



IPRO 309: H.O.P.E
Human Orthotic and Prosthetic Education
Final Report

1. Abstract

Interprofessional Project 309 Human Orthotics and Prosthetics Education, H.O.P.E., is a continuing venture spanning seven semesters at Illinois Institute of Technology. H.O.P.E is constantly working toward the goal of developing and supporting the first Category III Orthotics and Prosthetics educational program in Latin America to be accredited by the International Society of Prosthetics and Orthotics (ISPO) and Joliet Junior College (JJC) Orthotics and Prosthetics Technology program. H.O.P.E. organized into sub-teams categorized by the age groups: pediatric, adult, and geriatric. Focus later shifted towards sub-teams for each age group divided between each institution involved throughout the prosthetic treatment process inclusive of the patient, physician, orthotic and prosthetic technician, finances, and therapist. The summation of this semester's studies involved creating three fictional case studies covering real life injuries and diseases leading to above and below knee prosthetic treatment and how the overall patient care progresses throughout treatment process. The three case studies involved a topic concerning real concerns that need to be improved upon for the pediatric, adult, and geriatric in each profession. It established a broad educational base for training orthotic/prosthetic technicians in Bogotá and at JJC, while making sure not to overwhelm them with too much information.

2. Background

There exists a strong demand for orthotics and prosthetics (O & P) in Latin America, with approximately 2.5 million people in need of this type of care. IPRO 309 was started in the spring of 2006 with the goal of helping to make this type of care more readily available. However, there are only 50 certified and 1500 uncertified, O & P practitioners in Latin America. In order to become a certified practitioner, a student must graduate from an ISPO accredited program. Unfortunately, there is currently only one ISPO accredited program in existence in Latin America, along with several other programs that are not ISPO accredited. In October of 2004, Centro Don Bosco (Bogotá, Colombia), Don Bosco University (San Salvador, El Salvador), and the Laboratorio Gilete (Bogotá, Colombia) signed an agreement to establish the first accredited O & P education program in Colombia. Since then, Centro Don Bosco has allotted 3,500 square feet of space for the thriving faculty, classrooms, manufacturing training, and vocational workspace that are necessary for an ISPO accredited program.

There are three levels of accreditation according to ISPO standards. Category III involves the design and manufacturing of orthotic and prosthetic devices, Category II includes the fabrication of the devices as well as direct patient care, and Category I includes production, treatment for patients, and research and development. The equivalent to ISPO in the United States is the American Board of Certification in Orthotics and Prosthetics (ABC). Because it is independent from the ISPO, the ABC standards of accreditation will need to be taken into account in order to carefully cross cultural and national boundaries.

Now that the program has started at Centro Don Bosco in Bogotá and the goal is to achieve Category III accreditation. For students who begin the program, the chances for career advancement are greatly increased with the possibility of attaining Category II (or further) certification. Classes opened first in February 2005 with 17 students. Though the number of students may be small, their impact will be massive; in one year, each student can produce over 250 orthotic and prosthetic devices. The first graduating class can therefore affect a total of over 100,000 patients throughout a projected career of 25 years. This can be accelerated with the aid of IPRO 309 by creating educational modules necessary for the program to receive ISPO accreditation while providing basic material to students interested in the program.

In addition, several other institutes have joined to provide education and care to those in need. These institutions are listed below.

- Universidad de los Andes; Bogotá, Colombia
- La Escuela Colombiana de Rehabilitación; Bogotá, Colombia
- Centro Don Bosco, Bogotá; Colombia
- Laboratorio Gilete, Bogotá; Colombia
- Bioconcepts, Inc.; Burr Ridge, IL
- Dynamic Orthotics and Prosthetics; Houston, TX
- Children's Memorial Hospital; Chicago, IL
- Joliet Junior College Tech Prep Program; Joliet, IL
- Northwestern University Prosthetics and Orthotics Center; Chicago, IL

- Illinois Institute of Technology, Chicago, IL

Although the accreditation of the program in Colombia is the main effort of IPRO 309, the team's work will serve multiple purposes. The educational modules will also be offered to Joliet Junior College (JJC), where a similar O & P program has been established. Many of the students at JJC speak Spanish, which further emphasizes the need to translate all educational materials into this second language. Additionally, the IPRO team will have the opportunity to see the results of the research in action. In May, a four-day conference will take place in Bogotá, Colombia to present the educational modules developed this semester and interact with representatives of the many collaborating institutions. A pre-test and a post-test will be given to examine the efficacy of the educational modules. This will provide a first-hand evaluation of the modules and the efforts of the IPRO 309 team.

3. Objectives

Primary objective:

Inter-professional Project 309 is an ongoing venture spanning seven semesters at Illinois Institute of Technology working constantly toward the goal of developing and supporting the first Category III Orthotics and Prosthetics educational program in Latin America to be accredited by the International Society of Prosthetics and Orthotics (ISPO).

Secondary Objective:

The secondary objective is necessary for obtaining the primary objective. To ensure that the program receives accreditation, many guidelines must be followed. These guidelines have set the secondary objectives of the project as follows:

- Develop several educational modules related to lower-limb prosthetic issues concerning the general population distribution based on age in Latin America
- Develop several low-cost demonstrations and hand-outs to compliment the educational modules
- Carefully follow ISPO requirements to ensure accreditation
- Translate all materials to Spanish for use in Latin America
- Enhance the collaboration with other institutions for support on the project
- Develop educational materials regarding conditions affecting pediatric, adult, and geriatric populations to be presented at a four-day conference in Bogotá, Colombia

4. Methodology

Problem Definition

The current ISPO Category III program in Bogotá is not accredited. As a result, there is no significant career opportunity for orthotics and prosthetics (O&P) practitioners. The primary

objective of HOPE (Human Orthotics & Prosthetics Education) is to assist the accreditation of the O&P program in Bogotá by developing educational modules for use in Centro Don Bosco. Although several modules have been developed in the past, they contained insufficient emphasis on communication between patients and specialists, as well as the financial burdens patients typically carried.

Problems particularly arise when patients do not understand how to use an orthotics device. For example, a patient applies a spine orthosis incorrectly causing additional pain. This patient may then spend unnecessary time commuting to a specialized facility for assistance. This problem can be resolved by improving the communication between patients and specialists. This will include determining what physicians need to know for correct referral, what the O&P technicians require from physicians to make a device, and how the patient, therapist, and financial advisers may work together to restore a patient’s daily activities.

Problem Solution

IPRO 309 students seek to create educational modules for teaching O&P students at Centro Don Bosco. The previous educational modules developed have focused on biomechanics, common pathologies, common O&P devices, and fabrication processes. This semester common pathologies will again be addressed, but with greater emphasis on the interaction between patients, physicians, therapists, O&P technicians, and financial specialists. All educational modules will be in English and Spanish so they can be used at Joliet Junior College (JJC) in Illinois, U.S, and Centro Don Bosco in Colombia. For quality assurance, expert practitioners will review all modules and give their feedback and advice.

Three subgroups will be utilized to investigate common pathologies among three age groups: pediatric, adult, and geriatric. In order to narrow down the focus of research, each subgroup will study lower limb pathologies pertaining to one specific age group. In addition to exploring the O&P treatments, each student within each subgroup will specialize in researching one of the following roles: Patient, Physician, Physical Therapist, O&P Technician, and Financial Specialist.

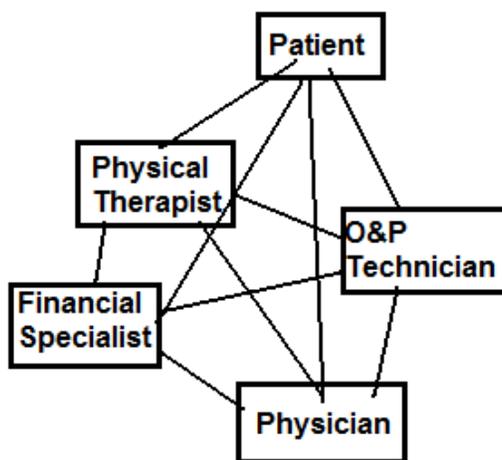
The group breakdown is as follows:

	Age Group/Pathology	Research
Subgroup 1	Geriatric Lower Limb	O&P treatments for elderly individuals who have stroke and diabetes.
Subgroup 2	Adult Lower Limb	O&P treatments for adults who have diabetes, PVD, stroke, and amputation due to trauma.
Subgroup 3	Pediatric Lower Limb	O&P treatments for children underwent congenital amputation and cerebral palsy.

Each subgroup is further broken down into researching the five specialized roles:

	Subgroup 1	Subgroup 2	Subgroup 3
Patient	Ryan	Matt	Manuel
Physician	Xuan	Stephanie F	Amber
Physical Therapist	Carlos	Stephanie L	Pallavi
O&P Technician	Greg	Wen	Todd
Financial Specialist	<i>*Flexible</i>	Mark	Mrigank

Within each subgroup, students will research how each particular role should act and communicate to treat a patient. The ideal interaction between the five roles is schematically drawn below:



Each subgroup will produce PowerPoint presentations, pamphlets, workshop procedures, and probable additions of video and hands-on demonstrations regarding their assigned pathology. In addition to research assignments, administrative tasks have been given to each member to ensure timely delivery of the project.

*Greg <i>Field Trip Coordinator & Translation</i>	Xuan <i>Presentation Coordinator & Slide Show Designer</i>	Ryan <i>Accreditation Expert</i>	Carlos <i>Spanish Translation Co- Manager</i>
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*Stephanie F <i>Vocabulary Manager</i>	Wen <i>Co-Vocabulary Manager & Secretary</i>	Mark <i>Budget & Treasurer</i>	Matt <i>Content Manager & Translator</i>	Stephanie L <i>Work Schedule Specialist</i>
*Mrigank <i>Webmaster & Secretary</i>	Manuel <i>Project Manager &Co- Translation</i>	Todd <i>Ethics Compliance Coordinator</i>	Pallavi <i>Co-Webmaster</i>	Amber <i>IPRO Day Coordinator</i>

* Designates group leader

Results and Documentation

Each subgroup will report researched results every week during meeting. This is to evaluate the work of each group to confirm whether the material presented makes sense. Every week, each subgroup will prepare a 15-minute presentation of new materials. The remaining subgroups are expected to listen and critique the work of other groups. Information will be gathered, documented, and properly cited as each subgroup work on PowerPoint presentations, worksheets, pamphlets, and any related media. These will be uploaded to iGroups on an ongoing basis. If a group is not producing measurable work, the team leader will contact them to attempt to get the group back on track. Successful progress will be measured by verbal and written feedback as to what is good in the presentation and what can be improved.

Accreditation

All materials produced for either the Centro Don Bosco or JJC will be subject to review by the designated Accreditation Expert on the team. In addition to ensuring that all materials produced comply with accreditation standards, the accreditation expert will also be responsible for educating the entire group on the accreditation process and any details it carry.

Deliverables

In addition to project plan, abstract, mid-term, and final reports, the primary deliverables will be PowerPoint presentations, poster, pamphlets, and website. The team will also be looking forward to furnishing video presentations, hands-on demonstrations, and designing educational workshops. To ensure timely completion of all IPRO deliverables, the subgroups will report all materials requested by the Project Manager and Content Manager approximately one week before deadline. At this time, the Project Manager and Content Manager will compile those documents for review. After which, all documents will be promptly uploaded to the iGroups website.

5. Team Structure and Assignments

Kevin Meade – *Advising Professor*

A. Subgroup 1

1. Xuan Kang – *Presentation Expert*
2. Ryan Ruidera – *Accreditation Expert*
3. **Greg Quandt** – *Field Trip Coordinator, Co-translation manager*
4. Carlos – *Spanish translation manger*

B. Subgroup 2

1. **Mrigank Bhatia** – *Secretary*
2. Manuel Castro – *Translation Manager*
3. Amber Purcell – *I PRO Day Coordinator*
4. Pallavi Gupta – *Co-webmaster*
5. Todd Maddamma – *Ethics Compliance Co-coordinator*

C. Sub-group 3

1. **Stephanie Fischer** – *Vocabulary Manager*
2. Wen Chan – *Co-Secretary/Co-Vocabulary Manager*
3. Mark Reibel – *Treasurer*
4. Matt Cosenza – *Content Manager*
5. Stephanie Lucas - *Work Schedule Specialist*

6. Budget

Overall, the main goal of this I PRO is to focus more on fabrication and thus this aspect has been allocated the most funding. Fabrication will consist of design and molding of the orthotic/prosthetic along with the parts required to construct the apparatus. Also, field trips along with the requisite transportation will be another major area of focus and requires a fair amount of funding. Finally, printing and office supplies as well as pending apparel design will require a fair amount of spending in order to communicate the results of the semester. Note that these numbers have been roughly estimated from previous semester's I PRO budgets.

Fabrication/Manufacturing:	\$700.00
Transportation/Field Trips:	\$200.00
Printing/Supplies/Apparel:	\$300.00

Total:	\$1200.00

7. Code of Ethics

Overarching Standard:

To create effective educational materials for students and technicians in the Orthotic and Prosthetic (O & P) field, specifically the students of Centro Don Bosco and Joliet Junior College, while maintaining the principles of honesty, integrity, and forthrightness.

Law:

Canon: Project members shall respect the legal frameworks of both the United States, embodied by the Health Insurance Portability and Accountability Act (HIPAA), and of the Republic of Colombia, regarding patient privacy, confidentiality and medical practice.

Pressure: Simplify treatment process and avoid what are perceived to be excessive or time-consuming measures.

Pressure: Through the communication process accidentally reveal private patient information

Risk: Educational modules may leave ambiguity or improper instructions for proper handling of confidential or identifying patient information.

Measure: Case studies will be fictional with no private information released, while still representing legitimate issues facing amputees.

Further Information:

<http://www.hhs.gov/ocr/privacy/hipaa/understanding/index.html>

[U.S. Department of Veterans Affairs](#)

Professional Code:

Canon: Project members shall perform according to the code of ethics of the International Society for Prosthetics and Orthotics (ISPO), the international accrediting body for O & P practitioners and programs, and the American Board for Certification in Orthotics and Prosthetics (ABC) and National Commission on Orthotics and Prosthetics Education (NCOPE).

Pressure: In order to meet deadlines, members may be tempted to skip steps or otherwise perform at less than their best.

Pressure: Due to the nature of collaborative effort, individuals may feel underappreciated or misused by the team.

Risk: Members may produce sub-standard products as a result of poor motivation or active sabotage.

Measure: All project members shall be provided with, become familiar with, and abide by the relevant professional codes of ethics (ISPO, ABC, NCOPE).

Further Information:

[U.S. National Society of the ISPO \(International Society for Prosthetics and Orthotics\)](#)

[NCOPE - National Commission on Orthotic and Prosthetic Education](#)

<http://www.abcop.org/>

Industry Standards:

Canon: IPRO members should become aware of and follow the common practices and methodologies that medical doctors, orthotics and prosthetics technicians, physical

therapists, and financial institutions utilize. Care should be taken to make sure that IPRO members do not impersonate these professionals nor prescribe orthotic/prosthetic devices.

Pressure: People may come to expect the IPRO to prescribe, fabricate, and fit prosthetic/orthotic devices.

Pressure: IPRO team members may over-sympathize and provide aid to outside parties.

Risk: Stepping outside one's scope of practice, be it prescribing devices, fabricating prosthetics, or assisting in physical therapy.

Measure: Scope of practice for the physician, O&P technician, and physical therapist are clearly defined and members of the IPRO are to understand these limitations.

Professional Scope of Practice

Canon: Each member shall become aware of the expectations and guidelines that encompass their specific profession, whether it a physician, orthotic and prosthetic technician, physical therapist, or a financial institution.

Pressure (Physician): Prescribing devices based on the demands of the patient.

Pressure (O&P Technician): Wishing to adjust or modify certain devices in order to satisfy a patient's request without proper medical evaluation.

Pressure (Physical Therapist): Attempting to treat or cure ailments that were not noticed by the physician or O&P technician.

Pressure (all): Stepping outside the bounds of one scope of practice in order to fulfill the needs of another scope of practice.

Risk: Violations of scope of practice may result in legal courses of action and loss of business.

Risk: Further aggravating the patient's condition.

Measure: All members must become familiar with and remain within their respective scope of practice as well as noting other professions' scopes of practice and abiding by their boundaries.

Example: An O&P technician is asked to modify or change a prosthetic device which would result in the O&P technician being required to seek the guidance of a physician in order to prevent a violation of scope of practice.

Social, Civic, and Geographical Community:

Canon: IPRO members shall become aware of and abide by the differences of the social, civic, and geographical community and identify where they apply.

Pressure: Applying standards from one location in order to assist in another.

Risk: Not fully recognizing certain community standards.

Risk: Failing to differentiate between different social situations and the nuances that come with each one.

Measure: The IPRO team will become acquainted with and carry out the standards of the various social, civic, and geographical communities, especially between the United States and Colombia.

Example: Different situations arise which require different responses from the health care professionals in separate countries. For example, families typically accompany patients to their medical appointments in Colombia and are often invited into the office. Conversely, medical appointments within the United States are typically patient-doctor confidential and family members are typically told to remain in the waiting room. This discrepancy could

possibly cause complications if the two separate entities were to come together for treatment.

Personal Relations:

Canon: Relations with outside parties, whether it be staff or industry personnel, will be carried out with respect and in a professional manner. IPRO team members shall also treat each other as equals and with the respect that everyone deserves.

Pressure: Take out frustrations on other team members when something is not completed in a timely manner.

Pressure: IPRO members have a lot of other projects outside of the IPRO.

Risk: Times of increased stress/strain tends to bring out the worst in people and thus feelings may be hurt and relationships may be strained.

Moral Values:

Canon: Credit will be given where credit is due. Therefore, no team member shall put their name on work that is clearly not theirs. Also, the work for the semester shall be divided equally and distributed to people who meet the requirements of the work.

Pressure: IPRO members may feel the work was not divided equally or other members are not pulling their own weight.

Pressure: IPRO members may feel the need to copy other's work and ultimately attempt to take credit for work that is not their own.

Risk: Credit may be given to a certain individual where credit is not due.

Risk: Vital information may be omitted and thus will deteriorate the quality of the final product.

Risk: Violation of university policy on plagiarism.

Measure: Proper schedules and distribution of tasks for IPRO team members will ensure the work is done in a timely manner and that each member has enough work to do for the semester.

8. Results

The main goal this semester was to create educational modules that effectively established a connection between physician, patient, orthotic/prosthetic technician, physical therapist, and the financial sector. Along with these subgroups came the development and implementation of the "scope of practice", a theoretical boundary for each professional in which he/she was to follow. For example, the physician is to handle the medical (anatomy) aspects of the patient as well as anything related to pain. Hence, a physician will make no attempt to modify prosthetic devices or perform physical therapy on a patient, as this would be deemed a violation of "scope of practice". The same idea applies to every other profession and thus will enable people to become familiar with the boundaries of the professionals and be able to make decisions on whom to contact when it comes to patient questions. These educational tools were then provided to the students of Centro Don Bosco and Joliet Junior College who were working to become O&P technicians. In order to fully expand on the idea of interdisciplinary communication within the medical community, three separate case studies were generated for pediatric, adult, and geriatric age groups. Each case study focused on fictional characters diagnosed with real life medical conditions and were then prescribed medical advice along with prosthetic devices. The goal of

these case studies was to effectively communicate to the reader the process a patient may typically see throughout the amputation process and to point out the miscommunication that typically arises between each professional subgroup. Also, each professional subgroup's scope of practice was developed and implemented into the case studies. For example, patients may ask an O&P professional to modify or adjust a device due to aggravated pain or discomfort when wearing the device. A point is then made that the O&P technician has a certain "scope of practice" in which he/she is not allowed to violate and thus the patient will then be referred back to the physician in order to diagnose the pain.

Other goals that were met throughout the semester were the further development of teamwork and effective management of the IPRO's time. Each member had a certain amount of work to do throughout the semester and deadlines were established in order to complete the work in a timely manner. Also, many members became more accustomed to public speaking and improved upon their ability to communicate the results of this IPRO with interested parties. Finally, general knowledge of medical terms and orthotic/prosthetic devices were established and incorporated into the case studies and final product. It was determined that in order for deliverables to be effective, the students of the IPRO would first need to know the medical and O&P terms and become familiar with the procedures and scopes of practice.

Also, a goal was set of having presentations in both Spanish and English. In order to effectively communicate our thoughts to those in Latin America, the educational modules needed to be translated into their native Spanish and thus two members who are fluent in the language were able to successfully accomplish this task.

One final goal that was met was the fabrication of various hand and feet orthotics. Three trips were made to Dr. Meade's Bio-concepts laboratory, where various members worked on the casting of different orthotics and actual prototypes were generated for educational purposes. Overall, all goals that were created were met and thus the conclusion can be drawn that this semester was a successful one.

An ethical/moral issue that arose during the semester was the fact that the students were not indeed the medical professionals that they were studying. Thus, it was made clear that the information was neither to be mistaken for medical prescriptions nor to be used instead of actual medical appointments with certified professionals. The IPRO was merely performing research and documenting the results for future use. This fact was made clear throughout the semester and an ethical coordinator was even established to be sure everyone abided by these rules. Another ethical dilemma that arose was the fact that since there was so much research performed throughout the semester, sources needed to be cited and credit was to be given where credit was due. It would have become very easy to lapse on creating bibliographies and claiming information as one's own but specific care was taken to avoid plagiarism. Overall, these were main issues that arose throughout the semester and were discussed at length during IPRO meetings in order to ensure a quality product.

9. Obstacles

There were a couple large obstacles faced this semester that had to be overcome to allow for a successful time. One of the first challenges faced, was the fact that we are not the professionals we were researching. We do not have their same training that could make some of the research material difficult to understand. To help with this possible challenge, the position of Vocab. Manager was created. She was responsible for compiling a list of vocab. words with their definition. Field trips to Bioconcepts and Children's Memorial Hospital were also set up to allow hands on experience and the chance to talk to real professionals. The next major challenge faced was scheduling. Our group is composed of 14 people. Outside of class time it would be next to impossible to find free time where everyone would be available to meet. Instead the group was split into three subgroups of 4-5 people each. Tasks were then split among the subgroups if they could not be completed in class. It is much easier to find a time that works for 5 people rather than 14. E-mail and the groups website were then used to communicate between members and subgroups until class. Because our materials are for Centro Don Bosco in Bogotá, Colombia everything needs to be translated into Spanish and only two people in the group are fluent Spanish speakers. To help them out, projects were given an early due date, so that they would have plenty of time to translate everything. Like for most projects there were ethical concerns that had to be taken into account while writing the case studies. The technical information presented is not supposed to be the point of the case studies but the information cannot be wrong if it is to be used by the students. Dr. Meade reviewed our material to ensure accurate information is given. All obstacles faced were overcome in the best means available to us.

10. Recommendations

The next step for this IPRO is to design a business plan to help sustain the O&P program at Centro Don Bosco. This will involve assess the costs, procurements, and insurance reimbursements of implementing prosthetic and orthotic devices. A program is useless if it cannot be maintained long enough to train future O&P technicians.

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12. Resources

Along with the standard two meetings a week for one hour and fifteen minutes each, there were many times when the subgroups would elect to hold meetings outside of class. These meetings typically occurred about twice a week and lasted approximately thirty minutes to one hour. Time spent outside of class varied by the amount of work that needed to be done for the upcoming IPRO class. No formal timesheets were kept this semester as per the decision of the team. Instead, meeting minutes were kept by various members of the group and were posted to iGroups for members to be able to view what took place for each meeting as well as goals for the next meeting.

In terms of the budget this semester, the only funding that was used was the cost of the train ride to Hinsdale in order to visit Bio-concepts. Ticket prices were five dollars for a round trip ticket from downtown union station to the Hinsdale station. From there, Dr Meade picked up the students via automobile and taken directly to Bio-concepts. Also, a visit to Children's Memorial Hospital was established but the cost of the trip was only the use of student U-passes and thus is not technically covered under IPRO guidelines. The cost of printing the poster and abstract/brochures was covered by the IPRO office and thus is not included in incurred expenses. It should be noted that everything that was to be printed needed to be printed twice, once for English and again for a Spanish version.

13. Acknowledgements

Professor Kevin Meade
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