007, China surpassed the USA in total greenhouse gas emissions (*The New York Times* 2007), and in 2010, it became the world's second-largest economy, after the USA. Although China is the biggest emitter by volume of greenhouse gasses, China's Standing Committee of the National People's Congress is making an attempt to reduce its greenhouse gas emissions (Morris, Childs, and Hamilton 2007;

Haines et al. 2009). In addition, though it is important to note that China ranks very low on the list of per capita greenhouse gas emissions, it is the world's biggest contributor of greenhouse gas emission by volume. Furthermore, in 2007, China produced 3.3 million college graduates, while the USA graduated 1.3 million (Morris, Childs, and Hamilton 2007). Therefore, it is imperative to analyze sustainability education in China. Yet despite the sheer sizes, cultural differences, and economic status of these two countries, studies that comparatively analyze their sustainability education are rare; this study attempts to fill this notable gap.

For the sample selection, our research procedure first narrowed the list of target schools by comparing several ranking systems, including those of the China Alumni Association and *US News and World Report* – the most widely cited ranking systems in China and the USA, respectively. This ranking method identified 437 business schools in the USA (*US News and World Report* 2010) and 592 in China (Cernet Corporation 2010). Legitimacy is critical to top business schools. Therefore, the research sample consisted of the top 100 business schools in China and top 99 business schools in the USA.

The curriculum analysis included all sustainability-related business courses, whether compulsory, elective, undergraduate, or graduate. Sustainability covers a wide span of topics, depending on the awareness and ambition levels of organizations, so this study first reviewed key sustainability-related topics, according to prior reports and research (Bird, Lutz, and Warwick 2008; Christensen et al. 2007; Environmental Association for Universities 2008; Matten and Moon 2004; National Council for Science 2003; National Environmental Education Foundation 2009; Wu et al. 2010). We examined several prior studies to produce a foundation of key sustainability-related topics. Christensen et al. (2007) base their research mainly on three topics: business ethics, CSR, and sustainability. Matten and Moon (2004) provide a more comprehensive list: CSR, business ethics, corporate citizenship, sustainability, corporate environmental management, business and society, business and governance, business and globalization, stakeholder management, and governance. Finally, Wu et al. (2010) offer the most extensive list of topics, encompassing all major topics related to the triple bottom-line principle. This thorough analysis led to an extensive definition of sustainability, based on the triple bottom-line principle, which includes social, environmental, and economic perspectives (Elkington 1994). Table 1 summarizes the list of 39 terms that formed the basis of the selection criteria for our curriculum content analysis.

The research design followed previous content analyses (Jones, Shan, and Goodrum 2010; Wu et al. 2010). Content analysis is a systemic, objective, quantitative research method that can measure variables as they naturally occur, without any manipulation of the independent variables (Neuendorf 2002). In particular, a conceptual analysis focuses on the frequency of keywords or phrases in a target text (Jones, Shan, and Goodrum 2010), compared with the overall target text, with the objective of producing counts of key categories and measures of the amounts of other variables (Neuendorf 2002). The empirical analysis is based on real phenomena (Neuendorf 2002). Thus, unlike studies that rely on survey questionnaires (Enderle 1997; Evans and Marcal 2005; Matten and Moon 2004; Schoenfeldt, McDonald, and Youngblood 1991) or interviews (Christensen et al. 2007), a web-based content analysis can resolve sample size concerns and is less subject to personal opinions. However, this study cannot offer a census of all activities; rather, the findings provide directions to help reveal major educational emphases on sustainability.

Table 1. Sustainability-related terms.

Biodiversity	Human rights
Climate change	Market economy
Community engagement	Natural resource
Corporate citizenship	Natural resources management
Corporate environmental responsibility	Peace and human security
Corporate responsibility	Pollution management
Corporate responsibility and accountability	Poverty prevention
CSR	Race relations
Culture diversity and intercultural understanding	Recycle
Disaster prevention and mitigation	Renewable energy
Ecology	Reuse
Ecosystem	Rural development
Energy	Sustainability
Environmental health and safety	Sustainable development
Environmental stewardship	Sustainable growth
Equal opportunity	Sustainable procurement
Ethics	Sustainable urbanization
Fair trade	Triple bottom line
Gender equality	Waste
Greening	

The coding methods also reflected prior research procedures (Aerts, Cormier, and Magnan 2008; Miles and Huberman 1994; Wu et al. 2010). The data collection process for both Chinese and US business schools began in September 2010, when three pairs of trained coders, selected for their language proficiency and commitment, received, and reviewed a standardized coding manual. The coding teams consisted of native speakers of English and Chinese, which should minimize translation bias. These graduate students all had taken sustainability-related courses, so they had a basic understanding of the subject, which should avoid any misinterpretation of terms. To insure reliability, all coders participated in training with online demonstrations, followed by a question-and-answer session. Because inconsistency is more typical in early coding stages, the trained coders attended a check-code meeting after their first 10 reviews to exchange ideas and resolve any problems. They also performed the actual coding activity in a shared research room, to foster communication if necessary. A paired inter-rater reliability check, conducted at the completion of the coding activity, indicated values of 92.1% ($\alpha = .84$), 90.3% ($\alpha = .82$), and 93.5% ($\alpha = .84$) for the three teams.

The actual coding consisted of three steps:

- (1) Identify the target school's website.
- (2) Identify terms from Table 1 in the course titles listed on the school website. Any course title containing any of the terms on Table 1 was entered as a '1' in the appropriate column.
- (3) Identify terms from Table 1 in course descriptions. Any mention of terms on Table 1 in course descriptions was entered as '1' in the appropriate column.

On the basis of the Step 3 results, the coders also identified descriptions of teaching methods in course syllabi. Any mention of a teaching method, such as textbooks or case studies, was entered as '1' in the appropriate column. We also

included an additional column for ‘other’ teaching methods (beyond those listed in Table 7), but we found very few schools that used other teaching methods, such as audiovisual techniques. That is, the four teaching methods we discuss subsequently (in Table 7) are the most widely adopted methods. The final sample contained 100 Chinese business schools and 99 US business schools that had no missing data.

Results

To address the research questions, the analyses compared the business educational approaches of Chinese business schools and US business schools. In particular, the examination involved sustainability-related courses per business school, course curriculum designs and arrangement, course content, and teaching methods in different institutional settings.

Sustainability-related courses per business school

To explore the sustainability-related course offerings between countries, the coders assigned business schools with sustainability-related courses a 1 and those without any sustainability-related courses a 0. Because the data are binary, logistic regression served to examine the differences in the offerings, using $\text{logit}(\hat{p}_i) = -0.447 + 3.188x_i$. The goodness-of-fit test of the logistic regression model with an Omnibus test indicated that the model fit was significant ($p = 0.000$; $\chi^2 = 75.228$). As Table 2 shows, with Chinese business schools as the reference category, the likelihood of US business schools having a sustainability course was 24.244 times greater. That is, US business schools emphasize sustainability-related courses.

Sustainability-related course curriculum design and arrangement

To examine the sustainability-related course curriculum design and arrangement, this study used two categorizations: compulsory or elective and undergraduate or graduate, as Table 3 shows. In China, more than half the sustainability-related courses are elective courses (69.74%), offered at the graduate level (61.84%). Similarly, business schools in the USA offer sustainability-related courses mainly as an elective (73.27%) and at the graduate level (77.47%). That is, both Chinese and US business schools designate the concept of sustainability to graduate-level education and offer it as an optional course rather than a required one.

Table 4 provides a comparison of Chinese and US business schools with regard to curriculum design and arrangement. The US business schools have a higher ratio of sustainability-related courses per school in both compulsory (1.56) and elective

Table 2. Sustainability-related courses: China and the USA.

Independent variables	Coefficient (β)	SE	Wald	df	Sig.	Odds ratio
Constant	-.447	0.205	4.760	1	0.029	0.639
China						
USA	3.188	0.468	46.316	1	0.000	24.244

Notes: Dependent variable: $\ln(p/1-p)$ (likelihood of sustainability courses/no sustainability course). -2 Log-likelihood = 179.019; $\chi^2 = 75.228$; model fit significance = 0.000.

Table 3. Classification of sustainability curricula: China and the USA.

	Top 100 Chinese business schools		Top 99 US business schools	
	Number	Percentage (%)	Number	Percentage (%)
Compulsory	23	30.26	154	26.28
Elective	53	69.74	432	73.72
Total	76	100.00	586	100.00
Undergraduate level	29	38.16	132	22.53
Graduate level	47	61.84	454	77.47
Total	76	100.00	586	100.00

Table 4. Sustainability-related courses' curriculum design and arrangement: China and the USA.

	Top 100 Chinese business schools			Top 99 US business schools			Difference (<i>p</i> -value)
	Number of courses	Number of schools	Courses/schools	Number of courses	Number of schools	Courses/schools	
Compulsory	23	100	0.23	154	99	1.56	-1.326 (.000)
Elective	53	100	0.53	432	99	4.36	-3.834 (.000)
Undergraduate level	29	100	0.29	132	99	1.33	-1.043 (.000)
Graduate level	47	100	0.47	454	99	4.59	-4.116 (.000)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

(4.36) offerings than those in China. Moreover, US business schools are more likely to offer sustainability-related courses at both the undergraduate (1.33) and graduate (4.59) levels than are business schools in China (.29 and .47, respectively).

Content of sustainability-related courses

This study also investigated the content of sustainability-related courses offered. Table 5 contains the 10 most common topics in sustainability-related courses; both Chinese and US business schools clearly consider ethics the most critical topic. Although the two business education approaches share common teaching content, they differ slightly. In their empirical study, Matten and Moon (2004) find that sustainable development, business ethics, and CSR are the three most selected topics in sustainability-related courses in western countries. Consistent with these findings, this study confirms the prevalence of these three course topics in US business schools. However, unlike business schools in the USA, Chinese business schools pay less attention to CSR in sustainability education and highly stress environmental stewardship. In addition, in line with China's economic status, market economy issues are among the most highly ranked topics in sustainability-related courses.

Table 5. Comparison of top 10 sustainability course contents: China and the USA.

Top 100 Chinese business schools			Top 99 US business schools	
Rank	Course content	Frequency	Course content	Frequency
1	Ethics	44	Ethics	115
2	Environmental stewardship	35	Sustainability	72
3	Culture diversity and intercultural understanding	31	CSR	43
4	CSR	28	Energy	41
5	Sustainability	26	Sustainable development	38
6	Sustainable development	20	Natural resource	35
7	Natural resource management	18	Climate change	29
8	Market economy	16	Greening	28
9	Energy	13	Ecology	25
10	Ecology	10	Corporate environmental responsibility	21

In accordance with Bird, Lutz, and Warwick's (2008) classification, this study divided the 39 terms from Table 1 into four subject clusters: comprehensive sustainability, social imperative, ecological imperative, and economic imperative. Using this course content description, the coders categorized each course into the four clusters, though because some courses cover a wide range of sustainability topics, they may fall into more than one cluster. The comprehensive sustainability-related content category contains three terms: sustainability, sustainable development, and triple bottom line. The social imperative cluster refers to systems of governance that propagate societal values, such as cultural diversity and intercultural understanding. An ecological imperative means staying within biophysical carrying capacities and includes climate change. Finally, the economic imperative pertains to the provision of an adequate material standard of living for humans and includes the market economy.

Table 6 summarizes the statistical analyses of sustainability-related course content data between the two countries for all four clusters. Business schools differ in their emphases; two statistically significant differences emerge at $\alpha = .01$, and one statistically significant difference indicates a level of $\alpha = .05$. Specifically, there are significant differences between the social and ecological clusters, such that undergraduate schools in China (44.8%) emphasized ecological aspects more frequently than US business schools (15.9%). Conversely, undergraduate business schools in the USA included social issues in 43.2% of their sustainability-related courses, vs. only 13.8% in China. Only one statistically significant difference marked the ecological cluster for graduate schools in China vs. the USA: graduate business schools in China (42.6%) tended to mention ecological terms more than US business schools (26.2%). Both undergraduate and graduate business schools in China focus on the ecological perspective in sustainability-related courses.

In their empirical study, Segalas, Ferrer-Balas, and Mulder (2010) find that sustainability education in engineering schools similarly places more emphasis on the ecological perspective. Our results suggest that management education in China's business schools adopts the same teaching orientation as engineering schools with regard to sustainability education. In contrast, management education in the USA appears to stress social perspectives, especially in undergraduate business schools. Although there was no significant difference in social perspectives between graduate

Table 6. Chi-square analysis of course content.

Group A	Comparison	Sample size		Cluster	χ^2	Sig.	Number of courses in each cluster			
		Group A	Group B				Group A		Group B	
	vs.	Group B	Group A				Counts	%	Counts	%
Chinese undergraduate	vs. US undergraduate	132	29	Comprehensive sustainability	0.100	0.752	9	31.0	45	34.1
					8.726**	0.003	4	13.8	57	43.2
					11.936**	0.001	13	44.8	21	15.9
Chinese graduate	vs. US graduate	454	47	Ecological	0.001	0.981	5	17.2	23	17.4
				Economic	0.961	0.327	10	21.3	127	28.0
				Comprehensive sustainability	1.095	0.295	17	36.2	131	28.9
				Ecological	5.674*	0.017	20	42.6	119	26.2
				Economic	0.012	0.914	9	19.1	84	18.5

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 7. Comparison of teaching methods for sustainability curricula: China and the USA.

Top 100 Chinese business schools			Top 99 US business schools	
Rank	Teaching method	Frequency	Teaching method	Frequency
1	Textbooks	28	Discussion	62
2	Assignment	22	Case study	46
3	Discussion	14	Assignment	33
4	Case study	5	Textbooks	27

business schools in China and the USA, this sector still attained the highest percentage (28.9%) among the four clusters in US business schools at the graduate level. The social perspective thus appears to be a core value in sustainability management education in the USA.

Teaching methods in sustainability-related courses

Finally, in addition to course content, it is critical to explore the teaching methods employed in these courses. Teaching methods can influence students' incentives to understand sustainability, and they have other learning effects as well. This statistical analysis focused exclusively on the online course syllabi available on each university's website. According to the analysis (see Table 7), Chinese business schools mainly relied on textbooks and assignments as teaching approaches; conversely, business schools in the USA focused more on discussion and case studies as teaching approaches.

These differences might be explained by the countries' cultural characteristics. Traditional Confucian thinking influences China's cultural norms and educational systems. In a traditional Confucian context, instructors are the highest authority in the classroom, and Chinese students are less proactive in pursuing knowledge by themselves; rather they passively receive knowledge from instructors. In other words, students are accustomed to obeying their teachers' instructions and the guidance from textbooks, without considering their own opinions. In contrast, US business schools incorporate adult learning theory into learning processes, so instructors view students as adults in control of what they learn and act as facilitators of students' education. Table 7 provides a comparison of these teaching methods.

Discussion and conclusion

This research has aimed to investigate differences between business schools in different institutional settings with regard to sustainability-related courses. Using a large sample of top business schools in China and the USA, the study offers a reference point for other business schools. To explore sustainability agendas and rankings of social issues, this study used a web-based content analysis. The results indicate a clear divergence in approaches to business education for sustainability between Chinese and US business schools. A business school's curriculum design is a reflection of the interplay between the university's organizational values and its institutional environment. Organizational legitimacy constitutes a crucial element of any university's institutional environment. Business schools operating in China and the USA face very different institutional settings in terms of the stages of economic development, cultural values, government systems, and so forth. The disparities in these

institutional settings likely appear manifested in their business school curriculum designs. Specifically, business schools in the USA offer more sustainability-related courses per school and offer these courses as electives at the graduate level. When business schools in China offer sustainability-related courses, they also tend to make them electives at the graduate level. In addition, though ethics is the most frequently taught topic for both groups, Chinese business schools also focus on environmental stewardship and cultural diversity; conversely, business schools in the USA emphasize sustainability and CSR. The ecological perspective in sustainability education is the most frequent topic at both undergraduate and graduate levels in Chinese business schools; the social perspective appears most frequently at the graduate level in US business schools. Furthermore, Chinese business schools use traditional teaching methods, such as textbooks and assignments, whereas US business schools use more participative approaches, such as discussion and case studies.

International organizations, including the United Nations, promote the need for sustainability-related education, and scholars have advocated accreditation-led reforms in sustainability curriculum designs (Evans, Trevino, and Weaver 2006; Læssøe 2010). The current study shows that diverse approaches exist in schools in different national institutional settings, such that an international, institution-led or top-down promotion of sustainability might overlook uniquely national notions and traits related to sustainability. For example, in their sustainability-related courses, Chinese business schools stress environmental stewardship and culture diversity, whereas US business schools emphasize CSR and sustainability. The content of the sustainability curricula reflects the local situation. Furthermore, the scope of sustainability is largely at the discretion of the organization. Organizations at the local level are most in tune with local conditions. Consequently, we are cautious about recommending top-down or accreditation-led reforms in sustainability curriculum designs, which might overlook local attributes.

Limitations and recommendations for further research

We have made a vigilant effort to provide a balanced discussion of differences in sustainability education. This research is not designed to provide an evaluation of any country's sustainability effort. In addition, several limitations suggest avenues for further research. First, though the coders underwent rigorous training and carefully cross checked the results after the data collection, some inconsistencies still could remain. Second, the course content and teaching method analyses might not generalize to all business schools in China and the USA; some university course syllabi were unavailable online. The top business schools in any country experience greater legitimacy pressures, so the results also might not generalize to other business schools in any nation. Third, instructors may not teach the content in the course syllabi and instead may modify their teaching approaches and course content to fit student needs in different semesters. Fourth, the effectiveness of the sustainability-related courses is unknown. Current sustainability curriculum designs may or may not reflect business needs. Fifth, the results are based on the availability of information in the course syllabus. We have to acknowledge that there are numerous instances of unmentioned, sustainability-related course content, which extends beyond what appears on the syllabus. Finally, despite the overall patterns of isomorphism across the business schools in the same ranking system (Wilkins and Huisman 2011), they still might be diverse within each nation.

In light of these limitations and findings, further research should evaluate sustainability-related courses in more detail to understand student learning performance and satisfaction. Understanding students' performance and the extent to which they integrate sustainability-related courses into their future actions would provide critical implications for the development of sustainability education. Further research also might compare pedagogical designs of sustainability-related courses in business and engineering schools to broaden the traditional focus on engineering education (Segalas, Ferrer-Balas, and Mulder 2010).

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