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## **Educational outcomes and effects on cross-cultural communication skills of an international experience for undergraduate STEM students through Michigan Technological University's Pavlis Institute for Global Technological Leadership**

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## **Introduction**

In a world that becomes more technologically advanced by the day, there is an increasingly high demand for global leadership in technological fields. In order to tend to this growing demand, Michigan Technological University alumnus Frank Pavlis founded the Pavlis Institute of Global Technological Leadership in 2005. Its purpose is to provide Michigan Tech students with the opportunity to develop their leadership skills throughout a four-year, 25 credit certificate program centered on building confidence and self-knowledge, cross-cultural communication and teamwork, adaptability, and resilience in its students. These skills are then put to the test in the summer after the students' third year, when they spend five weeks implementing a variety of technical projects in an international environment. When students complete four years of Pavlis Institute coursework, the international experience, and a Capstone project, they receive a certificate in Global Technological Leadership.

In the summer of 2012, two groups of Pavlis students traveled to Ghana and India. Their experiences abroad proved to bring the skills that they had spent developing for the past three years to life. They faced great challenges while working abroad, some expected and some that had never entered their minds. What they managed to accomplish in Ghana and India, and what they were able to take home with them, changed their perspectives on cross-cultural communication and the effects that their areas of study could have on a world outside their own.

In the fall after their summer trip abroad, the nine students who travelled to Ghana and India in the summer of 2012, the cohort of 2009, were surveyed on the effects that their trip abroad and the Pavlis Institute program had on their education and their cross-cultural communication skills. Their responses are included in this paper in the form of quantitative data and quotes.

## **Effects on leadership skills**

One of the goals of the Pavlis Institute is to instill leadership skills in its students that can be used both in their native cultures and abroad. Students in the Pavlis Institute are taught to be sensitive to differences in culture and to recognize how those differences may affect communication between members of different backgrounds. The students learn to develop their personal leadership style, along with strategies and tools to communicate effectively across cultural barriers. These skills are put into practice during their 5-week trips abroad the summer of their third year in the program.

When asked how their international experience impacted them, one of the most common responses from students was that it helped them develop a sense of self-confidence. One of the unique aspects of the Pavlis Institute's international experience is that it is not faculty-led. In fact, except for a few days at the beginning of the trip, students are without faculty accompaniment. When students realize they can handle themselves under stress in a foreign environment, they become more confident about their leadership

skills back home. When post-trip Pavlis students were surveyed, 71.4% responded that their abroad experience significantly increased their confidence and skills as a leader back home, and the other 28.6% reported feeling that their general leadership skills were at least slightly improved.

“It has definitely given me more confidence in what I can do- I am more comfortable in figuring out problems on my own, without the guidance of a higher authority figure.”  
(A1)<sup>[1]</sup>

Realizing this sense of self-confidence is paramount in becoming an effective leader. In order to be an effective leader one must be confident enough in one’s abilities to make decisions for the group. A leader often arises as a person who can make decisions in difficult situations where information may be limited. Francisco Dao is the founder of 50 Kings, an exclusive annual retreat aimed at fostering meaningful relationships among members of the technology and media community. <sup>[2]</sup> Dao states,

“While the fearful will agonize over decisions and always make the safe choice, the confident will take the information that they have and take action. That is the definition of leadership.” <sup>[3]</sup>

Good leaders are able to work in a variety of environments and make the best decisions based on the information available. Sometimes working in a foreign environment means making decisions in situations filled with uncertainty. The Pavlis Institute’s international experience is a great way for students to practice their leadership and decision-making skills. One of the members of the Ghana team reflected on the skills she learned on her trip this way:

“The Pavlis program did a good job of preparing for the ambiguity present in any international experience. It definitely helped me to develop strong decision making skills as well as a heightened level of flexibility.” (A2)

One of the lessons the Pavlis Institute tries to instill in its students during their coursework is the ability to deal with uncertainty and ambiguity one may face in a leadership role, especially in a foreign context. In the summer courses immediately before their trip abroad, students are presented with situations faced by members of previous cohorts during their trips and asked to discuss possible solutions with their teams. These situations include conflict within the group, challenges dealing with cultural differences, and many others. Though talking through solutions isn’t nearly the same as facing them in a real situation, it allows the students to practice communicating within their teams and to learn the communication styles of their team members.

Another one of the common takeaways students shared was a gained sense of empathy for the challenges faced by international students in the United States. Both the India and the Ghana groups spent time at universities in their respective countries. The India group in particular resided in the hostel at Karpaga Vinyaga College of Engineering and Technology for the duration of their stay in India. This proved to be an enlightening experience for the students on the difficulties international students face, both culturally and academically. When asked what he learned from his international experience in India, one student replied:

“I believe that the international experience helped me gain a new perspective on what it feels like to be a student in a different country, I can use this perspective to better relate to international students at Michigan Tech.” (B1)

Students in the Pavlis Institute return from their trips abroad to Michigan Tech better leaders in their better ability to empathize with the over 1,000 international students in the student body. <sup>[4]</sup> Development of these skills brings students one step farther down the path of developing the emotional intelligence necessary to becoming an effective leader. Pavlis students spend only five weeks learning in a foreign culture, but the lessons they learn about cross-cultural learning stay with them long after they return to the United States. In general, the aftereffects of the international experience on returning students are multifaceted. As the student below explains, however, self confidence and a broader outlook on life may be a few of the most intangible, yet essential aspects.

“I feel that Pavlis has helped me to have a more well-rounded global outlook and it has also helped me to realize that I have more potential to change the world than I previously thought I had before I was in the program.” (B1)

### **Better understanding of communication and culture**

In addition to cultural and academic challenges, there are complexities in cross-cultural communication that are important to understand when working both internationally and domestically. The most common theme in student responses to the question of how their Pavlis Institute education shaped their skills as a leader was better understanding of the cultural factors influencing communication. The six-week cultural preparation course students receive before they travel is essential to the success of their trip. During this time, students are exposed to a wide range of ideas and opinions about values and practices in other cultures. Only through understanding of thought-processes other than one’s own can cross-cultural communication be successful, and a leader’s primary job is often one of a mediator. The most valuable leaders are those who thoroughly understand the opinions and concerns of their group. As one student observed,

“I learned that cross-cultural communication involves much more than words; for people to communicate across cultures, they must be able to understand more than just each other’s languages, they must be able to understand one another’s background and have some idea of what the other person’s goals are, what their worries are, and what they want from the other person.” (B1)

A leader primary job is to work with people, and the more effectively a leader knows how to communicate their message, the more successful they will be. Communication is such an important skill, that it often trumps any other outward ability or skill set. One student made the following observation after coming back from her experience in India:

“Sometimes the leader who emerges from the group is not the person with the most technical knowledge, but the one with the most patience in communicating.” (B2)

Eventually, however, these skills must be taken outside the classroom and honed through practice in real situations. Due to the absence of faculty members to take care of the logistics of day-to-day occurrences in-country, students are forced to communicate in a foreign environment on their own. They learn how to

approach uncertainty in communications, and how to be more open to different worldviews. One student explained her new-found understanding in the following way:

“I learned that logic is more culture-specific than I used to believe, and that it is important to accept that our perceptions are affected by the environment we grew up in. After my international experience, I found myself better able to understand the actions and opinions of others, because I had gained an increased understanding of how to look at a situation from a different perspective.” (A1)

More than just knowing the language, understanding the significant cultural factors that influence a person’s style of communication is important when working internationally. In his book *Body Language*<sup>[5]</sup>, Julius Fast tells the story of an American professor who is challenged by the non-verbal cues from his Indian students. In western society, nodding the head up and down signifies understanding or “yes,” while moving the head from side to side signifies “no.” In India, tilting or shaking the head from side to side indicates agreement or an affirmative response. Though the professor knew intellectually that the differences in body language were cultural, he was so accustomed to his own culture’s style of non-verbal communication that he could not help but be distracted by the contradiction. During their international experience, Pavlis Institute students learn to recognize the challenges presented by differing styles of non-verbal communication and to adjust their behavior accordingly in future educational and career endeavors. Pavlis students also learn to recognize the aspects of communication that transcend cultures. Many students felt that the international experience helped them greatly in this area. Below are statements containing feedback from two Pavlis students after returning from their international experience:

“The international experience taught me...the way that you carry yourself, the gestures that you make, the sentiments that you convey are so much more important in making a connection with someone than any verbal communication.” (B3)

“Communication is definitely largely shaped by culture. There is a certain level of human interaction, however, that can be very well communicated across cultures and languages (a warm welcome, a caring gesture, shared laughter, etc.).” (A2)

### **Educational outcomes**

In addition to preparing students for cross-cultural communication and increasing their cultural awareness, the Pavlis Institute has an immediate impact on students’ education. The Pavlis Institute broadens students’ horizons beyond a traditional STEM (science, technology, engineering, and mathematics) education. While undergraduate degrees in engineering, the natural sciences, or other STEM fields might offer a student excellent career prospects, they often lack instruction on communication and leadership skills. This leaves students with an excellent understanding of their field but a lack of preparation for leadership roles. Even though stringent curriculums may make studying abroad or taking additional courses difficult, it’s becoming increasingly important for STEM majors to learn to work effectively across cultures. This aspect of STEM fields is often not stressed during undergraduate education. Though the Pavlis Institute admits students from all areas of study, it is especially useful for students in STEM majors who may not have many other opportunities in their major classes to learn about cross-cultural communication and leadership.

“The Pavlis program opened my eyes to an aspect of education that I think is often overlooked, and that is the importance of being open-minded and able to communicate across cultures. Through the classes, I was encouraged to explore the viewpoints of all different types of leaders, and the international experience allowed me to develop my own ideas about cross-cultural communication and my unique point of view.” (B3)

Students in the Pavlis Institute explore the many different styles of leadership in their coursework. They learn to develop their own personal leadership style, focusing on their strengths and working to improve skills they are deficient in. The Pavlis Institute’s unique curriculum centered on international leadership and communication, coupled with a five-week international experience gives students a chance to put into practice the communication, leadership, and technical skills they’ve learned during the first three years of their undergraduate education.

“The Pavlis program has given my education a different and divergent path from just engineering. It’s been an opportunity to complement that part of my education and learn to more effectively use it.” (A3)

By spending five weeks living and working in a developing country, students have the opportunity to apply the knowledge they’ve gained from their studies in a unique way. One example of this real-world application is when students in the 2009 cohort travelled to India and were able to use the skills they had learned in a microbiology course to test water samples from a well at a rural school. Also during the summer of 2012 students used skills they learned in engineering courses to install a Lister engine to provide emergency electricity in a village not connected to the area’s power grid. In the past, students interested in medicine have worked with students in Michigan Tech’s International Business Ventures enterprise to bring infant heartbeat annunciators to remote hospitals and health clinics in Ghana. Currently students are developing a mobile medical clinic to be used in communities in Ghana that have limited access to hospitals and medical care. These and other real-world applications help students in STEM majors to see the relevance of their education. In regions without reliable internet access or experts readily available for consultation, students are forced to problem solve and make decisions with limited information. This ability to think quickly and make the best decision without all the information is a key trait of good leaders.

As well as allowing students to practice their skills in real-world situations, students report that their Pavlis Institute international experience enhances their studies at their home universities. The students are encouraged to pursue in-country projects that are both relevant to the area and related to their area of study. The experiences they have implementing their project in-country enhance their education long after they return home from their trip abroad.

“Since traveling to Ghana I have referred to it many times during classes and in other contexts. I am also completing my senior design project involving one of the projects I worked on in Ghana, learning about air quality from wood cooking fires. I think that my degree in Environmental Engineering has been greatly enhanced by my certificate in Global Technological Leadership.” (A4)

It’s not uncommon for students in the Pavlis Institute to continue their projects after returning to Michigan Tech, either through their senior design projects or by helping younger cohorts carry on the

project during their own international experiences. Students in the 2012 India group spent time with doctors in a local hospital gathering information on how leg braces can be improved for post-polio patients, and shared this information with faculty who develop projects for international senior design groups. For some students, five weeks in country isn't enough - one student was so impacted by her experience in Ghana that she chose to return after her summer trip and study abroad there her senior year.

[6]

One of the Pavlis Institute's goals is to better prepare its students to be leaders in the global community by increasing the effectiveness of their cross-cultural communication skills and their level of comfort in foreign environments. When the cohort of 2009 was surveyed 55.6% of students indicated that after their international experience they were better able to communicate across cultures. The remaining 44.4% responded that they were *much* better able to communicate across cultures. In a separate survey of Pavlis students, which was carried out at least six months after their trip, 85.7% stated that if they were to return to their project locations, they would be still feel confident in their ability to communicate sufficiently and find their way around on their own. The remaining 14.3% indicated that they would need some time to re-orient themselves, but would then be comfortable travelling on their own. Increased confidence in their ability to communicate effectively with members of other cultures, as well as improved international travel skills, will surely be of great value to students Pavlis Institute students in both their academic and career endeavors.

### **Impact on future careers**

The Pavlis Institute's curriculum and unique international experience has a significant impact on its students both in their undergraduate education and in their lives after graduation. Two thirds of Pavlis Institute students in the 2009 cohort reported that their international experiences had an impact on their educational/career goals. Through the international experience, the Pavlis Institute offers its students an opportunity to consider careers abroad or working for an employer that values cultural sensitivity. After spending five weeks immersed in a new culture, students are better suited to work in that country, but furthermore they are better suited to work in any new culture. The international experience offers students a taste of the challenges and opportunities that accompany working internationally.

In addition to being better suited to work overseas, Pavlis Institute students are better equipped to work for domestic employers with a global presence. Students who have spent time in a foreign culture are more prepared to travel overseas for their employer to visit clients, suppliers, or research partners. More and more companies are reaching out to international clients and moving their manufacturing operations overseas, or even opening branches in other countries. Pavlis students have an advantage over their coworkers who haven't experienced other cultures in that they have already practiced their cross-cultural communication skills during their international experience. According to the QS Global Employer Survey Report 2011, over half the United States companies who responded replied "yes" when asked if they actively seek or attribute value to an international study experience when recruiting new employees. Worldwide, this statistic was even higher at 60%<sup>[7]</sup>. Pavlis Institute students have experience that employers both domestic and international are looking for. Their cross-cultural communication skills will be more and more valued as the world becomes increasingly connected and STEM fields become more globalized. One student from the 2009 cohort summarized his career goals this way:

“Since so many major companies who have a deep stake in the engineering fields are international companies, cross-cultural communication skills are invaluable traits. I hope to work for the sort of company that values those traits.” (A3)

Students return from their international experiences as seniors looking for career opportunities or graduate school options. Often they have an increased appreciation for employers or universities that value the skills they have acquired through the Pavlis Institute and their experience abroad, because they realize how important it is to be culturally-literate in today’s society.

In addition to being better suited for careers in industry, Pavlis students who choose to continue their education in graduate programs or pursue research opportunities report feeling more confident in their ability to work with fellow graduate students and colleagues from other parts of the world.

“I plan on going to graduate school and pursuing a career in scientific research, which will require me to collaborate with members of the scientific community from all across the world. Pavlis has taught me how to better communicate with other people, no matter where they're from.” (B2)

“I am going into the research field, where international collaboration has become increasingly essential over the years, so I look forward to applying the cross-cultural communication skills I learned through my international experience to enhancing the success of my research projects.” (A1)

As the field of academic and private research becomes more connected internationally, Pavlis Institute students in this field will benefit from their cross-cultural communication skills when they work with diverse groups of peers. Students will also benefit from the problem-solving skills they developed while implementing their projects during their international experiences.

## **Conclusion**

The unique nature of the Pavlis Institute’s international experience program allows students to have a more in-depth experience, and to practice their leadership skills not only in the real world, but on their own in a foreign environment. The benefits of the program can be summarized into four main themes:

Effects on leadership skills:

Nearly all graduates of the program credit the Pavlis program as a factor in the development of their independence and ability to lead in any environment. The unique attribute of the Pavlis international experience, that students must carry out projects abroad with no guidance from an accompanying faculty member, forces students rely on themselves and their team members to organize food and travel, plan their schedule and project goals, and communicate effectively with their local counterparts.

The international experience also emphasizes the flexibility required of students while working in a foreign country. Changing circumstances, lack of usual resources and technologies, and cross-cultural conflicts are all common situations which students were forced to handle quickly and tactfully. Such skills cannot be taught in a classroom- only through first-hand experiences did students gain confidence in their ability to handle such challenges successfully.



Better understanding of communication and culture:

Communication skills, both cross-cultural and within each travel team, were also listed by participants as one of the major benefits of the Pavlis program. The six weeks spent learning the language and culture of their country prior to travel lessened the time needed to adjust to the new location, and maximize the productive portion of time spent in country. The sheer amount of time spent in day-to-day interactions with local people in-country, however, had the greatest impact on students' cross-cultural understanding.

Educational outcomes:

Pavlis Institute students often report that their Pavlis Institute education and international experience was one of the most important shaping aspects of their undergraduate education. Students return from their time spent in a new culture with a better understanding of the challenges that international students face and are more able to relate to international students in the United States. Students also report that the Pavlis Institute has supplemented their STEM education by offering instruction on leadership and cross-cultural communication skills that they had not otherwise been exposed to.

Impact on future careers:

Lastly, students in the Pavlis Institute expect to be better prepared for careers in increasingly globalized fields of engineering and scientific research. Students are exposed to working in foreign cultures during their international experience. This familiarity with working with members of other cultures prepares Pavlis Institute students to work and live in a world that is becoming increasingly interconnected.

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