A creative vision of sustainability: How informal educational avenues may impact change

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Abstract: A sustainably-minded and technology-driven 2032 scenario was created to illustrate subtle attitudes and habits of characters based upon their collegiate informal learning and leadership experiences while earning an undergraduate degree. The creative scenario suggests that, based upon findings from a SLfSD (student leaders for sustainable development) study, leadership components may be identified and cultivated through informal educational avenues (i.e. student organization involvement) to help communicate and transition others to think and act in more environmentally-minded manners. The objective of the study was to explore the leadership components (leadership roles, personal capacities, and styles) of SLfSD. Quantitative, multivariate regression analysis of purposive sampling of student attendees of the 2013 AASHE (Association for the Advancement of Sustainability in Higher Education) revealed interesting influencers of leadership styles and personal capacities, including the interaction of gender, age, ethnicity, and leadership role (aspiring vs. formal leaders). This research suggests that SLfSD possess dynamic capacities and preferences that can impact the necessity for and effectiveness of sustainability-focused programming.

Keywords: Sustainable development, leadership, informal education, student organization
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1. Introduction

The year is 2042. Jorge and Feng are two employees at a fitness and wellness center called Whole Health. Jorge is a Hispanic male and Feng is an Asian male. Both of these individuals attended the same University directly after high school (fall 2017 incoming freshman class) and earned bachelor’s degrees in five years. As they are nearing their 20-year class reunion, we follow these individuals to see how their collegiate experiences have impacted their personal individualities and how society has evolved to put environmental and human well-being at the forefront of agendas.

In the morning, Jorge woke up and began his morning routine by making a cup of coffee. He walked to his front door and picked up the locally sourced and delivered cream that would help to make his organically and ethically produced coffee all the more delicious. After sipping down the last drop, he dumped the grounds from his French press down his composting chute, where during the day red wiggler composting worms will work to turn the previous days clippings into nutrient rich resources for the community garden on the rooftop of his apartment building. The water that cleansed Jorge during his morning shower is busily being filtered and distributed for use in separate cisterns located under the building that may be used by tenants for watering plants, washing clothing, or rinsing off one’s eco-vehicle in the solar-powered parking garage. Once he is dressed and groomed for the day, he slips on his tech sleeve, taking a quick glance at his nightly oxygen count and experienced sleep pattern, his current blood pressure, and reminder list before getting on his way to work. He heads to the parking garage where he opted to reserve an eco-ride for the day, which is part of the community initiative to transition vehicles to no-negative emission models, as he has a late appointment that doesn’t coincide with the local metro schedule. As he slides into the ergonomic self-adjusting seat, he gives oral instructions to the vehicle. The voice recognition system opens his options for activity during his ride to work. Jorge selects “review email” from the list of options, which also includes guided meditation, public radio news, or social media video archive. Finger scanning on the push button start for the vehicle authorizes access to all of Jorge’s accounts and preference settings, which connect to his personal cloud. Eco-ride begins its automated route to Whole Health, which was identified during vehicle reservation, and Jorge comfortably reviews his agenda for the day, as the vehicle is self-driving – being propelled by a combination of solar, wind, and stored electric power. He gets a reminder alert of an online quiz that is due by midnight tonight on his tech sleeve as he is finishing up his master’s degree in nutrition. He adds this quiz reminder to his tech sleeve to complete once he returns home and his increased heart rate is recorded in his health-monitoring app (Whole Health, just like many other companies, monitors physiological features of its employees to assist in a sustainable work environment). Once at Whole Health, Jorge empties the collection tank of his Eco-ride that generated water during transportation. Then off-loads the excess power collected through the vehicle’s wheels e-friction system that generates energy against the thermo-magnetized roads, as the generated energy was beyond what was needed to get him to work. Only 20 more energy points and Jorge will be one category closer to earning the...
company’s Presidential Wellness and Sustainability award where he will be able to help develop a wellness program for the child and adolescent center on Whole Health’s campus. As Jorge walks into work, he grabs an apple-pear out of the fruit trees that grow on the walkway into the main entrance for Whole Health’s Sustainable Nutrition Education Center (SNEC), where he works as a county educator – serving the state and nation as a sustainable nutritionist, specializing in educating the retired consumer. Jorge taps on his interactive desk and examines the video conferencing meetings he has throughout the day. He places his language translator ear bud into place to easily interpret video posting concerns of the diverse citizens he serves. An unexpected call comes in from Tomas, a member of his nutrition team, asking for advice regarding the upcoming project meeting – at which he will be giving a short presentation on a newly developed carrot-passion fruit hybrid and its positive effects on muscle growth. Jorge listens to Tomas’ concerns and guides him through a visualizing exercise. At the end of the conversation Tomas feels calmer and focused for his portion of the presentation. Jorge returns to review his postings, feeling pleased that he could help Tomas. After a period of time, his tech sleeve alerts him to go to the meeting, so Jorge heads to the Center’s IMAX viewing track. The gentle vibrations of his tech sleeve alarm awake Feng. He whispers, “snooze” and the alarm resets for 9 additional minutes. He slides on his personal media goggles to check on happenings of his friends from all over the world and comment on status updates, until his tech sleeve notifies him of his adjusted time-to-departure schedule. Feng tosses his Whole Health uniform, which was brought to the front of his automated closet system that monitors wear frequency of clothing, into his garment freshening machine. This way, when he gets out of the shower his garments will be freshly laundered and folded and the machine will be free to cycle through his (now dampened) towel. Just like in Jorge’s apartment, the water used in each living unit is filtered and cycled for others’ use, as freshwater is one of the world’s most scarce and valuable resources. Eight years prior, government regulations mandated the transition of all water systems (residential, commercial, and industry) to include filtration and recycling. Suddenly, a voice comes over the intercom system in Feng’s apartment reminding him of the morning metro schedule and how he needs to leave the unit immediately to walk four blocks to the metro station. He decides to grab his morning tea on the platform. As he exchanges service agreements with the beverage vendor (personal training sessions for tea) at the metro station, Feng wraps the teabag string around the stir-stick so that it doesn’t drop into his drink during transportation. As he and his fellow passengers board the metro, each pause for facial recognition and public transit reward balance, as Whole Health monetarily rewards its employees for taking the public metro to work. Seeing this increased balance makes Feng smile as he sits next to a colleague on the metro. Together they share plans for their earned funds. Feng plans to upgrade his tech sleeve and purchase tech performance leggings, which are set to come out the following week. Apparently, the leggings automatically compress and relax with muscle movements and have a cooling feature, which has been shown to support optimum fitness and athletic performance for the wearer. As a fitness educator and training coach, Feng is excited to showcase this new technology to students and clients. Feng and other metro passengers take the mid-morning time-staggered commute to catch up on personal tasks. Feng browses his home remotely from his tech sleeve and reorders necessary home consumables (garment freshener tablets, groceries, and compostable tissue paper) for delivery. He activates his home for self-
cleaning. First, sensory robotic arms will ensure that all home items are placed in their recorded location, then anti-static window blinds will discard any dust as the wind-channel home design will blow dust onto the floors for robotic vacuums cleanup. Finally, a non-toxic sanitation mist is spritzed throughout his home to ensure Feng’s allergies do not place him in a life-threatening situation upon returning home. The metro pulls into the stop for Whole Health and Feng exits, heading towards the SNEC building as he is part of a new nutrition and fitness project for 2036 summer Olympians and has a meeting momentarily. Feng gives himself a pep talk and aloud says, “I can do this” as he drops his almost empty tea cup in the disposal receptacle as the doors of the SNEC building automatically open and welcome him into the space. As he received additional certification for professional athlete athletic training after college, Feng will be proposing a rigorous fitness regimen for the Olympian track and field team during the meeting that appropriately functions with the nutritional program. Later, in the week he will be meeting with the team leads to discuss the cross-discipline collaboration details of this project. Updated messages for the meeting light up along the walkway media walls directing him to the 360 IMAX viewing track.

Once all members are present, the SNEC chief supervisor calls the meeting to order and welcomes project teams to begin their presentations. Everyone puts on his or her interactive eye frames and the walking-meeting commences. Presentation data and materials are displayed on the 360 IMAX walls and adjust to each person’s individual walking speed by communicating with the interactive frames. Non-presenters can pull up supplemental research data on the nutritional programs if desired through access on one’s tech sleeve – which is synced for visual display on the interactive frames’ interior lens. Even though Whole Health is a fitness and wellness center promoting healthy lifestyle options, many companies across the United States and around the world have restructured the way business is conducted – focusing on employee physical and mental health and well-being. The IMAX meeting track is one option for Whole Health members to conduct necessary project meetings that promotes social interactions amongst co-workers, personal health, and progress in the workplace. Walking next to each other also allows employees of Whole Health to log targeted steps per day. Midway through the meeting, the chief supervisor pauses for everyone to break, review steps and meeting notes, and refill their water bottles at the complimentary hydration station before continuing. The fitness team leader, David, along with Feng, talk with Jorge by the cucumber-lemon-mint infused water cooler regarding some new concepts from his and Thomas’ presentation. While Jorge had some opinions that he would have liked to share with David and Feng regarding the benefits of carrot-passion fruit from a study they had conducted with long-jumpers, he decided to keep these thoughts to himself. Feng was up to present next and the meeting was back underway.

After the meeting concluded, the project team members sat down for a farm-to-fork lunch that was prepared on-site so that the team could continue team building while making progress on the project. Jorge and Feng sat next to each other around the circle table. Jorge complimented Feng on a presentation well done and voiced his level of admiration for the focused fitness approaches tailored to the track and field athletes, while integrating the new nutritional programs that had been developed in the SNEC. A short while into the casual working lunch, Feng
admitted that he recognized Jorge from college. To his amazement, apparently Jorge was an individual that many people recognized and remembered on campus, as he was involved with many student organizations. The two of them started sharing stories of club events, residence hall pranks, intramural rivalries, and academic campus awareness campaigns that they both participated in. Feng admitted that he aspired to hold leadership positions like Jorge did while in college, but decided to attend and support the causes he believed in as a participant. One event was a climate change rally that was held on the library lawn. Until that rally, Feng didn’t realize how every discipline or career had an impact and contributed to sustainable development. Jorge remembered that rally as well; because it was there that he met Vikki, his college heartthrob and president of the Student Leaders for Sustainable Development (SLfSD) coalition. Her confidence, passion, perseverance, and ability to motivate everyone were characteristics that were simply contagious! Vikki recruited Jorge as an SLfSD member, and eventually club officer, while they were cleaning up after the rally. Both Jorge and Feng sighed with a smile just thinking about Vikki. They wondered what great things she was presently up to, so they clicked on their tech sleeves and launched iFaceChat. Since college, Vikki had gone onto graduate school to earn her MD and PhD in sustainable medical management systems and recently was awarded the chief medical officer position at the state’s health hospital and research facility. Jorge leaned into Feng and said; “that Vikki – it still looks like she’s a mover and a shaker.”

After the luncheon concluded, Jorge asked Feng if he would be interested in continuing their ‘trip down memory lane’ together, and they arranged to reminisce as they strolled through the botanical green space across from the Whole Health complex, later that day. They met by the solar benches to check out a mobile solar charger for their tech sleeves before they began their stroll. They talked about their favorite desserts at the campus cafeterias, intramural games that went down to the last minute, and the big homecoming bonfire that the entire town would attend. They talked about how much things seem to change in such a short amount of time and they laughed about the old touch screen data phones they used to have and the lifestyle habits that are unheard of in the present-day. They talked about the city they both live in now and how it has drastically changed from when they moved for work shortly after college graduation. Jorge made a comment to Feng, “I can’t believe how wasteful I used to be, I’m so glad that the city implemented the 100% recycling initiative.” Feng replied, “I know, but I kind of miss those 84-ounce freezee-slugpees they used to serve at CC’s Convenient- Convenient store in the big Styrofoam cups.” They both chuckled in amazement about the amount of sugar-filled unhealthy food and beverages that used to be available for their consumption. Jorge said, “I don’t think my body would know how to handle all of those refined sugars now, thankfully with age we’ve gotten wiser about our habits.” Feng nodded in agreement, although he internally reflected about some of the unhealthy and unsustainable choices and actions he makes daily. He was so thankful to have been reunited with Jorge and receive such a positive friendly exchange that inspired him to reflect on how he contributes to the greater good of society. He again told Jorge that he had always wanted to be in a more formal role within a student organization he supported and that was the one thing he regretted from his college experience. Jorge reassured him that there was still time to get involved and be a leader in the community or at work. He suggested they meet up later in the week to discuss a strategy for talking with the fitness team leader, David, about ways Feng may step into a more formal leadership position. Feng agreed and was excited about this possibility. He was very appreciative of the confidence that Jorge had in him to be a potentially
great leader for others. They continued reminiscing for a little while longer until Jorge’s tech sleeve alerted him about his appointment and the online quiz that he had yet to complete. He told Feng about the master’s degree in nutrition he has been working on and the appointment at the library that he holds bi-monthly to educate local retirees about cooking for nutrition that also helps to foster healthy relationships with their typical home life of multi-generational family members. Jorge walked Feng to the metro stop before heading to the parking garage where his Eco-ride has been storing solar energy throughout the day. Feng said in closing, “It was good to see you today and talk about possibilities. It just seems that things don’t ever turn out the way we plan them though. See you around.” The two shook hands and went in their separate ways.

What could lead individuals to make the choices that are mentioned in this visionary scenario? How might prior leadership positions, styles, and preferences play a role in what individuals do and how they act in the future? How does this creative vision for a sustainable future connect to research? Some connections and relationships will be explained as an inquiry-based study is reviewed. Note: As the reader progresses through the study design and findings, refer to the small decisions, actions, and mindsets of the main characters from the creative 2042 scenario. A description of the inquiry-based research project follows.

2. Purpose of Study

The purpose of this study was to explore and identify the leadership components (a combination of leadership roles, leadership styles, and leadership personal capacities) of student leaders who indicated an interest in supporting sustainable development within the higher education system. This exploratory study was designed with the intent of developing a baseline of knowledge pertaining to Student Leaders for Sustainable Development (SLfSD) upon which programming or training may be developed. The research question of this study was:

RQ: How does the association of leadership role with leadership personal capacities and leadership styles vary by age, gender, and ethnicity?

3. Method

Data were collected from student attendees of the 2013 AASHE (Association for the Advancement of Sustainability in Higher Education) student summit and conference. The students who registered and attended this conference were targeted as individuals who “are just learning about sustainability issues, seasoned sustainability student leaders, students interested in professional development, and students interested in gaining the skills and knowledge to lead sustainability transformation” at their college/university and beyond (AASHE, 2013). Therefore, it is assumed that students who registered and attended the AASHE student summit and/or conference were SLfSD.

A purposive sampling method was utilized in this study (Rea & Parker, 2005). The SLfSD attendees were purposely identified and selected based upon a common existing difference –
sustainability interest – rather than collecting data from leaders of student organizations in general. AASHE SLfSD were recruited via Student Summit event and asked to complete an electronic survey that was developed to collect leadership and demographic information. Four hundred-one students were recruited and invited for study participation at the conference and 293 entries were fully completed and analyzable for interpretation, yielding a 73% response rate. Data were collected from the electronic survey questionnaire using the Qualtrics online survey system. The questionnaire gathered SLfSD demographic characteristics and leadership role information, leadership personal capacities, and leadership styles. The questionnaire was structured in four sections:

I. Demographic Characteristics: Consistent with Rafferty and Griffin’s (2004) and Williams and Page (2011) suggestions that demographic characteristics may contribute to leadership development, information for each participant was collected.

- Age, gender, and cultural/ethnic background (categorical data analyzed in this study) Table 1 outlines these demographic details.

II. Leadership Role(s): a student at a college or university that self-identifies as either a formal leader (elected officer, chair of committee, or organization member) or an aspiring leader (one who did not identify a specific leadership role). Table 2 outlines SLfSD leadership roles.

- Aspiring leader: a student at a college or university who voices concern for and deep interest in transforming their campus to be more sustainable. Aspiring leaders are also referred to as peer leaders or student sustainability advocates.
- Formal leader: a student at a college or university who is in a leadership position (i.e. elected officer, chairperson of standing committee, club representative to student government -at-large, member of an organization (Eklund-Leen & Young, 1996).

III. Leadership Personal Capacities: unique dimensions of an individual based upon the 9 disciplines of a facilitator by Jenkins and Jenkins (2006) and the seven personal leadership capacities to facilitate co-learning and co-creation in strategic sustainable development (SSD) by Baan et al. (2011).

IV. Leadership Style: based upon the mean scores of subscales of the MLQ (Multi-factor Leadership Questionnaire) and corresponding to styles of: Transformational, Transactional, and Passive/Avoidance (Avolio & Bass, 2004).

Table 1

<table>
<thead>
<tr>
<th>SLfSD Demographics</th>
<th>Frequency</th>
<th>% of Responses</th>
<th>Condensed Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (N = 300)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>12</td>
<td>4.0%</td>
<td>Traditional</td>
</tr>
<tr>
<td>19</td>
<td>32</td>
<td>10.6%</td>
<td>Learners</td>
</tr>
<tr>
<td>20</td>
<td>49</td>
<td>16.3%</td>
<td>n = 23</td>
</tr>
<tr>
<td>21</td>
<td>62</td>
<td>20.6%</td>
<td>79.3%</td>
</tr>
<tr>
<td>22</td>
<td>38</td>
<td>12.6%</td>
<td></td>
</tr>
</tbody>
</table>
The following multivariate multiple regression model was used to analyze the exploratory research question. Correlation among leadership personal capacities and leadership style outcomes indicated small correlational effect size therefore warranting multivariate analyses.
Certain interactions were not considered in the model, as low n-value distributions were present (e.g. combination of formal leader, minority, adult learner, females equaled zero).

**Multivariate Multiple Regression Model:**

\[
\hat{y}_j = \beta_0 + \beta_1 \text{Role} + \beta_2 \text{Ethnicity} + \beta_3 \text{Age} + \beta_4 \text{Gender} \\
+ \beta_5 \text{RoleEthnicity} + \beta_6 \text{RoleAge} + \beta_7 \text{RoleGender} + \beta_8 \text{AgeGender} \\
+ \beta_9 \text{RoleAgeGender}
\]

Analytic techniques were applied to answer the research question of the study, including, descriptive statistics, and multiple regression. In this study, the multiple outcomes were: Leadership Personal Capacity scores (Prospective, Steadfastness, Being Present, Compassion, Intrinsic Confidence, and Continual Improvement) and Leadership Style scores (Transformational, Transactional, and Passive/Avoidance). The independent variables in this study were Leadership Role (Formal Leader and Aspiring Leader), Ethnicity (White and Minority), Age (Traditional Leaders and Adult Learners), and Gender (Male and Female). Age, gender, and ethnicity were viewed as moderator variables in describing the sample characteristics.

4. Results

The results of the multivariate regression analysis and overall model significance is outlined in table 3. As visible in the table, overall significance did not occur among scores for the leadership personal capacities of Compassion and Intrinsic Confidence, therefore these capacities were not further analyzed for interpretation. Non-significance in the regression model indicates demographics that may be ignored (to a certain extent) when looking at outcomes.

Table 3

<table>
<thead>
<tr>
<th>Leadership component multivariate regression</th>
<th>R-square</th>
<th>F-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leadership Personal Capacities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prospective</td>
<td>0.2567</td>
<td>10.85929</td>
<td>***</td>
</tr>
<tr>
<td>Steadfastness</td>
<td>0.0909</td>
<td>3.145275</td>
<td>**</td>
</tr>
<tr>
<td>Being Present</td>
<td>0.0946</td>
<td>3.284065</td>
<td>***</td>
</tr>
<tr>
<td>Compass</td>
<td>0.0433</td>
<td>1.422942</td>
<td>n.s.</td>
</tr>
<tr>
<td>Intrinsic Confidence</td>
<td>0.0346</td>
<td>1.125929</td>
<td>n.s.</td>
</tr>
<tr>
<td>Continual Improvement</td>
<td>0.1852</td>
<td>7.145738</td>
<td>***</td>
</tr>
<tr>
<td><strong>Leadership Styles</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transformational</td>
<td>0.0908</td>
<td>3.141251</td>
<td>**</td>
</tr>
<tr>
<td>Transactional</td>
<td>0.2355</td>
<td>9.684183</td>
<td>***</td>
</tr>
<tr>
<td>Passive/Avoidance</td>
<td>0.2661</td>
<td>11.398500</td>
<td>***</td>
</tr>
</tbody>
</table>

*Note: *p*<.05, **p*.01, ***p*.001 n.s. = not significant
The purpose behind the question in this study was to identify if and how the interactions of role, ethnicity, age, and gender (parameters) influence the leadership personal capacity and the leadership style outcomes for SLfSD. Table 4 reports the significant parameters from the estimated model for the Leadership Personal Capacities. Note: the intercept value indicates the predicted score for aspiring, traditional, minority, males. Table 5 reports the significant parameters from the estimated multivariate model for the SLfSD Leadership Styles.

Table 4

Leadership personal capacities multivariate regression

<table>
<thead>
<tr>
<th>Personal Capacities</th>
<th>Coef.</th>
<th>Std. Err.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prospective</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.9802644</td>
<td>0.4777188</td>
<td>*</td>
</tr>
<tr>
<td>Role x Age x Gender</td>
<td>-3.452024</td>
<td>1.46851</td>
<td>*</td>
</tr>
<tr>
<td>Intercept</td>
<td>21.23924</td>
<td>0.3156731</td>
<td></td>
</tr>
<tr>
<td>Steadfastness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1.419541</td>
<td>0.5667787</td>
<td>*</td>
</tr>
<tr>
<td>Role x Age</td>
<td>-2.639553</td>
<td>1.302093</td>
<td>*</td>
</tr>
<tr>
<td>Intercept</td>
<td>7.012973</td>
<td>0.3745232</td>
<td></td>
</tr>
<tr>
<td>Being Present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role x Age x Gender</td>
<td>-2.542384</td>
<td>1.331795</td>
<td>~*</td>
</tr>
<tr>
<td>Intercept</td>
<td>16.9543</td>
<td>0.2862846</td>
<td></td>
</tr>
<tr>
<td>Continual Improvement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role</td>
<td>1.439353</td>
<td>0.5210979</td>
<td>**</td>
</tr>
<tr>
<td>Age</td>
<td>1.016914</td>
<td>0.4493727</td>
<td>*</td>
</tr>
<tr>
<td>Intercept</td>
<td>9.218036</td>
<td>0.2212609</td>
<td></td>
</tr>
</tbody>
</table>

Note: Coef. = Correlation Coefficient, Std. Err. = Standard Error; ~*p<.051-.06, *p<.05, **p<.01, ***p<.001; Evidence of a significant 3-way interaction was indicated through multivariate analyses in the Being Present personal capacity (p = .057). As the calculated significance did not meet the .05 p-value significance level it was not interpreted.

Table 5

Leadership styles multiple regression

<table>
<thead>
<tr>
<th>Leadership Styles</th>
<th>Coef.</th>
<th>Std. Err.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformational</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role</td>
<td>-5.976173</td>
<td>2.163366</td>
<td>**</td>
</tr>
<tr>
<td>Role x Age x Gender</td>
<td>-9.036593</td>
<td>4.273216</td>
<td>*</td>
</tr>
<tr>
<td>Intercept</td>
<td>72.97836</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transactional</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>1.648115</td>
<td>0.6927185</td>
<td>*</td>
</tr>
<tr>
<td>Role x Ethnicity</td>
<td>-3.460144</td>
<td>1.182995</td>
<td>**</td>
</tr>
<tr>
<td>Intercept</td>
<td>23.25063</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Passive/Avoidant
5. Discussion and Implications

The described scenario for 2042 was a creative challenge to future-casting a vision for sustainable development in today's advancing technology-driven society. The scenario portrays the characters (Jorge, Feng, and Vikki) and the subtle attitudes and habits (characteristics) that each embodies in 2042 based upon their collegiate informal learning and leadership experiences from 2017-2022. The scenario suggests that, based upon findings from a SLfSD study, leadership components may be identified and cultivated through informal educational avenues (i.e., student organization involvement) to help communicate and transition others to be more sustainable.

Astin (1999) indicated that it would be useful to determine whether “different types of student peer groups can be consciously used to enhance student involvement in the learning process” (p.528). In this study, SLfSD are the student peer group researched to gain a better understanding of their leadership component characteristics. Findings from this study have the potential to lead to the development of customized programming to transmit learning of sustainable development (SD) to the greater student population. Programming for student leadership development has shown benefits that may bring about positive change in local, national, and international contexts (Ingleton, 2013).

Various authors argue the terminology associated with the dimensions/personal capacities of a facilitative leader. Personal capacities of a leader or facilitator are characterized as the “qualities of being” from which actions flow (Baan, Long, & Pearlman, 2011, p. 8). The seven-personal capacity model for facilitative leadership in SSD, conceptualized by Baan, Long, and Pearlman (2011) and the nine disciplines of a facilitative leader, conceptualized by Jenkins and Jenkins (2006) served as guiding models for framing the identified SLfSD leadership personal capacities of this study. Six factors specific to SLfSD were identified through analysis. Each factor was labeled as the following SLfSD Leadership Personal Capacities: Factor 1 = Prospective, Factor 2 = Steadfastness, Factor 3 = Being Present, Factor 4 = Compassion, Factor 5 = Intrinsic Confidence, and Factor 6 = Continual Improvement. The emerged factors with significant parameters from the estimated model for the Leadership Personal Capacities (Steadfastness, Prospective, and Continual Improvement) were categorized and labeled to align with descriptive statements of the seven personal leadership capacities to facilitate co-learning and co-creation in SSD by Baan et al. (2011). Table 6 outlines descriptions of the influential factors and leadership styles in the study and includes comments regarding how these characteristics, habits, and actions were subtly referenced in the future-casted scenario within each character.

Table 6
Influential leadership characteristics and future-casted comparison table
### Influential Leadership Characteristic

<table>
<thead>
<tr>
<th>SLfSD Leadership Personal Capacities</th>
<th>Personal Capacity Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Steadfastness</strong></td>
<td>Makes empowering and persevering statement: “I can do this”; Traditional age aspiring leaders have lower levels of steadfastness, but these levels increase as age increases.</td>
</tr>
<tr>
<td></td>
<td>Reflection of her constant encouragement and story of career success; Females have more steadfastness capacities than males (regardless of age and role).</td>
</tr>
<tr>
<td><strong>Prospective</strong></td>
<td>Personal development (calming and visualization) exercise with colleague right before meeting; Formal male leaders increase prospective scores as the age of the leader increases.</td>
</tr>
<tr>
<td></td>
<td>Discouraging comment regarding at end of scenario; Aspiring traditional males have higher levels of prospective, but lower levels as age increases.</td>
</tr>
<tr>
<td><strong>Continual Improvement</strong></td>
<td>Comment regarding “wisdom with age”; Formal leaders and</td>
</tr>
<tr>
<td></td>
<td>Comment regarding “wisdom with ---</td>
</tr>
</tbody>
</table>

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A creative vision of sustainability: How informal educational avenues may impact change

Influential Leadership Characteristic

<table>
<thead>
<tr>
<th>Future-casted Scenario Character Individualities</th>
<th>Demographic Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jorge</td>
<td>Male, minority, formal leader (traditional and adult ages)</td>
</tr>
<tr>
<td>Feng</td>
<td>Male, minority, aspiring leader (traditional and adult ages)</td>
</tr>
<tr>
<td>Vikki</td>
<td>Female, Caucasian, formal leader (traditional age)</td>
</tr>
</tbody>
</table>

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Journal of Sustainability Education

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made and takes action to correct wrongs; conscious of personal and group goals; action orientated.

<table>
<thead>
<tr>
<th>SLfSD-MLQ Leadership Styles</th>
<th>Leadership style Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leadership Style</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Transformational</td>
<td>Proactive: they seek to optimize individual, group and organizational development and innovation, not just achieve performance &quot;at expectations&quot;; convince others to strive for higher levels of potential, moral, and ethical standards.</td>
</tr>
<tr>
<td>Transactional</td>
<td>Defines expectations and promotes performance to achieve these levels; offers recognition when expected goals are achieved</td>
</tr>
</tbody>
</table>
Informal Education and Leadership

Colleges and universities provide students with numerous opportunities to be involved on campus through formal (curricular) and informal (co-curricular) activities. Informal education researchers have identified positive relationships between students’ involvement in co-curricular activities and academic growth (Terenzini & Wright, 1987), level of intrinsic interest and motivation in learning (Cordova & Lepper, 1996; Pascarella & Terenzini, 1991), and overall higher satisfaction with the educational experience (Astin, 1999, 2001; Pasque, Bowman, Small, & Lewis, 2009). Additionally, opportunities for involvement assist students with their personal growth and development, including identity (role) development (Evans, 1996) and relates to positive improvements in self-esteem and independence (Kuh, 1996; McKinney, Vacca, Medvedeva, & Malak, 2004). Astin (1999) stated, “it is easier to become involved when one can identify with the college environment” (p.524). This statement alludes to the idea that students who identify with a particular group/club/organization will be more likely to become actively involved (potentially holding a formal or aspiring leadership role) within the group and therefore develop personal and professional characteristics while completing their degree requirements.

Students as leaders. Leaders can garner the support of others to influence change toward a common goal. In this article, the common goal is building sustainable development in higher education. Leaders who are concerned about organizational transformation seek to foster organizational cultures that are hospitable and conducive to creativity, problem solving, risk taking, and experimentation (Bass & Avolio, 1993). More specifically, student leaders, also referred to as “peer leaders,” are students who have a role within an organization in which they serve as a leader or educator for other students (Haber, 2011, p. 70). Student leaders assist in the development of other students’ leadership skills, knowledge, or abilities. A student (peer) leader is an individual that:

- Provides a valuable real-time, experiential learning and development experience for other peers.
- Facilitates interaction with peers; assisting in social engagement
- Provides a support system for less-experienced peer individuals and can assist in their overall campus life experience and holistic development.
- Serves in a leadership role that may potentially increase peer students’ ownership and commitment to an institutional initiative.
- Serves as a valuable human resource for the institution.
- Provides insight into the current culture of the peer group/organization to address specific interests and needs (Haber, 2011, p. 70).

Education delivered by student leaders provides a number of opportunities for increased leadership capacity and enhanced organizational development and transformation (Bass & Avolio, 1993; Haber, 2011). When leaders show interest and consideration for followers by promoting and actively participating in activities, followers view the leader as someone who is dedicated to the individuals of the group as well as the overall group/organization. The individual and group dedication embodied and displayed by the leader encourages acceptance of
the transformation(s) occurring within the organization, regardless of the context or goal. These characteristics are seen in both Vikki and Jorge in the future-casted scenario.

**Demographic differences.** Exploring the interactions of demographic characteristics to SLfSD leadership components may indicate implications for informal education SD programming. The attitudes and behaviors that one possesses may be traced back to the symbolic meaning formed from an experience(s), and these experiences may be influenced by demographic characteristics. Social identity theorist, Stryker (2007) stated, “the content of a person’s experiences and the meanings derived from those experiences are shaped by where the person is located in the social structures of ethnicity, gender, age, religion, and so forth” (p. 1098). Rafferty and Griffin (2004) suggest that demographics such as age, gender, and classification may contribute to a leaders’ style and interpersonal skills. Williams and Page (2011) also suggest religion and family of origin information (such as ethnicity and income) may influence a leader’s characteristics. Literature supports consideration of the demographic characteristics of age, gender, and ethnicity (culture) as these variables have indicated influence on leadership component outcomes.

Role difference is significant amongst the ethnicity groups. Aspiring minority leaders (Feng) have lower transactional scores compared to minorities holding formal leadership roles (Jorge). When looking at aspiring leaders, white/Caucasian student leaders have higher transactional scores compared to minority student leaders. However, when aspiring leaders transition into the formal student leader role, the minority group possesses higher transformational characteristic scores compared to whites (Jorge encouraging Feng to step into formal leadership role at work). The main effect of gender also showed a significant influence, indicating that SLfSD females (Vikki) have more steadfastness capacities than SLfSD males (Jorge and Feng).

Miles (2011) indicated the need for formal leadership role engagement of adult learners. Adult learners are categorized as individuals age 25 and older who are engaged in postsecondary learning, as opposed to traditional-aged students (ages 18-24). Miles (2011) contends that adult learners, as a group, are more diverse than traditional-aged students and may bring perspectives that are more diverse to student organizations by holding formal leadership roles. Age difference is significant amongst the aspiring and formal leader groups. Aspiring traditional males have higher transformational scores (Feng), but significantly lower scores when transitioned into a formal leadership role. Males tend to have higher transformational scores compared to females, except in the case of formal traditional-age females (Vikki). When looking at formal leaders, traditional student males increase transformational scores as age increases (Jorge). Students who are involved with student government, in particular, have been shown to demonstrate changes in attitudes and behaviors due to the effects of peer-group interactions (Astin, 1999). The more frequently a student interacts with peer-groups, the more frequently attitude and behavioral change opportunities exist and are encouraged. Adult learners can be regarded as more capable and effective of achieving attitude and behavioral changes in others because of the personal experiences and communication maturity they bring to any setting. Informal educational settings such as those of student organizations, pose continual occurring opportunities for SLfSD to demonstrate SD changes in their personal attitudes and behaviors that then may affect the SD attitudes and behaviors of organization members or participants.
In the future-casted vision of a sustainable future, Jorge, Feng, and Vikki were at one time both traditional-age learners and adult learners. Jorge is currently working on a master’s degree in nutrition while serving in a team lead role at Whole Health and held a formal leadership position while in undergrad (traditional age). After undergrad, Feng received additional certification for professional athlete athletic training, during which he held the aspiring leadership role (participatory/support member). Present day (2042), he is making steps to potentially move into the formal leader position. Vikki served as a formal leader for the SLfSD coalition student organization during undergrad (traditional age learner), earned graduate level degrees (adult learner), and into her current leadership position as chief medical officer. As the findings from this study indicate, formal educational avenues pose opportunities for students to develop leadership styles and personal capacities while making progress for sustainable development on a college or university campus. These leadership (formal or aspiring) opportunities during the collegiate experience has the potential to impact and drive sustainable changes for our world, as indicated through the 2042 scenario.

6. Conclusion

Education for sustainable development has yet to find a place among the established traditions associated with formal education (Feinstein & Carlton, 2013). As the impacts of environmental and humanitarian degradation continue to be more clearly understood, society could soon be in a state of catastrophic disarray. Over-population, lack of uncontaminated natural resources, and consumer behaviors associated with consumption and waste, are current topics of global concern. Student leaders who have demonstrated interest and dedication to sustainable development currently exist in the higher educational system, but little has been studied about this group until now.

The purpose of this study was to explore the leadership components (leadership roles, personal capacities, and styles) of student leaders for sustainable development (SLfSD). Conducting exploratory research to better understand the underlying personal dimensions of SLfSD will allow educators to develop programming to cultivate strengths and weaknesses within each formal and aspiring SLfSD. Preparing student leaders who possess the personal capacities to impart sustainable development (SD) change during time in school and in the workforce may ultimately assist in the development of strategies that will allow nations to move on to processes of growth for SD (WCED, 1987). SLfSD possess the potential to lead students and other followers by bringing SD to the forefront of campus issues and rally support to address and resolve sustainability issues of the present and future.

To combat complex challenges on an institutional level, a strategic education for sustainable development approach is necessary – educating, training, and challenging student leaders through targeted programming. Formal student leaders hold roles that may potentially lead to policy and curricular transformation to embody sustainability. Formal and aspiring student leaders are in positions to influence the larger student population through campus events and activities. Students turn to peer leaders (in any discipline) for acceptance, empowerment, and
engagement. It is now necessary to identify and support student leaders who have recognized and adopted sustainable development as a mind-set and way of life. Exploring leadership components of SLfSD, may assist with the development of programming to better address SD and this group of students. Customized leadership programs/training have been supported by the works of Ingleton (2013) and Christiano and Robinson (1982) and identified as a key thrust for ESD (McKeown & Hopkins, 2003). Taking the time to better understand and identify the leadership components of SLfSD can provide a better picture for how to construct a strategy for moving the sustainability movement forward and ultimately cultivate and support these components through customized programming. Ingleton (2013) proposed that a leadership development program, rooted in the theoretical concept of transformational leadership, may develop the leadership capacities of students and equip students with the skills to bring about positive change in future local, national, and international contexts. The current research suggests that SLfSD possess dynamic capacities and preferences that can impact the necessity for and effectiveness of programming.

This study will contribute to the literature regarding education for sustainable development, transformative leadership, and overall knowledge of SLfSD. The findings of this study may interest student development and leadership professionals, higher education administrators, and sustainability campus coordinators as findings can provide direction for programming. The data gathered in this study may further serve to guide directions for achieving university education and sustainability action goals.

7. Future Studies and Limitations

Future studies may include the identification of preferred and practiced activities that help SLfSD develop his/her personal leadership components (leadership roles, personal capacities, and styles) for a more tailored programing/training approach. Continuous practice, and ultimately mastery, of personal capacities improves leadership performance of the leader as well as group leadership performance. Literature highlights the importance of self-mastery in leaders and through “increased self-awareness, self-regulation, and positive modeling, leaders foster the development of authenticity (i.e. the true self) in followers” (Avolio & Gardner, 2005, p. 317). Leaders, specifically SLfSD, are in positions where they may model awareness, attitudes, and behaviors and invite followers to do likewise (Avolio & Gardner, 2005). Cluster analysis of SLfSD data may also prove to be influential for further understanding the SLfSD individuals for optimal programming or group/organization formation and development. Researchers may also find it interesting to compare the SLfSD findings of this study to those leaders of non-common interest groups (i.e. all student organizations) to identify similarities and/or differences in leadership components and practices through a random sampling approach. A longitudinal study of the SLfSD may also provide information pertaining to personal capacity development.

Limitations of this study include the sample participants. This study was an exploratory-descriptive and correlational study that utilized a purposive sampling method. Although purposeful sampling may be viewed as a limitation, the AASHE (Association for the Advancement of Sustainability in Higher Education) conference, where data were gathered, was purposely selected as the data collection site. The AASHE conference was organized to target...
and engage active members (faculty, staff, students, and sustainability coordinators) of the higher education community to advance SD knowledge and form sustainability partnerships. “The AASHE annual conference is the largest stage in North American for higher education sustainability thought leadership” (AASHE, 2013). Students who registered and attended the AASHE conference in October of 2013 were the sample population. The findings of this study are only generalizable to SLfSD.

The scope of this study did not include skills or sustainability content knowledge of student leaders. The purpose of this study was to explore personal capacities of the SLfSD. Findings from this study provided a baseline of knowledge pertaining to SLfSD. The 2042 scenario and study were not designed to form absolute statements about the future or create conclusive evaluations about SLfSD, but to creatively describe potential individual characteristics (outcomes) based on findings of current students in institutions of higher education. Findings from this study aimed to provide a foundation of rich and meaningful information upon which future formal and informal programming and qualitative and quantitative research may be developed so that a more sustainable future may be supported, understood, and achieved.
References


