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# The assessment, development, and measurement of human capacity building programs for El Salvador's textile and apparel industry

Laura E. McAndrews<sup>1\*</sup>  and Jung E. Ha-Brookshire<sup>2</sup>

\*Correspondence:  
lauraemc@uga.edu

<sup>1</sup> Department of Textile,  
Merchandising and Interiors,  
University of Georgia, 305  
Sanford Dr., Athens, GA 30602,  
USA

<sup>2</sup> Department of Textile  
and Apparel Management,  
University of Missouri, 137  
Stanley Hall, Columbia, MO  
65211, USA

## Abstract

Sustained competitive advantage in developing nations is driven by human development through intangible assets that come from education. Grounded from Barney's (Journal of Management 17:99–120, 1991) resource-based theory, this study was designed (a) to assess El Salvador's textile and apparel (T&A) industry by identifying key knowledge gaps, (b) to create human capacity building opportunities using Kolb's experiential learning theory for T&A supply chain members, and (c) to measure effectiveness of such opportunities through principle-attributes matrix, ultimately helping the industry sector compete. A case study research study approach was used to develop a comprehensive approach to develop four educational workshops for Salvadorian T&A supply chain members from April 2019 to February 2020. Pre and post surveys measured workshops' effectiveness in knowledge, skills, and attitudes. The results showed that there was a statistically significant difference in pre- and post means for knowledge, skills, and attitudes for all four workshops. Further analysis showed that each of the workshops statistically changed participants' human capacity in supply chain management, product development, marketing, and CAFTA-DR provisions. The study shows that educational theory could be used successfully for human capacity building in developing nations and supply chain training.

**Keywords:** El Salvador, Textile/clothing supply chains, Human capacity development, Experiential learning theory, Principle-attributes matrix

## Introduction

The economics and much of the formal workforce in Central America's Northern Triangle (NT)—El Salvador, Guatemala, and Honduras—depend on the textile and apparel (T&A) industry. Specifically, El Salvador's apparel sector is the nation's leading manufacturing employer, and the primary employer of women who in many cases are the main earners for families and households (The World Bank, 2020). This is largely due to the Dominican Republic-Central America-United States Free Trade Agreement (CAFTA-DR) which took effect in 2006 and was set in place to help stimulate trade between the

U.S. and the region of CAFTA-DR. CAFTA-DR essentially made this group of trading partners into a new kind of free-trade zone, where producers can sell products both domestically and globally. Historically and simply stated, U.S. yarn and fabric producers export their products to factories in these countries where garments are cut and sewn, then shipped back to the U.S. with duty-free benefits (USTR, 2020).

The successful execution of this trade agreement has the potential to economically benefit all countries involved. However, the economic benefit of CAFTA-DR rests on the human capacity to support all facets of this agreement.

Amongst the CAFTA-DR member groups, the study focuses on El Salvador as it is the first country to sign CAFTA-DR on March 1, 2006. Therefore, El Salvador has one of the longest historical experiences with this policy, yet, still struggling to lift its economy to the next level, which provides unique research setting for the purpose of this research. At the close of 2019, The United States imported about \$1.86 billion worth of apparel from El Salvador (about 2.22% of the total U.S. apparel imports) (OTEXA, 2020). In El Salvador, the T&A industry employs about 70,000 directly and 200,000 indirectly, both of whom collectively contribute to the 45% of the total Salvadoran exports to the U.S. (Freeman, 2016). Approximately 66% of the apparel manufacturing industry in El Salvador offers full package services to foreign buyers (Just-Style, 2016) and the industry makes up around 46% of the country's total exports (OTEXA, 2020). Furthermore, as with other CAFTA-DR countries, El Salvador is considered one of the "near shoring" options for the U.S. apparel market and focuses on "speed to market" as a competitive advantage where more than 20% of the industry is vertically integrated (Just-Style, 2016).

In 2005, the year before CAFTA took effect, El Salvador's overall exports to the United States was \$2.0 billion and increased to \$2.5 billion in 2016 with various factors inhibiting the performance of Salvadoran exports. The inhibiting factors include a continued dependence on the highly competitive apparel trade, low levels of investment, public security problems, and broader governance concerns (Ribando Seelke, 2020). In addition, low levels of investment in T&A workforce have been problematic considering the increase of global competition. Though El Salvador has a willing population wanting to participate in the workforce, there are several challenges. Crime is the number one risk factor specifically affecting the youth population. High rates of poverty, inequality, school drop-out rates, easy access to arms, and chaotic urbanization all contribute to the high crime rates and fueled by local organized crime and gangs. Because of poverty and crime, lack of access to quality education, and job opportunities, Salvadorans emigrate not only within the country but also across international borders (Aleksynska & Kolev, 2021). The challenges of El Salvador, such as poor education, lack of capacity building, corrupt politics, and gangs are further hindering the economic growth.

For El Salvador to continue to develop, there needs to be further development of human capacity within the T&A supply chain. Without this focus on human capacity development, El Salvador will lack the ability for successful business development. To fulfil this need, this study's objective was to assess the effectiveness of a U.S. government capacity building program, to provide appropriate opportunities to T&A industry professionals that could help develop the country's economic conditions, and thereby increase the CAFTA-DR trade with the United States. Specifically, the study's aims were (a) to assess El Salvador's T&A industry by identifying key knowledge gaps, (b) to create

human capacity building opportunities for T&A supply chain members using Kolb's (1984) experiential learning theory, and (c) to measure effectiveness of such opportunities utilizing Rand's (2009) principle-attributes matrix, ultimately helping the industry sector compete by strengthening intangible assets for sustained competitive advantage. Barney's resource-based theory was applied as a guiding theoretical framework. This research was developed and conducted in conjunction with the U.S. Department of Commerce, Commercial Law Development Program (CLDP) and the Office of U.S. Trade Representative (USTR).

## **Literature review**

### **Human capital development issues in El Salvador**

After a history of authoritarian rule and a brutal civil war (1980–1992), El Salvador has made strides in establishing a multi-party democracy (Montgomery, 2018). Because of the adoption of “neo-liberal” economic model, El Salvador achieved stability and economic growth by cutting government spending, privatizing state-owned enterprises, and, in 2001, adopting the U.S. dollar as its currency (Menjivar & Gomez Cervantes, 2018). Lower interest rates, low inflation, and easier access to capital markets was a result of the dollarization but the government lost the ability to use monetary and exchange-rate adjustments to cushion the economy from external influence (Ribando Seelke, 2020).

In the 2000s, El Salvador experienced moderate growth rates however they did little to improve living standards for the 34.9% of Salvadoran living in poverty by 2015 (according to El Salvador's Ministry of the Economy, n.d.). Emigration led to reducing unemployment and infusing some households with income from remittances. The remittances from family living and working outside of El Salvador total US\$5.6 billion in 2019, which is approximately one-fifth of El Salvador GDP (The World Bank, n.d.). In addition, remittance has an influence on household schooling decisions (Acevedo & Maynor, 2012; Edwards & Ureta, 2003; Menjivar & Gomez Cervantes, 2018). Education is a localized and privatized system in El Salvador, funded primarily through tuition (Edwards & Ureta, 2003). Parents are forced to calculate the return on investment for increasing their child's human capital, when also trying to fulfill other needs such as food, health care, clothing and shelter.

The lack of human capital development in El Salvador has contributed to the lowest growth rate of Central America, an estimated growth rate of 2.5% for 2016 (Menjivar & Gomez Cervantes, 2018). A continuous narrative from economists explaining this low growth rate is the lack of public and private (domestic and foreign) investment in the economy. Instead, the development of human capital could be a solution—specifically targeting three objectives, which became stages in the research project: (a) to assess El Salvador's T&A industry by identifying key knowledge gaps, (b) to create human capacity building opportunities for T&A supply chain members, and (c) to measure effectiveness of such opportunities.

### **Stage 1. Assessment of knowledge gaps**

To assess the knowledge gaps, we first referred to resource-based theory of the firms. As Barney's (1991) stated, sustained competitive advantage is embedded in a firm's

resources and capabilities that are described as valuable, rare, imperfectly imitable, and non-substitutable. These resources and capabilities also known as intangible assets include management skills, organizational processes, and the information and knowledge that the members of a firm possess. Through these key resources, not only a firm, but also countries and regions can build and sustain a competitive advantage (Newbert, 2007; Porter, 1990).

Therefore, a firm, region, or country must examine their capabilities and human capacity to adapt to changing environments and accommodate strategically (Vanpoucke et al., 2014). For a country to sustain a competitive advantage, it must use their resources advantageously depending on the objective assessment of their environment (Barney, 2001), which implies that countries that are more aware of their capabilities, are more efficient in accessing and exploiting their resources, therefore having a better understanding of the market and more profitable. In this light, Gul et. al. (2021) found market orientation had a significant impact on brand performance that in turn boosted success for the T&A industry in Pakistan. Therefore, this study's approach was to enhance the intangible human capacity asset within the Salvadoran T&A industry.

Capacity building refers to an activity or processes of creating intangible, abstract, and multidimensional resource for a sustained competitive advantage (Barney, 2001; Newbert, 2007; Porter, 1990). Definitions range from a traditional top-down approach focusing on financial and physical resources to a holistic bottom-up development focusing on process (Brown et al., 2001; Horton et al., 2010). Enemark and Williamson (2003) define capacity building as the improvement knowledge, skills, individual and group attitudes to develop and manage aspects of society. Brown et. al. (2001) propose a definition to the activities that increase the abilities to improve the lives of the poor, to increase the capacity of implementing organizations, and to strengthen the position of organizations in society. This method has been named capacity development, as the process whereby individuals, groups, organizations, and societies enhance their human capital, institutions, and practices (Lusthaus et al., 1999).

The UN publication on Capacity Assessment and Development (UNDP, 1998) offers this basic definition: "Capacity can be defined as the ability of individuals and organizations or organizational units to perform functions effectively, efficiently and sustainably." This definition has three important aspects: (1) it indicates that capacity is not a passive state but is part of a continuing process; (2) it ensures that human resources and the way in which they are utilized are central to capacity development; and (3) it requires that the overall context within which organizations undertake their functions will also be a key consideration in strategies for capacity development (UNDP, 1998).

Capacity building can be analyzed and developed from different levels, each with different dimensions and strategies. Since capacity is the power or ability of something—a system, organization or person to perform and produce properly, the three levels related to capacity are (a) societal level, (b) organizational level, and (c) the individual level. Strategies for capacity assessment and development can be focused on any level, but it is important that strategies are formulated for a specific level. Given the goal of this case study was to enhance the individuals' capacity, as a key resource, within the Salvadoran industry, the focus was on building human capacity at the individual level throughout the research project and assessment of the knowledge gaps was conducted.

### **Stage 2. Human capacity building program development**

Kolb and Kolb's (2005) experiential learning theory (ELT) was adopted while developing the human capacity building programs, which is effective for adult learning. Kolb's theory views education and learning as lifelong that expand the learning processes into adulthood (Zuber-Skerritt, 1992). Further, the use of preferred learning styles allow individuals to learn subject matter more effectively (Healey & Jenkins, 2000). Kolb's four-stage model is a simple framework of a learning cycle that depicts how a learning experience is translated through reflections of concepts, which in turn are used for active experimentation and then the choice of new experiences. The four stages are: (a) concrete experience [when the learner is actively experiencing an activity], (b) reflective observation [when the learner is consciously reflecting back on the experience], (c) abstract conceptualization [when the learner is being presented with/or trying to conceptualize a theory or model of what is observed], and (d) active experimentation [when the learner is trying to plan how to test a model/theory/plan for a forthcoming experience]. In the model, the learning experience can begin at any point, but then followed in sequence.

ELT is a widely used learning theory for diverse disciplines and learners, therefore it has been applied in various settings. In education, most of the research has been in higher education aligning learning style with instructional method and curriculum (Murrell & Claxon, 1987). Further Baker et. al. (2012) applied ELT to construct a model for how agricultural educators can present purposeful experiences for students learning of real-world situations. In clothing and textiles, Ha-Brookshire and Norum (2011) created extra-curricular learning opportunities rooted in ELT to assess students' knowledge, skills, and attitudes regarding cotton and sustainability, where the study found statistically significant change pre and post learning intervention. In management research, training, and development, ELT was first published and therefore contributed substantially to this area of research. ELT, management style, and problem-solving has found to have a positive impact on job satisfaction and performance (Sims, 1983). Therefore, ELT was seen in training interventions for nurse managers (Kuraoka, 2018), government managers (Yamazaki et al., 2018), entrepreneurs (Ferreira, 2020), along with various other professions. Hence, the application of Kolb's ELT framework was applied for the development of the research project's educational activities that align with adult learning style.

### **Stage 3. Measuring effectiveness of the programs**

To assess the various learning activities and programs, Rands' (2009) principle-attributes matrix (PAM) was adopted. PAM has been extensively used for the creation of sustainable education curriculum along with assessing impact (Chalkley, 2006; Ha-Brookshire & Norum, 2011; Rands, 1993, 2009). PAM organizes principles, key learning topics with key attributes, specifically knowledge, skills, and attitudes. In an educational environment, principles are developed based on the learning topics that are deemed vital for the development of the learner. Thereby, if a principle is successfully taught, then such teaching should impact learners' knowledge, skills, and attitudes (Rands, 1993). The primary outcome of the components are that learners gain an understanding of principles'

issues, they have the skills to act if they wish, and they have the personal and emotional attributes to behave (Shephard, 2008). This requires learners to develop critical skill-sets through reflexivity, critique, and social action/engagement (Kearins & Springett, 2003), which aligns with Kolb's ELT.

Isolating the principles and key learning topics in each workshop for human capacity development for El Salvador's T&A supply chain members were needed. Therefore, an exploratory assessment of the T&A industry in El Salvador was executed to then inform and design education workshops. Once workshop principles and key learning topics were identified, then knowledge, skills, and attitude assessments were adapted from Rands (2009). Knowledge is "the theories, models and arguments that constitute the relevant body of knowledge and apply that knowledge" (Nygaard et al., 2008, p. 34). Skill development is the "ability to engage in certain courses of action so as to product intended and effected results" (Rands, 2009, p. 302). Attitudes is a strong preference towards the new principles and practices (Rands, 2009). With PAM's theoretical background, the effectiveness of the proposed educational programs was tested by using scale items that would measure each cell of the learning topic principles and the three learning outcome attributes (Ha-Brookshire & Norum, 2011). Overall, with the goal of building human capacity in the Salvadoran T&A industry, based on the resource-based theory, the study developed educational programs using Kolb's ELT, and assessed the learning outcomes using the PAM model.

## Methods

### Stage 1. Assessing the T&A industry in El Salvador

This research case study was done in conjunction with a larger U.S. government (USG) capacity building program under the title of "Building El Salvador's Trade and Competitiveness in Textiles and Apparel to Strengthen Regional Economic Prosperity" where research was built around the program to continuously evaluate outcomes. The USG program was developed by the Office of U.S. Trade Representative (USTR) and implemented in partnership with the U.S. Department of Commerce's Commercial Law Development Program (CLDP). The program's objectives from the USG perspective were to (a) develop human and institutional capacity to support a strong, integrated, and globally competitive T&A industry, (b) strengthen the capabilities and efficiencies of the Salvadoran T&A industry to enhance export opportunities along the full U.S.—CAFTA-DR supply chain; and (c) improve the economic prosperity of El Salvador and the CAFTA-DR region.

The USG team identified four knowledge areas that could be strengthened through training and educational workshop opportunities. The topic areas identified were (a) supply chain management, (b) CAFTA-DR provisions, (c) innovation and product design, and (d) marketing. Specific details for each content area are outlined next. To ensure that the four knowledge areas were appropriately aligned with El Salvador's specific needs and to outline the key learning principles (Rands, 1993) for each knowledge area, an assessment trip was conducted in March 2018. A team of four traveled to El Salvador, including a representative from the U.S. Department of Commerce, Commercial Law Development Program (CLDP), a representative from the office of U.S. Trade Representative (USTR) as an expert in CAFTA-DR trade and trade policies, and two

university professors as T&A content experts. They were joined in country by representatives from Commerce and State Department staff from the U.S. Embassy and the USAID Mission in El Salvador.

After 3 days of meetings with T&A industry leaders, T&A business owners (both large and small enterprises), Salvadoran and US government commercial experts, educational partners and non-profit agencies, the four topic areas were confirmed, and a work plan was devised. For the initial phase of the government project and the research case study, educational workshops opportunities were developed for human capacity building in the country's T&A industry. The case study's four workshops took place starting in April 2019 to February 2020.

### **Stage 2. Developing educational workshops**

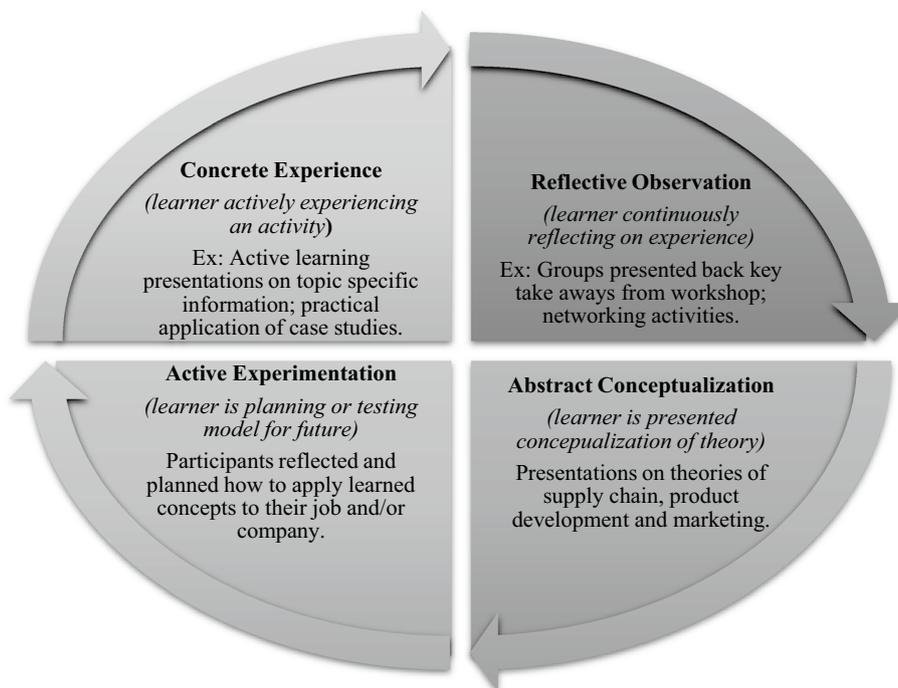
The assessment trip confirmed that there is a fundamental lack of knowledge and skills to build and sustain the competitiveness of the T&A industry. Therefore, to fill this gap, the group helped to develop a series of workshops for each of the four content areas to deliver new knowledge and skills to industry professionals as well as to foster a culture of knowledge that could be sustained through resources and networking.

As the group brainstormed workshop formats, Kolb's (1984) ELT was used as a foundation, so the participants would experience the learning opportunities by themselves, rather than simply being told. Therefore, the various workshops were planned with speakers, small group case study discussion, large group discussion and reflections. Each workshop lasted from 1 to 2 business days in a major hotel's conference rooms in San Salvador. Participants were also asked to share their future plans based on what they learned at each workshop. They also had opportunities to share what they actually did and learned with other participants. This process repeated for each workshop, over the 2 years of the project's span. Figure 1 illustrates Kolb's (1984) ELT and the workshop structure modeled after the four stages as described in Healy and Jenkins (2000) study.

### ***Series of workshops: building El Salvador's T&A capacity and competitiveness***

The selection of workshop participants was directed from additional findings from the assessment trip. A reoccurring discussion from government, education and industry partners was the ineffective middle management in Salvadoran T&A business. First, despite the T&A industry being El Salvador's leading employer and primary employer of women, there exists a disconnect between the workforce and curriculum within Salvadoran universities. University degree programs in El Salvador focus on law, business, engineering, and humanities rather than degrees geared to improve the country's largest industrial sector.

Second, within T&A businesses, upper management or business owners hold much of the decision-making power and nuanced knowledge. Employees receive most of their training on the job and perpetuate the same decisions they were told to make, rather than independently thinking or problem-solving on their own. This often leads to ineffective middle management that is unable to trouble-shoot by thinking creatively about solution. Therefore, the targeted participants for the workshops were middle management professionals. This was a unique approach to take because many government



**Fig. 1** Kolb’s experimental learning cycle based on Healey and Jenkins (2000) and how each stage was used to build the workshops’ agendas

funded development workshops in the past have targeted the training of business owners.

To ensure T&A middle management participation in the workshops, the U.S. Department of State in El Salvador reached out the owners of all T&A industry in El Salvador, inviting them and their middle managers to the educational training series of workshops. Table 1 includes the demographic information for the four workshops, along with providing participants’ businesses and positions descriptions. Specifically, 218 (or 78%) respondents indicated that their job position was middle management ranks within their companies out of the total 279 respondents across all four workshops.

All workshops were created to give foundational knowledge, real-life examples, and practical application through lecture presentations, case-studies, and small group activities and discussion. In addition, presenters facilitated networking during breaks and lunch. In each of the four topic areas, content experts were T&A educators, researchers, government specialist and/or industry professionals. See Additional file 1: Appendix S1 for the full agendas for each of the following workshop with Kolb’s learning cycle stages.

***Strengthen supply chain management***

The first workshop took place on April 29, 2019 and focused on strengthening supply chain management for T&A supply chain members. In total, 71 T&A supply chain members attended the workshop and participated in the pre and post survey assessment. The supply chain management workshop had four presenters from US universities that specialize in teaching and researching the global apparel supply chain and one presenter

**Table 1** Demographic description of workshop participants

Demographic variable in %	Description	April n = 71	July n = 89	Oct n = 65	February n = 104
Age	20–29	15.5	22.5	18.5	14.4
	30–39	28.0	24.7	21.5	22.1
	40–49	31.0	25.8	30.8	38.5
	50–59	7.0	11.2	15.4	16.3
	60 and older	18.5	10.2	4.7	2.9
	No response	0.0	5.6	9.1	5.8
Gender	Male	59.0	49.4	43.0	49.0
	Female	30.0	43.8	50.7	45.2
	No response	11.0	6.8	6.3	5.8
Years working in T&A industry	Less than 1 yr	1.1	2.2	1.5	2.9
	1–10 yrs	35.2	31.5	35.4	35.6
	11–20 yrs	22.5	14.6	23.0	14.4
	21–30 yrs	11.3	16.9	12.4	19.3
	31 yrs and more	6.0	4.5	1.5	1.8
	No response	23.9	30.3	26.2	26.0
Years working at current employer	Less than 1 yr	1.1	3.3	3.0	7.7
	1–10 yrs	53.5	42.7	43.0	42.4
	11–20 yrs	17.0	22.5	26.1	19.2
	21–30 yrs	12.7	10.1	0.0	12.5
	31 yrs and more	7.2	3.4	0.0	0.0
	No response	8.5	18.0	27.9	18.2
T&A sector	Textiles/printing	40.8	28.7	40.0	10.6
	Apparel/shoes manufacturer	28.1	27.6	12.3	55.8
	Government	4.2	7.9	9.2	0.0
	Education	11.3	1.1	1.5	1.0
	Support services	5.7	10.1	13.8	4.8
	No response	9.9	24.6	23.1	27.9
Business size by # of employees	Less than 50	22.6	28.1	32.3	26.9
	50–99	5.6	5.6	13.8	5.8
	100–499	18.3	12.4	9.2	6.7
	500–999	15.5	5.6	6.2	10.6
	More than 1000	21.1	13.5	16.9	17.3
	No response	16.9	14.6	21.5	32.7
Currently manufacture for U.S. customers	Yes	36.6	36.0	24.6	20.2
	No	36.6	47.2	27.7	25.0
	Actively seeking	7.1	12.4	20.0	16.3
	No response	19.7	16.9	27.7	38.5
Participant job position	Owner/CEO	11.3	12.3	9.2	12.5
	General management (sales/ operation/production/ account)	22.5	34.8	41.5	39.4
	Assistant management	32.4	26.9	12.3	21.2
	Administration	5.6	3.4	4.6	1.9
	Government/education	5.6	3.4	3.1	2.9
	Support service management	8.3	2.2	13.8	6.7
	No response	14.3	17.0	15.4	15.4

from USTR. Following Rands' (2009) PAM, the workshop focused on three key learning principles on supply chain management: (a) effective supply chain management, (b) effective communication and relationship within a supply chain, and (c) adapting to customer needs and priorities.

#### ***Building innovation in processes and proactively developing products***

The second workshop took place July 10–11, 2019 and focused on building innovation in processes and proactive product development. In total, 89 T&A supply chain members attended the workshop and participated in the pre and post survey assessment. The product development workshop had three presenters from US universities that specialized in teaching and researching product development and one presenter that was a leader in El Salvador T&A innovation. In this workshop, there were three PAM principle topics on process and product development (a) catalyzing innovation in products and processes, (b) quality assurance, and (c) investing in research and development. After each sub-topic presentation, there was practical application using case studies and how the topic to apply to participants' businesses.

#### ***Building effective marketing strategies and practices***

The third workshop took place October 22–23, 2019 and focused on building effective marketing strategies and practices. In total, 65 T&A supply chain members attended the workshop and participated in the pre and post survey assessment. Presenters for this workshop were one professor in the T&A discipline at a U.S. university and four U.S. marketing and trend analysis professionals. The marketing workshop had four PAM principle learning topics on marketing (a) marketing 101: defining your brand and voice, (b) starting from scratch: doing the research and SWOT analysis, (c) the importance of storytelling: craftsmanship and presentation, and finally (d) marketing is a two-way street.

#### ***Understanding the CAFTA-DR: textile and apparel-related provisions***

The fourth workshop took place February 27, 2020 and was a 1-day intense training on CAFTA-DR trade provision for the textile and apparel industry specifically. In total, 104 T&A supply chain members attended the workshop. Presenters for this workshop included two trade representatives from USTR, one trade specialist from the Department of Commerce's Office of Textiles and Apparel (OTEXA), and one representative from the textile policy branch of the Office of Trade, U.S. Customs and Border Protection. The CAFTA-DR workshop focused on three PAM principle learning topics (a) rules of origin, (b) short supply, (c) verification, and (d) synthesizing the policy with case study examples.

## **Results and Discussion**

### **Stage 3. Measuring human capacity outcomes**

Once IRB approval was granted from the University of Georgia Project #00000454, data collection began. To measure the changes of supply chain members' knowledge, skills, and attitudes, along with collecting qualitative open-ended data, paper survey assessments were distributed and collected before the start of the workshop, after opening

remarks and after the closing remarks of the workshop. Therefore, one pre test and one post test data collection was implemented for each workshop, totaling in eight data collections. To ensure 100% completion of surveys for each workshop data collection, participants were rewarded for completing both the pre and post surveys with a certificate of completion issued by the U.S. State Department.

#### ***Quantitative data collection***

Adopting Rands' (2009) principle-attributes matrix (PAM), survey instruments were constructed by adapting pre-existing scale items. PAM matrix has been used effectively for similar assessment like this study and has shown to be a valid measurement. PAM proposes that successful teaching should impact learners' knowledge, skills, and attitudes on developed learning principles. Thus, the study developed pre and post surveys for each workshop's measuring knowledge, skill, and attitude with 10 items for each attribute using a 7-point Likert scale of 1 (strongly disagree) to 7 (strongly agree). However, since the CAFTA workshop was condensed and more focused, knowledge, skill, and attitude were measured with four items from each attribute. Following previous PAM assessments and replacing key learning topics, knowledge items for pre test were "I have a pretty good idea about [key learning topic] and post test "Compared to before the workshop, I now have a pretty good idea about [key learning topic]. For skills the items for pre test were "I am capable of [key learning topic] and post test "Compared to before the workshop, I am now capable of [key learning topic]. Finally attitude items were "I believe [key learning topic] and post test "Compared to before the workshop, I now believe [key learning topic]. Cronbach alphas across all workshops, all three attributes, and for both pre and post items ranged between 0.973 and 0.989 showing strong reliability. Table 2 shows the examples of pre and post-workshop items for knowledge, skills, and attitude attributes.

#### ***Qualitative data collection***

Included in the post-survey, after the attribute items, open-ended questions were used to solicit qualitative data from participants. There were four questions asked on each post-survey which included "overall were you satisfied with the workshop", "would you recommend these workshop to others", "Please describe what you liked most about the workshop" and finally, "Please describe any observations or recommendations you have for the workshop." Blank spaces were provided for participants to hand write their responses. The qualitative purpose was to hear the inner voice of the participants that are beyond numerical responses to the survey. Data triangulation showed no contradictions between the quantitative and qualitative assessment.

#### ***Quantitative data assessment***

Survey responses were inputted in IBM SPSS for descriptive and statistical analysis. Overall, a one-way ANOVA result showed that there was a statistically significant difference in pre and post means between the four workshops on knowledge [ $F(3,259)=t(2.741)$ ,  $p<0.05$ ], skills [ $F(3,254)=t(5.038)$ ,  $p<0.01$ ], and attitude [ $F(3,255)=t(10.227)$ ,  $p<0.001$ ]. With this result, more in-depth analysis of the mean comparisons was made. The post-hoc two-group mean comparisons showed that each

**Table 2** PAM application: sampling of workshop pre- and post-survey questions by attribute

Attributes (examples of survey items)	Workshop
<p><b>Strengthening supply chain management (10 items each knowledge, skill, attitude pre Cronbach <math>\alpha = 0.983</math>; 0.984; 0.983 post Cronbach <math>\alpha = 0.982</math>; 0.985; 0.984)</b></p> <p>• Supply chain management</p> <p>• Effectiveness of supply chain management in the T&amp;A industry</p> <p>• Identifying challenges within the supply chain</p> <p>• Effective communication along the supply chain</p> <p>• The development of transparent relationships along the supply chain</p>	<p><b>Building innovation in processes and proactively developing products (10 items each knowledge, skill, attitude pre Cronbach <math>\alpha = 0.983</math>; 0.989; 0.989 post Cronbach <math>\alpha = 0.973</math>; 0.985; 0.979)</b></p> <p>• Research and development activities to create new product to US customers</p> <p>• How to innovate new product for US customers</p> <p>• How to generate new ideas for new products</p> <p>• Strategies to empower middle management to make decisions</p>
<p><b>Building effective marketing strategies and practices (10 items each knowledge, skill, attitude pre Cronbach <math>\alpha = 0.983</math>; 0.982; 0.987 post Cronbach <math>\alpha = 0.977</math>; 0.978; 0.981)</b></p> <p>• Marketing my company to US customers</p> <p>• How to build my brand's presence with US customers online</p> <p>• How to visually merchandise my company's products to present to US customers</p> <p>• SWOT analysis and how to utilize the results</p> <p>• How to utilize engagement marketing</p>	<p><b>Building effective marketing strategies and practices (10 items each knowledge, skill, attitude pre Cronbach <math>\alpha = 0.986</math>; 0.985; 0.989 post Cronbach <math>\alpha = 0.983</math>; 0.987; 0.987)</b></p> <p>• "Yarn-forward"</p> <p>• Short supply-theory</p> <p>• The short supply list that my company can utilize</p> <p>• The difference between country of origin versus originating goods</p>
<p><b>Identifying my company's competitive advantage</b></p> <p>• Analyzing my supply chain</p> <p>• Planning successful strategies to drive more business</p> <p>• Changing myself to ensure my company can implement strategies to drive competitive advantage within my company</p> <p>• Planning successful communication strategies to respond to US customers</p>	<p><b>Identifying my company's R&amp;D activities</b></p> <p>• Analyzing new trends in the market to solicit new US customers</p> <p>• Planning successful strategies to drive innovation and create new products</p> <p>• Changing myself to ensure my company can implement R&amp;D strategies to drive competitive advantage</p> <p>• Planning successful innovation strategies to promote sustainability</p>
<p><b>Identifying my company's competitive advantage</b></p> <p>• Analyzing my supply chain</p> <p>• Planning successful strategies to drive more business</p> <p>• Changing myself to ensure my company can implement strategies to drive competitive advantage within my company</p> <p>• Planning successful communication strategies to respond to US customers</p>	<p><b>Building my company's brand image to US customers</b></p> <p>• Presenting product to best highlight my company's strengths</p> <p>• Attracting current customers to advocate for my company online</p> <p>• Researching current and potential US customers and using this research to increase business</p> <p>• Utilizing marketing strategies to advertise my company</p>
<p><b>Identifying my company's competitive advantage</b></p> <p>• Analyzing my supply chain</p> <p>• Planning successful strategies to drive more business</p> <p>• Changing myself to ensure my company can implement strategies to drive competitive advantage within my company</p> <p>• Planning successful communication strategies to respond to US customers</p>	<p><b>Planning successful strategies to utilize the goods that have preferential treatment under CAFTA-DR</b></p> <p>• Successfully utilizing tariff shift rules</p> <p>• Successfully carrying out CAFTA-DR verification</p> <p>• Changing myself to ensure my company can implement strategies to maximize the use of CAFTA-DR</p>

**Table 2** (continued)

Attributes (examples of survey items)	Workshop	Strengthening supply chain management (10 items each knowledge, skill, attitude pre Cronbach $\alpha = 0.983$ ; 0.984; 0.983 post Cronbach $\alpha = 0.982$ ; 0.985; 0.984)	Building innovation in processes and proactively developing products (10 items each knowledge, skill, attitude pre Cronbach $\alpha = 0.983$ ; 0.989; 0.989 post Cronbach $\alpha = 0.973$ ; 0.985; 0.979)	Building effective marketing strategies and practices (10 items each knowledge, skill, attitude pre Cronbach $\alpha = 0.983$ ; 0.982; 0.987 post Cronbach $\alpha = 0.977$ ; 0.978; 0.981)	CAFTA (4 items each knowledge, skill, attitude pre Cronbach $\alpha = 0.986$ ; 0.985; 0.989 post Cronbach $\alpha = 0.983$ ; 0.987; 0.987)
Attitudes Pre-test: <i>I believe...</i> Post-test: <i>Compared to before the workshop, I now believe...</i>	<ul style="list-style-type: none"> <li>• Effective supply chain management in my company is possible</li> <li>• My company must strive to identify competitive advantage drivers to grow the business</li> <li>• My company must strive to become transparent communicators with supply chain members</li> <li>• Offering supply chain visibility to US retail customers is possible</li> <li>• My company can change to become more visible to our customers</li> </ul>	<ul style="list-style-type: none"> <li>• Effective product innovation in my company is possible</li> <li>• My company must strive to add product development and design to grow the business</li> <li>• My company can change to develop new product categories for US customers</li> <li>• I must contribute to creating a supportive work environment to facilitate new idea sharing</li> <li>• My company can change to listen and trust all employees</li> </ul>	<ul style="list-style-type: none"> <li>• Effective brand management for my company is possible</li> <li>• My company can create new products (categories) to tell a story to US customers</li> <li>• I must perform consistent SWOT analysis to effectively plan business change</li> <li>• Brand advocacy is difficult for my company</li> <li>• Researching US customers is challenging</li> </ul>	<ul style="list-style-type: none"> <li>• Utilizing CAFTA-DR in my company is very challenging</li> <li>• Effective application of CAFTA-DR is possible in my company</li> <li>• My company must strive to add strategies to take advantage of the CAFTA-DR trade agreement</li> <li>• I must contribute to strategizing and implementing strategies to build my company's application of CAFTA-DR</li> </ul>	

CAFTA Central America-United States Free Trade Agreement, PAM Principle-Attributes Matrix application  
Pre and post items adapted from Rands (2009)

**Table 3** Mean differences in workshop participants' learning outcomes: before and after workshops

Attributes	Strengthening supply chain management	Building innovation in processes and proactively developing products	Building effective marketing strategies and practices	CAFTA
Knowledge	4.706 <sup>a</sup>	4.313 <sup>a</sup>	4.028 <sup>a</sup>	3.636 <sup>a</sup>
	6.311 <sup>b</sup>	6.400 <sup>b</sup>	6.345 <sup>b</sup>	6.053 <sup>b</sup>
	1.625 <sup>c</sup>	2.087 <sup>c</sup>	2.317 <sup>c</sup>	2.417 <sup>c</sup>
	( $t^d = 24.66, p = 0.00$ )	( $t^d = 23.22, p = 0.00$ )	( $t^d = 20.45, p = 0.00$ )	( $t^d = 29.93, p = 0.00$ )
Skills	4.861 <sup>a</sup>	4.660 <sup>a</sup>	4.238 <sup>a</sup>	3.195 <sup>a</sup>
	6.247 <sup>b</sup>	6.310 <sup>b</sup>	6.333 <sup>b</sup>	5.959 <sup>b</sup>
	1.386 <sup>c</sup>	1.650 <sup>c</sup>	2.095 <sup>c</sup>	2.764 <sup>c</sup>
	( $t^d = 17.51, p = 0.00$ )	( $t^d = 24.08, p = 0.00$ )	( $t^d = 20.33, p = 0.00$ )	( $t^d = 32.99, p = 0.00$ )
Attitudes	5.810 <sup>a</sup>	5.449 <sup>a</sup>	5.389 <sup>a</sup>	5.125 <sup>a</sup>
	6.392 <sup>b</sup>	6.550 <sup>b</sup>	5.658 <sup>b</sup>	6.096 <sup>b</sup>
	0.582 <sup>c</sup>	1.101 <sup>c</sup>	0.269 <sup>c</sup>	0.97 <sup>c</sup>
	( $t^d = 9.38, p = 0.00$ )	( $t^d = 27.57, p = 0.00$ )	( $t^d = 6.43, p = 0.00$ )	( $t^d = 18.92, p = 0.00$ )

CAFTA Central America-United States Free Trade Agreement

<sup>a</sup> Mean of pre-workshop ( $n = 63, 64, 58, 99$ )<sup>b</sup> Mean of post-workshop ( $n = 59, 61, 57, 77$ )<sup>c</sup> Mean difference<sup>d</sup> Two-sided t-value

of the four workshops had an impact on participants' knowledge, skills, and attitudes. Please refer to Table 3 for each workshop's pre and post mean values, mean differences, and significance. For the supply chain management workshop, the largest change was in participants' knowledge [mean difference 1.625,  $t(61) = 24.664, p < 0.001$ ]. For the innovation and product development, the largest change was in participants' knowledge (mean difference 2.087,  $t(63) = 23.224, p < 0.001$ ). For the building marketing workshop, the largest change was in participants' knowledge [mean difference 2.317,  $t(57) = 20.447, p < 0.001$ ]. However, the CAFTA-DR workshop had the greatest difference in participants' skills [mean difference 2.764,  $t(76) = 32.99, p < 0.001$ ] and then knowledge [mean difference 2.417,  $t(78) = 29.93, p < 0.001$ ].

Similarly, the workshops also helped change participants' skills in supply chain management [mean difference 1.386,  $t(62) = 17.511, p < 0.001$ ], innovation and product development [mean difference 1.650,  $t(60) = 24.081, p < 0.001$ ], and marketing [mean difference 2.095,  $t(56) = 20.334, p < 0.001$ ]. The biggest change was in the participants' marketing skills. Finally, participants' attitudes towards innovation and product development workshop had the greatest impact [mean difference 1.101,  $t(62) = 27.565, p < 0.001$ ], followed by CAFTA [mean difference 0.97,  $t(74) = 18.92, p < 0.001$ ], supply chain management [mean difference 0.582,  $t(58) = 9.377, p < 0.001$ ], and marketing [mean difference 0.269,  $t(57) = 6.433, p < 0.001$ ].

Overall, the aggregate results of the pre and post workshops' surveys suggested that though the participants have positive attitudes towards supply chain management, innovation and product development, and marketing, they lacked the knowledge and skills to be competitive in these business areas. Specifically, the CAFTA-DR workshop gave participants the greatest change in skills and knowledge through the workshop, suggesting the participants lacked the fundamental knowledge and know-how related to CAFTA-DR despite it has been over 15 years since implementation. Building effective

marketing strategies and practices, followed by building innovation and proactive product development, was the next most improved content area as shown in the mean differences between before and after surveys. These results suggest that the participants are still focusing on manufacturing built from low-wage labor, losing the competitiveness against its competitors in other countries. Value-added activities, such as product development and marketing, are still difficult knowledge and skills to gain, despite the high level of attitude toward them.

However, the survey results also showed that immersive and experiential learning programs could easily and quickly improve the participants' knowledge and skills. The conversations throughout the workshop also indicated that there needs to be more mechanisms in El Salvador to train and/or educate T&A workers, in terms of degree programs in T&A management, focusing on policies and trade rules, marketing and product development. Therefore, working with universities and colleges in El Salvador to develop these degree tracks and educational programs was suggested to further bridge the gap in knowledge and skills with attitudes to build El Salvador's trade and competitiveness.

#### ***Qualitative data assessment***

A qualitative assessment of the workshop was also made from the post survey open-ended questions. Feedback and reflective comments were analyzed through Kolb's (1984) four learning stages (a) concrete experiences, (b) reflective observation, (c) abstract conceptualization, and (d) active experimentation. Participants' responses were coded per definition of each of Kolb's four learning stages. By doing so, the data was checked to see if participants went through the 4 stages of learning cycle, which is generally believed to be more effective for adult learning according to Kolb and Kolb (2005). Overall, only 32 percent of participants contributed comments to the open-ended questions, but the feedback given was still enlightening to the study's objective. However, the major themes were discovered, and themes are presented with direct quotes next.

#### ***Concrete experiences***

This is the stage where a learner is actively experiencing an activity. In this study, the participants were experiencing active learning through presentations as well as case studies. Participants found these experiences valuable as stated "each presentation was dynamic and had exercises that gave us opportunities to test our understanding" and "the presentations had great videos, photos, and other visuals". These testimonials show how Kolb's (1984) concrete experience is vital in creating a shared understanding on a topic and then actively getting participants to test that understanding. However, most comments were of appreciation on how presenters were "open to telling their experiences" and "sharing their challenges in the industry," suggesting that the workshop presented the concrete experiences for the participants through the speakers real life experiences and examples.

#### ***Reflective observation***

This is the stage where the learner is continuously reflecting on experience. Throughout each workshop, reflective points were purposefully integrated into the agenda for the

next workshops. Throughout the day there were networking activity breaks which one participant noted “the networking breaks were very beneficial in meeting with different people in the industry.” At the end of each day and workshop conclusion, groups of participants were asked to give thoughts and feedback for the organizers both as a large group and anonymously in the post-survey. This gave the participants time to reflect on what they had learned. Many discussed how they had never had an opportunity to learn such specific theories or topics. One participant noted, “I have gained knowledge in areas I didn’t know were so important to the industry”. In addition, many T&A supply chain members are not given an opportunity to learn new innovations that allow them to be proactive with strategy. Many commented how “what I learned was up-to-date and had changed since I began working” and “I had never created or thought to create a company identity, mission statement or purpose. It was so surprising how much we had needed that for success”.

#### ***Abstract conceptualization***

This is the stage where the learner is presented with the conceptualization of theory. Each expert presentation was guided by theory in the different workshop topics i.e. supply chain management, marketing, product development, etc. The theory was then linked with the concrete experiences engaged by from the learner (Kolb, 1984) “I loved being able to put ourselves in scenarios with real-world assumptions after the presentations”; a participant remarked, suggesting their own connection of theory and experience. Further, participants stated how “the information can be applied to my job and is very applicable to the Salvadoran industry”.

#### ***Active experimentation***

This is the stage where the learner is planning or testing model for future. A meaningful part of the workshops for the participants was the feedback and consultations they received from the content experts about the future plans that they developed on their own after the workshop experiences. In conjunction with case studies, participants were given exercises of how to apply the specific content to their job and/or company. Some examples were developing a SWOT analysis, researching U.S. customer profiles to target, creating their company’s brand identity and many more. Outcomes of these exercises were shared with the experts and as one participant described “the feedback given for our company was very interesting and gave us knowledge of our plan”. Many other participants just responded how their favorite part of the workshop was the one-on-one “conversations with the experts” and “giving us their thoughts and experiences”. These were critical part of the participants’ active experimentation as Kolb suggested how a continuous feedback loop of learning is important for their growth in capacity.

Overall, the qualitative analysis of the participants’ responses showed that all four stages of the learning cycle were experienced, echoing the quantitative assessment of changes in their knowledge, skills, and attitude and gave validation to the utilization of Kolb’s ELT for T&A supply chain members.

## Conclusions

To achieve sustained competitive advantage in a developing nation, capacity development is driven by human development (UNDP, 2009). Human capacity is a key resource, or a key intangible asset that drives a sustained competitive advantage according to the resource-based theory (Barney, 2001). At the individual level of capacity development, assessing the capacity needs of people can be addressed through education and training (Enemark & Williamson, 2003; UNDP, 2009). In this light, a team of T&A educators and U.S. government officials was formed to assess, develop, execute, and measure the education and training of T&A supply chain members in El Salvador.

First, from the knowledge gap assessment (stage 1), we found that industry professionals in El Salvador lack deep knowledge in (a) supply chain management, (b) CAFTA-DR provisions, (c) innovation and product design, and (d) marketing. This finding coincides with the fact that, even after 25 years of the CAFTA-DR policy, the industry is still focusing on labor-intensive parts of the industry (such as manufacturing), and lack the expertise in knowledge-intensive segments of the T&A supply chain. That is, the Salvadoran industry is still at its development stage, learning to manufacture products heavily relying on low-wage labor. Supply chain management, policy provisions, innovation and marketing require advanced levels of education and expertise, and our assessment results from stage 1 showed that the industry, as a whole, needs more knowledgeable workers, and therefore, the implication from the study's results suggests the country needs higher education opportunities to support the T&A industry.

Second, from the stages 2 and 3, while building/measuring effective workshops for the industry professionals to close the gaps in knowledge, we learned that both Kolb's (1984) experiential learning cycle along with Rands' (2009) principles-attributes matrix (PAM) were effective. Both theories have been used in countless higher education studies, however, their application in T&A supply chain members in a developing country through the lens of human capacity development had not been utilized and tested. The study's results showed that participants had a significant change in their knowledge, skills, and attitudes across all four workshops. This implication gives researchers, governments, and non-government organizations a framework to offer capacity development at the individual level. Future studies and/or programs could be used in other developing countries with an active T&A industry, such as Honduras and Guatemala. However, there are limits to a one-size-fits-all approach and using this study's model should also be in tandem with on the ground discussions with in-country stakeholders. This case study's assessment trip was vital in hearing and understanding government, educational, and industry agencies needs which were valuable inputs to plan appropriate workshops that would be impactful and useful.

Third, specifically for the stage 3, assessment of the workshop effectiveness, we referred to Enemark and Williamson (2003) who defined capacity building as the development of human resources (knowledge, skills, individual and group attitudes) for the purpose of development and managing certain areas in society. In addition, Rands' (2009) principles-attributes matrix (PAM) was utilized to measure human resource development efforts under human capacity theory. Though PAM has been used within higher education for sustainability education or training, the matrix was effective outside of those limited domains. For the assessment of the educational workshops, PAM

was utilized as a tool to capture quantitative changes in the participants learning experience. Organizations are continuously developing and executing educational trainings many times without capturing quantitative results to show change. PAM's knowledge, skills, and attitude scale helps in showing human capacity change. The implication of the study's findings supported the use of PAM in structuring educational workshop assessments not just in higher education but in business and industry. Future research could use PAM with other training contents not just in the T&A industry for human capacity building globally.

Fourth, as the quantitative results showed and the qualitative assessment further illuminated, the educational training was received genuinely and appreciated greatly by participants. El Salvador, like other CAFTA-DR countries, have an enthusiastic population of supply chain members wanting to grow the T&A industry, however there are educational and societal barriers that have made this development challenging (Acevedo & Maynor, 2012; Edwards & Ureta, 2003). For the benefit of all participating CAFTA-DR trade partners in the T&A industry, change agents on both sides developed this case study as a bottom-up development with a holistic approach, which is at the cornerstone of the human capacity development (Brown et al., 2001; Horton et al., 2010). With this approach, the participants in the workshops all had significant positive changes to the knowledge, skills and attitudes in supply chain management, product development, marketing, and CAFTA-DR provisions. Future studies could investigate the human capacity development around other trade policies, regions, and countries. Both the U.S. government and other non-government organizations develop and execute human capacity trainings for various industries. Assessing various trainings both quantitatively and qualitatively could help in understanding effectiveness and transferability across industries.

Fifth, the long-term effect of these educational workshops on El Salvador's T&A industry and supply chain members are still in question and therefore a limitation. Broadly, human capacity development of any nation's industry involves many other variables that are critical for development. These educational workshops were focused on micro topics. Within a country and region there are macro issues that can create insurmountable barriers. These initial educational workshops were a beginning of the future where both the U.S. and CAFTA-DR countries can collaborate together to help grow and develop the economies together through knowledge transfer, skill improvement, and attitude changes. As much as financial supports are important to help solve the nation's long-term development, human capacity building is critical and additional knowledge exchange is strongly encouraged for a better future together.

Finally, overall, this study has valuable implications for U.S. apparel buyers and retailers. Today, global trade practices and policies are currently in upheaval as supply chains across industries are being challenged. The U.S. is having to rethink and restructure supply chains to get U.S. consumers affordable goods and services (Goodman, 2022). The manufacturing dependency on single countries or regions is no longer a realistic trade practice for the U.S., especially for apparel. The U.S. must expand their global apparel supply chain and in turn, may need to optimize trade agreements like CAFTA-DR. To help in this new strategy, human capacity becomes a sustained competitive advantage for the global T&A industry. Hence, human capacity training and educational workshops are necessary in this new landscape. Though initial workshops were developed by

government agencies, U.S. apparel businesses could utilize similar trainings. U.S. apparel businesses are established with manufacturers and suppliers in CAFTA-DR countries. As a supply chain management strategy, U.S. apparel businesses could collaborate with valuable supply chain partners to jointly hold educational training workshops on focused key topics from this research project or other supply chain needs. U.S. consumers are demanding for their fashion brands to be more socially conscious and equitable, therefore human capacity programs sponsored by U.S. apparel businesses could boost consumer opinion. Future research could measure various consumer behaviors of U.S. businesses that offer human capacity programs for supply chain partners in various countries and regions.

This study has certain limitations, such as the recruitment of the participants. Though all T&A businesses in El Salvador were contacted, the participants who attended the workshops were from businesses that believed in employee training. This could have created a bias in our results. This research could be replicated with different participants and in other CAFTA-DR nations.

#### Abbreviations

CAFTA-DR	Dominican Republic–Central America–United States Free Trade Agreement
CLDP U.S.	Department of Commerce, Commercial Law Development Program
ELT	Experiential learning theory
NT	Northern Triangle—referring to the Central American countries of Guatemala, Honduras, and El Salvador
PAM	Rands (2009) principles-attributes matrix
T&A	Textile and apparel industry
USTR	Office of U.S. Trade Representative

#### Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40691-022-00311-x>.

**Additional file 1: Appendix S1.** Workshop agenda with Kolb's leaning cycle.

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#### Author contributions

Both LM and JHB helped in the assessment, design, and execution of the educational workshops in El Salvador with the U.S. government agencies. LM designed the pre-post surveys. JHB collected the data in country. Both researchers analyzed the data. LM wrote the manuscript with the guidance and final review of JHB. Both authors read and approved the final manuscript.

#### Authors' information

LM is an Assistant Professor in Product Development and Design in the Department of Textiles, Merchandising and Interiors at the University of Georgia. Her research interest is exploring the human dynamic of the global apparel supply chain to include the hidden voices or underserved supply chain members. She utilizes both qualitative and quantitative research methods.

JHB is a Professor and the Department Chair of Textile and Apparel Management at the University of Missouri. The areas of her research interests include moral responsibility of corporate sustainability, global supply chain and sourcing strategies, sustainable production and consumption of textile and apparel, and firm/industry identity issues. She utilizes both qualitative and quantitative research tools.

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#### Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

## Declarations

### Ethics approval and consent to participate

This research was under the supervision of the University of Georgia Institutional Review Board (IRB Project #00000454) regarding ethical issues.

### Competing interests

There is no competing interests.

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