

Journal of Management for Global Sustainability

Volume 6 | Issue 2

Article 10

12-31-2018

Full Issue

IAJBS Ateneo de Manila University

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Recommended Citation

Ateneo de Manila University, IAJBS (2018) "Full Issue," *Journal of Management for Global Sustainability*. Vol. 6: Iss. 2, Article 10.

DOI: <https://doi.org/10.13185/2244-6893.1179>

Available at: <https://archium.ateneo.edu/jmgs/vol6/iss2/10>

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Journal of Management for Global Sustainability

Volume 6, Issue 2, 2018

INNOVATION FOR SUSTAINABILITY



The Journal of Management for Global Sustainability is the official journal of the International Association of Jesuit Business Schools



ATENEO DE MANILA
UNIVERSITY

The Journal of Management for Global Sustainability is managed by the Ateneo de Manila University

The *Journal of Management for Global Sustainability* is a peer-reviewed scholarly journal devoted to the publication of original research in the field of management and global sustainability, with the latter defined as the broad set of interconnected issues that include, but are not limited to, the achievement of environmental preservation, social entrepreneurship, poverty eradication, social justice, desirable production and consumption patterns, species preservation, and spiritually rich lives at this time in our species' history on this planet. The journal publishes articles on how productive enterprises contribute toward realizing and achieving global sustainability so as to create socially just and spiritually-whole ways for all species to go on thriving indefinitely.

The *Journal of Management for Global Sustainability* is the official journal of the International Association of Jesuit Business Schools (IAJBS). The journal is managed by the John Gokongwei School of Management of the Ateneo de Manila University, Philippines.

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Journal of Management for Global Sustainability

Volume 6, Issue 2 (2018)
International Association of
Jesuit Business Schools
www.iajbs.org

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INNOVATION FOR SUSTAINABILITY

A CALL FOR AN ABOLITIONIST MINDSET TO LIBERATE OUR IMAGINATION FOR ACTION

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Every inhabitant of this planet must contemplate the day when this planet may no longer be habitable.

Thus spoke President John F. Kennedy nearly 60 years ago in his 1961 address to the United Nations (Kennedy, 1961). He was not talking about the consequences of climate change then, which was not a concern at the time, but of nuclear war, and his words carried the immense weight of the dire message—whether or not the audience had ever experienced a nuclear attack, whether or not it was fully understood, everyone believed the science behind the President’s speech about the dangers posed by nuclear conflict. There were no deniers. Everyone got it. The threat posed by the hydrogen bomb was collectively accepted as fact and everyone understood the importance of preparing for this threat.

Almost three decades later in 1988, James Hansen, director of NASA’s Goddard Institute, delivered a similar message in a historic testimony to Congress (Shabecoff, 1988), declaring science to be 99% unequivocal that the world was warming and that humans, by burning fossil fuels and through other activities, had altered the global climate in a manner that was going to change life dramatically on earth. He predicted droughts, floods, rising temperatures, the thermal expansion of the oceans, and the melting of glaciers which would cause sea levels to rise by as much as one to four feet by 2050. Hansen thus appealed for urgent collective action to reduce carbon emissions, yet, unlike Kennedy’s plea, there was skepticism and very little collective response (Rich, 2018).

Scientists now agree that Hansen's forecasts and mathematical models were spot-on (Gillis, 2018). Just as he predicted 30 years ago, the Earth's temperature rose by 1.8 degrees Fahrenheit on average and the planet has experienced an astonishing run of record-breaking temperatures, hurricanes, storms, forest fires, droughts, and ocean acidification caused by carbon dioxide (CO₂) emissions. Indeed, the United Nations' Intergovernmental Panel on Climate Change (IPCC) Report for Policymakers concluded only in October of this year that the average global temperature could rise by 2.7 degrees Fahrenheit by 2030—almost certainly by 2040—if there are no major cuts in CO₂ emissions. In fact, the report stated that even if such cuts were to begin immediately, they would only delay and not prevent this increase.

Many more explicit and urgent calls about the dangers of climate change have been made over the 30 years since Hansen's testimony. As recently as 2014, for instance, Elizabeth Kolbert drew upon the work of scores of scientists to predict that human activity and climate change would cause the extinction of 20%–50% of all living species by the end of this century in what she calls the "sixth extinction" (Kolbert, 2014). Indeed, the precipitous decline in earth's biodiversity and the extinction of animal and plant species have been convincingly traced back to human activity, for while climate change and pollution are significant drivers of this ongoing destruction, Kolbert also discusses human consumption patterns, habitat loss and degradation, over-exploitation of resources, and the introduction of invasive species as factors that have exacerbated this massive extinction. Even the World Wildlife Fund (WWF), echoing Kolbert in its *Living Planet Report*, accounts for an overall decline of 60% and 83% in vertebrate and freshwater species, respectively, between 1970 and 2014 (WWF, 2018). Marco Lambertini of the WWF states in the foreword of the report that,

on one hand, we have known for many, many years that we are driving the planet to the very brink. This is not a doom and gloom story; it is reality. The astonishing decline in wildlife populations shown by the latest Living Planet Index—a 60% fall in just over 40 years—is a grim reminder and perhaps the ultimate indicator of the pressure we exert on the planet.

As Kolbert warns, then, the Earth is in the midst of a modern and anthropogenic sixth extinction that will likely be humanity's most lasting legacy, challenging the reader to rethink the fundamental question of what it means to be human.

Perhaps the most courageous, compelling, and urgent call to action, however, is Pope Francis's 2015 encyclical *Laudato Si'* (Francis, 2015; see also IPCC, 2018), a detailed document that

links human consumerism and irresponsible development with environmental degradation and the ultimate destruction of our “home.” Francis explicitly states that preserving and taking care of our natural world is no longer “optional,” that it is an integral and essential part of the Church’s teaching on social justice. Most importantly, *Laudato Si’* unambiguously accepts the scientific consensus about anthropogenic climate change and urgently calls all peoples of the world to take “swift and unified global action.”

A very solid scientific consensus indicates that we are presently witnessing a disturbing warming of the climatic system ... [and] a number of scientific studies indicate that most global warming in recent decades is due to the great concentration of greenhouse gases (carbon dioxide, methane, nitrogen oxides and others) released mainly as a result of human activity. As these gases build up in the atmosphere, they hamper the escape of heat produced by sunlight at the earth’s surface. The problem is aggravated by a model of development based on the intensive use of fossil fuels, which is at the heart of the worldwide energy system. (Francis, 2015: #23)

If present trends continue, this century may well witness extraordinary climate change and an unprecedented destruction of ecosystems, with serious consequences for all of us. (Francis, 2015: #24)

CLIMATE CHANGE DENIAL

We are more [certain] that greenhouse gas is causing climate change than we are that smoking causes cancer.

—Kate Marvel, NASA atmospheric scientist (Marvel, 2018)

How sad to think that nature speaks, and mankind doesn’t listen.

—Victor Hugo (1840)¹

In his 2016 book *The Great Derangement: Climate Change and the Unthinkable*, Amitav Ghosh notes that the scale of the crisis makes it all but “unthinkable” how anyone could deny the fact of anthropogenic climate change. Recent polls suggest, however, that more than 30% of Americans do not believe in the science behind it (Brenan & Saad, 2018). In fact, unlike the collective response to Kennedy in 1961, not only does a significant percent of the population not believe the scientific consensus that there is a connection between fossil fuel emissions and climate change, some do not believe that the climate has changed at

¹See Hugo, 1968: 145.

all. It is a type of denial and colossal blind spot that is all but difficult to comprehend, yet it needs to be recognized as our new reality. Indeed, in their October 18, 2018 report entitled “Even Americans highly concerned about climate change dramatically underestimate the scientific consensus,” Gustafson and Goldberg from the Yale Program on Climate Change Communication Center found that while 97% of climate scientists are convinced that anthropogenic global warming is occurring,² a large percentage of Americans still question the degree of agreement among them regarding the connection between fossil fuel emissions and climate change. In other words, most Americans think that there is scientific doubt on the causes of climate change. Gustafson and Goldberg thus argue that misinformation campaigns, in spreading doubt about climate change, have specifically targeted the scientific consensus, falsely stating that “there is still much debate among scientists” about whether the climate is changing at all or if this is being caused by humans. Such rampant demagoguery highlights the urgent need and opportunity for all of us to communicate effectively the fact that the science behind climate change has been settled. Clear messages about the indisputable scientific consensus can likely strengthen and solidify, at the very least, already existing pro-climate beliefs and attitudes.

It is also worth noting a populist trend directed against the so-called “intellectual liberal elites” which include scientists and academics. In her book *The Age of American Unreason* (2009), Susan Jacoby details the convergence of social forces over the last 40 years which ended up creating the perfect storm for an “anti-rationalism and anti-science movement.” These forces include the upsurge of religious fundamentalism, the failure of education to create informed citizenry, junk or pseudo-science, the new culture of “distraction,” the collapse of journalism, and the substitution of video/Internet-driven media over a print culture. Building on Hofstadter’s *Anti-Intellectualism in American Life*, Jacoby asserts that citizens have embraced a culture of “junk thought” which makes no effort to separate fact from opinion and therefore views science *as* opinion. This level of scientific illiteracy has, in turn, provided fertile ground for political appeals that equate intellectualism and science with “elite” liberalism. Scientists have thus become part of the so-called “intellectual elites” who are, by proxy, enemies of the common sense that is supposedly a virtue of ordinary people. Climate science, then, immersed as it is in this social/cultural war, has been portrayed as a manifestation of “elite liberals” and has thereby become wrapped in this

²On the scientific consensus about anthropogenic global warming, see Cook et. al., 2013; Cook et. al., 2016; Ripple et al., 2017.

nonsense, making scientific evidence subject to cultural opinion and political debate (see also Brenan & Saad, 2018).

Against the background of this anti-science movement, Francis in *Laudato Si'* separates the Roman Catholic Church from other religious groups that have sided with climate change denial. Having studied chemistry in secondary school, the Holy Father follows in a long line of scientists who represent, as it were, the Roman Catholic Church's long contribution to scientific thought, including the likes of Nicolaus Copernicus, Gregor Mendel, Albertus Magnus, and Francis Bacon, among others (Lindberg & Numbers, 1986; Woods, 2005). In his book *God's Soldiers* (2004), Jonathan Wright even describes what he calls "the Jesuit science," characterizing the Jesuits as "the single most important contributors to experimental physics in the seventeenth century" (Wright, 2004). Indeed, *Laudato Si'* talks explicitly about the science behind climate change, with Francis ultimately arguing for the logic of sustainability based on the very foundation of all religions: the imperative to respect and care for God's creation, our home.

POLLUTION AND ENVIRONMENTAL DEGRADATION

Exposure to atmospheric pollutants produces a broad spectrum of health hazards, especially for the poor, and causes millions of premature deaths. People take sick, for example, from breathing high levels of smoke from fuels used in cooking or heating. There is also pollution that affects everyone, caused by transport, industrial fumes, substances which contribute to the acidification of soil and water, fertilizers, insecticides, fungicides, herbicides and agrotoxins in general. (Francis, 2015: #20)

The earth, our home, is beginning to look more and more like an immense pile of filth. (Francis, 2015: #21)

Climate change is a global problem with grave implications: environmental, social, economic, political and for the distribution of goods. It represents one of the principal challenges facing humanity in our day. (Francis, 2015: #25)

If it is safe to assume that most human beings would like to enjoy the benefits of a clean and healthy environment, why not reduce pollution for the sake of breathing clean air and drinking clean water? Why is it so much easier to imagine a nuclear apocalypse compared to the deleterious effects of pollution, ocean acidification, global warming, and climate change? Why deny that fossil fuel externalities and human activity are changing the climate or, at the very least, degrading the environment?

Who ultimately benefits from climate change denial and environmental inaction? The obvious answer lies with the fossil fuel industry, which would need to surrender about \$20 trillion in untapped wealth for the planet to avoid a temperature increase of two degrees. Robert Jay Lifton argues in *The Climate Swerve* (2017) that the last time assets like this existed and were stranded was in 1865, when the “assets” took the form of human beings—slaves made up to half of the economy of the Southern United States and 16% of the economy of the entire country, equivalent to about \$10 trillion (see also Mouhot, 2011; Hayes, 2014). It was fortunate, then, that the abolitionist movement prevailed at that time despite seemingly insurmountable economic interests. Indeed, the conceptions of freedom that the abolitionist movement brought to bear—considered radical, extremist, and impractical at the time—are now taken largely for granted as obvious, inevitable, and just the right thing to do. Yet as it was with the recognition of the savagery of slavery, confronting climate change, a crisis that threatens the collapse of human civilization as we know it, demands a drastic rethinking of how we live and of the importance of “swerving” onto a sustainable path.

CULTURAL CRISIS AND THE NEED FOR INSPIRED LEADERSHIP

It seemed that we had finally achieved, with the Paris Agreement of December 2015 just a few years ago, a tipping point in universal awareness concerning the dangers of global warming that would finally result in action. There was so much hope; a new path which Lifton called a “swerve” had been drawn. Yet he notes that with the swerve came the “whiplash,” and it was quick, sudden, and brutal—a crusade, one that denied anthropogenic climate change and redefined the scientific consensus as an “ideology,” took hold as an anti-science movement which led to the U.S. exit from the Paris Agreement in 2017. The “whiplash” shocked the environmental movement and had a profoundly depressing effect which resulted in hopelessness (Ballew, Marlon, Maibach, Gustafson, Goldberg, & Leiserowitz, 2018), frustration, and paralyzing despair. A psychiatrist by training, Lifton described the new “climate inaction” among those of us who believe in the science of climate change as a “psychic numbing,” a manifestation of “the mind’s resistance to the unmanageable extremity of the catastrophe, to the infinite reaches of death and pain.”

Environmentalists, lacking prior experience upon which to model this new crisis, are now left paralyzed. The world community is experiencing less of an outright denial and more of a protective inertia. Trapped between polar alternatives of catastrophe and business as usual, many have chosen the latter, failing as a society to innovate and envision alternative futures.

It is remarkable how weak international political responses have been. The failure of global summits on the environment make it plain that our politics are subject to technology and finance. There are too many special interests, and economic interests easily end up trumping the common good and manipulating information so that their own plans will not be affected. (Francis, 2015: #54)

We lack leadership capable of striking out on new paths and meeting the needs of the present. ... (Francis, 2015: #53)

I do not think it is necessary to convince this Journal's readers of the crisis of climate change and environmental degradation that will lead to an unnatural "sixth extinction" of living species. This Journal's vision, after all, is grounded precisely on the premise that working toward a sustainable future is important for controlling the further deterioration of our planet; so yes, I know that I am "preaching to the choir." The stakes are so high, though, and the political environment so toxic, that we must "shake off" our inertia, get up, dust our knees, and stand to fight the good fight. The current climate crisis poses a challenge that is larger in scope and more encompassing than any other crisis humanity has faced, and we are at the forefront of this reality. Anything short of a revolution, an attitude and system change, will prove to be an inadequate response.

THIS ISSUE: INNOVATION FOR SUSTAINABILITY

Delving into the topic of "innovation for sustainability," this issue continues the Journal's mission of exploring how a more sustainable world can be sought and brought into being. The five articles found herein, which were presented at the 24th International Association of Jesuit Business Schools (IAJBS) Global Forum and 2018 Colleagues in Jesuit Business Education (CJBE) Annual Meeting on July 2018 at Seattle University in Seattle, Washington, showcase various approaches for innovating toward sustainability as they touch upon, investigate, and propose models that expand our knowledge for embracing the challenge of global transformation. "Innovation for sustainability"—this was the Forum's theme as well, addressed through research and plenary presentations among an extraordinary group of representatives from Jesuit business schools all over the world.

Stoner makes a bold and extraordinary proposition as he explores how business schools, both Jesuit and otherwise, can contribute to transforming our global producing-distributing-consuming systems into ones that will support the wellbeing and continued existence of our

own and other species. Grounded in the Ignatian model, Arnesen calls for the development of “ethical transformational leaders” to advance sustainability. Garwood, Neiva de Figueiredo, Miles, and Barrientos propose a model for teaching data analytics in a service learning context that enhances the efficiency of aid allocation. Bertaux and Skeirik present an innovative and original model for teaching sustainability through art. Trail and McCullough empirically examine the psychological constraints that affect intentions to act in a sustainable manner by investigating the attitudes and actions of sports participants.

Stoner suggests that what we teach and research in business schools may well be the vehicle for challenging and ultimately changing the current paradigm that controls the way the world produces, distributes, and consumes. Building on the submission of the leadership of the International Association of Jesuit Business Schools (IAJBS) and Colleagues in Jesuit Business Education (CJBE) for the 2016 MacArthur Foundation “100&change” competition, he contends that a new initiative driven by business schools can create the wake-up call that has been lacking despite repeated research reports about, and everyday evidence of, the steady deterioration of our ecological and human situation. In this light, Stoner argues that while current business education is contributing to global unsustainability by actively supporting business-as-usual mindsets and practices, business schools have exciting opportunities for innovation in teaching and research, discovering and applying new processes of organizational transformation, and developing new collaborative alliances between business schools, business enterprises, and other stakeholders. He then notes that Jesuit institutions are uniquely positioned to deliver on this opportunity, that Jesuit business schools are equipped with particular attributes that differentiate them from others, and that such attributes will enable them to communicate the realities of climate change and global unsustainability in ways that can no longer be ignored, thereby leading to global action on those realities that is inspired and guided by their own innovative and transformative efforts. Stoner describes six areas of differentiation: 1) the Jesuit mission—the *raison d’être* of Jesuit education is consistent with the kind of commitment and leadership for global sustainability called for in *Laudato Si’*; 2) heritage—Jesuits have led transformational societal changes throughout history; 3) scale and scope—there are 261 Jesuit business programs spread out across 28 countries which could prove to be an even greater force for global well-being if they act together in this domain; 4) breadth—there are around 17 million alumnae and alumni from Jesuit schools; 5) network—the IAJBS and CJBE provide a platform for executing and supporting such an initiative; and 6) alignment—the leadership of Jesuit business schools would be very much in line with Francis’s call for global-level action in *Laudato Si’*.

Arnesen answers Francis's call for "leadership capable of striking out on new paths and meeting the needs of the present" and argues that "Jesuit business schools have an obligation to develop ethical transformational leaders who seek a just and humane world ... to advance sustainability." In "Leadership, Vision, and Reflection: Applying Ignatian Concepts to Develop Transformational Leaders with a Select Application to Sustainability," he discusses why Jesuit schools have a unique opportunity and ability to apply Ignatian concepts in the development of responsible leaders. The article examines foundational Jesuit concepts and applies them to attributes of leadership, with Arnesen's model linking to leadership the insight of reflection, the gift of empowering others, the strength from building trust, and the rewards of silent servant leadership in helping others rise. The article thus presents an excellent model that can be easily applied in a leadership/management course.

In "Using the Business Classroom to Help Fe y Alegría-Bolivia Schools with Analytics and Pattern Visualization," Garwood, Neiva de Figueiredo, Miles, and Barrientos propose a model where students used data analytics to help a Jesuit-sponsored institution in Bolivia identify and target which participants in a survey are most in need of educational support. Using three years' worth of data, the results provided therein suggest that integrating data analytics in a mission-related partnership makes identifying the need for aid and delivering much-needed support in providing it more efficient. The article therefore shows how data analytics tools were successfully used to enhance service learning partnerships in particular and suggests that such tools can be used in many different domains. It also successfully integrates the theoretical principles of data analytics in support of Jesuit mission objectives.

Bertaux and Skeirik present a novel and interesting proposition, arguing that sustainability can be taught through art and that sustainability awareness can be enhanced through the medium of art. They posit in "Creating Pedagogy to Integrate Sustainability and the Arts" that the arts, given their unique and time-proven ability to inspire and move the human heart in authentic and unique ways, motivate individuals to act in a sustainable manner. In their view, a sustainability pedagogy utilizing the arts increases the depth and effectiveness of learning by reaching students empathetically as opposed to only intellectually. They examine four courses and two intensive off-campus programs from a variety of disciplines, including economics, music, history, sustainability, and digital media—all of which integrate arts and sustainability—and their results indeed suggest as much, that adding an integrated arts and sustainability course component does enhance the effectiveness and depth of student learning. The article concludes with a summary of guidelines that can effectively operationalize this integrated pedagogy.

In “Differential Effects of Internal and External Constraints on Sustainability Intentions: A Hierarchical Regression Analysis of Running Event Participants by Market Segment,” Trail and McCullough examine the role and hierarchy of internal and external constraints on marathon runners and how these affect the intentions of these athletes to act in a sustainable manner. In other words, the article empirically investigates if, and how, internal beliefs (and constraints) and external messaging affect the intention to act sustainably. The results support the principles of constraint theory and suggest that internal constraints such as lack of knowledge and lack of worth positively predict intentions to act sustainably (e.g., to dispose of waste correctly), thereby providing evidence that internal constraints need to be addressed first before external constraints can become effective. In concluding that external messaging (marketing) only complements and does not substitute for internal constraints (knowledge and understanding), this study highlights the importance of the individual’s understanding and knowledge of sustainability. It confirms Bertaux and Skeirik’s argument to some extent by providing empirical evidence that an internal transformation is necessary for achieving sustainable behavior. Trail and McCullough thus confirm the need for education in their conclusion that knowledge, understanding, and comprehension are internal pre-requisites for an individual to act in favor of sustainability.

CONCLUDING THOUGHTS

We live on a planet with finite boundaries and yet we continue behaving as if its resources are without end. Steady and exponential consumption of resources without regard for limits is a model that is not sustainable, cannot continue, and has started to break down. There are no shortcuts to climate justice—climate change is the call to our civilization and its message has been delivered in the language of fire, drought, hurricane, storm, dramatic species extinction, disease, massive migration, and habitat degradation. We need to listen to nature’s call and respond with action.

The movement to abolish slavery reminds us that there is precedent for a response as big as the one we contemplate today. Burning fossil fuels is, of course, not the equivalent to owning slaves; there is no question that the moral imperative to liberate millions of human beings represents one of the greatest human rights achievements in history. Yet what makes this comparison relevant are the economic interests that stand to be defeated. As with the abolitionist, universal suffrage, and equal rights movements, the fight against unsustainable development and

the use of fossil fuels needs to be seen in light of the assertion that life in all its forms has intrinsic value. All these movements used economic arguments in building their case for justice, yet their victory did not come by putting monetary value on the granting of equal rights or the liberation of an enslaved population. They won by asserting that those rights and freedoms were too valuable to be measured in monetary terms and were inherent in all living things.

There is no doubt that economic arguments for moving beyond fossil fuels exist and that these are worth communicating through our research and teaching. Yet we will not win the climate battle by trying to convince corporations and governments that it is more cost-effective to invest in emission reduction now rather than in disaster response at a future time when we may no longer be alive. Human beings, unfortunately, are oriented toward the short-term, and some may not even be capable of sacrificing present convenience to forestall the penalty imposed on future generations. If we could really take a long-term view of the consequences of our actions, such as considering the fate of civilizations long after our own deaths, we would be actively grappling with the transience of what we are, know, and love. Maybe we have trained ourselves to evolve so that we concentrate only on the present, consider the medium term, and forget about the future; if so, the argument about how costly the effects of climate change will be in 30 years or by the end of the century might not be the best one. We will win only if we unapologetically assert that justifying the imperative of reduced fossil fuel consumption using a cost/benefit approach is morally bankrupt since doing so implies that there is a quantifiable price for allowing species to go extinct, cities to disappear, leaving millions to die of hunger on parched land, and denying our children and future generations their right to live on a planet with the wonders and gifts of creation. No, the effects of anthropogenic climate change *do not* have any quantifiable value.

I began this editorial by citing President Kennedy. Reading through his speeches, I discovered intellectual thought delivered through a masterful invocation of reason and its power for good. Calling for negotiation with the Soviet Union before students at American University in Washington, D.C., he described peace negotiations and nuclear disarmament as “the necessary rational end of rational men,” asserting that “[human] reason and spirit have often solved the seemingly unsolvable—and we believe [we] can do it again.” He also clarified that this was not just wishful thinking: “I am not referring to the absolute, infinite concept of [universal] peace and goodwill of which some fantasies and fanatics dream” but to achievable, necessary, and pragmatic reality (Kennedy, 1963).

Senator Robert F. Kennedy delivered a speech in similar fashion in Indianapolis soon after Martin Luther King Jr.'s assassination. Speaking to a predominantly African-American crowd that was experiencing the trauma, anger, and despair of such a tragic event, he had to improvise and address the reality of what had just happened. He pointed out that moments of crisis are times for us to look inward and ask, "What kind of nation are we?", and cited, in a choked voice, the playwright Aeschylus:

*Even in our sleep, pain which cannot forget
Falls drop by drop upon the heart,
Until, in our own despair,
Against our will,
Comes wisdom through the awful grace of God.* (Kennedy, 1968)

Writing this editorial has been an intense and, at times, depressing task, and so I have for this reason sought inspiration and hope in others who lived through tumultuously difficult periods. Even so, perusing the speeches of Presidents Kennedy or F. D. Roosevelt, for that matter, is almost like reading from another world, one brimming with inspired rhetoric elevated in a language and tone no longer seen, unfortunately, in political discourse today. Sixty years ago, cultural literacy and intellectual capacity in a President or politician were collectively perceived as necessary traits and essential attributes for exemplifying the highest ideals of civility. The general citizenry thus respected and admired its leaders, intellectuals, and scientists not so long ago, at a time when messages like the need for sustainability might have been fully embraced. So much has changed, however, thereby begging the question: what must we do to overcome this obstacle? What do we need so we can return to a collective respect for rational and scientific evidence? Does it even matter?

We have (at least) four problems. First, and perhaps the greatest, is the cultural challenge. We need to find a collective voice that rejects the irrational and demands answers and guidance through facts, science, and faith. Second, we need to communicate that climate change and global unsustainability, far from being related only to weather change, also encompass changes in our flora and fauna as well as the deterioration of human health brought on by environmental degradation. We need to stop what we have been doing for too long now: taking nature for granted.

The third problem is economic: we can no longer ignore the impact of currently unsustainable production models and wasteful lifestyles. We need to recognize, for instance, that the fossil fuel industry's economic interests and incentives are at odds not only with our short- and long-

term goals but maybe even with our very existence as well. Yes, there are costs that we will have to bear, and these must all be accounted for and addressed.

The last problem is inertia. We need to articulate the moral imperative of living sustainably to wake up the good in all of us simply because it is the right thing to do. We need to empower all citizens with the ability to know that this can be done. We need to reflect on what it means to be human.

I recommend that we read once again the very first article of this Journal. Written by my dear friend Bill Weis, "Hypocrisy at the Lectern: Do our Personal Lifestyle Choices Reflect our Spoken Commitment to Global Sustainability?" will certainly be a wake-up call for those of us who call ourselves environmentalists. Read it. Discernment and reflection are indeed necessary for us to move forward.

MOVING FORWARD: A CALL FOR ACTION

Other than using our voices every day to communicate that human beings have altered the environment and created climate change, there are some objective and measurable actions we can take on an individual basis, in our teaching and research, and this Journal and Issue give us examples of how to do so. Among the many opportunities for each of us to make substantive contributions, for instance, Hawken (2017) presents and provides brief but detailed summaries of a truly exciting set of possibilities for involvement and action in what he calls the 100 most substantive solutions to global warming action. And, as Weis (2013) notes, of course, we need to make changes in the way we live; in this light, some specific ways to help include reducing meat and dairy consumption, producing less waste, consuming locally sourced products, using video-conferencing instead of traveling, and demanding low-carbon externalities in every product, among others.

Skeptics will argue, however, that developing countries like China and India will continue polluting and contributing over one third of the world's greenhouse gas emissions even if we individually adopt sustainable attitudes and/or the United States follows the Paris Agreement. Indeed, according to the 2017 Science for Policy Report of the European Commission's Joint Research Centre (Janssens-Maenhout et al., 2017), China and India emit 26.6% and 7% of all greenhouse gases, respectively, compared to the United States' 13%. As such, why sacrifice the economic growth that can be achieved with cheap energy if China and India will continue polluting anyway? Although we can argue a moral

imperative to act in a sustainable manner, such nation-based analysis is flawed. We should examine instead the value of tracing emissions to producers; that is, we need to analyze emissions in terms of the fossil fuels produced by public and state-owned firms rather than by nations. Heede (2014), for instance, quantified the fossil fuel production records of 90 firms³ from 1854 to 2010 and found that 63% of all worldwide emissions can be attributed to them. The results of Heede's extraordinary investigation suggest that even though a nation-based analysis is useful, particularly for allowing the formation of multinational agreements within the jurisdiction of international law, we need to evaluate shifting responsibility to those firms that produce fossil fuels by tracing their emissions. Heede's study invites us to consider assigning to those firms who have extracted, refined, and marketed two-thirds of carbon fuels the responsibility for causing—and remedying—climate change.

Heede's findings also suggest collective action. To begin with, we need to advocate for all Jesuit universities to join the Fossil Fuel Divestment movement and sell (divest) whatever financial holdings in fossil fuel companies they may have. Led by citizens and, in the case of universities, student "activists," the Fossil Fuel Divestment movement maintains that the business model of the fossil fuel industry is unsustainable and will ultimately lead to an uninhabitable planet. Its immediate goal is to make it clear that oil companies play a role in society similar to that played by tobacco firms—as a hazard to life; the ultimate aim, of course, is to free ourselves fully from our addiction to fossil fuels. The divestment movement in educational institutions is also grounded in exposing a moral hypocrisy, for universities on the one hand are entrusted to prepare students for the future and yet are profiting at the same time from an industry that is destroying that future.

Such an argument based on moral hypocrisy is particularly significant in the case of Jesuit institutions whose mission is guided by a Roman Catholic Jesuit tradition. Surprisingly, however, the only Jesuit university to have fully agreed to divest from all fossil fuel companies is Seattle University (Sanchez, 2018). Georgetown University, in the only other divestment action performed by a Jesuit educational institution, sold its holdings in companies involved in coal mining and tar sands

³Heede (2014) evaluates 50 public- or investor-owned and 40 partially or fully state-owned companies. Some of the firms partially owned by the state had undergone a process of privatization and are publicly traded entities that still might be under some state ownership. Heede does not consider a weighted investor/state-owned analysis.

oil extraction but fell short and did not go as far as Seattle University in divesting from *all* companies associated with fossil fuels.⁴

As a Jesuit and Catholic university, we have a special obligation to address the unfolding climate change crisis. In his encyclical *Laudato Si'*, or “Care for Our Common Home,” Pope Francis calls us to view this as a social and ecological issue of grave urgency that is connected to all around us and that has especially devastating consequences for society’s most vulnerable.⁵ (Stephen V. Sundborg, S.J., President, Seattle University, Sept. 11, 2018 [see Sanchez, 2018])

Organize. We must join the students who have been promoting the fossil fuel divestment movement. Go to <https://campaigns.gofossilfree.org/> and “walk the walk.” Let us use our collective voice.

This is the greatest challenge our generation—nay, our species—has ever faced. Yet those of us in universities in particular have a chance to help everyone recognize that we can be women and men for others as we work together to meet it. We know that protecting nature is also about protecting our home and, ultimately, about saving lives. Educators thus have a special opportunity to act as enlightened leaders and champions for future generations. Indeed, while the call to action is loud and clear particularly for those of us entrusted to work in Jesuit institutions, every one of us in any university for that matter needs to be reminded of our roles as teachers and researchers—creators of knowledge—in educating, inspiring, changing the culture, and, like the abolitionists before us, freeing the imagination to what is possible so that we may inspire action. Irrational optimism might just win where rational arguments have failed; hope and faith, after all, are our most human qualities. Each of us is called, then, to recognize and act upon the power for good that we each possess. We need to recognize, ultimately, that we all have the opportunity to be part of a truly historic transformation. This is it. This is our chance.

⁴A list of educational institutions that have divested from fossil fuel companies is available at <https://gofossilfree.org/divestment/commitments/>.

⁵Speech available at <http://fore.yale.edu/news/item/seattle-university-board-votes-to-divest-from-fossil-fuels/>.

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INNOVATION IN EDUCATIONAL AND SOCIETAL TRANSFORMATION

THE MACARTHUR FOUNDATION, JESUIT BUSINESS SCHOOLS, AND THE WORLD

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ABSTRACT. On June 2, 2016, the MacArthur Foundation announced a competition awarding \$100 million to a single project that would contribute toward solving a significant societal problem. Six weeks later, in Nairobi, Kenya, the members of the annual meeting of the International Association of Jesuit Business Schools' World Forum unanimously passed a resolution requesting the submission of an application that utilized the resources of the global network of Jesuit business schools in addressing the inter-connected problem of global unsustainability, social injustice, and poverty. This article reports on the resulting 2016 application as well as on a possible 2019 version that builds upon it. The article emphasizes four aspects of innovation at the core of both of these applications and of the 2016 MacArthur Foundation competition. The four areas are: 1) the MacArthur Foundation's innovative approach to inspiring societal change; 2) innovation in teaching and research content—transforming teaching materials and research topics in business schools, both Jesuit and other; 3) innovation in the processes of organizational transformation—participating business schools transforming their teaching and research in an “impossibly” short time period of only three years; and 4) innovation in the processes of societal transformation—achieving collaborative transformation among business schools, the business community, governmental agencies, spiritual and religious organizations, social enterprises, and not-for-profits.

KEYWORDS: global sustainability; global flourishing; sustainability education; global transformation; MacArthur Foundation

OVERVIEW

In 2016, 1,904 applications were submitted to the MacArthur Foundation's "100&change" competition (Conrad, 2016). At stake was a \$100 million prize that would be used to fund a single project aimed at solving a "critical problem of our time," one that might seem unapproachable and unsolvable at first. The specific requirements of the competition included finding and defining a meaningful problem, describing the communities targeted by the proposal, plans for engaging with them, and showing how the proposal would measure real progress toward a "verifiable, durable, and feasible" solution.

This article briefly comments on this initiative of the MacArthur Foundation and then reports on just one of the applications sent in, a proposal submitted by the leadership of the International Association of Jesuit Business Schools (IAJBS) and the Colleagues in Jesuit Business Education (CJBE) on behalf of the global network of Jesuit business schools. That proposal was designed to create a global conversation and set off actions that would take our broken producing-distributing-consuming systems—ones that are destroying our planet's capacity to support our own and other species—and transform them into systems that will enable our own and other species to, in the words of John Ehrenfeld, "flourish forever" on this planet (Ehrenfeld, 2008).

The IAJBS/CJBE proposal sought to create that global conversation and actions for societal transformation by

1. recognizing that our current producing-distributing-consuming system is unsustainable ("the global system is broken");
2. recognizing that global business school teaching and research as a whole supports and contributes to that broken system ("admitting that we are part of the problem");
3. supporting 40 business schools in the transformation of their teaching and research toward aligning with the needs of a sustainable world ("transforming business education");

4. having those business schools create their own individual transformations in collaboration with businesses and other societal institutions (“collaborative transformation”);
5. having them do so in the seemingly impossibly short time period of only three years (“doing the impossible”); and
6. having them share the procedures and results of their transformations in a variety of completely transparent and widely visible processes that will inspire and enable other business schools and all other institutions to begin their own parallel transformations immediately (“inspiring global transformation”).

The proposal’s design emphasized that no one really knows how the world’s business schools “should” go about transforming themselves, and it is unlikely that one approach, even if it could be agreed upon, would work for all of them. Each of the 40 business schools, therefore, was to develop its own approach for executing its transformation within its own unique situation. These 40 “parallel projects,” in turn, would generate a variety of innovative approaches and discoveries and provide opportunities to learn from many different methodologies and their results.

This article focuses on the innovative nature of the MacArthur Foundation initiative, the multiple innovations called for by the design and intent of the original 2016 IAJBS/CJBE submission, and a potential project/submission for 2019 that builds on the 2016 application. It concludes with suggestions on how an application planned for the 2019 competition can be used as a vehicle for achieving the meta-goal of the original 2016 submission—using the visible and public transformation of business education to start the immediate transformation of the global producing-distributing-consuming system and of ourselves.

INTRODUCTION: WHAT’S SO? SO WHAT? NOW WHAT?

What’s so? As we grapple with a great many intractable societal problems in the 21st century, Albert Einstein’s observation that “we cannot solve our problems with the same thinking we used when we created them” (Einstein, n.d.) rings especially true. We need to find innovative new ways to conceptualize these complex concerns, these problems that have been labeled “wicked” (Churchman, 1967; Rittel & Webber, 1973; Waddock, 2013), and move forward toward effective “solutions.” Alas, no problem is more difficult to grapple with—and

more in need of creative thinking, innovative approaches, and bold actions—than the problem of global unsustainability. Our global producing-distributing-consuming systems are broken, and they are rapidly destroying the capacity of the planet to support our own and other species.

So what? The 2016 MacArthur Foundation 100&change competition, by inviting interested parties to submit proposals aimed at solving a critical societal problem and offering generous funding for the implementation of the winning pitch, sought to inspire exactly the kind of new thinking and innovative actions Albert Einstein called for. This article notes the innovative nature of the MacArthur Foundation initiative and emphasizes the multiple levels of innovation present in a 100&change proposal that moves toward “solving” the most critical problem of our time—the problem of global unsustainability.

Now what? Although the 2016 IAJBS/CJBE entry did not “win” the competition’s \$100 million prize, this article concludes with some of the actions being taken in 2019 that build upon that 2016 proposal.

INNOVATION BY THE MACARTHUR FOUNDATION: A “THEORY OF INNOVATION” CONSISTENT WITH THE 100&CHANGE COMPETITION

An over-arching “theory of innovation” that might be consistent with the broad scope of the MacArthur 100&change competition and which definitely guided the IAJBS/CJBE 2016 proposal as described later in this article can be captured in two quotations. First, there is “Hal” (Harold J.) Leavitt’s oft-repeated recommendation that “when you don’t know how to do something, give it to a group” (Stoner, n.d.). Second is the quotation from William Hutchinson Murray that is frequently attributed, though not very accurately, to Johann Wolfgang von Goethe and which is often phrased as follows:

Until one is committed, there is hesitancy, the chance to draw back, always ineffectiveness. Concerning all acts of initiative (and creation), there is one elementary truth, the ignorance of which kills countless ideas and splendid plans: that the moment one definitely commits oneself, then Providence moves too. All sorts of things occur to help one that would never otherwise have occurred. A whole stream of events issues from the decision, raising in one’s favour all manner of unforeseen incidents and meetings and material assistance, which no man could have dreamt would have come his way. I have learned a deep respect for one of Goethe’s couplets:

*Whatever you can do, or dream you can, begin it.
Boldness has genius, power, and magic in it!* (quoted by Murray, n.d.)

The 100&change competition invited groups and institutions to propose projects that would invest \$100 million each in one brief commitment, spanning approximately 3 to 5 years, to solve societal problems that might initially seem unapproachable and unsolvable. The applicants were required to figure out what problem to grapple with, how to address it, how to measure their progress and results, and to share what they did so others can learn from their experiences and outcomes. Rather than telling the applicants what concerns to focus on and how to address them, the competition called for innovative thinking on how to define and approach major societal problems.

The innovative design of the 100&change competition and of the three areas of innovation described in this article call for participants to discover creative and bold ways of doing the impossible in incredibly short periods of time. The approaches they will need to follow and the actions they will be called upon to take in making the impossible happen embody the following two-part theme: when you have an enormously challenging, bold, and perhaps impossible project, 1) *give it to a group* that is 2) *fully committed* to making it happen. And, oh yes, a third part: make sure that group's progress on its project is 3) *publicly visible* and *fully transparent*.

Viewed in the spirit of Einstein's statement, the MacArthur Foundation competition does not seek simply to solve one or a few societal problems; it is, rather, a bold and innovative initiative to inspire many more projects than the foundation could ever finance. In this light, one of its key goals—and perhaps its main purpose—would be to inspire a great many individuals and groups to dream up bold and innovative ways of approaching major societal problems, ways that would not be constrained by the usual feelings of financial stringency that narrow one's thinking and willingness to commit to bold action. The 1,904 applications received would therefore mark the competition as a very solid success indeed—if reasonable measures of “success” for this apparent goal are the number of entries received and, thus, the number of major projects designed and potentially committed to.

In addition to this initial commentary on the innovative nature of the MacArthur Foundation competition, this article also comments on the innovative aspects of one of these 1,904 applications—an entry inspired by a resolution passed at a conference in Nairobi, Kenya that was attended by members of a number of Jesuit business schools—and on a possible future application based on it.

Three remaining aspects of innovation are also discussed herein: 1) innovation in teaching and research content—transforming teaching materials and research topics, first in Jesuit business schools and then in others; 2) innovation in the processes of organizational transformation—participating business schools transforming their teaching and research within the impossibly short period of only 3 years, and showing other schools and organizations how to transform themselves; and 3) innovation in the processes of societal transformation—achieving collaborative transformation among business schools, the business community, governmental agencies, spiritual and religious organizations, social enterprises, and not-for-profits.

THE ROAD TO THE “NAIROBI RESOLUTION”

The MacArthur Foundation 100&change competition was announced on June 2, 2016. On July 10, the possibility of joining the competition was suggested at the 19th Annual Meeting of the Colleagues in Jesuit Business Education at Le Moyne College in Syracuse, New York. On July 18, at the 22nd Annual World Forum of the International Association of Jesuit Business Schools in Nairobi, Kenya, the following resolution was unanimously passed:

The annual meeting of the IAJBS requests the IAJBS leadership, CJBE leadership, and the rest of the network of Jesuit business schools to work together to apply for the MacArthur Foundation 100 million dollar 100&change competition with a project to transform Jesuit business education to be fully aligned with the wisdom in *Laudato Si'*, with our universally-valid Jesuit educational tenets, and with the need for global sustainability, social justice, and poverty alleviation.

THE IAJBS/CJBE APPLICATION(S)

On October 2, 2016, the IAJBS and CJBE, not-for-profit professional organizations that support collaboration and shared learning among Jesuit business school administrators and faculty (IAJBS, n.d.; CJBE, n.d.), submitted a proposal built on the Nairobi Resolution to the MacArthur Foundation. The proposal was designed to utilize the network of Jesuit business schools as a vehicle for transforming not just Jesuit and other business education but all of the world's producing–distributing–consuming systems as well. It did not win the \$100 million prize, yet its basic conceptual structure and the details of the original application

offer the possibility of inspiring a new initiative for the transformation of business education, our entire set of global producing-distributing-consuming systems, and our ways of being in the world. Innovations in teaching and research, in organizational change and transformation, and in societal change are all called for in the original proposal as well as in a possible 2019 initiative inspired by the 100&change competition.

The 2016 IAJBS/CJBE application called for 40 business schools to invest the \$100 million MacArthur Foundation prize in the alignment of their research and teaching with the Nairobi Resolution's implicit call for organizational and societal transformation. Such a public commitment to transform business school teaching and research would be done in ways that call very visible attention to the seriousness of the global unsustainability situation and to the need for dramatic and immediate action. The transformational processes, in a similar vein, would also be conducted in a manner that encourages all of the world's business schools to confront the need to do the same, and at a very rapid rate. The two most important contributions these 40 leading business schools would make, therefore, are in 1) calling the entire world's attention to the no-longer-deniable reality that our producing-distributing-consuming systems are destroying the capacity of the planet to support our own and other species and 2) inspiring all the world's business schools to transform their own teaching and research in collaboration with business and other institutions and, in doing so, to work with those other institutions toward aligning their own actions with the need for a sustainable world.

The initial group of business schools. In the 2016 proposal, at least 20 of the 40 business schools would be Jesuit institutions. These schools would also be invited to take the lead in this endeavor for at least six reasons in addition to the fact that the Nairobi Resolution inspired the proposal itself.

First of all, the espoused values and *raison d'être*s of Jesuit educational institutions are in very close alignment with the intent of the Nairobi Resolution and are consistent with the approach to transformation presented in the proposal. The Nairobi Resolution and the 2016 application are simply asking the Jesuit business schools, in many ways, to walk their own talk.

Second, the Jesuits have a long record of bringing about societal change through education and other initiatives. Indeed, the history of Jesuit educational innovation and leadership made it appropriate for Chris Lowney to call his first book *Heroic Leadership: Best Practices from a 450 Year-Old Company that Changed the World* (Lowney, 2003).

Third, the Jesuit business schools make up the world's largest group of business schools that have a common heritage. The scope, depth, and reach of these institutions are obviously substantial: the IAJBS Executive Director (Ulferts, 2018) reports that there are 261 business programs worldwide, encompassing everything from traditional brick-and-mortar university campuses to innovative Internet programs that provide access to business education in places where a campus is not feasible. There are Jesuit-affiliated business education facilities in at least 28 countries on six different continents. Various members of these schools have also worked together on social justice, social enterprise, poverty alleviation, sustainability, and other initiatives for many years.

Fourth, many of the estimated 17 million alumni and alumnae of Jesuit educational institutions are likely to be very supportive of the type of educational and societal leadership that the 2016 and (potential) 2019 proposals seek to create.

Fifth, the Jesuit business schools are connected to each other through the IAJBS and other support institutions, including the predominantly U.S.-focused CJBE which may soon become a more global organization.

Sixth, a Jesuit business school-inspired proposal that calls for aligning how we produce-distribute-consume as a society is very much in keeping with the call for radical change toward eliminating the climate crisis, a call that Pope Francis detailed recently in *Laudato Si'* (Francis, 2015). Such a call has been issued in a number of other Roman Catholic and Jesuit encyclicals and publications such as *Caritas in Veritate* (Benedict XVI, 2009) and *Healing a Broken World* (Álvarez, 2011).

The three-year target. Each of the 40 participating business schools would have only three years to transform themselves, three years to complete the development and implementation of their new curriculum and research programs. It seems to be an impossible task, yet part of the reasoning behind the setting of the three-year target was a suspicion that what cannot be done in 20 years in the university might well be doable in three. Nevertheless, such a short time frame for accomplishing this transformation also recognizes that the state of the planet is quite perilous, that we do not have 40, 30, or even 20 years to begin solving our problems.

The meta-goal. The IAJBS/CJBE application might appear on the surface to be about training individuals for playing leading roles in the creation of a sustainable world in 20, 30, or 40 years' time, namely, when they reach positions of significant power and influence. Such a laudable goal was not the true aim of the proposal, however, for we

simply do not have time for that kind of thinking. The intent was to start bringing about what is essentially an immediate transformation of global producing-distributing-consuming systems, beginning when the very first business school commits publicly to its own transformation.

Innovation in teaching and research content—transforming teaching materials and research topics/programs in business schools, both Jesuit and others. No one knows what the “perfect” business school curriculum and research program would be for creating a socially just, poverty alleviating, and sustainable/flourishing world. Many good ideas along that line clearly exist, however (e.g., Christopher, Laasch, & Roberts, 2017; Gosling & Mintzberg, 2006; Laszlo, Waddock, & Sroufe, 2017; Mårtensson, Bild, & Nilsson, 2008; Parris & McInnis-Bowers, 2017; Pirson, 2017, to suggest just a few).

Forty business schools attempting to transform teaching and research, learning about existing concepts, and experimenting, amending, and choosing among them would likely generate and test a great many more ideas than this short list suggests. Rather than attempting to decide at the beginning of the project what the eventual curricula and research program should look like, or asking all 40 participating schools to agree on a common curriculum and research approach and then directing them to implement and hopefully improve on their results, the IAJBS/CJBE proposal took a different path: each school was asked to choose its own destination (what its own eventual curriculum and research program would look like) and to figure out how to get there (“how do we go about bringing forth a new curriculum and research program?”). The proposal was designed to liberate all 40 participating schools for innovation and experimentation in creating their own curricula and research programs. In this manner, it followed the concept of “parallel research projects” similar to those used by the 3M Corporation in developing new products and by NASA in its program for landing a person to walk on the moon in the 1960s. We do not know what to do and we do not know how to do it, so we will ask a lot of groups to figure out what to do and how to do it, and then to go and do it ... and we will give each of them \$2.4 million to do so.

Innovation in the processes of organizational transformation—participating business schools transforming their teaching and research, and therefore themselves, in only three years. Although many good ideas about organizational transformation clearly exist (e.g., Bushe, 2011; Cooperrider & Sekerka, 2006; Goldman, Purmal, & Janzer, 2016; Whitney, 1996), no one knows for certain what the “perfect” way would be for any business school to transform what it is doing, much less how to do so in the impossibly short period of only three years. Forty business schools

attempting to transform themselves would likely test many existing ideas and, in doing so, generate a great many more new ones. The IAJBS/CJBE proposal is quite explicit about not attempting to tell the business schools how they should bring about their transformation; it was quite clear, in fact, that each school would be responsible for figuring out how to accomplish that transformation on its own. They, of course, would be likely, wise, and have the money to draw upon some of the world's leading thinkers and consultants, individuals, and maybe even consulting organizations likely to be excited by and attracted to any business school bold enough to engage in such an undertaking. Indeed, some of these individuals and consulting organizations might even be enthusiastic enough to offer their services for free.

Innovation in the processes of societal/global transformation—achieving collaborative transformation among business schools, the business community, governmental agencies, spiritual and religious organizations, social enterprises, and not-for-profits. No one knows the “best” way for inspiring and bringing about the types of transformations necessary if we want to reduce the burdens caused by our failing and unsustainable producing-distributing-consuming systems to a level that our planet can actually bear. Despite the availability of many good ideas about societal and global transformation (e.g., Fullerton, 2015a, 2015b; Khondker & Schuerkens, 2014; Korten, 2015; Maxton & Randers, 2016; Raworth, 2017; Scharmer, 2009, 2018; Whitney & Cooperrider, 2000; Wijkman, Lovins, Fullerton, & Wallis, 2018; Winston, 2014), the initial group of 40 participating business schools (along with other institutions inspired later on to join similar initiatives) will want and need to engage in active collaborations with businesses, governmental agencies, spiritual and religious organizations, social enterprises, and not-for-profits to help bring about their own transformations. Such collaborative work, in turn, will bring about change and transformation in those partnering organizations. Indeed, as the schools and other organizations work together on their mutual transformations, they will likely discover and generate many new ideas about how we can move our entire global community forward.

Such a global transformation will begin as soon as the first business school takes its first transformative steps in collaboration with other institutions within its environment. In doing so, it will begin increasing the number of parallel transformative projects being implemented as partner institutions become involved in their own transformative processes.

In addition to what participating business schools, businesses, and other organizations will need to discover as they co-create collaborative

and shared transformation, the proposal itself relies heavily on still one more form of societal innovation that is at the very core of the 2016 IAJBS/CJBE proposal and a possible 2019 initiative. It involves creating the global conversation concerning the need for immediate action that can restore and protect the ability of our planet to support our own and other species. Indeed, as Nathaniel Rich and George Steinmetz recently described and illustrated so effectively, we had—and missed—the opportunity *30 years ago* to create the dialogue that might have enabled us to avoid our current situation (Rich & Steinmetz, 2018).

Indeed, the world we have been so accustomed to living in is becoming less and less available to us every day (McKibben, 2011). Echoing the Stockdale Paradox (Collins, 2001), this new global conversation needs to help us find the shared courage for confronting the brutal facts—that the existing producing-distributing-consuming system is broken—and yet never allow us to lose faith that we can find the creativity, resolution, and shared commitment to create and live in a new and different world, one that works for all and with no one left out.

The creation, however, of that global conversation will itself need to be grounded in many innovative ideas and actions. It will begin when the very first business school says, loudly and clearly, that global business education as a whole is part of the problem of global unsustainability. When that school is soon joined by others, the conversation will then need much fostering and support if it is to become viral, global, and effective. Richard Nixon's reputation as a staunch anti-communist Cold War warrior, for example, gave him the opportunity to lead the way to a new relationship between the People's Republic of China and the United States in the 1960s. Now, in the same vein, the history of the world's business schools in supporting our current global producing-distributing-consuming systems gives them the opportunity to lead us into new ways of meeting our needs and appropriate wants and of being in the world.

A POSSIBLE 2019 100&CHANGE APPLICATION: AN OPPORTUNITY TOO GOOD TO MISS

The MacArthur Foundation is scheduled to announce the guidelines for a second 100&change \$100 million competition in early to mid-2019. In this light, one may view the original IAJBS/CJBE 2016 application posted and available on the Social Science Research Network website (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3270030). One of its "offshoots," also posted on the site, is a somewhat tongue-in-cheek, somewhat serious line-by-line rewriting of the United States Declaration

of Independence that is consistent with the theme of the 2016 proposal. Titled "The Declaration of Business School Independence," it can be found at <https://papers.ssrn.com/abstract=3163080>.

Building on the Nairobi Resolution and the original IAJBS/CJBE proposal, it is recognized that any single entry, especially one as bold as the original 2016 IAJBS/CJBE application, is very unlikely to win the \$100 million prize, especially with close to 2000 applications in the 2016 competition and maybe even more in 2019. The structure and intent of the original application, however, can serve as the basis for a 2019 submission that will not require winning the \$100 million MacArthur prize to move toward its goals. The 2016 application has required relatively little tinkering to convert it to a 2019 edition; such tinkering, in fact, is already largely complete, with the current version of a possible 2019 application already posted on the SSRN site (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3270054). This 2019 edition is likely to evolve over time, however, and so the file currently posted is only the latest iteration and not the final version.

The Possible 2019 Proposal. The major changes in the 2019 proposal as it stands at the moment, and given the caveat that it is likely to evolve, are as follows:

1. a clarification of each participating business school's processes for independence and public accountability as they bring about their own transformations and the requirement for sharing the ongoing results of their initiatives,
2. administrative oversight for the whole project reduced to an absolute minimum,
3. a structure that allows the project to move forward immediately one business school at a time, and
4. a very minor increase in the grant for each business school from \$2.1 million in the original 2016 proposal to \$2.4 million.

The 2019 revision still sees Jesuit business schools, individually and/or collectively, as key leaders and players in this transformative initiative. In a similar vein, the emerging proposal welcomes, and hopes for, the active encouragement and involvement of the IAJBS and CJBE in the project without requiring them to supply either resources or administrative work to do so.

Plans are currently underway to visit a number of Jesuit business schools to learn about five topics, four of which are directly related to a potential 2019 100&change application. The topics are

1. the possible interest of the school and university in being one of the participants of a 2019 application and in starting the transformation immediately;
2. the ways in which the school's teaching and research are already closely aligned with the Nairobi Resolution's call for teaching and research to be aligned with the need for global sustainability, social justice, and poverty alleviation;
3. how the business school and university have responded to the calls for ecological dialogue and action in *Laudato Si'*, and what plans are in place for doing so in the near future;
4. which individuals or institutions might want that business school to be one of the first ones to lead this transformational process and might be willing to contribute financially and perhaps professionally to this transformation; and
5. a somewhat separate topic about the finance faculty—who among them is most likely to be involved in teaching and research that grapples somewhat, in some way or other, with the problems of global unsustainability.¹

In addition to visiting individual Jesuit business schools—and perhaps even some non-Jesuit ones that might wish to be leaders in this initiative, formal and informal presentations on this opportunity have also been occurring regularly in a number of academic conferences. These include a conference of the Academy of Management in 2016, the Management and Organizational Behavior Teaching Conference in 2017, the Colleagues in Jesuit Business Education Annual Meeting in 2017, a keynote address at the 2017 IAJBS World Forum, a 2018 World Forum session based on an early draft of this article, and a session at the 2018 Academy of Business Education Annual Meeting also based on this piece.

¹This last topic is connected to an on-going inquiry into financial management and global sustainability (Werner & Stoner, 2015; Stoner & Werner, 2017).

2019 AND BEYOND

The two questions that are the two 800-pound gorillas sitting in the living room are as follows:

1. Where will the \$100 million for 40 participating business schools come from if not from the MacArthur Foundation (given the very low probability of winning the competition's prize) or, more immediately, where will each tranche of \$2.4 million come from as each school signs up and begins its three-year transformation commitment?
2. Which school will be the first to state publicly, implicitly or explicitly, that global business education is currently active in supporting the world's broken producing–distributing–consuming systems and that it is taking an active leadership role in discovering how to break away from that support by transforming first itself and then the world?

Raising the money and finding the schools that will take the leadership role—of these two tasks, getting 40 business schools—or even just one—to make this transformative commitment may well be a greater challenge compared to raising \$2.4 million for each of them. The current approach involves beginning the search for both at the same time—for the first \$2.4 million and for the first business school.

The fact that publicity and recognition often flow very heavily to the entity that is the first to undertake any action might encourage the first business school to commit to the transformation. The first one is always unique, and so the attention paid to the first school, the *leader* of this initiative, is likely to be especially high.

In a similar vein, the first \$2.4 million grant may not be that difficult to find because it could well be interpreted as the first investment that will encourage other similar investments from other sources, the “seed money” for an eventual sum of \$100 million from a variety of different sponsors. It might yield a 4000% “return” as it inspires 39 more grants of \$2.4 million each.

This search process eventually brings us back to a quotation early in this article:

the moment one definitely commits oneself, then Providence moves too. All sorts of things occur to help one that would never otherwise have occurred. A whole stream of events issues from the decision, raising in one's favour all manner of unforeseen incidents and meetings and material assistance, which no man could have dreamt would have come his way.

This article is thus one step in the process of inviting providence to start moving.

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LEADERSHIP, VISION, AND REFLECTION

APPLYING IGNATIAN CONCEPTS TO DEVELOP TRANSFORMATIONAL LEADERS WITH A SELECT APPLICATION TO SUSTAINABILITY

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ABSTRACT. Jesuit business schools have an obligation to develop ethical transformational leaders who seek a just and humane world. Whether it is addressing the needs of social justice or leading change to advance sustainability, these institutions have a unique ability to apply Ignatian concepts in developing responsible leaders. This article examines these concepts, including the insight of reflection, the gift from empowering others, the strength from building trust, and the rewards of silent servant leadership to help others rise.

In examining the “modeling” of successful leaders, we will look at how the transparency of leadership is essential for leading change in areas such as social justice and sustainability. We will consider, for example, how Jesuit-valued education can fill the void of effective environmental leadership with regard to sustainability. We will establish the case that Jesuit schools are in a unique position to develop these leadership skills to facilitate this necessary environmental dialogue. Thus, in reflecting on the philosophy of developing leadership, we will see how Ignatian principles can form the core foundation for building great leaders.

Finally, this article looks to the future of Jesuit business school education. What are the changes necessary in teaching leadership to advance social justice and lead sustainability change? What reflection on Ignatian concepts must faculty and administration pursue so that Jesuit business schools are

at the forefront of leadership? We will conclude the “modeling” of leaders with how our institutions can foster principled leadership within every student through the application of Ignatian concepts.

KEYWORDS: leadership; sustainability; Ignatian; reflection; discernment

INTRODUCTION

In his encyclical letter on the environment entitled “On Care for Our Common Home,” Pope Francis states that “we lack leadership capable of striking out on new paths and meeting the needs of the present with concern for all and without prejudice towards coming generations” (Francis, 2015). He also addresses in the same document the issues of air and water pollution, climate change, loss of biodiversity, and the need for functioning ecosystems. Most importantly, however, he calls for dialogue among all peoples:

I urgently appeal, then, for a new dialogue about how we are shaping the future of our planet. We need a conversation which includes everyone, since the environmental challenge we are undergoing, and its human roots, concern and affect us all. (Francis, 2015)

This obligation to care for the planet is not new—it can be traced back in Scripture to the books of Genesis and the Psalms. Nor is it new within the church; as Pope Paul VI stated, “Due to an ill-considered exploitation of nature, humanity runs the risk of destroying it and becoming in turn a victim of this degradation” (Paul VI, 1971). Pope Emeritus Benedict XVI also extolled the extent of this obligation: “We are all responsible for the protection and care of the environment. This responsibility knows no boundaries” (Benedict XVI, 2010).

That care for the environment is a moral issue is perhaps most important (Martin, 2017). As such, it must be part of the conversation in leadership development within every Jesuit business school. Ignatian principles are keys to this development. Discernment, for example, one of the Ignatian principles examined herein, shows how its application helps guide leaders in making carefully considered and informed decisions. These Ignatian concepts, therefore, should be the foundation of every Jesuit business school.

The skills necessary for leadership can clearly be learned through education and experience (Mumford, Marks, Connelly, Zaccaro, &

Reiter-Palmon, 2000). Transformational leaders, in addition, need the ability to embrace change. Such leaders, it should be noted, possess the following four characteristics: “idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration” (Avolio, Waldman, & Yammarino, 1991). We will thus show in the following how Jesuit business education can develop both the skills and characteristics necessary for transformational leadership.

THE FORMATION OF AN IGNATIAN BUSINESS LEADER

In developing Ignatian business leaders, we must first listen to and reflect on what students within Jesuit business schools need to develop their full Ignatian leadership potential. What do students in the 21st century require to become ethical servant leaders? Is there a certain void which Jesuit business schools have the unique opportunity to fill? To develop leadership, we first have to listen and reflect:

Be slow to speak, and only after having first listened quietly, so that you may understand the meaning, leanings, and wishes of those who do speak. Thus you will better know when to speak and when to be silent. (Ignatius of Loyola, 1546)

Ignatius thus set forth the first foundation for developing leadership within Jesuit education—the need to listen. While we as educators within Jesuit business schools can express leadership values and concepts using our words, we must first listen so as to construct our dialogue to have the greatest impact.

Silence is the foundation for this “effective listening” which must include reflection and discernment. Excellent examples of this as practiced in Jesuit higher education are the Ignatian silent retreats where our students have the opportunity to explore their own leadership qualities through reflection and discernment. Silence is also a key part of the *examen* “exercise” of reflecting on the day, embracing the spirit, looking for what tomorrow will bring, and discerning what one will need to lead others with Ignatian values.

The Ignatian principles of humility and discernment also enhance dialogue with our students (Byron, 2011). If we engage our students with humility, we can expand their own reflection and discernment as they seek to discover what transformational values are necessary for effective leadership.

TRANSFORMATIONAL IGNATIAN VALUES

Ignatian leadership requires transformational values. Ignatian values raise the very questions that leaders trained in Jesuit business schools must ask, questions that require reflection on the following concepts:

1. that of empowering others;
2. the power that comes from reflection;
3. the energy of “us” rather than of “me”;
4. how vision builds leadership;
5. the obligation to build trust;
6. how transparency builds leadership;
7. how transparency strengthens authenticity;
8. how leadership can bring differences together;
9. putting business into “life’s” perspective;
10. believing in others;
11. being a silent leader;
12. teaching the ability to do the impossible;
13. knowing how our actions impact others;
14. how we are more alike than different; and
15. the development of servant leadership.

Studies have clearly shown that reflection builds quality leadership (Callahan, 2013). Developing Ignatian leadership, therefore, requires reflection on values. It brings forth the principles of developing the whole person, creating social justice, and moving others to do the right thing. Indeed, reflection on the transformational concepts outlined above creates ethical leadership and helps develop moral values. Jesuit business schools, therefore, must develop more than just transactional business managers; they must develop transformational leaders who will lead at every level of an organization and who are committed to doing the right thing. As the famous management educator Peter F. Drucker stated, “Management is doing things right; leadership is doing the right things” (Drucker, 2001). Clearly, transformational values developed within the Ignatian framework of reflection can lead Jesuit business students to do the right thing.

Reflection also leads us to change, and change is essential for individuals, business, and society to progress and move forward. As President Harry S. Truman stated, “Men make history and not the other way around. In periods where there is no leadership, society stands still. Progress occurs when courageous, skillful leaders seize the opportunity to change things for the better” (Truman, n.d.). Reflection developed in the Ignatian framework allows us to examine what has happened

from various perspectives and then pursue effective change through discernment (Mauri, Neiva de Figueiredo, & Rashford, 2015). If we as educators embrace the Ignatian ideals to empower and lift others up, we will develop leaders who embrace effective change not just in business but in all of society. Indeed, the key to “modeling” those Ignatian values is to become the servant leader.

AN EXAMINATION OF EMPOWERING OTHERS: THE SERVANT LEADER

It is clear that empowerment in business leads to better performance (Garton, 2017). A foundation of Jesuit education, the servant leader is committed to empowering others. This empowerment of others is a key to business leadership. As Jack Welch, former chairman and CEO of General Electric, stated, “Before you are a leader, success is all about growing yourself. When you become a leader, success is all about growing others” (Welch, n.d.). Now the growth of others is clearly part of our Ignatian commitment, one that goes beyond business. It is a commitment to all of society, particularly with a special obligation to the poor and marginalized so as to lift them up. If we apply this philosophy to Jesuit business education, we become educators that develop leaders who will empower others to rise. As Microsoft cofounder Bill Gates said regarding future leaders, “As we look ahead into the next century, leaders will be those who empower others” (Gates, n.d.).

What unique characteristics must Jesuit business education embrace in developing the servant leader? First, there has to be a focus on the Ignatian practice of humility. As business leader and philanthropist Andrew Carnegie noted, “No man will make a great leader who wants to do it all himself or get all the credit for doing it” (Carnegie, n.d.). Humility gives credit to others. Transformational business leadership, therefore, needs the element of humility to embrace fully the significance of lifting others rather than the self.

Second, a servant leader must be transparent to empower others. True transparency in the business context, where information is available and flows freely within an organization, is often not the case. There are many reasons for lack of transparency, yet we do know that “an organization’s capacity to compete, solve problems, innovate, meet challenges, and achieve goals—its intelligence, if you will—varies to the degree that information flow remains healthy” (Bennis, Goleman, O’Toole, & Biederman, 2008). Likewise, there must be transparency for servant leaders to empower others to compete, solve problems, innovate, and meet challenges.

Third, transparency requires trust and authenticity. Jesuit business education must “model” examples of trust building by leading through example, open communications, and care for the whole person. Trust building only works if there is authenticity and a true commitment to others. Perhaps such belief in others can be summed up best by the famous North Carolina State basketball coach Jim Valvano, who said, “My father gave me the greatest gift anyone could give another person, he believed in me” (Valvano, n.d.). This gift to believe in others goes to the very heart of Ignatian values. If we “model” that respect within our Jesuit business schools, creating a belief in others, we will develop students who as leaders transform not only business but also those they interact with so they in turn become servant leaders.

TRANSFORMATION TO ACHIEVE THE IMPOSSIBLE

St. Francis of Assisi said, “Start by doing what’s necessary; then do what’s possible; and suddenly you are doing the impossible” (Francis of Assisi, n.d.). We can build upon many foundations within Ignatian teachings to help our students achieve what may seem impossible. First and foremost is the development of the whole person within the Jesuit business school context, which is essential. Unlocking an individual’s full leadership potential clearly cannot be achieved without the development of the whole person. Jesuit business school education, therefore, the development of the whole person, mind, body, and spirit, has the unique ability to unlock this potential.

Second, the Jesuit value of *cura personalis*, care for the person, can unlock this potential even further. This focus on the individual is established through our expression of humility, transparency, and trust. If we truly follow *cura personalis*, we will inspire our business students to act not on transactional elements alone but rather to consider as well their actions in the context of being a transformational leader.

Third, the Jesuit principle *ad majorem Dei gloriam* (“for the greater glory of God”) can be found in the Ignatian practice of *magis*. Francis, in fact, notes the importance of spirituality in motivating us to solve the issues of ecological stewardship:

Here, I would like to offer Christians a few suggestions for an ecological spirituality grounded in the convictions of our faith, since the teachings of the Gospel have direct consequences for our way of thinking, feeling and living. More than in ideas or concepts as such, I am interested in how such a spirituality can motivate us to a more passionate concern for the protection of our world. (Francis, 2015)

Jesuit education helps build this spirituality through *magis*, often a part of St. Ignatius's spiritual exercises which include reflection on and contemplation of what has occurred and how to improve. It builds self-awareness, ingenuity, heroism, and a drive to accomplish goals (Lowney, 2003). *Magis* within Jesuit business teaching can build a personal commitment to act, aim high, achieve excellence, and serve others. It is but another example of Jesuit education with which we can help our students achieve what seems to be the impossible.

It should be noted that self-awareness is one of the key elements in developing emotional intelligence. The ability to understand your own emotions and those of others, empathy, and how others will react to you, emotional intelligence is a key skill of effective leadership (Ovans, 2015).

Combining the elements of development of the whole person, *cura personalis*, and *magis* makes servant leaders grow with the courage to be transformational. As Michelle Obama noted, "You may not always have a comfortable life and you will not always be able to solve all of the world's problems at once but don't ever underestimate the importance you can have because history has shown us that courage can be contagious and hope can take on a life of its own" (Obama, n.d.). Developing this servant leader courage is essential therefore if we are to address important social justice issues such as sustainability.

IGNATIAN-BASED SOCIAL JUSTICE INVOLVES SUSTAINABILITY

Part of our Jesuit business school commitment to social justice must include a concern for sustainability (Obermiller & Atwood, 2014). Sustainability looks at how we impact the earth, air, and water for future generations. It looks to balance environmental protection with economic development and social equity (Curran, 2014). If we truly believe in a commitment to improve social justice, this must include improving sustainability for future generations.

Let us first examine what sustainability leadership is. The Center for Ethical Leadership found that leaders go through a "five stage pattern of sustainability leadership" which engages the following elements: awareness, experimentation, systems thinking, resource commitment, and sharing. First, there is an acknowledgement of the issues along with a will to move forward based on values. Second, the element of experimentation then looks at initiating a specific sustainability project. Third, systems thinking considers the broad impact of the sustainability initiative. Fourth, resource commitment recognizes the need to allocate resources to achieve sustainability. Finally, sharing aims

at being a sustainability advocate within the industry. The Center also noted characteristics shared among the leaders who participated in the study: passion, vision, a “participatory organizational culture,” and a “willingness to learn” (Center for Ethical Leadership, 2005).

Applying Ignatian concepts gives us a unique ability in Jesuit business education to address these characteristics of sustainability leadership. As Rockhurst University president Thomas Curran, S.J., pointed out in 2014, “Ignatian spirituality speaks of ‘our way of proceeding’ and considers all engagements as conversations. The pursuit of sustainability requires thoughtful and patient engagement. Providing that conversation the time it needs demands a discipline and intentionality” (Curran, 2014).

Considering the diversity of opinions on how best to address sustainability, it can be argued that Ignatian philosophy possibly provides a unique “leadership” way of bringing divergent ideas together. First, Ignatian-based leadership looks at gaining engagement not through criticism but through conversations. It recognizes the complexity of the issues. How do we balance, for example, the current economic needs of developing countries that use resources in a less sustainable manner with the worldwide goal of greater sustainability and resource protection for future generations? Applying Ignatian teachings which recognize the need for in-depth and “patient” engagement can help in examining complex sustainability questions such as this.

While progress toward achieving greater sustainability has been made, much more clearly needs to be done as the world is still depleting and significantly polluting many resources which must be protected for future generations. Solutions to sustainability issues will require leaders with more than just “technical managerial skills.” Given, therefore, that all business schools teach such skills, the unique ability of Jesuit business education to teach transformational leadership is perhaps what is necessary for moving solutions forward in solving the complex issues of sustainability.

There is another element of Jesuit education that can lead us to more sustainable solutions. One of the benefits of developing the whole person is that doing so can foster “imagination” within the student and lead to “heightened creativity and empowerment” (Imanaka, 2016). Such “imagination” and “creativity” may arguably be exactly what is needed to provide new solutions for achieving greater sustainability in the future. Francis noted the need for these new avenues of thought to address sustainability, particularly in business:

If we look at the larger picture, we can see that more diversified and innovative forms of production which impact less on the environment can prove very profitable. It is a matter of openness to different possibilities which do not involve stifling human creativity and its ideals of progress, but rather directing that energy along new channels. (Francis, 2015)

Finally, sustainability in the next century needs to be addressed from a global perspective. As Francis noted,

An interdependent world not only makes us more conscious of the negative effects of certain lifestyles and models of production and consumption which affect us all; more importantly, it motivates us to ensure that solutions are proposed from a global perspective, and not simply to defend the interests of a few countries. (Francis, 2015)

Jesuit education has the unique ability to address sustainability worldwide—there are 28 Jesuit business schools in the United States and 55 international members of the IAJBS. If we are committed to developing transformational leaders who are committed to social justice, then we need to include business education that is focused on creating a global impact in improving sustainability.

EXAMPLES OF TRANSFORMATIONAL LEADERS

It can be argued that the influence, the “leadership,” of Jesuit-educated individuals in virtually every profession has been significant. We need to look only at a few among the thousands of examples to establish impact. In politics, Jesuit-educated leaders from Thomas P. “Tip” O’Neil to John Boehner have reached across the entire political spectrum. Jesuit school alumni and alumnae include Jerry Brown, Andrew Cuomo, Geraldine Ferraro, Thomas Foley, Tim Kaine, John Kerry, Patrick Leahy, Barbara Mikulski, Janet Napolitano, and Leon Panetta. This influence, this “leadership,” extends globally as well to include Vicente Fox (former President of Mexico), Gloria Macapagal-Arroyo and Benigno Aquino III (former Presidents of the Philippines), Park Geun-hye (former President of Korea), Pierre Elliott Trudeau (former Prime Minister of Canada), Ramaswamy Venkataraman (former President of India), Frederick Weld (former Prime Minister of New Zealand), Alejandro Toledo Manrique (former President of Peru), and Saad Hariri (Prime Minister of Lebanon).

This Jesuit-educated “leadership” influence also goes well beyond politics. Representatives in entertainment and the media have included Bing Crosby, Denzel Washington, Alfred Hitchcock, Bob Newhart,

Charles Osgood, Chris Mathews, Bill Murray, Tim Russert, and Salma Hayek. William F. Buckley, Jr., Tom Clancy, Jr., and Sir Arthur Conan Doyle are counted among those leaders in literature who were educated in Jesuit universities. In sports, Jesuit-educated leaders include Vince Lombardi, Bill Russell, Bob Cousy, Pete Rozelle, and Don Shula.

Finally, Jesuit-educated leaders in business have included John Paul Getty (founder of Getty Oil Company), Peter Lynch (Manager of the Fidelity Magellan Fund from 1977–1990), Joseph Berardino (former CEO of Arthur Anderson), Sabeer Bhatia (co-founder of Hotmail), Timothy Donahue (Executive Chairman of Sprint Nextel), Charles F. Dolan (founder of Cablevision), Maria Elena Lagomasino (CEO of JP Morgan Private Bank from 2001–2005), John Leahy (COO of Airbus), Mark Thompson (Director-General of the BBC), and Jim Whittaker (mountaineer, environmentalist, and former CEO of Recreational Equipment, Inc.).

Clearly, if Jesuit education can help develop leaders across these professions, it certainly can develop those who will address sustainability.

PRINCIPLED LEADERSHIP AND IGNATIAN TEACHING

As Dov Seidman pointed out in the World Economic Forum, “Leaders need to act with conviction founded on core values, because only principled, ethical leadership will survive the challenges ahead.” He noted six key principles of that leadership: ethics, the ability to stop and think, extend trust, embrace two way communications, demonstrate moral authority, and lead with a purpose (Seidman, 2015). Each one of these elements of leadership are within the core of a Jesuit business education.

Teaching ethics, first and foremost, is the core of every Jesuit university, and there is no doubt that ethics and moral standards are essential for effective leadership (Giles, 2016). Second, Seidman’s element of “stop and think” is found in Ignatian teaching as the element of reflection, one of the key elements of a Jesuit business education which is important not only for leadership but also for learning. Indeed, studies have shown that greater learning occurs when there is reflection and that actual experience adds to the learning when it is viewed through the reflective observations to “synthesize, abstract, and articulate” (Di Stefano, Gino, Pisano, & Staats, 2016). Such enhanced learning is key to effective leadership. As President John F. Kennedy stated, “Leadership and learning are indispensable to each other” (Kennedy, n.d.).

Finally, the concept of extending trust in principled leadership is rooted in the Ignatian concept of empowering others. Two-way

communications are the encouragement of dialogue within our business curriculums. Moral authority and purpose are found within our spiritual commitment, exercises, and discernment. Truly, the values necessary for principled leadership are clearly found within the Jesuit business school.

CONCLUSION

We have the ability in Jesuit business education to build, with Ignatian values, a leadership vision that transforms what seems impossible into the possible, one that brings forth inquiry, innovation, authenticity, self-awareness, and empowerment. Jesuit business education includes more than teaching profit and loss; it includes “moral and justice perspectives” (Delbecq, Cavanagh, Haughey, Hendrickson, Stebbins, & Winkler, 2010).

Jesuit business education is unique not only for its foundation on Ignatian principles but also in its ability to develop leadership characteristics through the focus on *cura personalis* and exercises such as *magis*. *Cura personalis* develops the humility, transparency, and trust that form the foundation of a true servant leader; *magis* teaches reflection, discernment, and spirituality, thereby developing the transformational elements of leadership. It is important that these elements of Jesuit education carry over into our business school teachings. Moreover, it should also be noted that solutions to environmental and sustainability issues will ultimately require global efforts. Our Jesuit business school network, which is global in reach, provides us a unique opportunity to develop this necessary leadership.

Finally, Jesuit business schools can clearly meet what Francis calls for in *Laudato Si'*—to fill in the gap within sustainability leadership. Jesuit education based on Ignatian principles, as shown above, teaches both the skills and characteristics necessary for transformational leadership. If we are truly committed to social and economic justice, then, we must include sustainability in Jesuit business education. It is a moral obligation.

As we move forward in the 21st century, we need to reflect on what has made Jesuit education historically successful for centuries throughout the world: “the theistic worldview of Ignatius, along with the synthesis of educational principles he drew from it” (Ganss, 1989). The principles of Ignatius still apply, and they allow us to develop transformational leaders. This “Ignatian Leadership,” in addition to giving us a “distinctive competence” in business education (Kim, Rivas, & Snodgrass, 2011), puts us in a unique position to solve, through the development of transformational leaders, complex global problems like sustainability in the 21st century.

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USING THE BUSINESS CLASSROOM TO HELP FE Y ALEGRÍA-BOLIVIA SCHOOLS WITH ANALYTICS AND PATTERN VISUALIZATION

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ABSTRACT. This article describes the analytical support a Saint Joseph's University (SJU) data mining class provided over the past three academic years to Fe y Alegría in Bolivia (FyAB), a Jesuit-sponsored institution dedicated to the education of the poor and looking for a feasible model that could help them identify which students and schools have the most need. SJU undergraduates, working without viable socio-economic household income information for each student in the database, had to be creative in assisting FyAB using only survey data provided by Bolivian school-age pupils. Working in consultation with FyAB school representatives, their goal for each iteration was twofold: 1) create a model that provides evidence, given current sample data, of the students most in need and 2) expand it for application across the larger population of FyAB schools. Such work exemplifies, as noted by Pope Francis in his encyclical *Laudato Si'* (2015), the importance of equality and justice in education as instruments toward sustainability. This article thus provides context for, and a historical background of, this ongoing initiative, and describes its specific characteristics. It reviews sequential cohorts of students by semester, how the requests, focus, and models evolved with new and changing issues, and concludes by sharing a system SJU students created in the fall of 2017—an innovative web-based and easily updated visualization tool that allows for very efficient examination of survey answers—to help make initial analyses easier for those looking to implement immediate student outreach initiatives in Bolivia.

KEYWORDS: social sustainability; education for the marginalized; data analysis for sustainability; data mining in education; data visualization for education; school education equality

INTRODUCTION

Fe y Alegría (FyA)¹ is a Jesuit-sponsored institution dedicated to educating the poorest of the poor in over 20 countries, mostly in Latin America. As Pope Francis states in his encyclical *Laudato Si'* (2015):

We have to realize that a true ecological approach always becomes a social approach; it must integrate questions of justice in debates on the environment, so as to hear both the cry of the earth and the cry of the poor. (Francis, 2015: #49)

¹Because Fe y Alegría's mission and work are present in over 20 countries worldwide (mostly in Latin America), we use FyA when referring to the broader Fe y Alegría federation and FyAB when referring to Fe y Alegría in the country of Bolivia.

We are faced not with two separate crises, one environmental and the other social, but rather with one complex crisis which is both social and environmental. Strategies for a solution demand an integrated approach to combating poverty, restoring dignity to the excluded, and at the same time protecting nature. (Francis, 2015: #139)

FyA's mission is also highly consistent with two of the United Nations' Sustainable Development Goals, namely Nos. 4 (Quality Education) and 10 (Reduced Inequality), and indirectly related to Nos. 1 (No Poverty) and 8 (Decent Work and Economic Growth).

This article describes the analytical support a data mining class from the Haub School at Saint Joseph's University (SJU) provided over the past three academic years to Fe y Alegría in Bolivia (FyAB). Indeed, despite the two institutions having had an ongoing partnership for over 15 years, the question of how to identify, from survey data alone, which early high-school students² are most impoverished was first brought into the SJU data mining classroom only in the fall of 2015. It was essential to identify and prioritize which students were in most economic need so that targeted and effective support could be provided given the limited availability of education support resources for helping students and teachers at FyAB. Undergraduate students, on the other hand, could also benefit from using data analytics in a real-world context and learn more about vastly different realities in the process. The initiative thus resulted in a discovery-based learning opportunity for undergraduate business students to address a real-world challenge with many potential benefits for the underserved.

The Bolivian Context

Bolivia is a landlocked developing country in South America with an estimated population of 11.1 million inhabitants as of 2017, a GDP of \$37.78 billion, and an area of 1,098,000 square kilometers. It has, broadly speaking, three geographic regions with very different climates and where different flora, fauna, and human adaptation factors have led to the development of very distinct autochthonous cultures over the centuries. Bolivia thus has the highest percentage of inhabitants with indigenous ethnicity (over 60%) among Latin American nations, and cultural plurality permeates Bolivian society to this day. With over three dozen native-American tribal nations represented, the most numerous being the Aymaras, the Quéchuas, and the Guaranis, the country's

²Specifically the third year of *la secundaria*, i.e., corresponding to high-school freshmen students in the United States.

official name is *Estado Plurinacional de Bolivia* (de Mesa, Gisbert, & Gisbert, 2008: 17, 43, 49). Cultural heritage is highly respected therefore, with a bilingual education that includes Spanish now a reality for many Quéchuan and Aymaran children. Pre-university level education includes two cycles, with the primary one encompassing six years of elementary school (ages 6–11) and the secondary cycle covering another six (ages 12–17). Yet while 92.5% of the mostly young Bolivian population is literate, and despite recent public initiatives having done much to improve education, the country still lags behind other South American nations according to most pedagogical metrics. Bolivia also has, despite recent improvement, very unequal income and wealth distribution, and while raw materials are plentiful given that the country exports mineral commodities including natural gas, crude oil, and tin, Bolivia's original inhabitants have seen the richness of their land being used to benefit outsiders ever since the discovery of the New World. Indeed, with roughly 40 percent of the population below the poverty line and despite the country's Gini index for distribution of family income having fallen from 0.60 to 0.47, Bolivia still exhibits extreme poverty (World Bank, 2018).

Fe y Alegría in Bolivia

Founded in 1955 in Caracas, Venezuela, Fe y Alegría (“Faith and Joy”) is a Jesuit-sponsored, not-for-profit organization focused on the education and development of the “poorest of the poor” in over 20 mostly Latin American countries but also including Chad, Madagascar, and Spain. Now headquartered in Bogotá, Colombia, FyA acts in each country through a small staff which leverages capabilities and resources across schools within the network to train and develop faculty members, work with individual school personnel in establishing and reaching aggressive goals, identify and develop best practices, and ensure that these are disseminated. In 2018, FyA schools numbered over 1,000 worldwide and reached over 500,000 students.

FyAB itself started in Bolivia in 1966 and is present in every Bolivian province (*departamento*), operating in a decentralized structure with departmental (provincial) directors who provide local leadership and a national office that coordinates nationwide support activities. Offering a wide range of educational services and now an integral part of the country's educational system, FyAB counts over 400 schools with more than 10,000 teachers and over 180,000 students in its care. The largest area, “formal education,” is where the organization oversees a network of elementary and secondary schools that also offer classes in the widely spoken Quéchua and Aymara indigenous languages. The local impact

of FyA is thus apparent because network schools, working in very harsh conditions, not only help individuals become fully integrated members of society with a deep appreciation and respect for their own culture and heritage but also foster a very strong sense of self-worth and local identity within the communities they serve.

The Fe y Alegría-Bolivia-Saint Joseph's University Partnership

The partnership between FyAB and SJU began over 15 years ago with the facilitation of an agreement between the Jesuit Provinces of Maryland and Bolivia to collaborate and share resources. In 2001, SJU staff conducted two exploratory visits to Bolivia and tangible steps were taken to initiate a joint collaboration that resulted in three initiatives: FyAB staff attending the English Services Center near SJU; periodic ten-day SJU faculty and staff immersion trips to Bolivia which were scheduled annually at first, subject to availability of funds; and SJU faculty-led workshops for FyAB. Indeed, while there had already been several faculty collaborations for the benefit of FyA, the first long-term community-engaged research project began after the 2008 faculty immersion trip and had examining school efficiencies as its objective (de Figueiredo & Marca Barrientos, 2012). The initiative described in this article took hold in 2015 and was followed by several other service-related in-class initiatives with Fe y Alegría.

The partnership has been able to grow over the years because a solid foundation of trust was gradually built. One factor contributing to this growth was a strengths-based approach where both parties endeavored to identify and recognize each other's abilities. A second factor was mutual respect for cultural characteristics, including the Bolivian culture's gift of focusing on the whole individual and therefore moving beyond the task at hand. A third factor was concerted mutual deference and curiosity which led to active listening and which in turn led to effective communication.

CONCEPT DEVELOPMENT

Identifying the Fe y Alegría Students Most in Need

Consistent with FyA's mission to provide educational support to those who need it most, FyAB focuses very much on obtaining reliable data as exemplified by surveys that students periodically fill out. They were thus searching in 2015 for a way to identify, through survey data alone, students who were most in need of outreach efforts, i.e., those whose families, unbeknownst to their teachers, might be in a difficult

socio-economic condition and who were most at risk therefore of not finishing their studies. The outreach efforts occur on an individualized basis and involve several fronts, e.g., making specific efforts to help prevent dropping out, offering special courses on practical skills such as waitressing and basic mechanics, and organizing special initiatives such as introductions to entrepreneurship. FyAB also hopes to identify students with difficult personal situations as early as possible because older students' families tend to be less involved in education.

The Benefits of Using Real-Case Data

Moore and Roberts (1989) initiated work on the merits of teaching "data-driven" courses where the main goal, in the hopes of stimulating discussion and development of statistical techniques, is to lead the class in identifying questions and analyses arising from a set of data that is intrinsically interesting or relevant to the students. In this case, therefore, it is important to identify those most in need. Using household surveys, moreover, had become an increasingly important means of measuring poverty and well-being around the world (Deaton, 2003), with student surveys in particular providing important information in which qualitative answer categories are frequently reverted to a Likert scale, thereby allowing for quantitative data analysis. Likert-type questions are often used when the goal is to identify extremes (extreme poverty in this case) while cluster analysis initiates segregation of the objects being studied (Allen & Seaman, 2007).

In light of this, a business data mining course created in 2015 had 70% of its classroom time follow a traditional learning model while the remainder was devoted to raw data sets which students were expected to draw conclusions from and provide clear reports on in a short period of time (about 1 to 48 hours, depending on the case). Student teams in each class were in effect acting as pro-bono consultants for FyAB.

The data shared in the case of the FyAB project provided SJU students with a window into a vastly different reality: one of scarce resources and urgent needs. Initiation into a culture different from their own became a mind-broadening experience that increased their engagement and emotional attachment, leading them to build on the cohorts' analyses of prior terms and creatively add value in innovative ways. This has resulted in a virtuous cycle over the semesters, with every term culminating in the presentation of new approaches for identifying the most impoverished students in the Bolivian schools surveyed and allowing FyAB schools to provide targeted support. Thus, what began as an analysis of two FyAB schools in the city of Potosí evolved into an examination of institutions

across different regions of the country and later incorporated schools outside the FyAB network.

The objectives and key results over the course of this analysis have been moving targets, however, much like in the real world where data might not exist at a fixed moment in time (Baumer, 2015). Like a practicing statistician, the lion's share of the time spent on this project was devoted to data cleaning and manipulation (or data wrangling, as it is often called [Kandel et al., 2011]) with less given for conclusions and next steps. Measurement in terms of feedback was necessary, however, for recognizing whether or not what had been done in the past should be used going forward. On this point, then, there were three instances when we stopped to make sure we were moving in the correct direction. After the first data set was analyzed, a list of identified students was shared back with the school where the data was collected from. Faculty confirmed that those on it were indeed very needy, yet many of them, however, had already dropped out during the 18-month lag time between data collection and analysis. In the second data set, a large portion of students came from a similar school and so a shop was immediately implemented to help both the school and the students identified hence. Finally, in the third data set, students identified which among the schools that were requesting for inclusion into the FyA system would benefit the most from it.

The business undergraduate students' contributions, in the meantime, grew in areas that are not as easy to measure, including survey question suggestion (something these students would not usually research and learn) and advanced pattern visualization techniques (which "pushes" them beyond simple bar graphs and into data story-telling). SJU students also suggested, as described below, the inclusion of additional questions to help increase the response accuracy and reliability of the surveys which originally included 22 multiple-choice questions. The entire experience thus led to deeper student involvement and a broadening of impact.

METHODOLOGY

The Process: Data Analysis Consulting

One major (and often overlooked) component of data analysis that is vital when working with real data is the consultative process itself. While the goal is for students to be comfortable diving into any data set, the reality is that those providing the data (e.g., the end-users, the "clients") usually have more familiarity and a better base knowledge of the material. Their proximity to the raw data can be a double-edged

sword, however, as they might be used to looking at it in a given way and therefore miss innovative angles or perspectives with which to proceed. In other words, they do not know what they do not know. The ability to ask the right question, then, and even to explore others becomes an important skill that all good analysts need especially in situations like these. Phases important to the process as such can be seen in Figure 1.

Coming in contact with the data. To develop the ability to “think outside the box” and stimulate creativity in problem-solving, students examining raw data for the first time are encouraged to dive in and, within an hour’s time, share with the class what they may have found, i.e., to discover anything interesting that the data might be able to tell them. Students will ideally take a moment or two to familiarize themselves with the survey (see Appendix A1) as well as with any goal that the stakeholder puts forth before taking this “dive,” although they usually have some interesting insights and invariably many questions by the end of the hour. It is at this point that students become intrigued by the FyAB context and spend time learning more about Bolivia and FyA’s work, answering some of the overarching questions in the process. Remaining questions are posed to Miguel Angel Marca Barrientos, national advisor for general education for FyAB, often via live Skype chat in class.

Understanding the stakeholder and engaging with the issue. Students gradually deepen their understanding of the data over the succeeding weeks and begin to perceive the bigger picture of what FyAB is trying to accomplish with this effort. They begin to appreciate and understand the FyAB students whom they are analyzing and become familiar with the regions in Bolivia where the schools are located through articles, the Internet, discussion boards, and communication with Miguel and others who may have also been in the country.

Using data analysis techniques. This corresponds to the period when students are applying statistical techniques as enumerated in Figure 1, tools that are integral to the data mining course (such as ANOVA, PCA, cluster analysis, etc.), and bridging the conceptual models with a real case which they are able to not only envision but also emotionally commit to. Prior to the final analysis, the students work together as a class to clean the data set by way of class consensus where they debate whether or not to impute a value or delete a question or student response based on missing data.

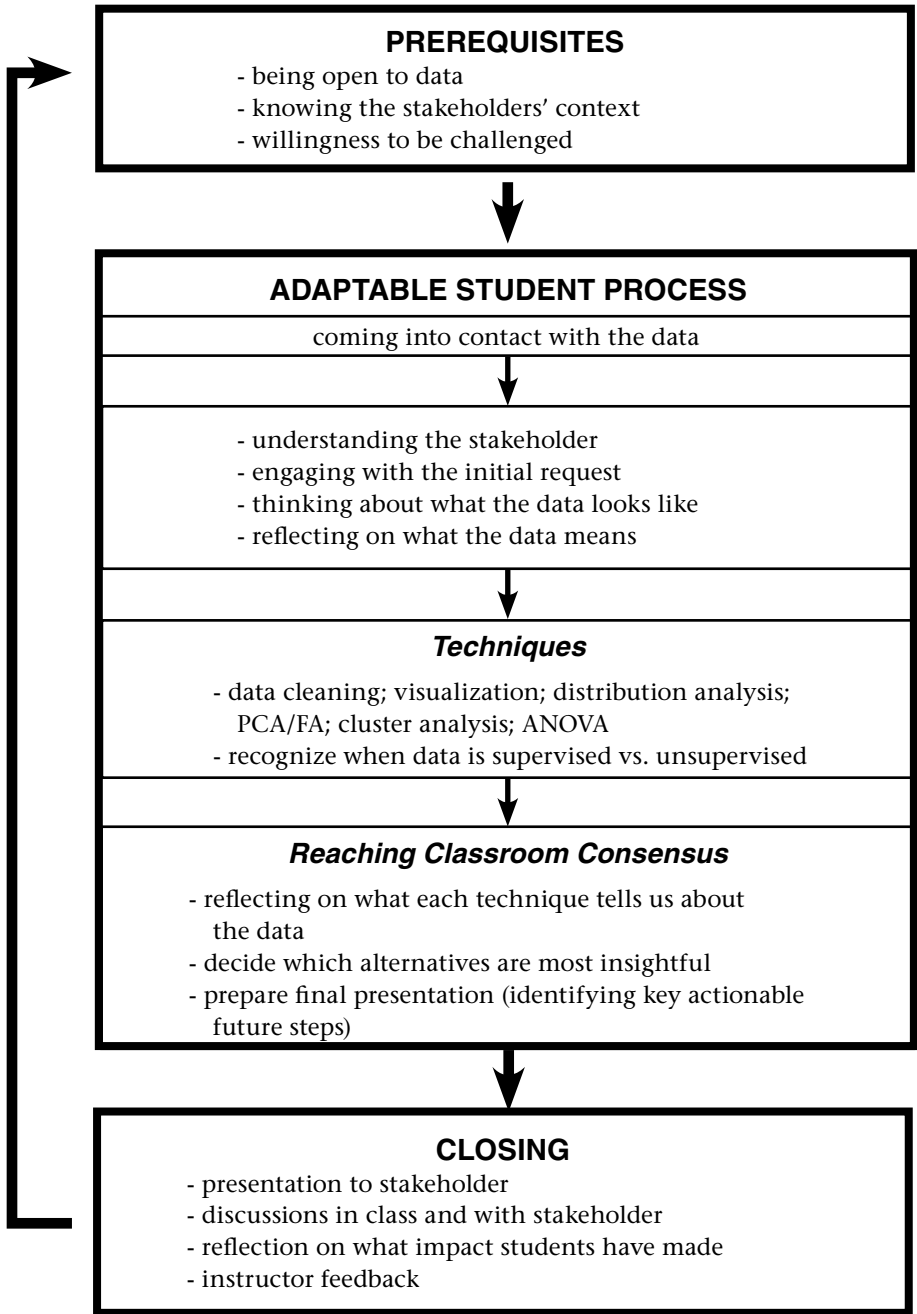


Figure 1: Consulting process applied in this data analysis effort.

Reaching classroom consensus. The objective at this point is for the class to reach agreement on which one among the data sets is to be analyzed. This is because while each team started out with the same raw data, each cleaned it in a different way and therefore performed analyses that produced slightly different results. Once students agree on a final data set, they are given two days to come up with a final analysis and presentation which they share live, translated in real-time, with FyAB on Skype. It is a consultative process that has evolved since its first iteration in the fall of 2015 and has been applied in each succeeding iteration, for while FyAB's specific questions and goals have changed slightly over time, their main objective of identifying students with the highest socio-economic need from survey data alone has remained the same.

Examples of Impact

In this subsection, we briefly consider impact related directly to activities done within the schools in Bolivia and look at some reflections from the students who ran the analysis at SJU.

Impact on FyAB. As mentioned earlier, the application of this FyAB-SJU initiative has focused mostly on the analysis of surveys filled out by students in the third and fourth years of *la secundaria*. This faces some challenges. First, families in Bolivia tend to not be directly involved with their children's school work at this level (as opposed to lower school, for instance, where family involvement is intense and indeed a prerequisite for FyA participation). This lack of involvement means school officials may not have relevant information about the socio-economic condition of individual students. Second, students in adolescence may be reluctant to provide fully accurate information in a survey for various personal reasons (including, perhaps, feelings of inadequacy), making data analysis (cross-checking different responses in the same survey, for example) even more important. Third, the main objective of the effort is to provide outreach and individual support within enough time to make a difference. Given, therefore, that most of the FyAB high school students in unfavorable socio-economic conditions will likely find themselves unable to go to college upon graduation, it is important to identify those in need who still have one or two more years of high-school instruction ahead so their learning can be tailored appropriately.

Depending on the school, FyAB has several programs in place that provide support for students with the most socio-economic need. In the schools of Sucre and Potosi, for example, selected students were prioritized for training and entrepreneurship initiatives under the

assumption that these would be helpful for them should they be unable to go to college. These included both basic training for school and job training in areas such as bakery, cooking, basic electrical installation, and various forms of retail selling. One school, for instance, set up a small taco-vending operation to serve as a training ground for their students. Such initiatives are indeed helpful not only because of the specific skill training provided but also because students become involved, usually for the first time, with entrepreneurial opportunities in the process.

Impact on SJU Students. Methods for assessing the direct impact on SJU students are still being developed for future cohorts. We do, however, collect reflections from students throughout the duration of the course and, in this case, at the end of each phase of the project.

ANALYSES AND FINDINGS

To give a sequential view of the ongoing process and share, by semester, the analyses considered, relationship flow, successes, and next steps, the in-class analyses conducted by SJU undergraduate business students in response to the original FyAB inquiry is presented in chronological order below.

Data Set 1 (Fall Semester, 2015; four schools in Potosí, with 272 student responses before data cleaning and 261 after). A data mining class of SJU students was asked to help assess a simple two-part question posed by Miguel Marca Barrientos:

1. What was the meaning of the principal component analysis/factor analysis (PCA/FA) output which an outside source had generated for him?
2. Could the coefficients from said analysis be applied as weights to produce a meaningful measure that might be indicative of poverty for each student (poverty score)?

The class, working through the PCA and FA topics, collectively decided to focus on the first question as a real-world example of survey analysis. They met with FyAB via Skype to identify the most important variables and discussed how these might be formed into factors—the very goal of PCA/FA. Nevertheless, while this provided insight into the analysis that Miguel had in hand, it did not help answer the more important question of how to create a predictive model for identifying poverty or helping in any way in the partitioning of the FyAB students.

The SJU students then continued working through the analysis in an attempt to help with the second question, leading them to the use of data mining to address social issues. They created a poverty model with insights and results that were presented to Miguel at the end of the semester. PCA/FA analysis was performed after the data was first cleaned (which led to 11 students being dropped), thereby allowing for data reduction and refined independent variables. Cluster analysis was then applied to partition the 261 remaining students into subgroups of similar attributes to help identify those most in need; the class eventually settled on using eight clusters along with a preset goal of identifying the bottom 25% of the most impoverished individuals. The SJU students expected at first that creating more clusters would result in more equal partitioning and a clearer way to observe the requested threshold of 25%. Two very large clusters, however, remained unchanged even as more clusters were made; the smaller clusters, in the meantime, continued to break down into smaller and smaller partitions, thereby clarifying the groups so identified (e.g., one cluster lacking water or another lacking electricity). Such resulting uneven partitions thus made the original request to identify the bottom 25% more elusive.

The class ranked the clusters in order using key “poverty” features as defined by the United Nations based on some key questions concerning food, shelter, electricity, water, and parents’ work. Using this logic, the analysis identified the 23 most impoverished students (bottom 9%), i.e., those who lacked the basic necessities of food, electricity, or water. The cluster next most in need identified 36 students (moderately low 13.8%) who had 2.28 meals a day on average, no meal before school, and whose fathers were less educated and less likely to work a full five days in each given week.

At this point, the class was able to provide initial identification of students most in need according to school and name. It is important to note, however, that the data was collected two years before (in 2013). As such, while teachers in the respective schools confirmed that a majority of the students identified in the cluster analysis were indeed the most impoverished, many had already dropped out or graduated.

The successes of Data Set 1 included data cleaning, integrity, PCA and FA, cluster analysis, achievement of initial concepts, and proper student identification. More work needed to be done, namely, the use of simpler cluster techniques and creation of a usable predictive model.

Data Set 2 (Spring Semester, 2016 to Spring Semester, 2017; six schools in Potosí and Sucre, with 838 student responses before data cleaning and 731 after). This data set, with its techniques and conclusions advancing

due to continuous analysis improvement and tool fine-tuning, was used from Spring 2016 through Spring 2017. Until it arrived, however, the class focused on the previous 261-student Data Set 1 for the first half of the semester.

The new data set required intense cleaning, eventually dropping 107 responses due to missing or invalid answers. The class also read up on the two Bolivian regions as they cleaned the data and provided suggestions on how to adapt questions to get more useful insights; these were considered and implemented in subsequent surveys.

Correlations were checked once the data was cleaned, revealing what seemed to be mild correlation (.54) between two variables (mothers' and fathers' education levels). As with previous data, PCA/FA was also run, generating results that were similar to those of the first data set, and used once again for reducing variables and identifying which survey questions would be considered in running the cluster analysis. The class tried several iterations of cluster analysis; they eventually chose eight clusters from which 38 of the most impoverished Bolivian students were identified and immediately made known to FyAB.

School	# of students from school	% of students from school
Luis Espinal Camps	17	11
Gualberto Paredes	6	7
Sagrada Familia	5	4
Loyola de Fe Y Alegría B	4	2
Jose Maria Valez	4	4
Fray Vicente Bernedo B	2	2

Table 1: Counts and percentage of students in-need by school.

A new application was then considered with this second data set. The 38 students so identified were assigned a binary dependent value of "1" which indicated poverty while the remaining students were assigned a value of "0" which indicated a less impoverished status. The class then attempted to generate a logistic regression using this newly created binary dependent variable. Such a model would help identify weighted averages that might be applicable for future survey-based data sets, although with fewer than 5% of students coded as "1" for impoverished, it was less accurate due to the small sample bias in the logistic model's maximum likelihood estimation (Allison, 2012). The attempt to obtain a logistic regression needed further investigation, therefore, to ensure model accuracy.

The successes during this term included data cleaning and integrity, PCA and FA, cluster analysis, and creation of an initial dependent variable. More work needed to be done on the number of most impoverished students so identified (38 was too small) and the predictive model relied heavily on two survey questions, namely, about electricity and water.

Fall 2016. In the Fall semester of 2016, the class embraced a major change that was prompted by one group who decided to pre-partition a subset of the data. This group classified any Bolivian student as impoverished if they responded that they were without electricity or water. Once classified as such, these respondents were removed from the data set, thereby allowing for the clustering technique to be applied to the remaining 693 students.

After this revised data set was partitioned, the number of impoverished students so identified increased to a total of 69 (9%), nearly doubling the previous number of students identified as such. This change thus helped to create a slightly better logistic model that could feasibly be applied to survey collection and data analysis in the future. Indeed, while the new dependent variable produced a feasible model, logistic models do not have easily identifiable weights; some care about the magnitude of the effect, for example, while others about the magnitude of the odds ratios, yet both are easy to misinterpret (Norton & Dowd, 2018). However, despite the challenges of interpreting the outputs in layman's terms, this was the first time a reasonable model was created. The results were thus shared with Miguel with the goal of producing coefficients for future survey applications.

The successes during this term included data cleaning and integrity, PCA and FA, cluster analysis, creation of an initial dependent variable, identification of a larger sample, and creation of a decent logistic model. More work needed to be done on the number of most impoverished students so identified (69 was still small) and the creation of a continuous dependent variable.

Spring 2017. Two major changes occurred during this term. First, a class of graduate students, in addition to two undergraduate classes, was invited to analyze the data. Second, a resampling method called bootstrapping was considered in this iteration in an attempt to create a continuous dependent variable, i.e., once all the initial steps of cleaning the data and reducing the independent variables (survey questions) through PCA/FA were successful, cluster analysis could be applied using simulated samples from within the survey to try and make estimates about the student population in FyAB. The technique is often useful

for analyzing small, expensive-to-collect data sets for which prior information is sparse, distributional assumptions are unclear, and further data may be difficult to acquire (Henderson, 2005). In this case, no prior data was available, the data was unsupervised, and we had already established a viable method for model-creation that needed verification.

After SJU students performed the initial data cleaning and reduction, smaller subsets (about 25%) of the larger data set were chosen at random. These subsets were run through cluster analysis by hand (using four clusters typically) and each cluster was ranked according to need based on the averages of responses to questions being considered. Here the two undergraduate classes noticed, on their part, that the rankings naturally followed an ordered pattern that most often depended on the number of meals the students consumed on a daily basis, i.e., having fewer meals was typically consistent with the group considered most impoverished. Working in groups (with each group running an iteration), the SJU students also assigned a value for the FyAB students within each cluster once the rankings were put in order. Thus, due to random generation and 20 separate groups running the analysis, each Bolivian student was chosen multiple times and assigned a ranked cluster value between 1 (most in need) and 4 (least in need) each time they were chosen for an iteration. The classes averaged these recorded values to see if a continuous variable might be created according to which each student might be attributed a continuous value (between 1 to 4 inclusive).

The graduate students, working separately in the meantime, came to a similar conclusion. Having written a program in R that was simulated 10,000 times, this group recognized that true bootstrapping required resampling to be done thousands of times over to assure the most appropriate results. Each time a sample was taken, a cluster value was recorded for each FyAB student (resulting in approximately 2,000 values assigned to each); these values were then averaged out, creating a feasible continuous dependent variable ranging from 1 to 4 inclusive. In this way, a multiple linear regression, by possibly identifying weights applied to questions, became a feasible option for getting a poverty value. A distribution of this continuous dependent variable revealed clear partitions of students, with the lowest section ($y\text{-value} \leq 2.3$) assigned a value of one for impoverished and the remaining students given a value of zero indicating less impoverished (see Figure 2). Both logistic and multiple regression models thus became available at this point in time for SJU students to use as feasible methodologies for evaluating the data in view of the ideal scenario: generating a model with viable weights that FyAB can apply to future student responses to identify those who might be the most in need.

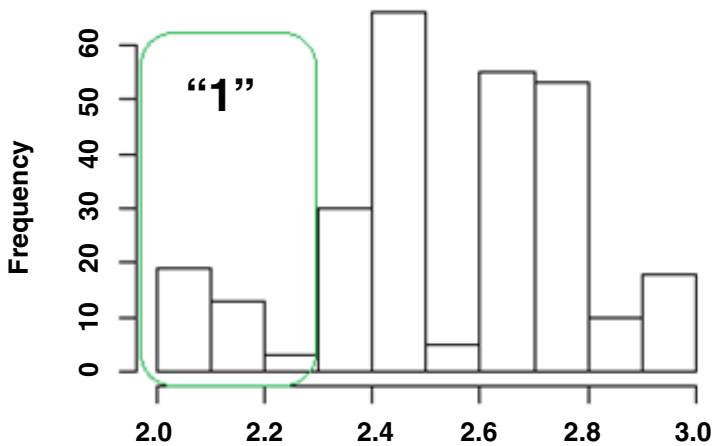


Figure 2: Distribution of dependent averages after bootstrapping is applied.

Two reasonable and useful models, then, were created during this term, yet more work on the use of other data samples needed to be done to verify the process. This was carried out over the summer to assess the most viable cluster size and best model. A more advanced R program was thus created that could be applied to this data set and to future survey results, thereby providing an open source code and model which could be used by FyAB and others who might give similar surveys (Garwood & Dhobale, 2018).

Data Set 3 (18 to 32 students from each of eight schools in various regions of Bolivia, totaling 204 responses before data cleaning). This final data set was dramatically different from previous ones—student names were not provided, the schools included were not part of the FyAB network at that time, and many students left blank answers. The underlying question/goal here was noticeably different, namely, to identify schools with students similar to those within FyAB, assuming perhaps that these schools might be interested in being adopted by the FyA administration.

Fall 2017. While waiting for access to Data Set 3, the students considered Data Set 2 for the first iteration of the project. They were asked to clean and organize the data as well as analyze it for insights and anomalies. One group proposed a dashboard that could filter through all the responses based on eight questions that provided an overall visual of the data. A filter applied to as little as one or two questions, for instance, could produce a list of students who could be high in need, with the resulting visual dashboard narrowing down to those students falling within a need category based on the filter(s) chosen. Possible responses for each question were color-coded in red (likely impoverished), yellow

(possibly impoverished), and green (less likely impoverished) to indicate a different need level for those filtered in each. Indeed, while such a method does not undergo the statistical processes required to make a model, it is useful for immediate visualization and was shared with FyAB soon after its creation. This tool can be updated with new data easily and efficiently and provides immediate poverty insights to FyAB. A grayscale snapshot of this dashboard is shown in Figure 3; immediate access to the live version is available at <https://public.tableau.com/profile/hayley.miles#!/vizhome/FeYAlegría/Dashboard1>.

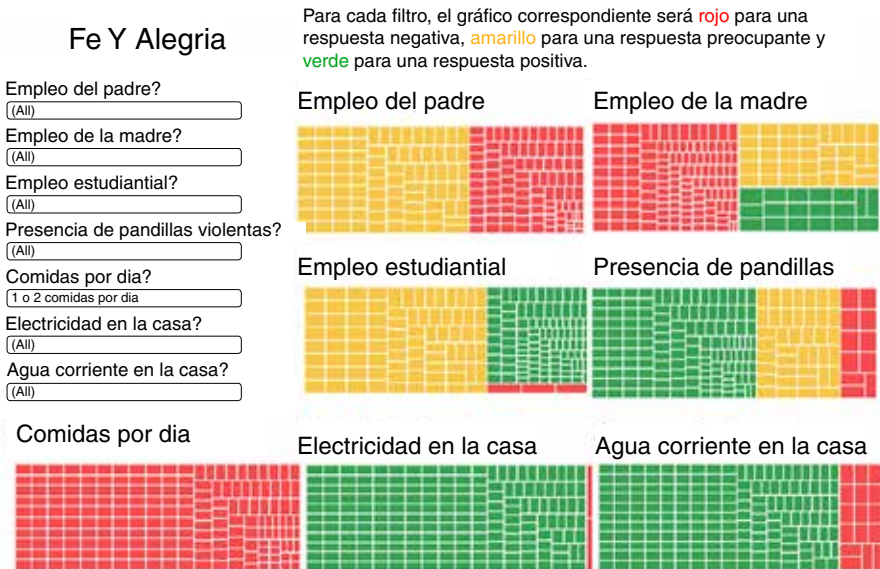


Figure 3: Visualization of students by need, with drop down choices on student employment, parents' work, food, number of rooms, and electricity. Choosing different responses presents how each student answered.

Once the students had familiarized themselves with FyAB, they were asked to compare Data Set 2 with the new and very different Data Set 3, with one objective proposed to the class being to advise FyAB as to how the two data sets compared to one another and see if any patterns existed. The students thus ran analyses of variance in an effort to identify any schools in the 2017 data that aligned more closely with those in the 2016 set, i.e., that seem to have similar students. All the schools were also analyzed as one whole in an effort to identify the 25% most impoverished students overall. Similar to the analysis conducted in the previous semester, the students ran PCA/FA to identify the characteristics that provided the most variability and isolate clusters of impoverished students. Finally, efforts were made to identify the schools the students came from (school) and who the students were (according to student names for the 2016 data and student numbers for the 2017 set).

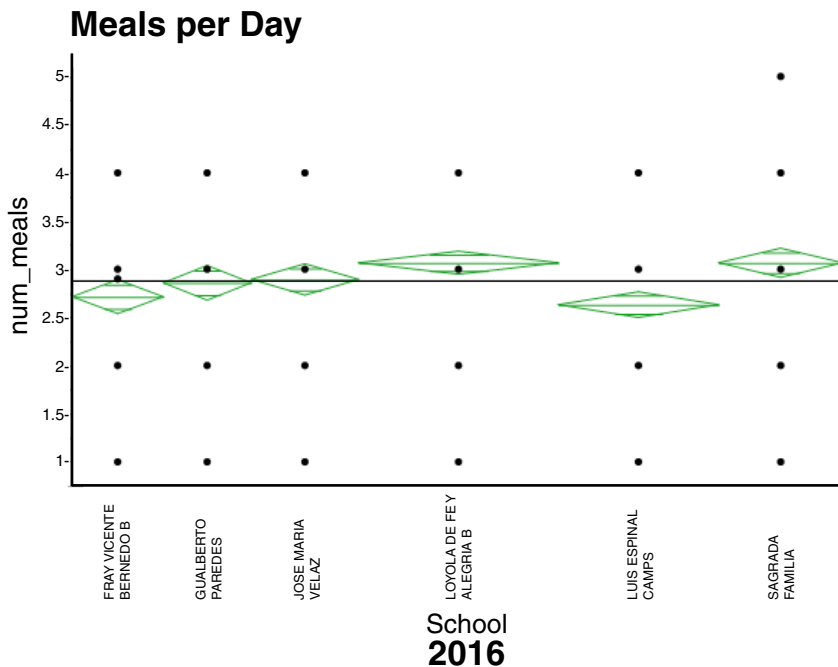


Figure 4a: ANOVA of the number of meals per day by school, showing 2016 data. The majority of students for both years did answer that they ate three meals per day. Note that Fray Vicente Bernedo B and Luis Espinal Camps had a larger portion of students with fewer than three meals a day and are the focus of the 2016 data.

As an example of the ANOVA used to identify students in need, the average number of meals per day by data set (see Figures 4a and 4b) was analyzed. This produced evidence of students in two schools within each data set who receive less than the primary average of three meals a day.

The overall analysis thus provided early insights into patterns as well as a recommendation to FyAB regarding which schools in Data Set 3 seemed to have the most need and how these schools compared with currently known FyAB schools.

The successes during this term included adapting to new and different data and identifying similar schools across data sets. More work needs to be done, however, in creating a poverty index that can help find schools most in need given only small samples and a lack of names.

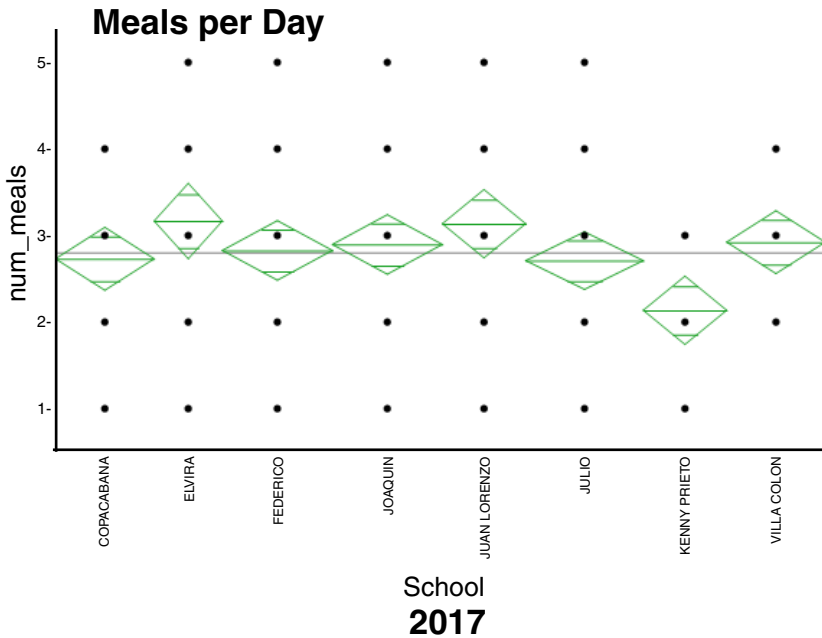


Figure 4b: ANOVA of the number of meals per day by school, showing 2017 data. The three schools that should be the focus for 2017 due to the larger portion of their students having less than three meals per day are Copacabana (Virgin de Copacabana), Julio (De Julio B Senakata), and Kenny Prieto.

Tableau Dashboard: An Expanded Example of Students Moving the Project Forward

When the class created the original Tableau dashboard, it contained tree maps partitioned by eight separate questions. A tree map is a space-constrained diagram (visualization) of a hierarchical structure which uses an enclosure to visualize trees as well as size and color coding to map sub-trees onto a sequence of nested rectangular areas (Shneiderman & Wattenberg, 2001). Survey respondents were thus easily compared to one another by nesting the data into separate categories (eight in this case) and coloring the level of poverty based on answers to the survey questions. The visual also allowed for quick interpretation regarding their level of need—dropdown menus at the top of the dashboard contained filters that partitioned these tree maps and allowed for a user-friendly and interactive experience while the color-coding of responses visually articulated each student's need environment.

The questions used in the original Tableau dashboard can be seen in Table 2. To ensure a more successful final product that could be shared

within FyAB, several improvements were suggested, including increased participant confidentiality, translation of materials into Spanish, and categorization of answers based on need.

1	How many meals per day do you eat?
2	Is there running water in your house (do you have access to potable water)?
3	How many people sleep in your bedroom?
4	Is there a shower in your house?
5	Which one of the following groups best fits your mother's current work situation?
6	Which one of the following groups best fits your father's current work situation?
7	Does your house have electricity?
8	Do you work and get paid for it?

Table 2: Questions used in the original Tableau dashboard.

Confidentiality is critical to a shared dashboard. In the original version of this one, each cell represented a student and displayed that student's name as the user hovered over it. To update the initial dashboard, then, the first element that needed to be rectified was the confidentiality of the participants. Second, the original dashboard was in English but needed to be in Spanish as the main users are Spanish speakers. Third, only one question was partitioned into three categories even though color-coding was a success of the original data compilation. The three-level scale was thus adopted for all questions that had three or more responses to reduce polarization among the survey questions.

The privacy of participants was protected by adapting each tree map to include alternate identifiers for both school and student names. To create the identifier codes for the school names, a three letter acronym for each school was created as shown in Table 3. Each student was then assigned an identifying number, with the first on the list of each school assigned 001, the second 002, and so on in increments of 1. The school and student identifiers were then concatenated to form confidential and unique student ID numbers that retained regional information. This list can thus be supplied to users who need to decode a student ID and identify the original student.

Code	School Name
FVB	FRAY VICENTE BERNEDO B
GBP	GUALBERTO PAREDES
JMV	JOSE MARIA VELAZ
LEC	LUIS ESPINAL CAMPS
LFA	LOYOLA DE FE Y ALEGRÍA B
SAF	SAGRADA FAMILIA

Table 3: Codes given to each school used in the tree diagram.

The survey originally came to the schools in Spanish and was translated into English for the use of the data mining students. For the dashboard to be efficient and user-friendly, however, it had to be translated from English to Spanish to allow for ease of use at FyAB. Once this was achieved, the questions to be used were discussed with Miguel and a final dashboard was created. These questions in the final Tableau dashboard can be seen in Table 4. Although the survey asked about the highest education level achieved by the mother and father, SJU students elected to include their employment status in the dashboard as that more directly reflects how the respondent is being provided for. These two questions, combined with the students' need to work, deliver to the user an idea of the financial situation of the respondent's family that is consistent with the United Nations' definition of poverty (United Nations, 1995: 6–12).

1	How many meals per day do you eat?
2	Is there running water in your house (do you have access to potable water)?
3	Which one of the following groups best fits your mother's current work situation?
4	Which one of the following groups best fits your father's current work situation?
5	Does your house have electricity?
6	Do you work and get paid for it?
7	Are there any violent gangs in your neighborhood or school?

Table 4: Questions used in the final Tableau dashboard.

The survey given to students also offered multiple choice questions with possible answers that ranged from 1 to 2 for yes/no queries and 1 to 4 or 1 to 5 when multiple individual responses were an option. Most responses to each question considered were grouped into three color categories: green, yellow, and red, indicating a low, medium, and high level

of need, respectively. There was no corresponding medium or intermediate need (yellow) category in the case of two-answer (yes/no) questions. Table 5 provides an example of how the questions were color-coded for the tree maps and indicates how answers were categorized by needs.

<i>Are there any violent gangs in your neighborhood or school?</i>		
Provided Answers	Need Base	Color
There aren't any gangs. Neither at school nor in my neighborhood.	Low Need	Green
There are gangs in my neighborhood, but they do not come close to school.	Low Need	Green
When I come to school or go home I see gangs.	Medium Need	Yellow
There are gangs at my school.	High Need	Red
Some of my friends are part of a gang.	High Need	Red

Table 5: Responses to gang question and how these were color coded.

By translating the dashboard back into Spanish, adjusting the confidentiality of respondents, and altering how the information is presented, the final product became a user-friendly and informative dashboard. As more data is collected over time, this tool will be helpful in identifying broader trends (such as per region and per school) and a surface level of socio-economic well-being among FyAB students. It is easily adaptable as new data comes in, and can be changed if new or different questions become significant in poverty identification. Since the tool is web-based, it can feasibly be implemented on a broader scale and shared with school officials quickly and easily as other schools in Bolivia continue to collect data. The impact over the long term can thus help with an immediate overview of potential student need.

Impact on SJU Students

The following are student testimonials representing qualitative examples of impact.

From this experience, we have not only learned to improve upon our skills, but how we may also make use of them to help others. So many groups took a unique approach to dissecting this issue and with such a wide array of perspectives, I really feel as though we have taken the first step to alleviating this problem. It is remarkable how by using just a few tools: data, software, and our minds, we were able to help in making a difference in someone's life. (Student A from Spring 2017, after Phase 1 [data dive])

When combined with insights based on relationships, insights from this data could be used to alleviate some basic needs of children and families in the area. I believe that education is one pathway to break the cycle of injustice or poverty. By identifying students to target and programs to implement, students may be able to focus more on their education and ultimately have more of a fighting chance in this world. (Student B from Fall 2017, after Phase 1 [data dive])

The final presentation was overall very rewarding because it did show that Miguel had the potential to use our findings to better the lives of some of the children in Bolivia. This was definitely the most fascinating and most rewarding project that I have participated in during my time at St. Joe's. (Student C from Fall 2016, after Phase 2 [Final Presentation])

CONCLUSION

Fe y Alegría's mission of serving the poorest of the poor through education is one of the most eloquent examples of social sustainability as idealized by Francis and outlined in the United Nations' Sustainable Development Goals. This article describes a model that shows how this social aspect of sustainability can be embedded in the learning and practice of undergraduate business students, a model that integrates the application of statistical analysis techniques in support of Jesuit mission objectives while engaging undergraduate business students in imparting values of community stewardship, global citizenship, and social responsibility.

Having provided analytical support over the past three academic years to Fe y Alegría in Bolivia, the efforts of a data mining class' cohorts at the Haub School of Saint Joseph's University have led to a process of identifying, from survey data alone, which early high school (*la secundaria*) students are most impoverished so that support efforts can be targeted sooner rather than later to those most in need. There were changes in approach, analysis, and instruction as more data and new questions arose, and the initiatives led to an innovative, web-based Tableau dashboard visualization tool which allows for very efficient examination of survey answers and updates as new data is gathered. Indeed, such outcomes contribute to FyAB's mission while engaging students and faculty at the Haub School of SJU in this important social-sustainability work.

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We would like to acknowledge with sincere gratitude the help and guidance provided by the Managing Editor who took time to engage with our paper and authors.

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APPENDIX A1: 32-question survey given by FyAB, filled out by students in the third and fourth years of *la secundaria*, and analyzed by SJU students throughout this ongoing project.

Context Analysis. Carefully read the following instructions before answering this questionnaire. *IMPORTANT: DO NOT WRITE ANYTHING HERE, USE THE ANSWER SHEET.*

- Now we will ask you to answer some questions regarding your home and your life.
 - This is not a test/exam: if you do not understand a question or if you are not sure about what to answer, you can ask your professor/teacher.
 - Please be as honest as possible when answering this questionnaire. None of your answers will be made public.
 - Use the answer sheet to indicate the number that corresponds to the answer you selected.
1. How present and involved is your father in daily life in your home?
 - 1) Deceased
 - 2) Not present in the house
 - 3) Little or nothing present / involved
 - 4) Present / involved sometimes
 - 5) Always present and very involved
 2. What is the highest level of education achieved by your father (or guardian if you do not live with your father)?
 - 1) Does not know how to write or read
 - 2) Finished primary school then stopped studying
 - 3) Some high school education but no diploma
 - 4) Finished high school education and has a diploma
 - 5) At least some college education (not necessarily with a degree)
 3. Which one of the following groups best fits your father's (or guardian's if you do not live with your father) current work situation?
 - 1) Does not work (either physically/mentally unable or just unemployed)
 - 2) Holds an occasional/temporary job in agriculture, construction, cleaning, security, etc., or he performs self-sustaining agriculture; works as a domestic employee; or does partial jobs that may come up

- 3) Works a salary job in a store, office, workshop, the army/police, agriculture, or as an independent driver
 - 4) Owns a store or a workshop with less than ten employees; is an office or a store manager; works independently performing specific jobs; is a teacher; holds a high position in the army/police; or is a farmer who owns the land where he works and sells what he plants
 - 5) Is the owner or general manager of a business with more than ten employees; is a government official or an army general; or holds a profession as an architect, doctor, lawyer, etc.
4. How present and involved is your mother in daily life in your home?
- 1) Deceased
 - 2) Not present in the house
 - 3) Little or nothing present / involved
 - 4) Present / involved sometimes
 - 5) Always present and very involved
5. What is the highest level of education achieved by your mother (or guardian if you do not live with your mother)?
- 1) Does not know how to write or read
 - 2) Finished primary school then stopped studying
 - 3) Some high school education but no diploma
 - 4) Finished high school education and has a diploma
 - 5) At least some college education (not necessarily with a degree)
6. Which one of the following groups best fits your mother's (or guardian's if you do not live with your mother) current work situation?
- 1) Is physically/mentally disabled to work or only performs domestic labor
 - 2) Works as a domestic employee, or holds a temporary position with no salary
 - 3) Works independently and/or has a stable job in a store, workshop, or business/office
 - 4) Works as a teacher or nurse, or is the owner or general manager of a small business or workshop with less than ten employees
 - 5) Is the owner or general manager of a business with more than ten employees; is a government official or an army general; or holds a profession as an architect, doctor, lawyer, etc.

7. How many rooms does your household/residence have (including living room, dining room, bathroom, and kitchen)? Do not include back or front yards, or any other exterior properties.
 - 1) One common room for everything
 - 2) Two
 - 3) Three
 - 4) Four
 - 5) Five or more
8. How many people live in your household (including you)?
 - 1) Three or less
 - 2) Four or five
 - 3) Six or seven
 - 4) Eight or nine
 - 5) Ten or more
9. Is there running water in your house (do you have access to potable water)?
 - 1) Yes
 - 2) No
10. Which family members do you live with?
 - 1) I live with my mom and dad (including siblings, grandparents, and other relatives).
 - 2) I live with only one of my parents (including siblings, grandparents, and other relatives).
 - 3) I do not live with my parents. Instead, I live with my grandparents or my aunt/uncle (including siblings and other relatives).
 - 4) I live with my siblings only or with other relatives who are not my parents, grandparents, aunt, or uncle.
 - 5) I live with a family different than mine.
11. How many people sleep in your room?
 - 1) No one else (I sleep by myself)
 - 2) One or two more people (two to three people in total)
 - 3) Three or four more people (four to five people in total)
 - 4) Five or six more people (six to seven people total)
 - 5) More than seven people total

12. How many meals per day do you eat?
 - 1) One
 - 2) Two
 - 3) Three
 - 4) Four

13. Do you have breakfast or lunch before going to school?
 - 1) Yes
 - 2) No

14. Is there a shower in your house?
 - 1) Yes
 - 2) No

15. Does your house have electricity?
 - 1) Yes
 - 2) No

16. Is there a table/desk in your house where you can sit down and study?
 - 1) Yes
 - 2) No

17. Is the entire floor of your house comprised of concrete?
 - 1) Yes
 - 2) No

18. Does your house have a working [telephone] landline?
 - 1) Yes
 - 2) No

19. Are there any books in your house?
 - 1) There are no books
 - 2) Only school books/textbooks
 - 3) Less than twenty books, without taking the school books/textbooks into account
 - 4) More than twenty, without taking the school books/textbooks into account

20. Are there any purchased toys or games in your house?
 - 1) None
 - 2) Less than five
 - 3) More than five purchased toys or games

21. How many people in your family constantly contribute with money to the house?
- 1) None
 - 2) One or two
 - 3) Three or four
 - 4) More than four
22. What do you usually do on weekends (Saturdays and Sundays) or during holidays?
- 1) I have a job outside of the house.
 - 2) I help my parents with their jobs outside of the house.
 - 3) I work at home (for example, doing laundry, cleaning the house, taking care of my siblings, etc.).
 - 4) I play with my friends or siblings.
 - 5) I go on roadtrips with my parents (to the city, visit family or friends, etc.).
23. Do you work and get paid for it?
- 1) I do not work.
 - 2) I help my family when I do not have to go to school, but I do not get paid.
 - 3) I work sometimes when I do not have to go to school in order to make some money.
 - 4) I work and get paid, but that does not stop me from going to school.
 - 5) Sometimes I work to earn some money and that prevents me from going to school.
24. Are there any violent gangs in your neighborhood or school?
- 1) There are no gangs either at my school or in my neighborhood.
 - 2) There are gangs in my neighborhood, but they do not come close to school.
 - 3) I see gangs when I come to school or go home.
 - 4) There are gangs at my school.
 - 5) Some of my friends are part of a gang.
25. Do you currently have any disease that requires permanent/special treatment (e.g., asthma, allergies, gastrointestinal problems)?
- 1) Yes
 - 2) No

26. Are you currently affiliated with any health insurance/service?
- 1) Yes
 - 2) No
27. How long does it take you to get to school from home?
- 1) Less than 15 minutes
 - 2) Between 15 to 30 minutes
 - 3) Between 30 minutes and one hour
 - 4) Between one and two hours
 - 5) More than two hours
28. The access and circulation roads (streets, avenues, roadways, etc.) where you live are
- 1) Not paved and unattended; they flood easily.
 - 2) Not paved but taken care of; they rarely flood.
 - 3) Paved but unattended; there are potholes on the roads.
 - 4) Paved and are in good condition.
29. Are the walls in your home made of any of these materials: rough wood, plank, bamboo, any vegetable/plant material, zinc, cloth, or cardboard?
- 1) Yes
 - 2) No
30. Is there access to the public sewage system in the house where you live in?
- 1) Yes
 - 2) No
31. Do you have access to a mobile phone?
- 1) No, I do not have access to a telephone.
 - 2) Yes, I use it one to ten times a week.
 - 3) Yes, I use it eleven to twenty times a week.
 - 4) Yes, I use it more than twenty times a week.
32. Are you involved in any sports, cultural, musical, or other activity outside of class?
- 1) No activity
 - 2) One activity
 - 3) Two activities
 - 4) Three activities
 - 5) Four or more activities

APPENDIX A2: Individual statistical techniques and tools applied throughout the process of data mining the surveys for FyAB.

The Content: Data Analysis Topics Covered

The following statistical and data analysis tools were applied by students through many iterations, with slight adaptations each semester based on current and prior class interactions, changing data sets over time, consultations with FyAB, and changing goals of the project. The goal was to provide a succinct rationale and basic definitions without excessive statistical discussion.

Data Cleaning. Incorrect survey answers such as blanks and mistakes were identified throughout each phase. Consistent and reasonable techniques ensured that all iterations considered the data through a similar lens, leading to the development of identical data-cleaning rules. Respondents with more than two blanks or errors were typically removed from the data while substitutions were made with those who had two mistakes or less.

Data Visualization. Histograms, boxplots, bar charts, tree diagrams, cluster plots, and pivot tables were used in each analysis iteration; every step provided graphics and visuals that often helped guide both the students doing the analysis and the team at FyAB who relied on the results.

Distribution Analysis. In every data iteration, the distributions of survey responses were considered on both a per-school and an aggregate basis to identify underlying data patterns. Histograms provided quick insights into how students responded to each question and helped in quickly examining differences among schools regarding pertinent questions.

Principal Component Analysis (PCA)/ Factor Analysis (FA). PCA allows the user to reduce the number of independent variables in a model while capturing as much of the total variability among all the independent variables as possible. The independent variables are regrouped into *factors* which combine associated variables into orthogonal (uncorrelated) groups using weights identified in the factor analysis. Overall, PCA/FA was used to identify which variables might be eliminated from consideration without substantial loss of explanatory variation.

Analysis of Variance. Often one of the main goals was to find schools that were both similar to and different from one another in

light of survey questions that might be indicative of poverty. Analyses of variance were thus run in each data iteration to assess the overall average of any specific question answered as well as how each school compared to that average, revealing differences among the schools being analyzed and a lack of difference within them.

Cluster Analysis. This technique considered regrouping the students (row data) into like groups that have minimal variation within each group while maximizing the variability between any two different groups. The output provided an “average” student answer to each question according to cluster, with such averages providing insights into students who have fewer meals, minimal access to electricity or water, or parents with fewer job prospects (i.e., who work fewer hours each week). Once created, these clusters could thus be used to rank the students in need based on the U.N. definition of poverty³ or other reasonable indicators of such.

Multiple Linear Regression. The data set of survey answers was formed by purely independent variables with no clear dependent variable that could be used to create a predictive regression model. Several possibilities were considered with the long-term goal of establishing a dependent variable that represented a poverty score. Such a score could then be used to develop a weighted model for helping categorize future survey takers.

Bootstrapping. This advanced simulation technique is an iterative process of sampling from within a larger data set in an attempt to identify key data patterns. Simulations were applied in an effort to create a meaningful dependent variable according to which a poverty value might be created for each student currently within the collected data.

Logistic Regression. Groups of students from each cluster iteration may be considered to be “more impoverished” than other groups based on the average answers in each cluster. A binary dependent variable where the more impoverished students receive a value of one while the others receive a value of zero was also considered. In this way, a logistic regression model could be made for evaluating which variables are most useful in identifying poverty, possibly creating a predictive tool that could be implemented with future students.

³In 1995, the United Nations defined absolute poverty as “a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services” (see <https://www.un.org/development/desa/dspd/world-summit-for-social-development-1995/wssd-1995-agreements/pawssd-chapter-2.html>).

CREATING PEDAGOGY TO INTEGRATE SUSTAINABILITY AND THE ARTS

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ABSTRACT. The creation of a sustainable world urgently requires managers of organizations to consider large-scale changes in the practices and policies of social and economic institutions. Compelling scientific and economic information on the environment, while the basis of much dialogue in higher education and in the public sphere, has failed to motivate adequate progress to date. In this article, therefore, we present an original theoretical model for a pedagogy that brings together the arts and sustainability. We postulate that the motivation or “heart” to initiate such actions for the environment and persist in the face of societal and institutional inertia can come from the arts, particularly given their unique and time-proven ability to move the human heart in authentic ways. A sustainability pedagogy that utilizes the arts can be incorporated moreover into any discipline at any level of education. This pedagogy reaches students not only intellectually but empathetically as well, thereby increasing the depth and effectiveness of learning. Indeed, emphasizing the content characteristics of complexity, modernity, and equity/justice as well as incorporating student reflection/discernment, experiential learning, and community engagement will further enhance an arts/sustainability pedagogy. In this light, we briefly examine

some preliminary courses integrating the arts and sustainability across four different disciplines, including business, and find these examples indicative of the pedagogy suggested by this theory as a promising avenue to pursue. Finally, we provide some specific suggestions for instructors. New pedagogy that integrates the arts with sustainability can thus contribute significantly to the education of current and future managers, those who are essential agents in effecting needed change.

KEYWORDS: arts and sustainability pedagogy; complexity and sustainability; discernment; modernity; experiential learning; arts and sustainability in higher education

I. INTRODUCTION AND BACKGROUND

There is widespread scientific consensus on the need for urgent, large-scale changes in the practices and policies of social and economic institutions to achieve a sustainable world. This reality has been eloquently addressed by Pope Francis in his encyclical *Laudato Sí'* (Francis, 2015). There is, furthermore, a growing recognition in the business and economics community that proceeding with changes aimed at planetary sustainability will be necessary and can be good in the long term for forward-thinking businesses and sustainable economic development (Whelan & Fink, 2016; Moran, 2017; Eccles, Ioannou, & Serafeim, 2012; Peil & van Staveren, 2009; Sachs, 2015). This is already requiring organizational managers to make changes—dramatic ones in some cases—in a variety of contexts (Soyka, 2012; Dunphy, Griffiths, & Benn, 2014). The pace at which needed changes are actually achieved, however, has been disturbingly slow given the seriousness of the challenges faced (IPCC, 2014).

The arts as a whole (popular and serious), on the other hand, are vibrant and alive, exerting a strong influence on culture, society, and even on the economy (Heilbrun & Gray, 2001). The National Endowment for the Arts recently discovered, for instance, that the arts sector represents 4.3% of the U.S. gross domestic product, exceeding even the construction sector; that 4.7 million are employed in producing arts and cultural goods, receiving \$300 billion in compensation; and that spending on the arts sector creates 62 additional jobs for every 100 new arts jobs (NEA, 2015). The arts and music, furthermore, are highly and passionately significant for students at all levels. Despite all this, however, the role of the arts is too often overlooked in pedagogical design.

In light of the foregoing, we present in this article an original theoretical construct for a pedagogy that harnesses the arts and sustainability. We postulate that the motivation or “heart” needed by managers and citizens to meet our enormous sustainability challenges, as well as the persistence to overcome societal and institutional inertia, can come from the arts’ unique, time-proven ability to move the human heart in authentic ways. The arts can deliver the same general truth and beauty that a scientific paper on sustainability, an economic cost-benefit study, or a business plan does, using messages carried not only via the intellect but also through the spirit, emotions, and their physicality as expressed through sound, vision, and movement.

The theory presented in this article addresses the key roles of complexity (Bertaux & Skeirik, 2018), modernity (Bertaux, Skeirik, & Yi, 2015), and equity/justice (Francis, 2015) in designing an effective arts/sustainability pedagogy for any educational context. We argue that such a pedagogy should, whenever possible, utilize greater degrees of artistic sophistication to address the high level of complexity inherent in sustainability, engage today’s art for today’s sustainability challenges, and incorporate a focus on equity and justice in recognition of the disproportionate impact environmental concerns have on those at the bottom of the pyramid.

Brief and illustrative examples of arts/sustainability pedagogy in the higher education context are given in the final section of the article. University students now expect and demand that their education be conducted with an understanding of how sustainability issues impact their disciplines (Emanuel & Adams, 2011; Dobson, Quilley, & Young, 2010). Thus, more than a third of the deans of leading business schools worldwide as ranked by the *Financial Times* report having requirements for sustainability-related curricula in their MBA programs (Christensen & Worzala, 2010). Commitments to on-campus sustainability practices can also contribute to reinforcing pro-sustainability student behaviors (Durr, Bilecki, & Li, 2017)—nearly 400 colleges and universities have approved plans for the reduction of carbon emissions, over 100 have comprehensive climate action plans, and many specify carbon neutral/net zero goals for the next one or two decades (Burger, 2018; Second Nature, n.d.; Xavier University, n.d.b). Jesuit universities in the Asia-Pacific region have agreed to significant climate action policies and goals (JAPC, 2015), and in 2015, nearly 200 leading administrators from a wider group of Roman Catholic higher education institutions across the globe (including many Jesuit ones) signed a statement entitled “In Response to *Laudato Si’*: On Care for Our Common Home” that committed their institutions to integrate “care for the planet, integral human development, and concern for the poor” into their infrastructures, curricula, research, and

community outreach (Ignatian Solidarity Network, n.d.). In this vein, new curricula that place sustainability issues front and center in diverse areas of study, including business, economics, and many others, have emerged in higher education (Berry, 2011; Rheinlander & Kramer, 2003; Hill & Wang, 2018; Xavier University, n.d.a; Chia, 1996).

We have observed, however, both in our own university and in conversations with colleagues at other institutions, that the role of art in sustainability programs and courses is typically minimal or non-existent except for courses taught in arts departments (Kagan & Kirchberg, 2008). Furthermore, the arts components typically found in the common or core curricula of liberal arts institutions are not environmentally-focused (Harvard University, n.d.; Ohio State University, 2015). This article thus argues that those teaching across all levels, from the earliest ages to adult, should incorporate content that integrates the arts and sustainability into a wide array of courses and contexts. We propose guidelines in the conclusion for those wishing to experiment with the power of the arts in their courses to motivate true change in sustainable practices and policies.

II. ART AND SUSTAINABILITY

Objective information is vital to society yet conveying that information to the community often fails at the very first step of public engagement, resulting in a kinetic engagement failure, a disconnect. Accounting systems for sustainable development, for instance, are challenged by “conceptual misconceptions” when constructing sustainable cost calculations (Bebbington & Gray, 2001). Such misapprehensions are often based upon the failure to understand and incorporate relevant interrelationships and/or cultural and social values. In communicating sustainability, personal commitment and public engagement are key initial components of the messaging solution (Shields, Solar, & Martin, 2002; Hickman & Sinha, 2018). The arts in this regard make up a highly effective tool for communicating the sustainability imperative as they generate aesthetic values that contrast with information communicated through the mind alone.

Understanding the intersection of policy, science, and the public’s values and objectives is essential, therefore, for conveying sustainability information and its use in public policy. The arts can be a key component in addressing this intersection (Curtis, 2017; IPCC, 2014) for they lead us to reconsider our thinking about the world first by subjectively reframing content, thereby bypassing any potential “inherited” initial objections

and allowing us the opportunity to engage empathetically with the idea before we process the information found therein. Indeed, for science to be utilized effectively, it must be contextualized in terms of social goals and values and presented so that the audience finds meaning in the information. We have argued in previously published work (Bertaux & Skeirik, 2018) that reaching the threshold of public motivation and involvement in sustainability issues requires more than accurate environmental and human data, intelligently designed sustainable systems, or popular media/political reporting about our challenged relationship with our planet. Art empathetically communicates messages regarding social values and equity through a unique engagement of both the senses and the heart, and is therefore able to evoke understanding, feelings, and commitments directly to personal and social actions. When engaged through the arts (literature, performing/visual arts, or a combination of these), the hearts of individuals spark personal and public engagement in sustainability issues. In this regard, the arts have a competitive advantage over data, analysis, design, and application when it comes to motivating and educating people about the critical importance of creative and sustainable decision-making and action.

The arts can thus function as a type of language (and often a universal one) which, when combined with a sense of place, becomes a strong communicator (Mackinnon-Day, 2016). As part of our media world, they can create any number of new “resonant frames” to engage the public on issues such as climate change (Moser, 2014). Indeed, truly sustainable solutions to the many ecological and social challenges we face require increased levels of citizen participation and a re-making of our collective consciousness which is currently in conflict with today’s realities (Sterling, 2014). These new frames of reference that are founded in aesthetic and experiential learning which the arts can provide will help shift the currently info-centric tendency of public engagement with sustainability (Bendor, Maggs, Peake, Robinson, & Williams, 2017).

We have also argued that it is essential for artists and the public who engage in the arts and sustainability issues of our time to move that engagement in the direction of higher levels of artistic complexity. Sustainability problems and policies are incredibly complex as demonstrated by the physical, biological, economic, and human sets of interrelationships that impact sustainable systems and solutions. Arts that incorporate degrees of complexity, when given breadth and freedom, thus become both an aesthetic and pedagogical tool for assisting society in focusing and advancing sustainable solutions for the Earth (Bertaux & Skeirik, 2018; EcoJesuit, 2018). This is especially critical given that we view mass media today, with its “on” switch forever frozen in place, as a type of gravity that draws the public in to serve it a large portion of

its intellectual content. To maintain or grow its market, however, the media is now structured to deliver simple content in the fastest way possible (Twitter, Facebook, Internet news, etc.). It is poorly suited in general to manage the delivery of information about critical, complex, and impending ecological and economic failures such as the relationship between climate change and migration/immigration or the social and ecological impact of a food supply that relies heavily on fossil fuels, irrigation, and techniques that undermine topsoil quantity and quality. Due to the nature, therefore, of market-based components of media messaging systems, the media organization is forced to avoid complexity and deliver only highly simplified dimensions of more complex issues, leading to an audience disconnect or, at best, a conveyance of effective misinformation that is incomplete and devoid of its complex context. Developing a way of communicating the complexity of a sustainability issue to the heart and engaging the values of both the individual and the public is a proper role, then, for the arts.

Lastly, we have maintained that the flourishing of art that reflects our current culture is an imperative as opposed to an excessive focus on historical art that is defined by what is considered “canonical” within the various fields of art (Bertaux et al., 2015). Art is for everyone, from the novice to the dedicated artist, and people need only to be exposed to art for artistic experiences to commence. Indeed, the world is adrift in a sea of readily available, simple, and democratic arts, everything from garage band music to commercial art symbols used to advertise products. The electrification of our world, moreover, has brought these simple arts to more and more of us, everywhere and all the time. We thus have an active delivery system, yet one that is not yet carrying the cargo that it could—namely, contemporary, complex, and artistic messages that are required for true progress on sustainability issues.

To sum up, we need art because art subjectively communicates vital messages about society by way of the heart and can thus impact cultural values and equity/justice through its uniquely high degree of public engagement. We need complexity in art today because artistic impact on sustainability will be most transformative when combined with a consistent nudge toward increasing levels of complexity in our art and our understanding. We need greater emphasis on a fertile environment for the growth of contemporary art that is based on current realities and social challenges, including the many ecological and social crises we face today.

III. SUSTAINABILITY PEDAGOGY AND THE ARTS

There is convincing scholarship on the general effectiveness of the arts for enhancing pedagogy across many contexts. Authors have documented that the arts can effectively influence the “aesthetic, epistemological, ethical, ontological, and political aspects of curriculum across a wide array of curricula” (Willis & Schubert, 1991). At the high school level, for example, vibrant discussion about cross-disciplinary approaches is bringing the arts into each discipline (Boston, 1996). Incorporating art into pedagogies is effective at changing pre-conceptions about our world because the artistic process and content, as discussed in the previous section, help students creatively re-frame the world (Gunn, 2016). Business schools, in particular, have used this creative re-framing aspect of the arts in management and entrepreneurship programs—by experiencing and studying the arts (drama, drama literature, and symphonic conducting), management techniques are enriched and instruction is made more effective (Mockler, 2002). The study of arts-based processes, moreover, develops unique skills for individual organization managers when these are re-applied to management (Taylor & Ladkin, 2009). Still others demonstrate that arts-based learning is a key foundation in general for business and management education (Nissley, 2010). Indeed, integrating the arts into business school curricula awakens the “entrepreneurial imagination” and initiates new thought processes for the resolution of stubborn barriers to business solutions (Wankel & DeFillippi, 2002).

With respect to *sustainability* pedagogy in particular, scholars have demonstrated the usefulness of the arts across all levels of education. Pre-school curricula that study seemingly unrelated concepts about the natural world through art yield unique educational benefits in terms of awareness about local environment and culture (Ward, 2013). Environmentally-based storytelling, drama, and visual arts in an elementary school in Botswana resulted in better communication and a more egalitarian and locally-connected educational experience (Silo & Khudu-Petersen, 2016). Despite this, however, studies of sustainability pedagogy often overlook the potential role of the arts in uniquely engaging students (Cullingford & Blewitt, 2013; Caniglia et al., 2017).

Nevertheless, a wide range of organizations in sectors from defense to education recognize the importance of pedagogy that integrates the arts and sustainability (Allen-Gil, Stelljes, & Borysova, 2009; Medrick, 2013). This pedagogy simply begins with exposure to both areas inside the framework of a single course, with such exposure possibly occurring when faculty present or assign actual artistic works (as opposed to

secondary sources that merely describe them) or, in the case of an arts program, sustainability content. Students can also gain exposure by having one or more of their peers bring in or present to the class artistic works related to course content within their discipline or sustainability content in the case of an arts course. Finally, exposure can also be facilitated by having one or more students create their own artistic work which could then be presented to the class; in the case of an arts course, sustainability content could be included in one or more of the student works created. Note thus that the amount of exposure to art in any non-art course, or to sustainability in any non-sustainability course, is quite flexible. It may be as minimal as is necessary or desired, such as one student presentation or one part of a lecture in a course, or it may be the primary focus of the entire program. Faculty are invited to begin small, with a single example or component, and build appropriately as confidence and experience are gained.

In accordance, therefore, with the theory presented above, the greatest desired impact from integrating the arts and sustainability in a course or program occurs when the curriculum pushes the envelope in three specific directions: artistic complexity, contemporary art, and content related to equity. Artistic complexity should first be encouraged, especially when this complexity is related to intersections between Earth's systems and our own human systems and institutions. In terms of pedagogy, it is not sufficient to limit sustainability instruction to the essential logical information within a particular discipline because content exposure in and of itself is weak when it comes to motivation, values, and engagement on complex modern issues. Indeed, the pedagogy of values and engagement is not typically part of a standard secondary text. Consider a simple example, such as an economics textbook that has a chapter or section discussing pollution as an economic externality (Colander, 2016) which could lead to an intellectual reaction on the part of the student. An empathetic and potentially deeper impact could occur if artistic content were included and presented in the course, such as paintings of a landscape before and after pollution (Hattam, 2010).

Students ignite their creative energy to solve sustainability problems when artistic works related to their discipline are integrated with the sustainability challenge within the curriculum. A broader range of more creative solutions thus occurs in this newly expanded curriculum because students do differ in their individual empathetic reactions to modern complex problems when they are stimulated by an artwork. For a more involved example, compare a rap song on the diminishing number of forests that is addressed to future generations (Prince Ea, 2015) to a textbook narrative on sustainable forestry in an ecological economics textbook. Each offers important but different information

about sustainability and forests. The drama, intensity, and exaggeration in Prince Ea's rap music video pulse and paint into the heart of the student a shocking future made up exclusively of artificial trees! Clearly, Prince Ea intentionally exceeds the boundaries of a textbook, yet this very excess, unreasonable by common standards, ignites the critical component within the classroom, thereby ensuring the birth of a broader array of creative solutions. Each student's personal interpretation of Prince Ea's video also forges ideas of ownership and engagement, and the layers of meaning found in this complex work parallel the deep complexity of the topic as Daly and Farley (2011) outline in their textbook. This stereophonic form of instruction provides the student with a way to own the material as an individual and sets the class up to work as a team to overcome their differences in values and attitudes. Note that this in turn can assist in removing inappropriate filters of ideas that may pre-exist in students and inhibit learning (Djordjevic & Cotton, 2011). Our theory thus implies that the higher education classroom considering sustainability should ignite the complexity/value matrix when examining the information, intellectual, and analytical aspects of a sustainability issue.

Some might argue that art-inspired fantasies or imaginings are not part of a rigorous curriculum. We argue otherwise because the solutions to the matrix of sustainability issues on this planet are still in process and yet urgently needed (McKibben, 2010). We no longer have the luxury of time to teach our courses within silos, and so we are suggesting a tool for any discipline that instructs in an area of sustainability, a tool for breaking out of that discipline's silo while simultaneously leading the student into the complexity of the issues. That tool is to incorporate one or more artistic components, preferably at a high level of complexity, which bring forth creative interpretations and imaginings, motivation and values. Indeed, our challenged culture demands and deserves the maximal number of creative resolutions to its multi-faceted problems, and we argue that the best ones can be furthered in higher education instruction that integrates imaginings arising out of artworks with rigorous academic curricula. It is in this way, when pedagogy integrates the arts and sustainability, that artistic complexity will assist in generating maximum impact.

The second direction to highlight in this pedagogical integration is in emphasizing the inclusion of contemporary artistic works, as is the case with both examples given above. Note that this definition of "contemporary" is flexible as it may vary within artistic disciplines and with the sustainability issue to be considered within a course (Bertaux et al., 2015). Some issues, for instance, have only recently been manifested while others may have lasted for quite longer. Duncan Macmillan's

2011 play “Lungs” (Macmillan, 2011) is an example of a very recent sustainability issue; in it, a couple is deciding whether or not to bring a child into this world given its deeply troubling environmental challenges and the likely negative impact on that child’s future. Evoking a deep sense of place and involvement with nature, Merce Cunningham’s dance work “Rainforest” (Cunningham, Tudor, Cage, Leacock, Pennebaker, & Oppenheim, 1968) is, on the other hand, an example of a work that is 50 years old but still arguably contemporary. Nevertheless, it should be noted that we are not arguing for all artistic content to be contemporary as historical works can still be important sources of inspiration. For example, classroom discussion of the long-lasting issue of technology’s disruption of nature can be enhanced by presenting J. M. W. Turner’s 19th century painting entitled “Rain, Steam and Speed” (Turner, 1844). While not contemporary, this work can be included and treated in the course as still relevant for today.

The third direction suggested for pedagogy consideration, in line with our growing recognition of the mutual dependency between social and environmental sustainability, is that artistic works should significantly represent themes of human development, equity, and justice (Nulkar, 2016; Lauesen, 2016). The field of architecture demonstrates, for example, how sustainability concerns have penetrated deeply into the ways society’s everyday spaces are thought out, with designs beginning to consider with a conscience the impact on various members and segments of the public (Blincoe et al., 2009; Christensen & Worzala, 2010). In the last decade or so, architectural theories and practices such as LEED (Leadership in Energy and Environmental Design) standards have reframed the design of space and the organization of cities through the lens of equitable urban development; such is reflected in the NEA (National Endowment for the Arts) grant awards (Harvey, 2010; Dempsey, Bramley, Power, & Brown, 2011; IHCD, n.d.; Kibert, 2016). Other arts, though, can also serve to explore the relationship between equity and sustainability, including the opera on human trafficking entitled *Angel’s Bones* (Yun, 2011), the instrumental composition on polar ice melting *Become Ocean* (Adams, 2013), the novel on immigration entitled *Miss Ex-Yugoslavia* (Stefanovic, 2018), the book of poetry on the importance of place-centered thinking *Sustainable Poetry: Four American Ecopoets* (Scigaj, 2015), and the film *Time of the Wolf* (Haneke, 2003) about the end of the world and disaster.

In addition to encouraging the three content-based directions as described above (complexity, modernity, and equity/justice), we want to highlight the potential contributions of experiential learning, community engagement, and reflection/discernment, pedagogical techniques which can be utilized separately or in combinations. Experiential learning,

which can be problem-, project-, or place-based, has been shown to deepen student learning and can be used in many courses that integrate the arts and sustainability. Community-engaged (or service) learning can be conceptualized as a type of experiential learning that engages students with an actual community, usually close to the campus or other classroom site, and as a valuable way of exposing students to the real-world complexities of sustainability policies and practices or possibly even the art-sustainability nexus (Holden, Elverum, Nesbit, Robinson, Yen, & Moore, 2008; Wurdinger & Carlson, 2010). It should thus be noted that since experiential learning and community engagement will serve to deepen the context of the entire course, these techniques, even if used separately from the arts-sustainability integration component, can still assist in said integration within the course itself.

Finally, we argue that guiding students to reflect and discern deliberately during a course is an inherent contribution to the integration of the arts into sustainability pedagogy. Discernment as a learning process parallels the artistic experience in many ways, for the artist intentionally manipulates and skillfully crafts a mirror of society and reflects back their interpreted understanding/vision/impression of that society, however accurate or corrupted it may intentionally be. The observer of the artwork, in this case the student, will not necessarily develop a logical and linear reaction to it; in fact, the ideas students find in an artwork often arise from associations they bring to the work. Each subjective reaction may thus be unique and invite dialogue with classmates and faculty (Skeirik, n.d.). Discernment as such may be seen as a type of reflexive capital or positive feedback loop that uses personal reflection to motivate modification and improvement of human behaviors and policies. In this case, the feedback loop involves student awareness of, as well as attitudes or beliefs regarding, sustainability challenges and how to address them. Aesthetically-based discernment, therefore, is a potentially important change agent by which sustainability education can lead to effective actions (Dieleman, 2008).

In the technique of discernment, we encounter what the arts do best—fueling the imagination that reframes current thinking and envisions new futures. The arts activate sensorial and mental ownership of these visions and even utilize what may at first be confusion or a lack of clarity as we enter into the world of new visualizations. These are prerequisites to learning about sustainability—for example, anyone desiring to imagine a culture that will address a sixth mass extinction on our planet (Kolbert, 2014) will need to deal with the intersections of a new vision, data documenting a difficult current reality, and the understandable confusion that results as students and scholars grapple with possible solutions. Invoking the discernment process in the

classroom provides a tool for navigating this difficult aesthetic and intellectual terrain.

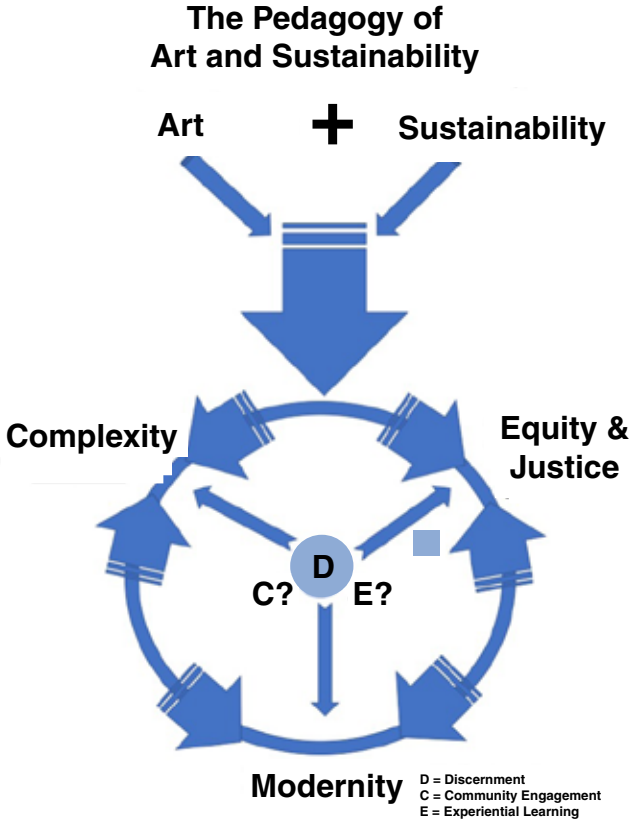


Figure 1: The Pedagogy of Art and Sustainability

Faculty should thus consider these three content characteristics—complexity, contemporariness, and equity—when designing their course or course components. To make sure students understand these characteristics, the course design should include guidelines for (or conversations with) students to assist them as they bring in, present, create, interpret, and discuss artistic works for the course. Moreover, the pedagogical techniques of experiential learning, community engagement, and discernment will, singly or in combination, make traversing the frontier of the arts and sustainability pedagogy more effective. That integration of the arts in pedagogy inherently incorporates extensive opportunity for students’ conscious discernment and provides

a path through the multiple interpretations that emerge from such an integration is thus of special note. Figure 1 illustrates the relationship between the main content areas to be addressed (art and sustainability), the suggested characteristics or directions to be encouraged in the content (complexity, modernity, and equity/justice), and the techniques that are inherently present (discernment) or possibly present (experiential learning and community engagement).

We note that the pedagogy envisioned here is consistent with several Ignatian concepts, including discernment, community engagement, and concern for equity, and with recent initiatives on an Ignatian pedagogy for sustainability as articulated by the AJCU Ecology Educators (AJCU Ecology Educators, n.d.).

IV. SOME PRELIMINARY EXAMPLES

This section will present a few illustrative examples of actual course content that integrates the arts and sustainability. Prior to choosing the examples, we reviewed relevant literature and notes from numerous presentations on the topic by authors at scholarly conferences, including feedback and discussions with colleagues on incorporation of the arts into sustainability pedagogy for higher education. Due, however, to the small number of courses following this pedagogy and the difficulties inherent in locating them, examples for this preliminary study were selected from courses the authors had planned and taught as well as from courses taught by colleagues in other disciplines at the same university. The latter were identified by emailing all colleagues who had participated in specific academic sustainability initiatives and following up with those who responded. This process resulted in an initial review of four courses and two intensive off-campus programs from a variety of disciplines (economics, music, history, sustainability, and digital media), all of which integrated art with sustainability content. The courses were located in two different colleges (business and arts and science) at Xavier University in Cincinnati, Ohio, a Jesuit, Roman Catholic university founded in 1831 with a student body of approximately 4,650 undergraduates and 2,150 graduate students. From the initial group of courses identified, a few were selected to show possibilities across disciplines, types, and levels of courses. To suggest how the theory presented above could be applied to specific courses, a simple review of relevant course content from these selected courses, i.e., content incorporating the arts into sustainability topics, as well as of any available feedback from faculty and students was conducted.

The courses selected were as follows:

1. *Music, War & Peace* (Music 109)
2. *Natural Resource, Ecological, & Environmental Economics* (Economics 320)
3. *Urban Ecologies, Urban Economies* (History 536)
4. *Senior Project, Digital Media* (Digital Media xxx)

1. A review of *Music, War & Peace* (Skeirik, 2014) involved students from all undergraduate majors who were in the artistic field of music. The course, which fulfills a university-wide undergraduate common core requirement for an elective in Ethics/Religion and Society, has for its theme a focus on guiding student discernment regarding the many interpretations and meanings of war and peace. An important interpretation thus explored is the notion of whether humanity is at peace or war with nature. On this point, students analyzed the sustainability content in the recorded and published work of composers and musicians. The professor, who provided both audio and video/audio examples as part of the required material for the course, notably included works that addressed both equity/social and ecological sustainability as well as contemporary, new, and complex pieces such as Julia Wolfe's 2015 composition *Anthracite Fields* which uses as inspiration the physical and social history of coal in Pennsylvania. In addition to this, students also brought examples from their own musical listening experiences to class as part of the course content. Here we see a good example of bringing in and analyzing sustainability content in a course that on its face would not seem to be an obvious place for such.

2. *Natural Resource, Ecological, & Environmental Economics* (Bertaux, 2014), in addition to being a required course for the several interdisciplinary and sustainability-oriented undergraduate academic programs at Xavier University,¹ is also taken as an elective by many economics majors and minors who may have little or no background in environmental issues. This course also fulfills a university-wide undergraduate common core requirement for an elective in Ethics/Religion and Society as well as being an elective for the Peace and Justice Studies minor.

Below is a description posted on the course management software system for one of the first assignments in the course. Note that students present these to the class using a sense of "place" from their own lives

¹These are BA in Economics, Sustainability & Society; BS in Environmental Science; BA in Land, Farming, and Community; BSBA in Sustainability: Economics & Management; and the Environmental Studies minor.

(Figures 2 and 3); the assignment also serves as the way in which students introduce themselves to each other.

“Where I’m From” assignment (for the first week of class): Bring/post an artistic creation to share with the class. This should be something that you have created/alterd, and that expresses “Where I Come From.” This can be a drawing, video, essay, photograph, piece of music, three dimensional object/sculpture, collage, painting, poem, etc. Presentation time will be no more than 1 minute. It must reflect or express the physical, geographical location that you consider to be “where you are from” (which may or may not be where you [were] born or where you reside now).

Post an image, link or file with your creation here. If you are bringing a physical item, post a photo of it here.



Figure 2: *Where I’m From: Pittsburgh* (student output from *Natural Resource, Ecological, & Environmental Economics* [Economics 320, Xavier University])



Figure 3: *Where I’m From: The Universe* (student output from *Natural Resource, Ecological, & Environmental Economics* [Economics 320, Xavier University])

Students return to this concept later in the course by using discernment/reflection to apply course material to their “place”; they

have, for example, an assignment where they apply to their given place textbook classifications of various types of ecological resources used in economic activity. Students' own reactions and feelings about the present and future of their place are then shared and discussed in class. This course thus provides a good example of bringing and analyzing artistic understandings and interpretations of sustainability content in a discipline that rarely utilizes the arts in any manner at all. It is a good example of encouraging non-artistic majors to create artistic works, allowing them to understand that artistic creation is not only for dedicated "artists" but for all of us, and to harness the power of that understanding to motivate further study of the sustainability content upon which the course is based. Indeed, while the students' own artistic creations for the course are not necessarily complex or sophisticated, the course content to which these creations are related is certainly at an intermediate level. Finally, the course also includes community-engaged, experiential, and project-based learning, thereby adding to opportunities for integration and discernment.

3. A required course for the interdisciplinary MA in Urban Sustainability and Resilience at Xavier University, *Urban Ecologies, Urban Economies* (The Ecological City, 2012) is an example of a graduate-level course wholly dedicated to sustainability content in a field (social and ecological history) that does not typically incorporate artistic work. Indeed, while the use of artistic examples to "set the stage" for trends and events being discussed is not uncommon in fields like history, they are typically brief and not strongly emphasized. In this course, however, a major experiential learning assignment involves students producing videos for a course website about their own visions for the future of the city they currently reside in, namely, Cincinnati, Ohio. They are guided along a number of important avenues of learning: course concepts are applied to a real world vision; students engage with the community and discern key issues as they develop material and perform interviews for their video; a sense of place which they can carry to wherever they locate in the future is encouraged; and, once again, having "non-artist" students produce an artistic work engages the imagination, allowing a deepening of learning for the rest of the course.

4. *Senior Project, Digital Media* (Xavier University Communication Department, n.d.) is a second example of an artistic course that can be applied to sustainability. In this case, digital media majors choose the topic of their required senior video project without sustainability content being a requirement. The professor's strong interest in sustainability, however, and her own produced works, including an award-winning film on the subject (DeVault, 2013), can serve to encourage students who might have an interest in this content. This is an example of an entire

course dedicated to experiential learning through the artistic creation of students along with opportunities for reflection and discernment on the project theme chosen. The course is also an example of relatively complex and sophisticated artistic creation—according to the standards of undergraduate curricula—by virtue of its placement as the final senior product of a major in an artistic discipline. An example viewed by the authors—a student’s senior project video on local air pollution—also showed community engagement and development of a sense of place through site visits and interviews.

Preliminary and subjective assessments of the efficacy of arts and sustainability integration in these selected sample courses included reviews of relevant assignments and available student feedback as well as conversations with professors. Our initial impressions from these assessments suggest that adding an integrated arts and sustainability course component or focus appeared to have enhanced the effectiveness and/or depth of student learning. Each professor answered yes to the question “Is the additional insight and dedication gained worth the time it takes away from other course content?” This conclusion, however, is not based on a rigorous selection process for courses nor on a systematic assessment of learning in the courses studied. A further caveat, too, is that none of these samples included online or off-campus courses or programs. Finally, courses from only four disciplines were examined. Nevertheless, our initial evaluation does indicate that developing a more rigorous and systematic process of evaluating the effectiveness of integrating arts and sustainability across the curriculum could be a promising avenue for further research. For such research to proceed, ways to identify courses that currently integrate arts and sustainability must be found, and a systematic process to review and assess the integrated component needs to be designed.

V. CONCLUSION

We have developed a theory for an initial pedagogy on art and sustainability that can serve as a foundation structure for sustainability-related courses. This theory, moreover, can be adapted to any educational level despite us having presented examples from higher education only. Indeed, a flexible and innovative pedagogy integrating the arts and sustainability presents a unique opportunity for the classroom due to the wide array of art currently available in our cultures or that students may create as part of a course. It is the unbounded aspect of the arts that provides this pedagogy with the chance to stimulate more creative solutions and thus add significant value.

We have also explained how and why the integration of art and sustainability in any discipline, especially when pressed into more complex, modern, and equity-focused directions, can result in improved, student-driven solutions to sustainability challenges and thus bring forth deeper student awareness and motivation directed at “healing a broken world” (Álvarez, 2011). The crucial role managers play in organizations gives an added urgency to the incorporation of this pedagogy into the education of current and future leaders.

We summarize below six simple faculty/teacher guidelines for this new pedagogy of the arts and sustainability:

1. Bring art into the classroom even in a small way.
2. Always try to increase the complexity of artistic content and assignments.
3. Always try to include art that is contemporary.
4. Always encourage addressing equity and social sustainability issues.
5. Invoke the discernment process to relate art to course content.
6. Consider including community engagement or other forms of experiential learning.

The higher education academy, for its part, should increase support for the efforts listed above through individual institutions and organizations for higher education (O’Connor & Gray, 2016). It should increase its efforts to nurture the creation of new artistic works by students, faculty, and the community at large as a contextual form of support for such. This kind of support is important for all levels of teaching institutions, from pre-school to adult.

New pedagogy that integrates the arts with sustainability can contribute significantly to the education of current and future managers toward becoming critical agents in re-framing and implementing needed changes. Art is the heart-felt link between culture and life’s challenges on Earth, and creative pedagogies that incorporate the arts lead students to understanding first through the heart. To live in and restore synergistic systems on Earth, we need students with a whole body, heart, and mind commitment to conceive, create, implement, and manage innovative new solutions on each sustainability front. By guiding them to learn from art across many more courses, we can unleash the empathetic processes in students to ensure deep engagement within each of our disciplines. Art, in short, adds pulsing heart to sustainability learning.

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Thanks to Ryan Kambich for research assistance, students John Means and Daniel Newman, and Xavier University for Professor Skeirik's faculty research leave.

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DIFFERENTIAL EFFECTS OF INTERNAL AND EXTERNAL CONSTRAINTS ON SUSTAINABILITY INTENTIONS A HIERARCHICAL REGRESSION ANALYSIS OF RUNNING EVENT PARTICIPANTS BY MARKET SEGMENT

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ABSTRACT. There are immediate calls to action across all business sectors to address the adverse effects of climate change. The sports industry is not immune to these calls—practitioners have engaged participants to further the environmental initiatives of their events through creative messaging campaigns with mixed success. We thus examine the differential effects of internal and external constraints on the sustainability intentions by market segment of a running event’s participants. This furthers our understanding of how to engage sports participants in sustainable behaviors at a sporting event and improves the sustainable behavior outcomes of messaging campaigns. Our results support the principles of constraint theory and that internal constraints need to be addressed first before external constraints become

relevant. Internal constraints, such as lack of knowledge and lack of worth, predict variance in intentions to act sustainably (i.e., to dispose of waste correctly). After controlling for internal constraints, the external constraints of lack of interest from others to act sustainably and lack of access and time explain additional variance in sustainability intentions. We also found that each market segment varies on the impact of constraints that inhibit sustainability intentions, with the amount of variance in sustainability intention explained by such constraints varying from as low as 11.4% in one segment to as high as 33.1% in another. We thus provide specific recommendations for future research, and discuss how practitioners can use these results to ameliorate these constraints and increase sustainability intent.

KEYWORDS: sustainability; constraints; market segmentation

There are an increased number of calls for immediate action to combat and greatly reduce the causes of climate change (Kates et al., 2001; United Nations, 2016: 1–27). Indeed, dealing with the impending effects of climate change requires a collective effort from large corporations to individuals to alleviate adverse environmental impacts. This shared responsibility is a major component of the current environmental movement to achieve sustainability goals (Sartore-Baldwin, McCullough, & Quatman-Yates, 2017). Large corporations, for instance, have responded with commitments to lessen their adverse impact on the environment through various sustainability initiatives (e.g., reduce landfill waste [Babiak & Trendafilova, 2011; Ihlen, 2009]). Yet while such efforts are laudable, these large organizations do not seem to be in a position to engage their customers or stakeholders directly and in an effective way to further their environmental sustainability efforts (Ashforth & Gibbs, 1990; Morsing & Schultz, 2006).

That being said, the United Nations Climate Change Secretariat sees sport as a possible touchpoint for engaging individuals about climate change and for promoting more sustainable behaviors at events and in people's everyday lives (United Nations, 2017). Sport in general presents a unique context because of its universal appeal, and specifically because of the affinity individuals have with sport brands when compared to other business sectors (Fink, Trail, & Anderson, 2002; Sutton, McDonald, Milne, & Cimperman, 1997). As for the environmental sustainability efforts in the sports sector, these have been characterized by waves of commitment; indeed, sports organizations have reduced their environmental impact by modifying business operations within their control (e.g., procurement, resource management, etc.). Yet because of the dynamics of the sports industry (i.e., a service industry) and due to their considerable contribution to the overall environmental impact of

an event (e.g., production of waste; Babiak & Trendafilova, 2011; Collins, Jones, & Munday, 2009; Trendafilova, McCullough, Pfahl, Nguyen, Casper, & Picariello, 2014), it is necessary to engage sports participants as part of the next wave of environmental sustainability in the sports sector (McCullough, Pfahl, & Nguyen, 2016).

Sports organizations thus have the opportunity to encourage their participants to behave more sustainably and see why it is necessary to do so (Sartore-Baldwin & McCullough, 2018). There are, however, many constraints or barriers that individuals must overcome to engage in sustainable behaviors, including, among others, a lack of basic awareness of opportunities for such behaviors, feelings that sustainable behaviors are not worthwhile, a lack of support from others, and a lack of time and accessibility in a sports event context (McCullough, 2013; McCullough & Cunningham, 2011). These constraint categories are likely present for individuals outside of sport (cf. Kaplowitz, Yeboah, Thorp, & Wilson, 2009), for sport spectators (cf. McCullough, 2013), and for sport participants (like in this study), although the degree by which these categories impact behavior or behavioral intentions may differ due to the context. The task of encouraging sustainable behavior in sports participants also becomes challenging in specific contexts in which sustainable behaviors have never been requested, and so the success of these efforts in removing any external barriers to such behaviors is very reliant on sound managerial practices (United Nations, 2010). Further examination is needed, therefore, to bolster such efforts given that sports event managers who launch engagement campaigns to promote sustainable behavior changes among participants have met with mixed success (McCullough et al., 2016).

There also remain marketing objectives that need to be resolved to maximize the event's sustainable legacy (O'Brien & Chalip, 2007) and encourage sustainable behavior change among participants (e.g., runners in a race). Thus, while previous researchers have examined the value-action gap between environmental values and sustainable behaviors (e.g., Juvan & Dolnicar, 2014), it is necessary for advancing the sustainable legacy of an event to determine whether this gap can be bridged and whether perceptions of barriers differ among specific active sports participant segments. The ability to bridge this gap will allow sports managers to organize and communicate sustainability initiatives more effectively to consumers and increase levels of sustainable behaviors. Different sports or leisure contexts (e.g., spectating, fishing, hiking, running, etc.), however, may bring different specific behavioral constraints within a category (e.g., lack of knowledge) due to their own particular circumstances. Examination of sports participants is necessary,

therefore, for determining the behavioral constraints they encounter while engaging in active participation.

To this end, the purpose of this study is to examine the barriers that prevent sustainable behaviors and how to overcome such among runners in a ten-mile race (The Cherry Blossom Run, hereafter referred to as "*The Run*"). The study thus adds to the growing body of knowledge concerned with enhancing current sustainability efforts of the sports and leisure sectors and increasing the innovation for sustainability of current industry practice by identifying specific behavioral constraints that inhibit sustainable behaviors. By examining this context and leveraging the social platform of sport, sports organizations can influence sustainable behaviors at sports events and eventually throughout everyday lives (Casper, Pfahl, & McCullough, 2017).

THEORETICAL BACKGROUND

Understanding the influences and impediments of attitudes and behaviors is important for identifying and overcoming them to promote positive sustainability intentions and subsequent behavioral change. Most importantly, it is necessary to identify the constraints that inhibit an individual from engaging in the desired behavior. Thus, while constraints have been defined differently in other academic disciplines, we use Trail and James's (2015) definition of constraints as the factors (or reasons) that prevent or prohibit an individual from participating in some activity.

Lepisto and Hannaford (1980) identified five types of constraints to purchasing products. Cultural constraints are related to cultural values and norms that lead to decreased purchasing whereas social constraints are defined more narrowly as the negative influences of reference groups. Marketing constraints represent a lack of fit from an organizational perspective between the product and the consumer. Structural constraints reduce consumption because of temporal, spatial, or physical challenges; personal constraints are related to the lifestyle of the consumer. Nevertheless, while Lepisto and Hannaford's constraints are focused more on purchasing and consumption behavior rather than on participation behavior, most of the constraints defined are probably applicable in the case of this study.

Crawford and Godbey (1987) built upon Iso-Ahola's (1981) research on barriers to leisure participation but neither they nor Iso-Ahola mentioned research from the business realm; both come from more of a counseling perspective. According to their theoretical model, Crawford and Godbey

suggested that constraints among participants of leisure activities could be divided into three main categories: intrapersonal, interpersonal, and structural. Intrapersonal constraints were seen as making up the individual's psychological state that could inhibit their motivation for engaging in a specific leisure behavior, interpersonal constraints influenced an individual through social connections or networks that could impede the individual's preference for and participation in a specific behavior, and structural constraints were conceptualized as physical or contextual aspects that could deter a specific leisure behavior. Each individual, however, does not experience equally the influence of each category of constraints, thus making it necessary to understand the varying degrees of influence these constraints have in inhibiting the desired behavior.

Crawford, Jackson, and Godbey (1991) proposed a hierarchical model of leisure constraints to address and explain the conceptual links between the constraint constructs. They argued that constraints were determined by a hierarchy of importance and concluded that an individual would not be able to participate in a leisure activity until after these constraints had been overcome in sequential order. It was a clarified model which was criticized considerably by other researchers (Kay & Jackson, 1991; Scott, 1991; Shaw, Bonen, & McCabe, 1991); indeed, there has been limited support for Crawford and colleagues' three dimensions because the intrapersonal and interpersonal constraints at times lacked discriminant validity while intrapersonal and structural constraints overlapped in some instances. A number of researchers even reported, in fact, that behavioral constraints as proposed by Crawford et al. (1991) were not, in fact, constraints to engaging in specific behaviors (Kay & Jackson, 1991; Scott, 1991; Shaw et al., 1991).

To address the concerns with the model of Crawford et al. (1991), Kim and Trail (2010) proposed a two-dimensional model of constraints, echoing previous arguments about the discriminant validity of the three constraint constructs as proposed by Crawford and Godbey (1987) and the subsequent conceptual model proposed by Crawford et al. (1991). Kim and Trail argued that the intrapersonal and interpersonal should be paired together and conceptualized as internal constraints which they defined as the "internal psychological cognitions that deter behavior" (Kim & Trail, 2010: 194). They likewise conceptualized Crawford et al.'s structural constraints as external constraints, defining these as the "social and environmental aspects that prevent or decrease the likelihood of an individual performing the behavior" (p. 194). Indeed, they found that their two-dimensional model of constraints (internal and external) worked well and had good construct and discriminant validity—an assessment of Kim and Trail's model vis-à-vis the five

categories proposed by Lepisto and Hannaford (1980) shows that the cultural, social, marketing, and structural constraints of the latter's work fit within Kim and Trail's external constraint dimension while their personal constraints are similar to Kim and Trail's internal dimension. In addition, all general categories seem relevant to both participative behavior and purchase behavior as defined by Kim and Trail.

Kim and Trail (2011) showed later on that a hierarchical model of constraints existed, with internal constraints entering the model first followed by external ones, thereby explaining the additional variance. They found that internal constraints (e.g., lack of knowledge, perceived lack of worth) typically needed to be overcome first before external constraints (e.g., lack of interest from others, lack of access/time) could be addressed (Kim & Trail, 2011); both, however, needed to be ameliorated for sustainability behaviors or behavioral intentions to increase. For example, sports organizations are making greater efforts to engage their participants in sustainability behaviors to promote the organization's sustainability initiatives. To engage participants properly in these environmental sustainability campaigns, however, it is necessary to get them to act in environmentally sustainable ways (e.g., recycling, waste diversion).

Engaging sports participants (e.g., runners) in sustainable behaviors can significantly reduce the environmental impact of the organization or event (Collins et al., 2009; Kellison & McCullough, 2016). Previous researchers, however, have focused on sports spectators rather than on sports participants. These two categories differ in their consumption of a sporting event—passive consumption (i.e., watching) as compared to active consumption (i.e., participating; see McDonald, Milne, & Hong, 2002 for a further discussion on such differences). Nevertheless, it is our premise that the general categories of constraints still exist regardless of the distinction between active or passive consumption of sport; it is only the focal point of the action or behavior that changes. For example, the potential internal constraint of lack of awareness exists whether the focal action is participating in a sustainability campaign during a 10K run or attending a sporting event. In both cases, a lack of awareness will prevent the individual from doing either behavior. Researchers examining sustainable behaviors in various sports contexts (McCullough, 2013; McCullough & Cunningham, 2011) have not adequately examined or determined as of yet the influence of internal and external constraints on sustainability intentions, especially among sports participants (e.g., runners in an organized event).

CONSTRAINTS AND SUSTAINABILITY INTENTIONS

As with other behaviors, constraints are the main obstacles that must be overcome for one to engage in sustainability efforts. Research has examined sustainability intention constraints in various contexts, such as from home (Martin, Williams, & Clark, 2006), on campus (Kaplowitz et al., 2009), and at sporting events (McCullough, 2013; McCullough & Cunningham, 2011). While evaluating communication strategies, for instance, Kaplowitz et al. found that lack of knowledge of how and what to recycle significantly decreased intentions to do so. In a similar vein, Martin et al. showed that lack of time to recycle and lack of resources provided by the city were also significant constraints that inhibited intentions to recycle while at home.

Previous researchers have also explored ways to evaluate and explain sustainability intentions within a sports context (Casper, Pfahl, & McCullough, 2014, 2017; Martin, Ross, & Irwin, 2015; McCullough, 2013; McCullough & Cunningham, 2011). These attempts examined behavior from multiple theoretical perspectives, including values-beliefs-norms (VBN; Stern, Dietz, Kalof, & Guagnano, 1995) and the theory of planned behavior (TPB; Ajzen, 1991), with the latter framework based on how behavioral constraints influence individuals on whether or not to engage in specific behaviors. Using the TPB, McCullough and Cunningham (2011) examined the influence that lack of time, conscientious thought to recycle, and access to recycling receptacles (Taylor & Todd, 1995) had on perceived recycling behavioral controls while attending a weekend-long tournament. They did not find these constraints to have significant influence on sustainability intentions.

In an extension of the aforementioned work, McCullough (2013) also examined the sustainability intentions of football tailgaters. He found that the internal constraints of lack of knowledge about how to act sustainably and the perceived lack of worth of doing so reduced sustainable behaviors among them. That is, the tailgaters were less likely to act sustainably when they did not know how or what to recycle and when they did not recognize or understand the value (or worth) of recycling. He also found that external constraints such as the lack of interest from significant others decreased intentions to recycle while tailgating, i.e., individuals who did not have others around them that were interested in acting sustainably (such as recycling) were less likely to act sustainably themselves.

Despite these findings, however, it is still necessary to understand and explain the value-action gap between environmental attitudes and

sustainability intentions (Juvan & Dolnicar, 2014). Further examination is needed to identify which constraints are significant and need to be ameliorated—if not eliminated—to promote sustainable behaviors successfully among sports participants. To this end, we propose a hierarchical constraints model in which internal constraints (specifically lack of knowledge and perceived lack of worth) predict sustainability intentions and external constraints (lack of interest from others and lack of access/time) predict additional variance in sustainability intentions (after controlling for internal constraints [see Figure 1]).

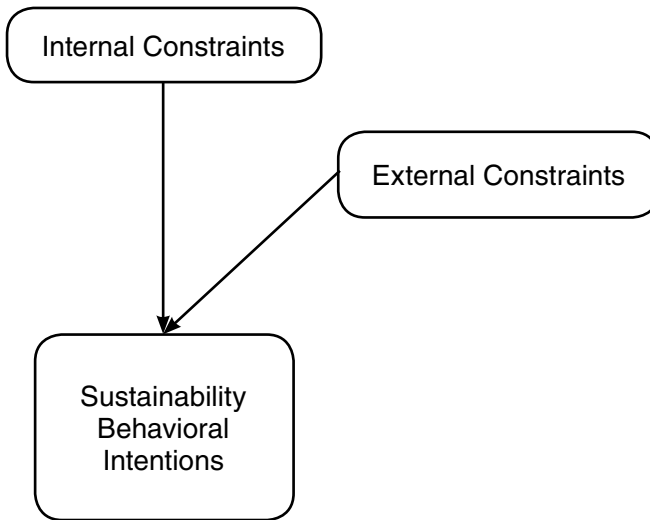


Figure 1: Model of Constraints

Based on this proposed hierarchical constraints model and existing literature, we propose the following hypotheses:

Hypothesis 1: Internal constraints will negatively impact sustainability intentions.

Hypothesis 2: After internal constraints are controlled for, external constraints will explain additional variance in sustainability intentions while further reducing them.

MARKET SEGMENTATION

While the above hypotheses will allow us to assess whether or not the model works and whether or not internal and external constraints will

impact sustainability intentions for the entirety of the sample, Belz and Peattie (2012) suggested that there are differences among people and how “they perceive and respond to [a] sustainability agenda” (p. 104). Thus, there may be different groups (segments) of participants who perceive the constraints as impacting sustainability intentions to a greater or lesser degree compared to other segments. It is necessary, therefore, to determine whether segments exist and, if so, how they differ within the existing model because determining how to eliminate or ameliorate the constraints will vary across segments, as will the communications necessary to connect with each. As Belz and Peattie noted, it would be unwise, due to contextual factors and situational constraints, to base segmentation decisions on prior or generic research data.

Market segmentation is defined as “the process of dividing the total market for a particular product or product category into relatively homogeneous segments or groups” (Ferrell & Hartline, 2005: 135). This cannot be done randomly—as Wedel and Kamakura (2000) suggested, there are six criteria for segmentation: identifiability, substantiality, accessibility, stability, responsiveness, and actionability. *Identifiability* refers to the segment’s being recognizable according to some type of distinctive basis such as psychographic, behavioral, or demographic data. A segment is *substantial* if it is large enough to be worth assessing and *accessible* if the organization can reach and communicate with it. *Stability* refers to the idea of the segment as not varying considerably over time and thus requiring marketing or communication adjustments. *Responsiveness* is concerned with how the segment is “unique enough to respond to differentiated marketing mixes” (Trail & James, 2015: 99). Finally, *actionability* has to do with a segment being defined accurately enough so that managers can effectively and efficiently communicate with it in a sufficiently differentiated manner. Meeting these criteria will allow organizations to “[cope better] with the diversity of consumers and their (sustainability) behavior” (Belz & Peattie, 2012: 153) so that each segment can receive information that is specific and relevant to it.

Belz and Peattie (2012) also suggest that using psychographic variables such as values, attitudes, and needs to determine sustainability market segments is preferable to other methods such as using geographic or demographic variables (although behavioral variables are very useful in some instances). Segments may vary not only by mean scores on referent sustainability attitudes and behaviors but also by the relationships among those attitudes and behaviors. These varying relationships require different communication strategies because the impact of certain variables—constraints in our case—may differ across segments (Belz & Peattie, 2012).

Based on the information above, we thus propose our next hypothesis:

Hypothesis 3: This model will hold across market segments but the impact of specific constraints on intentions will vary by segment.

METHOD

Study Context

We worked with the event organizers of *The Run*, an annual ten-mile “fun-run” held every spring in the mid-Atlantic region of the United States, to evaluate the effectiveness of their campaign messaging strategy. The organizers have expanded their environmental sustainability initiatives in recent years to achieve a higher sustainability certification through the Council for Responsible Sport.

Sample and Procedure

The Run uses a lottery system to award spots to participants, with 17,000 runners selected at random out of all those who sign up. Event organizers thus emailed a link to our survey questionnaire to approximately 17,000 people in their database and posted the link on their Facebook page and website. The initial email was sent two weeks before the race and was followed by two reminder emails about five days apart. The survey was closed on the day before *The Run* took place. The research project was approved by our Institutional Review Board.

We obtained a 5% response rate (746 respondents) but had only 531 complete responses for this analysis, which exceeded the sample size of 376 that was required for a confidence level of 95% and a margin of error of 5%. Of the participants who sent in completed surveys, 93% had completed college ($N = 502$) and most were male (79.3%). The average household income was close to six figures (\$98,000). While a slight majority (54.8%) lived within 15 miles of where *The Run* took place, the average distance traveled was 85 miles as 10% of the runners came from more than 250 miles away to participate. There were no significant differences for any of the demographic variables between those that completed the survey before the final reminder and those that completed it on the final day of the survey (approximately 10% of the respondents), thereby giving some evidence of the sample’s representation of the population.

Instrument

We used two internal constraint dimensions. The first, Lack of Knowledge, had three items that measured a lack of understanding or knowledge about sustainability, waste diversion, and appropriate disposal of waste. The second, Lack of Worth, had three items that measured the perception that waste diversion, recycling, and acting in an environmentally friendly way were not worthwhile. The former items, from Kim and Trail (2010), were slightly modified to focus on sustainability; the latter three, from Pritchard, Funk, & Alexandris (2009), were similarly revised.

We also included two external constraint dimensions: Lack of Interest from Others had three items modified from Kim and Trail (2010) that measured a lack of support in acting sustainably from friends, significant others, and family while Lack of Access/Time included four items about the lack of easily accessible waste receptacles, the ease of throwing waste on the ground instead of accessing receptacles, the understanding that race workers will clean up the wrappers thrown on the ground, and the lack of time to look for waste receptacles. These latter items were based on the general concepts from Pritchard et al. (2009).

We also included an item created specifically for this research that measured the intention to dispose of waste properly during *The Run* (sustainability intention). The specific items in each dimension are listed in their respective figures (Figures 2–6). All items have a seven-point Likert-type response format ranging from 1 (“Strongly Disagree”) to 7 (“Strongly Agree”).

Other items included in the survey measured personal needs, values, and identity and were used solely in the cluster analysis to determine the number of groups. There were ten items representing needs (physical fitness, personal safety, financial security, true friendship, social acceptance, intimacy, family togetherness, wisdom, inner peace, and curiosity) and six items representing values (environmentalism, kindness, social justice, global peace, tolerance, and aesthetics). An additional four items represented identity (identifying as a runner, as an environmentalist, with the community, and with *The Run* itself). Both the needs and values items were measured on a nine-point scale, with 1 = Opposed to my Needs/Values, 2 = Not Important, 5 = Important, 8 = Very Important, and 9 = Of Supreme Importance (cf. Schwartz, 1992). The identity items were measured on a seven-point scale ranging from 1 = Strongly Disagree to 7 = Strongly Agree.

Demographic and geographic variables were also included in the survey.

Item Name	Item Definition
Behavioral Intention	
intention	The next time I participate in the Cherry Blossom Run I will make sure to dispose of my wrappers/cups in an appropriate receptacle.
Lack of Knowledge	
lacknow1	I don't understand what the term "sustainable" means when applied to a race like the Cherry Blossom Run.
lacknow4	I don't understand what the term "waste diversion" means.
lacknow5	I don't know how to appropriately dispose of my wrappers while I'm running the race
Lack of Worth	
lackworth2	I don't understand why The Run is worried about diverting waste from the landfill.
lackworth3	I don't think recycling is worthwhile.
lackworth4	Acting in an environmentally friendly way won't improve the environment enough to make a difference.
Lack of Interest from Others	
lackint1	My family is not interested in acting sustainably.
lackint2	My significant other is not interested in acting sustainably.
lackint3	My friends are not interested in acting sustainably.
Lack of Time/Access	
lacktime1	I don't have time to find a waste receptacle while I'm running the race.
lackacc1	When running the Cherry Blossom, there are no easily accessible waste receptacles along the course.
lackacc2	It is just easier to throw my wrappers on the ground while running than to look for a waste receptacle.
lackacc3	I know that if I throw my wrappers/cups on the ground during the run, race workers will pick them up for me.

Table 1: Item Names and Item Definitions. The items had content and face validity as they were deemed appropriate for measuring each specific aspect as designated by several faculty and event staff. No internal consistency or construct reliability measures were attempted as the items were not designed to measure a single construct. The individual items were used in the regression analyses.

RESULTS

Model for Total Sample

Similar to Kim and Trail (2011), we performed a hierarchical multiple regression to test the proposed model. Correlations among the variables included in the regression are shown in Table 2. The hierarchical regression on the whole sample supported the proposed model and the hypothesis that external constraints would explain additional variance in sustainability intentions after internal constraints were controlled for (Table 3). All the items for the two internal constraints dimensions were entered first into the regression equation as a block and explained 21.3% of the variance in sustainability behavior intentions. Then, after internal constraints were “controlled for,” all the external constraint items were entered into the regression equation as a block and explained an additional 9.8% of the variance in sustainability behavior intentions for a total of 31.1% (Figure 2).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	1.000													
B	-.209	1.000												
C	-.223	.416	1.000											
D	-.393	.206	.253	1.000										
E	-.250	.402	.459	.155	1.000									
F	-.236	.213	.261	.193	.294	1.000								
G	-.221	.201	.331	.148	.407	.310	1.000							
H	-.198	.341	.328	.092	.462	.249	.319	1.000						
I	-.242	.217	.275	.152	.276	.213	.202	.396	1.000					
J	-.183	.219	.358	.184	.286	.205	.189	.343	.437	1.000				
K	-.374	.154	.251	.518	.181	.136	.177	.164	.233	.260	1.000			
L	-.235	.153	.228	.395	.164	.086	.149	.112	.153	.144	.336	1.000		
M	-.452	.111	.171	.449	.139	.092	.167	.127	.122	.142	.558	.273	1.000	
N	-.232	.130	.105	.273	.127	.008	.072	.102	.114	.019	.402	.193	.414	1.000

Table 2: Correlations among Constraints and the DV.

Legend: A = intention; B= lacknow1; C=lacknow4; D=lacknow5; E=lackworth2; F=lackworth3; G= lackworth4; H=lackint1; I=lackint2; J=lackint3; K=lacktime1; L=lackacc1; M= lackacc2; N=lackacc3

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.462 ^a	.213	.204	.8793	.213	23.642	6	524	.000
2	.558 ^b	.311	.294	.8283	.098	10.509	7	517	.000

a. Predictors: (Constant), lackworth4, lacknow5, lacknow1, lackworth3, lacknow4, lackworth2

b. Predictors: (Constant), lackworth4, lacknow5, lacknow1, lackworth3, lacknow4, lackworth2, lackacc3, lackint2, lackacc1, lackint3, lackacc2, lackint1, lacktime1

Coefficients ^a						
Model	B	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		Std. Error	Beta			
1	(Constant)	7.396	.105		70.366	.000
	lacknow1	-.033	.027	-.054	-1.218	.224
	lacknow4	-.010	.032	-.014	-.302	.762
	lacknow5	-.210	.026	-.330	-8.126	.000
	lackworth2	-.092	.041	-.107	-2.250	.025
	lackworth3	-.100	.042	-.101	-2.384	.017
	lackworth4	-.056	.030	-.082	-1.855	.064
2	(Constant)	7.756	.154		50.279	.000
	lacknow1	-.031	.026	-.051	-1.206	.228
	lacknow4	.009	.031	.013	.285	.776
	lacknow5	-.103	.029	-.162	-3.500	.001
	lackworth2	-.066	.040	-.078	-1.657	.098
	lackworth3	-.103	.040	-.103	-2.572	.010
	lackworth4	-.030	.029	-.043	-1.028	.305
	noint1	-.005	.034	-.006	-.134	.894
	noint2	-.073	.029	-.109	-2.525	.012
	noint3	.011	.035	.014	.312	.755
	lacktime1	-.026	.026	-.049	-.994	.321
	lackacc1	-.016	.029	-.022	-.550	.583
	lackacc2	-.156	.024	-.300	-6.420	.000
lackacc3	-.004	.024	-.007	-.171	.864	

Table 3: Model Summary of Hierarchical Multiple Regression on the Total Sample

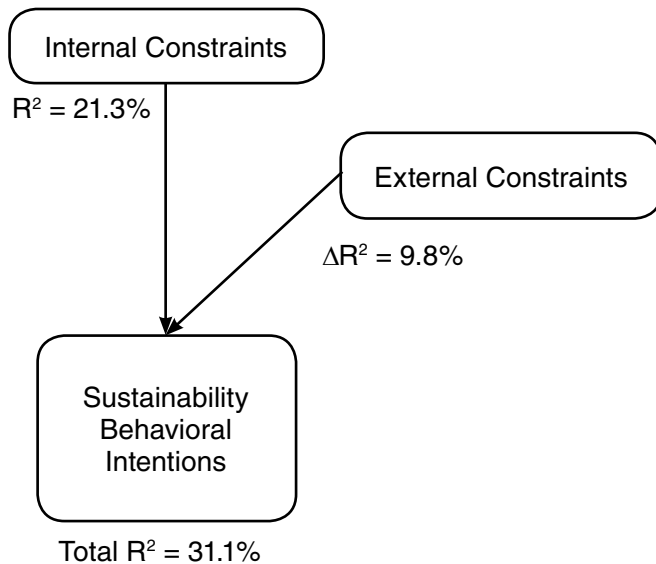


Figure 2: Impact of Internal and External Constraints on Sustainability Behavioral Intentions

Following the procedures outlined by Aldenderfer and Blashfield (1984) and supplemented by information from Sarstedt and Mooi (2014), we initially used a hierarchical cluster procedure in SPSS 22 to determine the potential number of clusters. The collinear diagnostics showed that no variables in the cluster analysis shared more than 46% of the variance (correlation table available from the authors). We determined that either 8 or 3 clusters would be most appropriate based on the dendrogram in the hierarchical analysis. We used a K-Means Cluster Analysis (squared Euclidean Distance) in SPSS 22 with the needs, values, and identity items noted above again as determining variables. Between the 3- and 8-cluster solutions, we chose the 8-cluster one even though the number of iterations was the same (12) for both because the ratio of the number of cases across segments was smaller and we felt that more segments would provide the potential for greater distinction. We had to eliminate 2 of the 8 clusters, however, which had only 2 and 11 cases, respectively. We thus ended up with six distinct and viable segments which existed in the sample (Figure 3).

We named Segment 1 Social Justice Visitors (SJVs) because this segment scored highly on social justice values and came primarily from out-of-town. We called Segment 2 Loyals because of their attachment to *The Run* and their long-term association with it. Segment 3 was labeled Unawares because they had very little knowledge about sustainability in

general, let alone as specific to *The Run*. Segment 4 was called Runners for Sustainability (RfS) because of their high environmentalism values and because they scored the highest on having a “runner identity.” We labeled Segment 5 Conventionals and also called them Inner-Focused Metros because they were primarily from the metro area and focused on their own physical fitness and financial security, with limited interest in environmentalism, global peace, or social justice. Finally, we called the last segment Local Runner Culture (LRC) because they were both highly connected to the local community and fairly highly identified as runners. There were no meaningful differences (variance > 4%; see Cohen, 1988) across the segments on the demographic variables (Table 4).

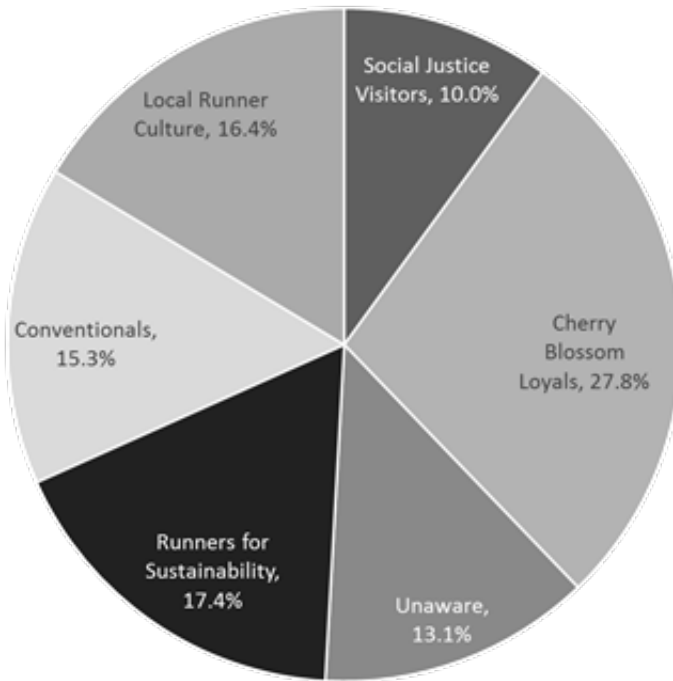


Figure 3: Runner Segments Based on Cluster Analysis.
 Social Justice Visitors, 10.0%; Cherry Blossom Loyals, 27.8%; Unaware, 13.1%; Runners for Sustainability, 17.4%; Conventionals, 15.3%; Local Runner Culture, 16.4%

	Social Justice Visitors	Cherry Blossom Loyals	Unaware	Runners for Sustainability	Conventionals	Local Runner Culture	Total Sample	Univariate GLM results
Sex = Male	84.60%	81.30%	83.80%	84.40%	65.80%	76.50%	79.30%	F(5, 512) = 2.86, $\rho = .026$, $\eta^2 = .025$
Education (4 = College grad)	M= 4.46 (SD = .75)	4.54 (.60)	4.41 (.58)	4.51 (.64)	4.43 (.63)	4.51 (.65)	4.49 (.63)	F(5, 512) = .54, $\rho = .748$, $\eta^2 = .005$
Household Income	\$117,500 (\$33,744)	\$107,500 (\$35,199)	\$86,480 (\$31,219)	\$98,140 (\$37,071)	\$107,000 (\$33,520)	\$87,420 (\$35,180)	\$98,000 (\$34,100)	F(5, 512) = 4.15, $\rho = .001$, $\eta^2 = .039$
Distance Traveled (miles)	147.4 (453.8)	71.9 (175.2)	94.4 (195.2)	129.2 (222.3)	67.9 (165.1)	30.6 (76.5)	85.0 (220.5)	F(5, 512) = 2.86, $\rho = .015$, $\eta^2 = .027$

Table 4: Segment and Total Sample Demographic Characteristics. Means are the upper value and standard deviations are in parentheses.

A univariate GLM showed that the segments differed on sustainability intentions [F(5, 517) = 25.193, $p < .001$, $h^2 = .197$] (Figure 4), thereby giving preliminary evidence that the clusters should be evaluated separately and providing criterion validity.

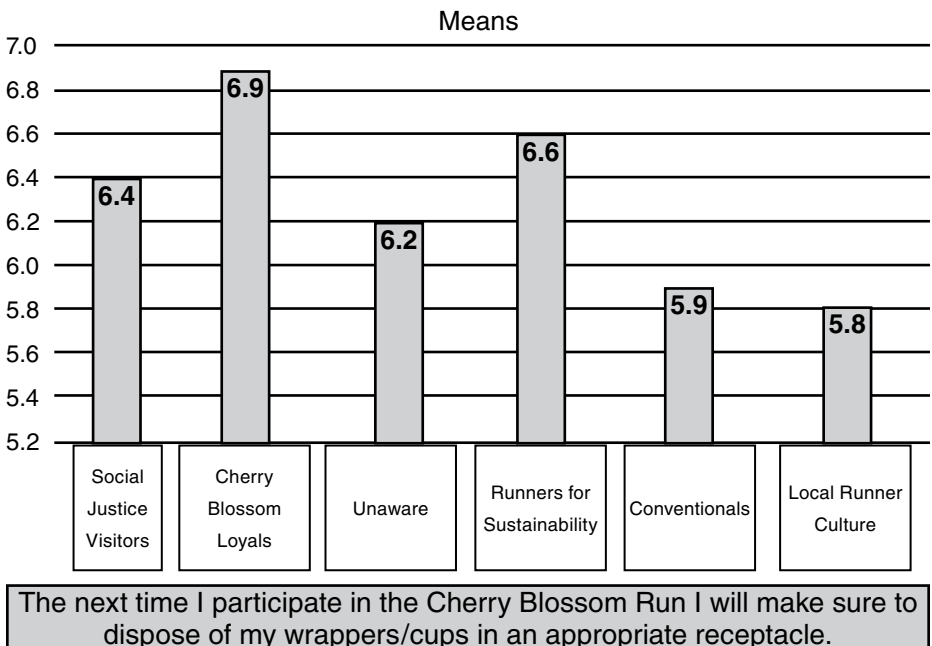


Figure 4: Means of Sustainability Intentions by Segment

Four separate multivariate GLM analyses, moreover, showed segment differences on all four sets of constraints—the two internal constraints (Lack of Knowledge [F(15, 1408) = 31.127, $p < .001$, $h^2 = .232$] and Lack of Worth [F(15, 1408) = 17.863, $p < .001$, $h^2 = .148$]) and the two external constraints (No Interest from Others [F(15, 1408) = 16.597, $p < .001$, $h^2 = .139$] and Lack of Access/Time [F(20, 1689) = 24.234, $p < .001$, $h^2 = .189$]) (Figures 5–8). The eta squared values also showed that some clusters differed fairly substantially across the different constraint categories. Figure 5, for example, shows that the Unaware group scored significantly and meaningfully higher than the other five groups on a lack of understanding about what the term “sustainable” meant. The Loyals disagreed with that statement though, indicating that they did understand what the term meant, and they scored significantly lower (better) than the other groups on that item.

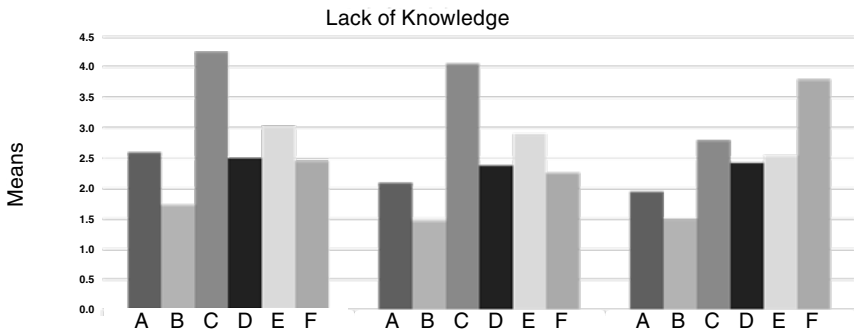
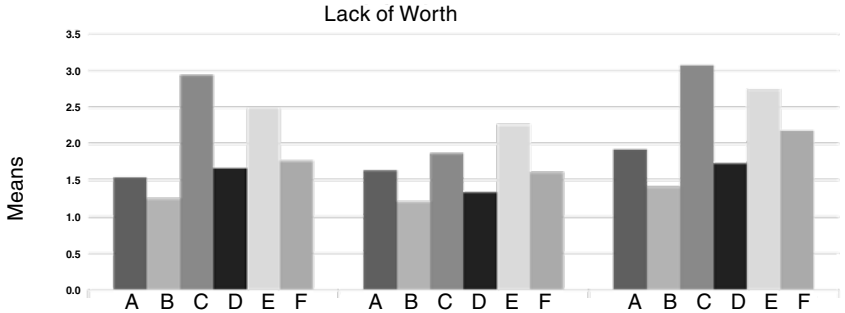
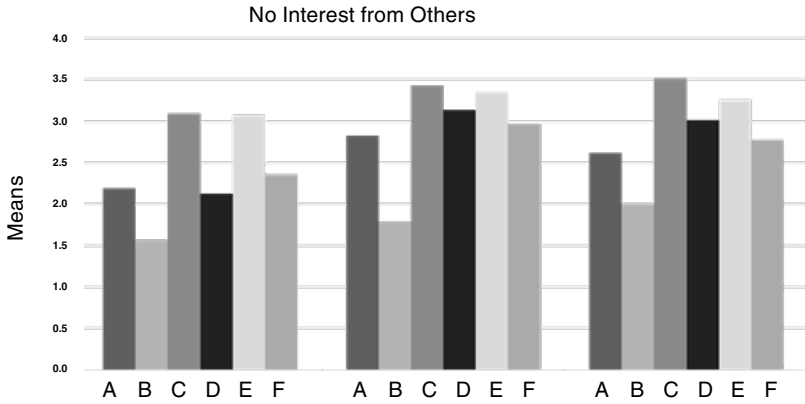


Figure 5: Means of Lack of Knowledge Items by Segment



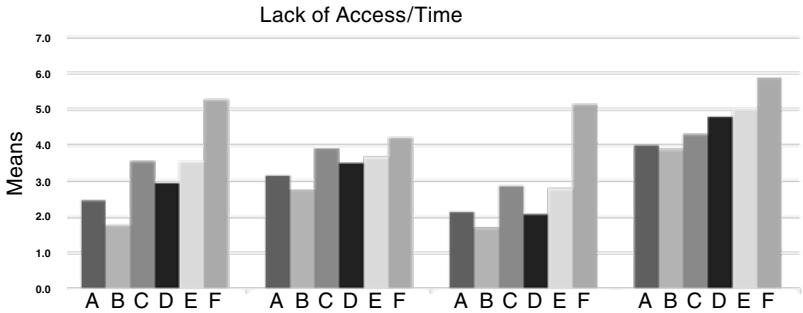
	I don't understand why the Cherry Blossom Run is worried about diverting waste from the landfill.	I don't think recycling is worthwhile.	Acting in an environmentally friendly way won't improve the environment enough to make a difference.
Social Justice Visitors (A)	1.5	1.6	1.9
Cherry Blossom Loyals (B)	1.3	1.2	1.4
Unaware (C)	2.9	1.9	3.1
Runners for Sustainability (D)	1.7	1.3	1.7
Conventionals (E)	2.5	2.3	2.7
Local Runner Culture (F)	1.8	1.6	2.2

Figure 6: Means of Lack of Worth Items by Segment



	My family is not interested in acting sustainably.	My significant other is not interested in acting sustainably.	My friends are not interested in acting sustainably.
Social Justice Visitors (A)	2.2	2.8	2.6
Cherry Blossom Loyals (B)	1.6	1.8	2.0
Unaware (C)	3.1	3.4	3.5
Runners for Sustainability (D)	2.1	3.1	3.0
Conventionals (E)	3.1	3.3	3.3
Local Runner Culture (F)	2.4	3.0	2.8

Figure 7: Means of No Interest from Others Items by Segment



	I don't have time to find a waste receptacle while I'm running the race.	When running the Cherry Blossom, there are no easily accessible waste receptacles along the course.	It is just easier to throw my wrappers on the ground while running than to look for a waste receptacle.	I know that if I throw my wrappers/cups on the ground during the run, race workers will pick them up for me.
Social Justice Visitors (A)	2.5	3.2	2.1	4.0
Cherry Blossom Loyals (B)	1.8	2.8	1.7	3.9
Unaware (C)	3.5	3.9	2.9	4.3
Runners for Sustainability (D)	2.9	3.5	2.1	4.8
Conventionals (E)	3.5	3.7	2.8	5.0
Local Runner Culture (F)	5.3	4.2	5.1	5.9

Figure 8: Means of Lack of Access/Time Items by Segment

Model Testing and Fit

Stepwise hierarchical regression analyses on each segment showed differential impacts of internal and external constraints on sustainability intentions. Similar to the regression for the entire data set, the internal constraint items were all entered in the first block for each segment followed by all of the external constraints entered in the second block.

Relationships Between IVs and DVs

For Social Justice Visitors, internal constraints (specifically Lack of Knowledge) explained 8.5% of the variance in intentions to dispose of waste properly while external constraints (Lack of Access) explained

an additional 17.3% for a total of 25.8% of the variance. For Loyals, internal constraints (Lack of Knowledge and Lack of Worth) explained 10.3% and external constraints (Lack of Time) an additional 2.6% for a total of 12.9% of the variance in intentions to dispose of waste properly. For the Unaware segment, Lack of Worth (internal) explained 23.2% and Lack of Time (external) an additional 7.1% for a total of 30.3% of the variance. For the Runners for Sustainability segment, Lack of Worth explained 10.0% and Lack of Knowledge an additional 6.6% (both internal constraints) for a total of 16.6%; external constraints were not significantly related to intentions for this segment. For the Conventionals segment, Lack of Knowledge explained 18.1% and Lack of Worth an additional 4.1% (both internal constraints) while Lack of Access explained an additional 10.9% for a total of 33.1%. Finally, for the Local Runner Culture segment, the internal constraint of Lack of Knowledge explained 5.7% and Lack of Access an additional 5.7% for a total of 11.4% of the variance in intentions to dispose of waste properly. The beta weights and total variance are shown in Figure 9.

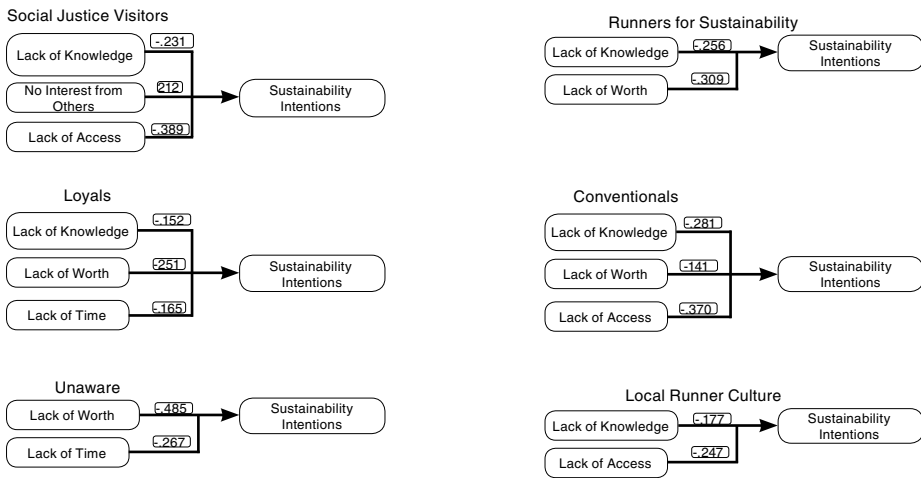


Figure 9: Beta Values for Path Coefficients for Significant Predictors Only on Sustainability Intentions by Segment

DISCUSSION

The focus of the study was to use constraint theory (Crawford & Godbey, 1987; Crawford et al., 1991; Kim & Trail, 2010, 2011) to investigate the impact of internal and external constraints on the sustainability behavior intentions of participants in a ten-mile run. Market segmentation has typically been used to examine whether different

groups of people have different sustainability attitudes or behave in different ways (Belz & Peattie, 2012). When distinct and viable segments are determined, organizations can create different communication or sustainability campaigns to address each segment more effectively and efficiently instead of wasting resources directing communications to an audience that has no interest in the message. We proposed specifically that lack of knowledge about sustainability and perceiving that acting sustainably has no value or lacks worth (internal constraints) as well as lack of interest from others concerning sustainability and lack of time or access relative to sustainability actions (external constraints) would negatively impact the sustainability intentions of participants in *The Run* when it came to waste diversion. We also proposed that the model would hold across segments although with the impact of constraints on intentions varying by segment.

Overview of the Significant Findings

The model fit the data well when it was tested on the entire sample. Internal constraints such as lack of knowledge and perceived lack of worth do predict variance in intentions to act sustainably, specifically in this instance of proper waste disposal either by recycling, composting, or putting trash in the correct receptacle. Once internal constraints were controlled for, the external constraints of lack of interest by others to act sustainably and lack of time and access explained additional variance in sustainability intentions.

We suspected, however, that multiple segments of participants would exist based on Belz and Peattie's (2012) suppositions and that they would differ not only in beliefs about constraints and sustainability intentions (which they did) but also in the impact of internal and external constraints on intentions. That is, we hypothesized that different constraints would impact each segment differently. This was borne out as each segment had a different set of constraints that negatively impacted intentions, with the amount of variance in sustainability intention which the constraints explained going from as low as 11.4% in the Local Runner Culture segment to as high as 33.1% in the Conventionals segment.

For the Social Justice visitors, the internal constraint of lack of knowledge did not have a substantial impact on intentions to dispose of waste properly while perceived lack of worth was also not significant at all. This indicates, not surprisingly, that internal constraints for this segment could easily be overcome if necessary. The external constraint of lack of access, however, was a substantial negative predictor of intentions, showing that organizers of *The Run* had not sufficiently educated this segment about how and where to dispose of their waste during the race.

This differed quite a bit from the Loyals for whom lack of knowledge was a slight constraint. Perceived lack of worth had a larger negative impact on intentions but this was still relatively small. This indicated that the Loyals saw the value in general of diverting waste from the landfill (100% agreed with this sentiment) and were knowledgeable in general about sustainability and what *The Run* was trying to accomplish. They were supportive of *The Run's* agenda, having been associated with it for long enough and sufficiently educated about the event's endeavors to be sustainable. However, the more the Loyals felt that they did not have sufficient time to find a waste receptacle while running the race, the less likely they were to dispose of waste correctly. Luckily, only 4.9% of this segment indicated that they would not do so.

While the Unaware segment indicated that their lack of knowledge was a constraint, it was not the primary predictor of their intentions. More importantly, this segment unfortunately did not see the value of acting sustainably (lack of worth)—the more they did not think recycling was worthwhile, the more likely they were to just throw their waste on the ground and not dispose of it properly. Moreover, even if this internal constraint could be ameliorated through educational communications, this segment did not think that they would have the time to find a waste receptacle during the race (external constraint). Event organizers of *The Run* will have to do quite a bit of work to get this group to dispose of their waste properly during the event.

Less than 2% of those in the Runners for Sustainability segment felt that recycling was not worthwhile, yet they were more likely to throw their waste on the ground during the race as this internal constraint increased. Part of this was due to a lack of knowledge about appropriately disposing of waste (e.g., wrappers, etc.) during the race, as 11% of this segment indicated that they did not know how to do so. This lack of sufficient education for this segment was the fault of *The Run's* organizers to some extent, especially since a majority of this segment had never run this race before. Appropriate educational communications would probably alleviate these internal constraints fairly easily as these runners already want to act sustainably and intend to do so. Indeed, this segment had no influence from external constraints, indicating that they would take the time to access the waste receptacles and dispose of their waste appropriately during *The Run*.

The Conventionals lacked knowledge about sustainability in general, and specifically about how to dispose of waste appropriately, second only to the Unaware segment. This, moreover, was a substantial constraint for them to act responsibly during the race. They also did not see the

value of *The Run* in trying to divert waste from the landfill, although this impacted their actions less than their lack of knowledge did. It seems that organizers of *The Run* would have difficulty in convincing this group to change their attitudes and in educating them to act more sustainably given that they are not interested in acting consciously for the environment in the first place. Indeed, even if such internal constraints could be overcome, these Conventionals indicated that they would find it easier to just throw their wrappers on the ground than try to find a waste receptacle. Educating them in an attempt to change their behavior would probably be an arduous process.

The final segment, Local Runner Culture, was not constrained very much at all; in fact, they were the least impacted by constraints out of all the segments. Their largest internal constraint, a lack of understanding of what the term “sustainable” meant, negatively impacted their disposal behavior during the race only to a small degree. Such a constraint can easily be reduced or eliminated by communicating more effectively with this segment and educating them about the term. Only one external constraint had a significantly negative impact—their belief that there were no easily accessible waste receptacles along the course. This was an accurate assessment to some extent as organizers of *The Run* had only recently improved accessibility to waste receptacles along the course and had not yet implemented a communication campaign to educate participants about the ease of disposing of their waste. Nevertheless, this was a very small constraint for this segment and could be easily ameliorated through education because this group did want to dispose of their waste properly.

Implications for the Study

Internal constraints need to be dealt with first by educating the participants not only on how to act more sustainably but also on the importance of doing so not only for the event but for other participants, spectators, and the local community as well. Ameliorating internal constraints, however, is typically more challenging than dealing with external constraints. Indeed, making people aware of sustainability issues is not overly difficult but changing belief systems certainly is.

Fixing external constraints, therefore, is usually less difficult, and is often something under the organization’s control. For example, *The Run* needed to make the waste receptacles much easier to access during the race itself as well as increase their number and frequency along the course. Organizers then needed to communicate more effectively about where the receptacles were located, both before (through more

extensive communications) and during (with better signage along the course indicating that waste receptacles were coming up) the race.

The key for organizations is to communicate and educate more effectively than they typically already do. Positively reinforcing sustainable behaviors while trying to decrease unsustainable ones should also help. Organizations need to understand, however, that they have different segments, that these segments have different belief systems and levels of knowledge, and that they will respond differently to various communications and education attempts. Organizations need to understand their different segments and communicate appropriately with each.

Limitations

One obvious limitation of this study was that it was focused solely on one event at one time and so may not be as generalizable as desired. Similar to previous research, however, the model was supported in general and in each of the segments studied. Taken as a whole, therefore, this evidence ameliorates the generalizability concern to some extent. Second, given that ours was a cross-sectional study that occurred before the event, we were unable to collect actual behaviors of the runners during the race itself. We even wanted to do a follow up study after the race but the organization was not inclined. Third, while there were additional constraints that might have been examined, we focused on the ones that we felt (based on previous research) were those most likely to explain behavioral intentions.

Recommendations

Practitioners are encouraged to evaluate the constraints that customers (e.g., participants) might encounter which may inhibit them from engaging in desired behaviors (e.g., recycling, composting, etc.). While the internal and external constraint dimensions (not necessarily the specific items) used in this study are applicable to other contexts in and outside of sport, researchers and practitioners alike should determine the specific constraint items that are relevant to their context and that may inhibit desired behavioral outcomes. As noted above, moreover, organizations need to deal with internal constraints first. When dealing with waste disposal issues, for example, they need to enhance education on what recycling and composting mean in general. They need to improve education communications about the benefits of recycling and composting to increase their perceived worth/value.

However, even if internal constraints are controlled, external constraints may still prevent people from performing sustainable behaviors. Organizations, for instance, still need to enhance communications about the *processes* of recycling/composting that are specific to the particular event so that participants understand how to dispose of their waste properly. They also need to check whether or not the beliefs of family and friends about sustainability impact the actions of the participant (although that was not relevant in this particular sample). If so, the organization needs to educate not only the participants but friends and family as well about acting sustainably.

That being said, these communications probably need to vary by segment because each segment is impacted by various internal and external constraints in different ways. Each organization, therefore, needs to do their own research to determine what segments exist and what specific constraints are relevant to each. Once those are determined, communications specific to each segment can be created.

CONCLUSION

We found support for constraint theory and the hierarchical constraint model which shows that internal constraints need to be addressed first before external constraints become relevant. Both, however, have typically negative impacts on sustainability behavior and need to be ameliorated if not eliminated. We also showed that it is very important for organizations to realize that they probably have multiple segments of participants, customers, or clients and that they need to interact and communicate with each segment differently. Finally, we suggested various ways of addressing both the internal and external constraints, both those specific to *The Run* and in general.

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INNOVACIÓN PARA SOSTENIBILIDAD

UN LLAMADO PARA UNA ACTITUD ABOLICIONISTA QUE LIBERE NUESTRA IMAGINACIÓN Y RESULTE EN ACCIÓN

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Cada habitante de este planeta debe pensar en el día cuando ya no se podrá vivir en este planeta.

John F. Kennedy pronunció estas palabras hace casi 60 años en su discurso ante las Naciones Unidas en 1961 (Kennedy, 1961). En aquel momento, Kennedy no estaba hablando de las consecuencias del cambio climático, que no era una preocupación en esos tiempos, sino de los efectos de una guerra nuclear. Sus palabras elocuentemente expresaron un mensaje funesto—y no importo que la audiencia hubiera o no experimentado un ataque nuclear—todos aceptaron la lógica sobre el efecto de un conflicto nuclear. Nadie tuvo duda de la certeza del pronóstico. La amenaza de la bomba de hidrógeno fue reconocida por todos como un hecho y la ciudadanía colectivamente entendió que tenía que actuar y prepararse para enfrentar esta amenaza.

Veinte y siete años después del discurso de Kennedy, en 1988, James Hansen, director del Instituto Goddard de NASA dictó un mensaje parecido al de Kennedy en su histórico testimonio ante el Congreso de los EE. UU. (Shabecoff, 1988). En su testimonio, Hansen afirmó que la comunidad científica tenía un 99 por ciento de certeza que el planeta se estaba calentando rápidamente como consecuencia del acumulamiento

de emisiones de combustibles fósiles¹ y de otras actividades humanas. Este rápido trayecto en el calentamiento alteraría el clima de tal manera que resultaría en un drástico cambio en la vida de la Tierra. Hansen predijo que el resultado del acumulamiento de emisiones de carbono se manifestaría en: calentamiento y temperaturas crecientes, sequías, inundaciones, expansiones térmicas en el océano y el derretimiento de los glaciares que causaría que los niveles del mar aumentasen de uno a cuatro pies para el 2050. Hansen pidió al Congreso una urgente acción colectiva para reducir las emisiones de carbón. Sin embargo, a diferencia del llamado de Kennedy, el mensaje de Hansen no resultó en acción colectiva y hubo un marcado escepticismo resultando en inacción (Rich, 2018).

La comunidad científica ha confirmado que las predicciones y modelos matemáticos de Hansen han estado correctos (Gillis, 2018). Tal como predijo hace casi tres décadas, la temperatura de la Tierra ha subido en promedio unos 1.8 grados Fahrenheit y el planeta ha experimentado una racha asombrosa de calentamiento récord, huracanes, tifones, incendios forestales, y acidificación de los océanos causada por las emisiones de dióxido de carbono. El Resumen político del grupo intergubernamental de expertos sobre el cambio climático (*Intergovernmental Panel on Climate Change* o IPCC) de las Naciones Unidas concluyó en octubre del 2018 que el promedio de la temperatura global podría subir unos 2.7 grados Fahrenheit² para el 2030—y seguramente para el 2040—de no haber una considerable reducción en las emisiones de CO₂. De hecho, el informe concluye que aun si se redujeran estas emisiones de inmediato, solo se retrasaría la subida en temperatura, pero no se prevendría completamente el calentamiento de 2.7 grados.

Más de treinta años después del testimonio de Hansen, se han hecho innumerables llamamientos urgentes sin aparente resultado. Las emisiones de carbón continúan creciendo a un ritmo más acelerado que nunca y el planeta continúa calentándose. En 2014 por ejemplo, Elizabeth Kolbert analizó el trabajo de la comunidad científica llegando a la conclusión de que la actividad humana y el cambio climático provocarán la extinción del 20 a 50 por ciento de todas las especies vivas para finales de este siglo—en lo que ella denomina “La sexta extinción” (Kolbert, 2014). Está claro que el deterioro precipitado de la biodiversidad de la Tierra y la extinción de especies en la flora y fauna

¹Los combustibles fósiles son de origen no-renovable y son 4: petróleo, carbón natural, gas natural y gas licuado; y se caracterizan por las emisiones producidas al quemarlos de CO₂ (carbón).

²2.7 °F = 1.5 °C

han sido causados por actividad humana. Si bien el cambio climático y la contaminación son impulsores de esta destrucción, Kolbert también discute el efecto de los patrones destructivos de consumo humano, la pérdida y degradación del hábitat de las especies, la sobreexplotación de recursos y la introducción de especies invasivas como factores que han acelerado esta extinción masiva. El Fondo mundial para la naturaleza (*World Wildlife Fund* o WWF) confirma lo que predice Kolbert. El Informe Planeta Vivo 2018: Apuntando hacia las Alturas (*Living Planet Report 2018: Aiming Higher*) concluye que entre el 1970 y 2014 ha habido una disminución de entre 60 por ciento en especies de vertebrados y de 83 por ciento en animales de agua dulce (WWF, 2018). Marco Lambertini del WWF nos plantea en el prólogo del informe que:

Esta no es una historia de fatalidad y pesimismo; es la realidad. La disminución significativa de poblaciones de vida silvestre que nos muestra el último Índice Planeta Vivo concluye que ha ocurrido—una disminución del 60 por ciento en un poco más de 40 años—un aviso desalentador y tal vez indicador definitivo de la presión que ejercemos sobre el Planeta.

Como Kolbert, Lambertini advierte que la Tierra está en el medio de una sexta extinción antrópica (causada por la actividad humana) que tal vez será el legado más duradero de la humanidad, retándole al lector a que reconsidere la pregunta fundamental que significa ser humano.

Sin embargo, quizás el llamamiento más valiente, convincente y urgente ha sido la Encíclica del 2015 *Laudato Si'* del Papa Francisco (Francisco, 2015; véase también IPCC, 2018), un documento detallado que denuncia que el consumerismo y el desarrollo irresponsable del género humano, ha causado la destrucción definitiva de nuestra “casa.” El Papa Francisco advierte explícitamente que la conservación y el cuidado de nuestro mundo natural no es una “opción” sino una parte integral y esencial de las enseñanzas de la Iglesia sobre justicia social. Aún más importante, *Laudato Si'* acepta inequívocamente el consenso científico sobre el cambio climático antrópico y pide urgentemente a todos los pueblos del mundo que tomen “una acción global rápida y unificada.”

Hay un consenso científico muy consistente que indica que nos encontramos ante un preocupante calentamiento del sistema climático ... numerosos estudios científicos señalan que la mayor parte del calentamiento global de las últimas décadas se debe a la gran concentración de gases de efecto invernadero (anhídrido carbónico, metano, óxidos de nitrógeno y otros) emitidos sobre todo a causa de la actividad humana. Al concentrarse en la atmósfera, impiden que el calor de los rayos solares reflejados por la tierra se disperse en el espacio. Esto se ve potenciado especialmente por el patrón

de desarrollo basado en el uso intensivo de combustibles fósiles, que hace al corazón del sistema energético mundial. (Francisco, 2015: #23)

Si la actual tendencia continúa, este siglo podría ser testigo de cambios climáticos inauditos y de una destrucción sin precedentes de los ecosistemas, con graves consecuencias para todos nosotros. (Francisco, 2015: #24)

LA NEGACIÓN DEL CAMBIO CLIMÁTICO

Tenemos más [certeza] de que los gases causantes del efecto invernadero son responsables del cambio climático que de la certeza que tenemos de que el fumar causa el cáncer.

—Kate Marvel, científica atmosférica de NASA (Marvel, 2018)

Produce una inmensa tristeza pensar que la naturaleza habla y el género humano no la escucha.

—Victor Hugo (1840)³

En su libro *The Great Derangement: Climate Change and the Unthinkable* en el 2016 (El gran desarreglo: el cambio climático y lo impensable), Amitav Ghosh indica que la extensión de la crisis es de tal magnitud, que es “impensable” que alguien pueda negar el hecho del antrópico cambio climático. Sin embargo, encuestas y sondeos recientes, insinúan que más del 30 por ciento de los estadounidenses no cree que la ciencia está clara sobre que causa el calentamiento (Brenan & Saad, 2018). A diferencia de la reacción colectiva al llamado de Kennedy en 1961, un porcentaje significativo de la población no solo no cree en el consenso científico de que existe una conexión entre las emisiones de combustibles fósiles y el cambio climático, sino que algunos no creen que el clima haya cambiado. El rechazo a un hecho tan claro es un punto ciego enorme difícil de entender, pero que tenemos que reconocer. En su informe del 18 de octubre 2018, con el título “Even Americans highly concerned about climate change dramatically underestimate the scientific consensus” (Incluso los estadounidenses que están preocupados por el cambio climático subestiman dramáticamente el consenso científico), Gustafson y Goldberg de Programa de Yale de Centro de Comunicaciones sobre el cambio climático (Yale Program on Climate Change Communication Center) encuentran que aunque más del 97 por ciento de los científicos están convencidos de que se está produciendo un calentamiento global

³Véase Hugo, 1968: 145.

antrópico,⁴ un gran porcentaje de los estadounidenses cuestiona el grado de consenso con respecto a la conexión entre las emisiones de combustibles fósiles y el cambio climático. En otras palabras, una gran cantidad de estadounidenses piensan que hay duda científica sobre las causas del cambio climático. Gustafson y Goldberg sostienen que las campañas de desinformación afirman equivocadamente que “todavía hay mucha duda entre los científicos” con respecto al clima, si este está cambiando o si el cambio lo provocan los seres humanos. Tal demagogia recalca la necesidad urgente de que se comunique de manera eficaz y contundente el hecho de que la ciencia ya ha determinado que esta causando el cambio climático. Es necesario desarrollar mensajes claros sobre el indiscutible consenso científico para fortalecer y solidificar, al menos, las actitudes pro-climáticas ya existentes.

Hay que también reconocer una creciente tendencia global populista en contra de las “élites liberales intelectuales” en el que se incluye a los científicos y los miembros de la academia. En su libro *The Age of American Unreason* (La edad de la insensatez estadounidense [2009]), Susan Jacoby elocuentemente detalla la convergencia de fuerzas sociales en los últimos 40 años que han creado un ambiente fértil para el desarrollo de “un movimiento de antirracionalismo y rechazo de la ciencia.” Esta ideología ha sido promulgada por: el aumento dramático de extremismo religioso, el fracaso de los sistemas educativos en crear una ciudadanía informada, la pseudociencia, la nueva cultura de “distracción,” el deterioro del periodismo y el reemplazo de la palabra escrita por medios pasivos de comunicación basados en vídeos y en internet. Añadiendo a la obra *Anti-Intellectualism in American Life* (El anti-intelectualismo en la vida estadounidense) de Hoftstadter, Jacoby afirma que los ciudadanos han adoptado una cultura de “pensamiento basura,” donde ya no se hace un esfuerzo de separar la realidad de la opinión, y en consecuencia, se evalúa la ciencia como una opinión más. Por su parte, este nivel de analfabetismo científico ha creado terreno fértil para que partidos políticos iguallen el intelectualismo y la educación con la “elite liberal científica.” Los miembros de la “élite intelectual” se catalogan como enemigos del sentido común—siendo el sentido común la virtud de la gente común. La climatología, pasa a ser un personaje en esta pugna social y cultural, sometida a la opinión y al debate político (Brenan & Saad, 2018).

En el contexto de este movimiento anticientífico, el Papa Francisco, en *Laudato Si'*, distingue a la Iglesia Católica Romana de otros grupos religiosos que niegan el cambio climático antrópico. Químico por vocación, el Santo Papa continua la tradición de desarrollo científico

⁴Sobre la relación con el consenso científico del calentamiento global antrópico, véase Cook et. al., 2013; Cook et. al., 2016; Ripple et. al., 2017.

en la Iglesia Católica, incluyendo: Gregor Mendel, San Alberto Magno, Francis Bacon y Nicolaus Copernicus entre otros (Lindberg & Numbers, 1986; Woods, 2005). En su libro *God's Soldiers* (Los Soldados de Dios [2004]), Jonathan Wright describe la aportación de “la ciencia Jesuita.” Según él, los Jesuitas son “los colaboradores más importantes de la física experimental en el siglo diecisiete” (Wright, 2004). Con rigor científico *Laudato Si'* explica el cambio climático y desarrolla convincentemente el imperativo de la sostenibilidad. Al final de cuentas, el Papa Francisco discute la lógica de la sostenibilidad como un hecho ineludible y compartido por todas las doctrinas religiosas: la expectativa que debemos respetar y cuidar la creación de Dios, nuestra casa.

LA CONTAMINACIÓN Y EL DETERIORO AMBIENTAL

La exposición a los contaminantes atmosféricos produce un amplio espectro de efectos nocivos a la salud, especialmente afectando más a los pobres y provocando millones de muertes prematuras. Se enferman, por ejemplo, a causa de la inhalación de elevados niveles de humo que procede de los combustibles que utilizan para cocinar o para calentarse. A ello se suma la contaminación que nos afecta a todos, por las emisiones del transporte, al humo de la industria, a los depósitos de sustancias que contribuyen a la acidificación del suelo y del agua, a los fertilizantes, insecticidas, fungicidas, controladores de malezas y agrotóxicos en general. (Francisco, 2015: #20)

La tierra, nuestra casa, parece convertirse cada vez más en un inmenso depósito de porquería. (Francisco, 2015: #21)

El cambio climático es un problema global con graves dimensiones ambientales, sociales, económicas, distributivas y políticas, y plantea uno de los principales desafíos actuales para la humanidad. (Francisco, 2015: #25)

Como punto de partida, podemos dar por sentado que los seres humanos prefieren disfrutar de los beneficios de un medioambiente limpio y saludable, entonces: ¿Por qué no reducimos la contaminación para respirar aire sano y beber agua limpia? ¿Por qué pudimos imaginar un apocalipsis nuclear, pero no aceptamos los efectos dañinos de la contaminación atmosférica, la acidificación del océano, el calentamiento global y el cambio climático? ¿Por qué se niega que las externalidades de los combustibles fósiles y la actividad humana cambian el clima, o al menos, degradan el medioambiente?

A final de cuentas, ¿Quién se beneficia de que no se crea que está ocurriendo un cambio climático? ¿Quién se beneficia de la inacción

con respecto a la protección ambiental? La respuesta clara es que los beneficiarios son las industrias de combustibles fósiles, quienes tendrían que sacrificar los beneficios de más de 20 trillones de dólares estadounidenses en recursos aun sin explotar, para que el planeta pueda evitar una subida de temperatura de dos grados. Robert Jay Lifton, en su obra *The Climate Swerve* (El viraje del clima [2017]) señala que la última vez que un recurso de tal magnitud fue abandonado y no explotado, ocurrió en 1865, cuando los recursos eran seres humanos. La esclavitud generaba más de la mitad de la economía sureña en los Estados Unidos y más del 16 por ciento de la economía del país; lo que es equivalente a unos 10 trillones de dólares estadounidenses (véase también Mouhot, 2011; Hayes, 2014). Fue sencillamente extraordinario que el movimiento abolicionista prevaleciera a pesar de los grandes intereses económicos, que al momento parecían insuperables. Está claro que las ideas sobre libertad y dignidad del ser humano que el movimiento abolicionista comunicó—el cual se consideraba radical, extremista e impráctico en aquel entonces—hoy en día se aceptan como el resultado obvio, inevitable y correcto. Sin embargo, como en el caso del reconocimiento de la brutalidad de la esclavitud, aceptar el cambio climático, una crisis que amenaza con el ocaso de la civilización, requiere una reconsideración radical en la manera en que pensamos, actuamos y vivimos. Solo así podemos cambiar el rumbo hacia el camino de la sostenibilidad.

LA CRISIS CULTURAL Y LA NECESIDAD DE UN LIDERAZGO INSPIRADO

El Acuerdo de París de 2015, parecía haber marcado el momento crítico de inflexión en el que se había creado una conciencia universal sobre los peligros del calentamiento global que resultaría en acción colectiva. Existía esperanza. Habíamos cambiado el rumbo y se había trazado un nuevo camino, lo que Lifton llama “un viraje.” Sin embargo, después del viraje, vino una rápido y repentina sacudida; y se desarrolla una motivada cruzada populista que niega el cambio climático antrópico y cuestiona el consenso científico. Este movimiento redefine el movimiento ambientalista como una “ideología” y en consecuencia, se desarrolla una corriente que abiertamente rechaza la ciencia y que culmina con la retirada de los Estados Unidos del Acuerdo de París en 2017. Este “nuevo viraje” fue un golpe inesperado que le quito el aire al movimiento ambientalista, dejándole derrotado, frustrado y en desesperante paralización (Ballew, Marlon, Maibach, Gustafson, Goldberg, & Leiserowitz, 2018). Lifton, un psiquiatra de formación describe la nueva “inacción climática” entre los ambientalistas, como un “adormecimiento psíquico,” una manifestación de “la resistencia de la

mente a la enormidad de la catástrofe.” El movimiento ambientalista está en shock: paralizado; resultando en la inacción y una inercia “protectora.” Atrapados entre las alternativas extremas de catástrofe y de normalidad, muchos han elegido esta última sumiéndonos en la aceptación del fracaso previniendo la innovación que resulte en futuros alternos.

Llama la atención la debilidad de la reacción política internacional. El sometimiento de la política ante la tecnología y las finanzas se muestra en el fracaso de las Cumbres mundiales sobre medio ambiente. Hay demasiados intereses particulares y muy fácilmente el interés económico llega a prevalecer sobre el bien común y a manipular la información para no ver afectados sus proyectos. (Francisco, 2015: #54)

Hace falta construir liderazgos que marquen caminos, buscando atender las necesidades de las generaciones actuales. ... (Francisco, 2015: #53)

No creo que sea necesario convencer a los lectores de esta *Revista* de las consecuencias del cambio climático y de los resultados de una degradación ambiental que nos llevará a una “sexta extinción” de las especies vivientes. Y es precisamente la visión de esta *Revista* en que es imperativo que continuemos trabajando con miras hacia un futuro sostenible para controlar y detener la destrucción de nuestro planeta. Sí, sé que hablar de este ante esta audiencia suena como “llover sobre mojado,” pero los riesgos son tan altos y el ambiente político es tan perjudicial que debemos despertar de la inercia, levantarnos, sacudirnos las rodillas, y ponernos de pie para pelear la buena batalla. La actual crisis climática marca el mayor desafío que la humanidad haya enfrentado. Cualquier otra cosa que no sea una revolución, un cambio de actitud y de sistema, será desgraciadamente insuficiente.

ESTE TOMO: INNOVACIÓN PARA SOSTENIBILIDAD

Profundizando en el tema de la “innovación para la sostenibilidad,” este tomo continúa la misión de la *Revista* de explorar los medios con los que se pueda crear un mundo más sostenible. Los cinco artículos en este tomo presentan varias investigaciones e innovadoras estrategias pedagógicas sobre la sostenibilidad. Los artículos abordan, investigan y proponen modelos eficaces y prácticos que amplían nuestro conocimiento ayudándonos a enfrentar al desafío en busca de una transformación global. Estos artículos fueron presentados en el 24th International Association of Jesuit Business Schools (IAJBS) Global Forum and 2018 Colleagues in Jesuit Business Education (CJBE) Annual Meeting (24vo Foro global de la IAJBS y la Reunión anual 2018 del CJBE)

en julio del 2018 en la Universidad de Seattle en Seattle, Washington, EE. UU. El tema del Congreso fue “Innovación para Sostenibilidad” el que fue discutido en presentaciones de investigación y discursos puntuales ante representantes de escuelas de negocios jesuitas de todo el mundo.

Resumiendo, los artículos: Stoner nos presenta una proposición audaz al explorar cómo las escuelas de negocios, tanto las jesuitas como otras, pueden contribuir a transformar nuestro sistema global de producción-distribución-consumo en algo que apoyara el bienestar y existencia misma de la nuestra y de otras especies. Fundamentado en el modelo ignaciano, Arnesen exige la formación de “líderes éticos con espíritu transformacional” para avanzar el imperativo de la sostenibilidad. Garwood, Miles, Marca y de Figueiredo proponen un modelo para enseñar la analítica de datos en un contexto de aprendizaje a través del servicio comunitario para mejorar la efectividad y eficacia de como proveer ayuda. Bertaux y Skeirik presentan un currículo original e innovador para enseñar sostenibilidad a través del arte. Trail y McCullough empíricamente examinan cuales son las restricciones psicológicas que afectan las intenciones de actuar en una manera sostenible investigando las actitudes y acciones de los participantes en un evento deportivo.

Stoner dice que lo que enseñamos e investigamos en las escuelas de negocios podría ser el vehículo para desafiar, y al fin de cuentas, cambiar el actual paradigma que controla la forma en que el mundo produce, distribuye y consume. Basándose en la elaboración de una propuesta por parte del liderazgo de la Asociación Internacional de Escuelas de Negocios Jesuitas (*International Association of Jesuit Business Schools* o IAJBS) y Colegas en la Educación Empresarial Jesuita (*Colleagues in Jesuit Business Education* o CJBE) para participar en la competencia “100&change” (con premio de \$US 100 millones) de la Fundación MacArthur. Stoner propone que una nueva iniciativa encabezada por las escuelas de negocios jesuitas podría ser el agente catalítico que necesitamos. Stoner nos recuerda que existen innumerables trabajos de investigación que evidencian el diario deterioro de nuestra situación ecológica y humana. Stoner declara que la enseñanza actual en las escuelas de negocios ha contribuido a la insostenibilidad global, directa o indirectamente apoyando mentalidades y prácticas (por costumbre) basadas en las teorías pasadas. El artículo nos reta a que aprovechemos la oportunidad de innovar en la enseñanza y la investigación, en vías a descubrir y aplicar nuevos procesos de transformación organizacional usando la sinergia de alianzas entre las escuelas de negocios jesuitas, las empresas y otras organizaciones. Indica también que las instituciones jesuitas están en una posición única para desarrollar efectivamente esta oportunidad. Las escuelas de negocios jesuitas están equipadas con atributos particulares que las diferencian de las demás, y dichos atributos les permiten comunicar las

realidades del cambio climático y la insostenibilidad global inspiradas por nuestra misión y guiadas por nuestros esfuerzos innovadores y transformadores. Stoner describe los seis campos de diferenciación: 1) la misión jesuita—la razón de ser de la educación jesuita está de acuerdo con el tipo de compromiso y liderazgo para la sostenibilidad que se pide en *Laudato Si'*; 2) el legado—los jesuitas han encabezado cambios sociales transformacionales a lo largo de la historia; 3) la escala y el alcance—hay 261 programas de educación empresarial jesuita en 28 países que pueden ser una fuerza más grande para el bienestar global si trabajamos juntos; 4) la amplitud—hay alrededor de 17 millones de ex alumnos de las escuelas jesuitas; 5) la red—la IAJBS y el CJBCE proveen una plataforma para llevar a cabo y apoyar la propuesta; y 6) la convergencia—el liderazgo de las escuelas de negocios jesuitas está de acuerdo con el llamamiento del Papa Francisco para una acción a nivel global en *Laudato Si'*.

El Profesor Arnesen responde al llamamiento del Papa Francisco para que desarrollemos “liderazgos que marquen caminos, buscando atender las necesidades de las generaciones actuales” y afirma que las escuelas de negocios jesuitas están “obligadas” a la creación y desarrollo de líderes éticos y transformacionales quienes equiparados con el conocimiento de los conceptos ignacianos trabajaran para la sostenibilidad. Arnesen nos explica cómo las escuelas de negocios jesuitas tienen la oportunidad única y la capacidad de aplicar los conceptos ignacianos en la formación de líderes responsables. El artículo discute la doctrina y conceptos ignacianos y los aplica a los atributos necesarios para el liderazgo ético. El modelo de Arnesen relaciona la intuición con la reflexión, el don que viene de empoderar a los demás, la fuerza que genera la confianza y la recompensa del liderazgo silencioso que sirve para ayudar a los demás a salir adelante. El artículo nos muestra un modelo excelente que se puede emplear en un curso de liderazgo/administración.

En “Usando el análisis de datos y la visualización de patrones para ayudar a las escuelas Fe y Alegría en Bolivia (FyAB),” Garwood, Miles, Marca y Neiva de Figueiredo proponen un modelo donde los estudiantes utilizan técnicas estadísticas y análisis de datos, para el desarrollo de eficiencias que maximizan la ayuda a una institución patrocinada por los jesuitas en Bolivia: FyAB. Utilizando estas técnicas, los estudiantes logran identificar a los niños de FyAB que necesitan más apoyo educativo. Usando tres años de data, los resultados sugieren que la integración del análisis de datos en proyectos de ayuda relacionados con la misión jesuita, facilitan la identificación de donde se necesita ayuda, creando así eficiencia y eficacia para maximizar el impacto de esta ayuda. Por tanto, el artículo muestra cómo las herramientas de la analítica de datos se pueden emplear exitosamente para mejorar los programas de colaboración, en particular, los de estudio al extranjero, y sugiere que

tales herramientas se pueden usar en muchos dominios diferentes. Por supuesto, estos programas también logran enseñar a nuestros estudiantes no solo el currículo, la teoría y la práctica de la analítica de datos, pero también los empodera con la satisfacción que brinda la ayuda al prójimo.

Bertaux y Skeirik hacen una propuesta novedosa e interesante, mostrándonos como que se puede “crear conciencia” expandiendo el espíritu de la sostenibilidad mediante la introducción del arte en nuestras clases. Bertaux y Skeirik discuten que el arte nos mueve emocionalmente creando el sentimiento y la espiritualidad necesaria para crear una “conciencia de sostenibilidad.” Proponen en su artículo “Creando pedagogía para integrar la sostenibilidad y las artes,” que las artes, dada su capacidad única y probada por el tiempo para inspirar y mover el corazón humano de manera auténtica y única, motivan a las personas a actuar de manera sostenible. En su opinión, una pedagogía de sostenibilidad empleando las artes aumenta la profundidad y la eficacia del aprendizaje porque llega a los estudiantes de manera empática y no solo de manera intelectual. Los autores analizan cuatro cursos y dos programas intensivos fuera del campus en diferentes disciplinas—incluyendo la economía, la música, la historia, la sostenibilidad y los medios digitales—todos los cuales integran las artes y la sostenibilidad. Los resultados sugieren lo siguiente: al integrar el arte y la sostenibilidad mejora la efectividad y profundidad del aprendizaje de los estudiantes. El artículo concluye con un resumen de los pasos que se pueden utilizar para implementar efectivamente esta pedagogía integrada.

En “Los efectos diferenciales de las restricciones internas y externas en las intenciones de sostenibilidad: un análisis de regresión jerárquica en participantes en un maratón utilizando la segmentación de mercado,” Trail y McCullough examinan el rol de la jerarquía de valores y restricciones internas y externas en los participantes de un maratón y cómo estos afectan las intenciones de los atletas para actuar de una manera sostenible. En otras palabras, el artículo investiga empíricamente si, y cómo, las creencias internas (y sus restricciones) versus los mensajes externos afectan la intención de actuar de una manera sostenible. Los resultados respaldan los principios de la teoría de restricciones y sugieren que limitaciones internas, como la falta de conocimiento y la falta de valor, predicen positivamente las intenciones de actuar de manera sostenible (es decir, eliminar los desechos correctamente), proporcionando evidencia de que las restricciones internas deben abordarse primero antes de que las restricciones externas pueden ser efectivas. Al concluir que el mensaje externo (márketing) solo complementa y no sustituye las restricciones internas (conocimiento y comprensión), este estudio destaca la importancia de la educación en las acciones del individuo. En cierta medida, este artículo confirma la teoría de Bertaux y Skeirik

mostrándonos que tiene que existir una transformación interna para que se desarrolle un comportamiento sostenible. Así mismo, Trail y McCullough destacan que tiene que existir conocimiento, entendimiento y comprensión para que se pueda actuar y vivir de forma sostenible.

PENSAMIENTOS CONCLUSIVOS

Vivimos en un planeta con límites finitos, pero seguimos actuando como si los recursos nunca se acabaran. El consumo constante y exponencial de recursos y materia prima, sin tener en cuenta los límites del planeta es un modelo que no es sostenible, que no puede continuar y que ha comenzado a derrumbarse. No hay atajos para la justicia climática: el cambio climático es el grito de nuestra civilización y su mensaje se ha traducido a través del lenguaje de: incendios, sequías, huracanes, tormentas, la extinción dramática de especies vivientes, enfermedades, migración masiva y degradación del hábitat, entre otros. Necesitamos escuchar el llamamiento de la naturaleza y responder con acción.

El movimiento para abolir la esclavitud nos recuerda que existe un precedente para responder a una crisis tan grande como la que contemplamos hoy. Quemar combustibles fósiles no es, por supuesto, el equivalente a la esclavitud humana; no hay duda de que el imperativo moral de liberar a millones de seres humanos representa uno de los mayores logros de los derechos humanos en la historia. Sin embargo, lo que hace relevante esta comparación, son los masivos intereses económicos que pueden ser derrotados. Al igual que con los movimientos abolicionistas, el sufragio universal y la lucha para igualdad de derechos humanos, hay que analizar la batalla contra el desarrollo insostenible y el uso de combustibles fósiles, con la incondicional convicción de que la vida—en todas sus formas—tiene valor intrínseco. Todos estos movimientos utilizaron argumentos económicos para defender sus argumentos a favor de la justicia, pero su victoria no se obtuvo al poner valor monetario en la concesión de la igualdad de derechos o la liberación de una población esclavizada. Ganaron la batalla al afirmar que esos derechos y libertades son demasiado valiosos para ser medidos y son inherentes y absolutos de todos los seres vivos. No podemos medir el valor de nuestra casa y de la vida misma.

No hay duda de que existen argumentos económicos para ir más allá o para sustituir los combustibles fósiles. Sin lugar a duda, vale la pena comunicarlos a través de nuestra investigación y enseñanza. Sin embargo, no ganaremos la batalla climática tratando de convencer a las empresas y a los gobiernos de que es más rentable invertir en la

reducción de emisiones hoy que esperar y responder a los desastres en el futuro, cuando ya no estemos vivos. Desafortunadamente, los seres humanos estamos programados para evaluar el corto plazo y algunos ni siquiera son capaces de sacrificar la comodidad del presente para prevenir la sanción impuesta a las generaciones en el futuro. Si realmente pudiéramos tener una visión a largo plazo de las consecuencias de nuestras acciones, como por ejemplo, si fuéramos capaces de imaginar el destino de las civilizaciones mucho después de nuestra propia muerte, estaríamos en cierta medida manifestando nuestra impermanencia, y reconociendo la fugacidad de lo que somos, sabemos y amamos. Tal vez nos hemos entrenado para evolucionar de modo que nos concentremos solo en el presente, consideremos el mediano plazo y olvidemos el futuro; de ser así, el argumento de cuán costosos serán los efectos del cambio climático en 30 años o para fines de siglo sería desgraciadamente una pérdida de tiempo. Solo ganaremos si, sin pedir disculpas, afirmemos que la justificación del imperativo de reducir el consumo de combustibles fósiles utilizando un enfoque de costo / beneficio sugiere una bancarrota moral. Al hacerlo, implicamos que existe un precio cuantificable que permita: que las especies se extingan, que las ciudades desaparezcan, que millones que mueran de hambre en tierras secas, y que le neguemos a nuestros hijos y generaciones futuras el derecho a vivir en un planeta con las maravillas y los dones de la creación. No, los efectos del cambio climático antrópico *no tienen* ningún precio cuantificable.

Empecé este editorial citando al presidente Kennedy. Al leer sus discursos, descubrí un pensamiento intelectual claramente articulado mediante la invocación de la razón y a su poder para el bien. Discutiendo la lógica de la negociación con la Unión Soviética ante los estudiantes de la *American University* (Universidad Americana) en Washington, D.C., Kennedy describió las negociaciones de paz para el desarme nuclear como “el fin racional necesario de hombres racionales,” afirmando que “la razón y el espíritu [humano] a menudo han resuelto lo que aparentemente era imposible resolver—y creemos que podemos hacerlo de nuevo.” También aclaró, que la lucha por la paz no era solo una ilusión: “No me refiero al concepto absoluto e infinito (y universal) de paz y buena voluntad, de aquellos que sueñan fantasías,” sino a una realidad pragmática, necesaria y factible (Kennedy, 1963).

Cinco años después del asesinato del presidente Kennedy, Martin Luther King, Jr. fue asesinado el 4 de abril del 1968. Horas después, de la muerte de Martin Luther King, el Senador Robert F. Kennedy dio un emotivo discurso en Indianápolis. Ante una multitud predominantemente afroamericana que acababa de enterarse del asesinato: traumatizada, con ira, coraje y desolación; Kennedy tuvo que improvisar su discurso ante

la trágica situación inesperada. Señaló que los momentos de crisis son instantes para mirar hacia adentro y preguntarnos: “¿Qué clase de nación somos?” Kennedy citó, con voz entrecortada, al dramaturgo Esquilo:

*Incluso en nuestro sueño, el dolor que no se puede olvidar
cae gota a gota sobre el corazón,
hasta que, en nuestra propia desesperación,
contra nuestra voluntad,
viene la sabiduría a través de la terrible gracia de Dios. (Kennedy, 1968)⁵*

Escribir este editorial ha sido una tarea dura e intensa, y muchas veces, deprimente. He buscado inspiración y esperanza en otros que sobrevivieron tiempos difíciles. Aun así, repasar los discursos de los presidentes Kennedy o los de F. D. Roosevelt, es como leer de algo escrito en otro mundo, llenos de retórica inspirada y elevada en un lenguaje y en un tono que desafortunadamente, ya no se ve en la oratoria y el discurso político. Hace sesenta años, la alfabetización cultural, la educación y la capacidad intelectual en un presidente o figura política eran colectivamente percibidas como rasgos necesarios y atributos esenciales para ejemplificar en el pueblo los ideales más elevados de civismo. La ciudadanía respetaba y admiraba a sus líderes: intelectuales y científicos, y fue una época en que mensajes como la necesidad de sostenibilidad podrían haberse aceptado por completo. Sin embargo, ha habido muchos cambios que nos deben hacernos preguntar: ¿Qué debemos hacer para superar este obstáculo de falta de liderazgo? ¿Qué necesitamos para volver a tener respeto colectivo por la evidencia racional y científica? ¿Aún importa?

Tenemos (como mínimo) cuatro problemas. El primero, y tal vez el mayor, es el desafío cultural. Necesitamos encontrar una voz colectiva que rechace lo irracional y exija respuestas y dirección a través de hechos y ciencia. En segundo lugar, debemos comunicar que el efecto invernadero y la insostenibilidad, no solo causan el calentamiento del clima, sino también crean cambios masivos en nuestra flora y fauna, así como también el deterioro de la salud humana provocado por la degradación ambiental. Necesitamos dar por sentado que la naturaleza no tiene tiempo para adaptarse a estos cambios súbitos. Tenemos que cambiar. El tercer problema es económico: no podemos ignorar el efecto de modelos de producción insostenibles y el despilfarro producido por nuestros estilos de vida. Debemos reconocer, por ejemplo, que los intereses e incentivos económicos de la industria de los combustibles fósiles son contrarios—no solo con nuestros objetivos a corto y largo

⁵Robert F. Kennedy fue asesinado 2 meses después de este discurso.

plazo—sino también con nuestra propia existencia. Sí; hay costos que tendremos que asumir y no podemos ignorarlos. El último problema es la inercia. Debemos expresar el imperativo moral de que hay que vivir de manera sostenible para despertar lo bueno en todos nosotros, porque es lo correcto. Tenemos que empoderar a todos los ciudadanos con la certeza de que se puede hacer. Tenemos que encontrar nuestra fe y reflexionar sobre lo que significa ser humano.

Recomiendo que volvamos a leer el primer artículo que se publicó en esta *Revista*. Escrito por mi gran amigo Bill Weis, “Hipocresía en el claustro: ¿Refleja nuestro estilo de vida nuestro compromiso con la sostenibilidad global?”. Sin duda este artículo nos dará la respuesta a aquellos de nosotros que nos llamamos “protectores del medioambiente.”

ADELANTE: UN LLAMAMIENTO A LA ACCIÓN

Además de utilizar nuestras voces día a día para comunicar que los seres humanos han alterado el medio ambiente y creado el cambio climático, existen algunas acciones objetivas y medibles que podemos tomar de manera individual, en nuestra enseñanza e investigación; y esta revista nos brinda ejemplos de cómo hacerlo. Entre las muchas actividades en que podemos lograr contribuciones sustanciales, por ejemplo, son las recomendaciones de Hawken (2017) quienes nos presenta resúmenes breves, pero detallados, de un conjunto de posibilidades de participación y acción verdaderamente interesantes, que el titula: “las 100 soluciones más sustanciales de acción contra el calentamiento global.” Así mismo, Weis (2013) señala que debemos hacer cambios en nuestra manera de vivir. En este sentido, algunas formas específicas en que cada uno de nosotros podemos hacer son: reducir el consumo de carne y lácteos, producir menos desperdicios, consumir productos de origen local, utilizar videoconferencias en lugar de viajar y exigir que cada producto que consumamos produzca externalidades bajas de carbono, entre otros.

Por supuesto, los escépticos dirán, que los países en vía de desarrollo como China y la India continuarán contaminando y contribuyendo con la producción de gases, con más de un tercio de las emisiones de gases que producen el efecto invernadero, independientemente de que EE. UU. participe o no en el Acuerdo de París. Es cierto. El Informe de la ciencia para la política del 2017 hecho por el Centro de Investigación Común de la Comisión Europea (Janssens-Maenhout et al., 2017), indica que China y la India emiten el 26.6 y el 7 por ciento de todos los gases que causan el efecto invernadero, respectivamente, en comparación con el 13 por ciento emitido por los Estados Unidos. Si es así, ¿para qué sacrificar el crecimiento

económico, si China y la India seguirán contaminando? Aunque podemos argumentar el imperativo moral de actuar de manera sostenible, el análisis basado en la comparación de emisiones en términos de países es un análisis equivocado. Deberíamos en cambio examinar quienes son los productores de estas emisiones. Esto significa que debemos analizar las emisiones en términos de los combustibles fósiles producidos por empresas (públicas y privadas). Heede (2014) concluye que tan solo 90 empresas⁶ han generado el 63 por ciento de todas las emisiones mundiales desde 1854 hasta 2010. Los resultados de esta investigación sugieren que, aunque un análisis basado en las emisiones por nación es útil, particularmente porque permite la formación de acuerdos multinacionales dentro de la jurisdicción del derecho internacional, debemos evaluar la responsabilidad de las empresas (y no de los países) que producen combustibles fósiles en función de sus emisiones. Estos datos indican que son las empresas que han extraído, refinado y comercializado dos tercios de los combustibles de carbono las que han causado y a las que debemos hacer responsables de nuestra actual crisis. Los hallazgos de Heede también insinúan la necesidad de una acción colectiva. Para empezar, debemos invitar a todas las universidades jesuitas a que se unan al movimiento de desinversión en empresas basadas en la extracción y mercadeo de combustibles fósiles. Es decir, las universidades jesuitas deben vender (desinvertir) cualquier participación financiera que tengan en las compañías de combustibles fósiles. Encabezado por ciudadanos, y en el caso de las universidades, por estudiantes “activistas,” el movimiento de Desinversión de combustibles fósiles sostiene que el modelo de negocios de la industria de los combustibles fósiles es insostenible, y que al final de cuentas resultara en un planeta inhabitable. Su objetivo inmediato es dejar claro que las compañías petroleras desempeñan un papel en la sociedad muy parecido al que tuvieron las empresas tabacaleras, siendo ambas cómplices de la producción y venta de un producto que contribuyen al deterioro de la vida y a la muerte. El objetivo final, por supuesto, es liberarnos completamente de nuestra adicción a los combustibles fósiles. El movimiento de desinversión en las instituciones educativas también se basa en exponer la hipocresía moral de las universidades, quienes, por un lado, están encargadas de preparar a los estudiantes para el futuro y, al mismo tiempo, se benefician de una industria que está destruyendo ese futuro.

El argumento de hipocresía moral en nuestras universidades es particularmente importante en el caso de las instituciones jesuitas cuya misión se guía por la tradición jesuita católica. Es sorprendente que la

⁶Heede (2014) evalúa 50 empresas públicas y privadas y 40 empresas con algún porcentaje de propiedad gubernamental. Algunas de las empresas cotizan en bolsa, pero el estado tiene algún control propietario. Heede no considera un análisis ponderado de la propiedad del inversor/estado.

única universidad jesuita que ha aceptado desinvertir completamente sus intereses en las empresas de combustibles fósiles es la Universidad de Seattle (Sanchez, 2018). La Universidad de Georgetown es la única otra universidad jesuita que se ha comprometido con una desinversión “parcial” en empresas de combustibles fósiles. Georgetown se ha comprometido a vender sus participaciones en empresas dedicadas a la minería del carbón y a la extracción de arenas de petróleo, pero no llegó tan lejos como la Universidad de Seattle quien acordó desinvertir en *todas* las empresas asociadas con los combustibles fósiles.⁷

Como una universidad jesuita y católica, tenemos la responsabilidad de abordar la actual crisis del cambio climático. En su encíclica *Laudato Si'*, o “Sobre el cuidado de la casa común,” el Papa Francisco nos invita a ver (esta crisis) como un asunto social y ecológico de gran urgencia que está conectado a todos y que tiene consecuencias especialmente devastadoras para los más vulnerables de la sociedad.⁸ (Stephen V. Sundborg, S.J., Rector, Universidad de Seattle, 11 de septiembre, 2018 [véase Sanchez, 2018])

Organicémonos. Debemos unirnos a los estudiantes que han estado promoviendo el movimiento de desinversión de combustibles fósiles. Diríjase a <https://campaigns.gofossilfree.org/> y “haga lo que predica.” Usemos nuestra voz colectiva.

Este es el mayor desafío al que se ha enfrentado nuestra generación, o, mejor dicho, nuestra especie. Sin embargo, aquellos de nosotros, en las universidades, tenemos la oportunidad de ayudar a reconocer que podemos ser mujeres y hombres para otros mientras trabajamos juntos para hacer frente a esta crisis. Sabemos que proteger la naturaleza también se trata de proteger nuestro hogar y, al final de cuentas, de salvar vidas. Por lo tanto, los educadores tenemos una oportunidad única de actuar como líderes iluminados: campeones para las generaciones futuras. De hecho, si bien el llamado a la acción es fuerte y claro, especialmente para aquellos de nosotros que trabajamos en instituciones jesuitas, cada uno de nosotros, independientemente de la universidad o la escuela, tenemos que recordar la importancia de nuestro rol como profesores e investigadores: creadores de conocimiento, para educar, inspirar, cambiar la cultura y, como los abolicionistas, liberar la imaginación para descubrir todas las posibilidades necesarias que resulten en acción. ¿Quién sabe? Tal vez el optimismo irracional puede ganar donde los argumentos racionales

⁷Una lista de las instituciones educativas que han desinvertido de las compañías de combustibles fósiles está disponible en <https://gofossilfree.org/divestment/commitments/>.

⁸El discurso está disponible en <http://fore.yale.edu/news/item/seattle-university-boardvotes-to-divest-from-fossil-fuels/>.

han perdido; al fin y al cabo, la esperanza y la fe, son las cualidades más humanas que tenemos. Cada uno de nosotros está llamado, a reconocer y actuar para el bien que cada uno posee. Debemos reconocer que, en el fondo, todos estamos en el mismo bote; confrontados con decidir si somos parte o no de una transformación verdaderamente histórica. Esta es nuestra oportunidad.

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RESÚMENES

La innovación en la transformación educativa y social: La Fundación MacArthur, las escuelas de negocios jesuitas y el mundo

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RESUMEN. El 2 de junio 2016, la Fundación MacArthur anunció un concurso que otorgaría 100 dólares estadounidenses a un proyecto que contribuiría a la resolución de un problema significativo de la sociedad. Seis semanas después, en Nairobi, Kenia, los miembros del encuentro anual del Foro Mundial de la Asociación Internacional de las Escuelas de Negocio Jesuitas aprobaron por unanimidad una resolución sobre la entrega de una solicitud que emplea los recursos de la red mundial de las escuelas de negocios jesuitas con el fin de abordar el problema interconectado de la insostenibilidad global, la injusticia social y la pobreza. Este artículo informa sobre la solicitud del 2016 así como una posible versión para el 2019 basándose en el primero. Se hace hincapié en los cuatro aspectos de la innovación en el corazón de ambas solicitudes y el concurso de la Fundación MacArthur del 2016. Estos son: 1) el planteamiento novedoso de la Fundación MacArthur para inspirar el cambio social; 2) la innovación en la enseñanza y los temas de investigación—transformando los materiales de enseñanza y los temas de investigación en las escuelas de negocios, tanto de los jesuitas como en las demás; 3) la innovación en los procesos de la transformación organizacional—las escuelas de negocios participantes que transforman su enseñanza e investigación en un tiempo “imposible” y muy corto de solo tres años; y 4) la innovación en los procesos de la transformación social—logrando la transformación colaborativa entre las escuelas de negocio, el mundo empresarial, las agencias de gobierno, las organizaciones espirituales y religiosas y las organizaciones sin ánimo de lucro.

PALABRAS CLAVE: la sostenibilidad global; el florecimiento global; la educación sostenible; la transformación global; la Fundación MacArthur

El liderazgo, la visión y la reflexión: Aplicando los conceptos ignacianos para formar líderes transformacionales con una aplicación selecta para la sostenibilidad

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RESUMEN: Las escuelas de negocios jesuitas tienen una obligación de formar líderes transformacionales éticos que trabajan para un mundo justo y humano. En abordar las necesidades de la justicia social o en dirigir el cambio para promover la sostenibilidad, estas instituciones tienen la capacidad única de aplicar los conceptos ignacianos en la formación de líderes responsables. Este artículo estudia estos conceptos, así como la percepción de la reflexión, el don que viene de empoderar a los demás, la fuerza que viene de generar confianza y la recompensa del liderazgo de servicio silencioso para ayudar a los demás a salir adelante.

Al estudiar la “formación” de líderes exitosos, examinamos la importancia de la transparencia de liderazgo para hacer cambios en ámbitos como la justicia social y la sostenibilidad. Consideraremos, por ejemplo, cómo la educación jesuita puede llenar el vacío de un liderazgo ambiental efectivo con respecto a la sostenibilidad. Demostraremos que las escuelas jesuitas están en una posición única para desarrollar las destrezas de liderazgo necesarias con el fin de facilitar este diálogo imprescindible sobre el medioambiente. De este modo, al reflexionar sobre la filosofía de desarrollar el liderazgo, veremos cómo los principios ignacianos forman la base fundamental para la formación de grandes líderes.

Por último, este artículo mira hacia el futuro de la educación de las escuelas de negocios jesuitas. ¿Cuáles son los cambios necesarios en la enseñanza del liderazgo para promover la justicia social y encabezar el cambio en la sostenibilidad? ¿Qué reflexiones sobre los conceptos ignacianos necesitan el profesorado y la administración para que las escuelas de negocios jesuitas estén en la vanguardia del liderazgo? Terminaremos la “formación” de líderes con lo que nuestras instituciones pueden hacer para fomentar el liderazgo con principios en todos los alumnos a través de la aplicación de conceptos ignacianos.

PALABRAS CLAVE: el liderazgo; la sostenibilidad; Ignaciano; la reflexión; el discernimiento

Usando el aula de negocios para ayudar a las escuelas de Fe y Alegría en Bolivia en la analítica y la visualización de patrones

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RESUMEN: Este artículo describe el soporte analítico que le da una clase de minería de datos en la Universidad de San José (UJS) en los últimos tres años académicos, a Fe y Alegría en Bolivia, una institución patrocinada por los Jesuitas, dedicada a la educación de los humildes, con el fin de ayudarles a buscar un modelo factible para identificar los alumnos y escuelas más necesitados. Los estudiantes de grado de la UJS, trabajando sin información socioeconómica viable de los ingresos del hogar de cada alumno en la base de datos, tuvieron que usar la creatividad en ayudar a FyAB usando solo los datos de encuesta proporcionados por los alumnos bolivianos de edad escolar. Trabajando con los representantes de escuelas de FyAB, su objetivo para cada iteración tenía un doble aspecto:

1) crear un modelo que proporciona la evidencia, teniendo en cuenta los datos de muestra actuales sobre los estudiantes más necesitados y 2) extenderlo para su aplicación a la población más grande de escuelas de FyAB. Tal proyecto es un ejemplo, tal como lo nota el Papa Francisco en su encíclica *Laudato Si'* (2015), de la importancia de la igualdad y la justicia en la educación como un medio para la sostenibilidad. De este modo, este artículo da el contexto para, y antecedentes históricos de, esta iniciativa en desarrollo, y describe sus rasgos específicos. Examina una población base secuencial de alumnos por semestre, de cómo las peticiones, los enfoques y los modelos se han evolucionado con los temas nuevos y cambiantes, y termina compartiendo un sistema creado por los estudiantes de la USJ en el otoño de 2017—una herramienta de visualización basada en la red que se puede actualizar fácilmente y que permite un estudio eficaz de las respuestas de encuesta—para que los que quieren implementar iniciativas de ayuda a los estudiantes en Bolivia, puedan hacer un análisis más rápido.

PALABRAS CLAVE: la sostenibilidad social; la educación para los marginados; análisis de datos para la sostenibilidad; la minería de datos en la educación; la visualización de datos para la educación; la igualdad en la educación escolar

Creando pedagogía para integrar la sostenibilidad y las artes

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RESUMEN: La creación de un mundo sostenible requiere urgentemente a los gerentes de organizaciones que hagan cambios a gran escala en las prácticas y las normas de instituciones sociales y económicas. A pesar de ser muy hablada en la educación superior y en el público, la información científica y económica sobre el medioambiente, aunque convincente, hasta ahora ha fallado en generar el progreso adecuado. Por lo tanto, en este artículo, presentamos un modelo teórico original para una pedagogía que reúne las artes y la sostenibilidad. Proponemos que la motivación o “el corazón” para iniciar estas acciones para el medioambiente y que persisten frente a la apatía social e institucional puede venir de las artes, sobre todo dada su capacidad única y comprobada por el tiempo para mover el corazón humano de manera auténtica. Además, una pedagogía de sostenibilidad que emplea las artes se podría incorporar en cualquier disciplina, en cualquier nivel de enseñanza. Esta pedagogía llega a los alumnos de manera más enfática y no solo de manera intelectual, así aumentando la intensidad y la eficacia de aprendizaje. Es cierto que al hacer hincapié en los rasgos de contenido de la complejidad, la modernidad y la igualdad/la justicia así como al incorporar la reflexión o el discernimiento del alumno, el aprendizaje experiencial y la participación de la comunidad, se aumentará más una pedagogía basada en las artes y la sostenibilidad. Teniendo esto en cuenta, examinamos brevemente algunos cursos preliminares que integran las artes y la sostenibilidad en cuatro disciplinas diferentes, incluyendo la de empresariales. Descubrimos que estos ejemplos indican que la pedagogía propuesta por esta teoría es prometedora. Por último, proporcionamos algunas propuestas específicas para profesores. La nueva pedagogía integrando las artes con la sostenibilidad podría contribuir considerablemente a la formación de futuros y actuales gerentes, que son los agentes importantes para efectuar el cambio necesario.

PALABRAS CLAVE: pedagogía de las artes y la sostenibilidad; la complejidad y la sostenibilidad; el discernimiento; la modernidad; el aprendizaje experiencial; las artes y la sostenibilidad en la educación superior

Los efectos diferenciales de las restricciones internas y externas en las intenciones de sostenibilidad: Un análisis de regresión jerárquica de los participantes de una carrera según la segmentación de mercado

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RESUMEN: Hay llamamientos a la acción urgentes en todos los sectores empresariales para abordar los efectos del cambio climático. La industria de deportes no es inmune a estos llamamientos—los profesionales han involucrado a los participantes en impulsar las iniciativas de sus eventos en pro del medioambiente a través de campañas de mensaje creativas pero con éxito mixto. Examinamos los efectos diferenciales de las restricciones internas y externas en las intenciones de sostenibilidad según la segmentación de mercado de los participantes de una carrera. Así se amplía nuestro entendimiento de cómo involucrar a los participantes deportistas en emplear el comportamiento sostenible en un evento de deporte y se mejoran los resultados de comportamiento sostenible de las campañas de mensaje. Nuestros resultados apoyan los principios de la teoría de las restricciones y muestran que las restricciones internas deben ser abordadas para que sean relevantes las restricciones externas. Las restricciones internas como la falta de conocimiento y la falta de valor predicen la varianza en las intenciones de comportarse de manera sostenible (i.e. desechar correctamente los residuos). Después de controlar las restricciones internas, las restricciones externas como la falta de interés de los demás en comportarse de manera sostenible y la falta de acceso y tiempo, explican la varianza adicional en las intenciones de sostenibilidad. Asimismo descubrimos que cada

segmento de mercado varía en el impacto de las restricciones que inhiben a las intenciones de sostenibilidad, con la cantidad de variación en la intención de sostenibilidad explicada por tales restricciones que varían desde tan bajo como 11.4% en un segmento, hasta tan alto como 33.1% en otro. Proporcionamos entonces recomendaciones específicas para una investigación futura y hablamos de cómo los profesionales pueden usar estos resultados para mejorar estas restricciones y aumentar las intenciones de sostenibilidad.

PALABRAS CLAVE: la sostenibilidad; las restricciones; la segmentación de mercado

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Journal of Management for Global Sustainability

Volume 6, Issue 2, 2018

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Mindset to Liberate Our Imagination for Action

Marinilka Barros Kimbro

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