



IPRO 309: H.
Human Orthotic and Prosthetic Education

1. Team Information

a) Roster:

| | | | |
|----------------------|------------|------|----------------------|
| 1) Mrigank Bhatia | ██████████ | ECE | 3 rd Year |
| 2) Manuel Castro | ██████████ | MMAE | 3 rd Year |
| 3) Wen Chan | ██████████ | MMAE | 3 rd Year |
| 4) Matthew Cosenza | ██████████ | MMAE | 4 th Year |
| 5) Stephanie Fischer | ██████████ | CS | 3 rd Year |
| 6) Pallavi Gupta | ██████████ | ECE | 2 nd Year |
| 7) Xuan Kang | ██████████ | BME | 4 th Year |
| 8) Stephanie Lucas | ██████████ | BME | 2 nd Year |
| 9) Todd Maddamma | ██████████ | MMAE | 3 rd Year |
| 10) Kevin Meade | ██████████ | MMAE | 26 Years |
| 11) Amber Purcell | ██████████ | BME | 3 rd Year |
| 12) Gregory Quandt | ██████████ | MMAE | 4 th Year |
| 13) Mark Reibel | ██████████ | MMAE | 4 th Year |
| 14) Ryan Ruidera | ██████████ | MMAE | 4 th Year |
| 15) Carlos Sardi | ██████████ | MMAE | 3 rd Year |

b) Team member strengths, needs and expectations:

o Strengths:

- a) Mrigank: video editing, Stay on top of things, computers, Experience
- b) Manuel: Structural Analysis, Experience, Spanish
- c) Wen: Organization, internship experience, materials science research, knowledge of mechanics/materials, Excel, Word processing, PowerPoint, and some programming.
- d) Matthew: Mechanical Analysis (static and dynamic), Computer skills – Office, ProE, AutoCAD, FEA, Technical writing, second IPRO
- e) Stephanie Fischer: terminology, anatomy, like to be organized and follow schedule
- f) Pallavi: Computers and Organized
- g) Xuan: Computer simulations give better knowledge of human anatomy, knowledge of biomaterials. Hospital volunteering, planning, Lab work in neuroscience
- h) Stephanie Lucas: Very Organized, Love to learn
- i) Todd: Engineering, research
- j) Amber: Organized, planning, video editing
- k) Gregory: Experience, Communication skills, basic understanding in mechanical engineering, O&P engineering and manufacturing.
- l) Mark: FEA & CAD/CAM, Spanish
- m) Ryan: PROE, AUTOCAD, FEA, fabrication, Spontaneous
- n) Carlos: Good technical knowledge, especially mechanics of bodies, Good knowledge of Spanish

- **Needs:**

- a) Mrigank: Patience from team members.
- b) Manuel: Communication- keep it simple, talk more, class discussions
- c) Wen: Understand the pathologies and the devices to cure them. Manufacturing process of P/O devices and the costs. Implementation procedure.
- d) Matthew: Teamwork
- e) Stephanie Fischer: improve teamwork and communication skills
- f) Pallavi: Learn team work, presentation skills
- g) Xuan: Deeper understanding of the information and principles related to Orthotics and Prosthetics, Improving my team work skills,
- h) Stephanie Lucas: improve teamwork and communication skills
- i) Todd: Organization
- j) Amber: written and verbal communication skills
- k) Greg: Work on time management
- l) Mark: Improve on teamwork and learn more about O&P
- m) Ryan: Schedule, Learn to be organized.
- n) Carlos Sardi: Improve Organization

- **Expectations:**

- a) Mrigank: Look into research of the project.
- b) Manuel: teamwork - don't argue in unproductive way guys keep things simple
- c) Wen: Understand most important pathologies
- d) Matthew: Learn biomechanics, improve medical terminology, improve team work
- e) Stephanie F: build on what was learnt last semester learn about O&P as a career option, people are responsible and work together
- f) Pallavi: Learn team work, learn about O&P
- g) Xuan: an understanding of O&P, help with co-operation between staff and students and improve work skills and English writing skills
- h) Stephanie L: Learn more about O&P.
- i) Todd: understand the O&P field better and effectively communicate this information
- j) Amber: Better understand of the prosthetic fields, learn what an IPRO is about
- k) Greg: improve teamwork, presentation skills.
- l) Mark: Improve teamwork skills, build of previous IPRO
- m) Ryan: develop communications, better understanding of O&P; learn how real a multi disciplinary team can solve world problems. To have fun,
- n) Carlos Sardi: To help people, learn to work in team

- c) **Team identity:**

- a) **Motto:** "Estamos ayudando a nuestros amigos, one step at a time."
(We are helping our friends, one step at a time.)
- b) **Team Name:** H.O.P.E. (Human Orthotic and Prosthetic Education)



c) **Logo:**

d) **Team Values:**

1. Privacy (HIPAA)
2. Show up to class on time/don't skip
3. Respect the opinions & input of others
4. Contribute & participate
5. Learn something new

e) **Individual Team Member 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 – *IPRO 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*

2. 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

3. 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.

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.

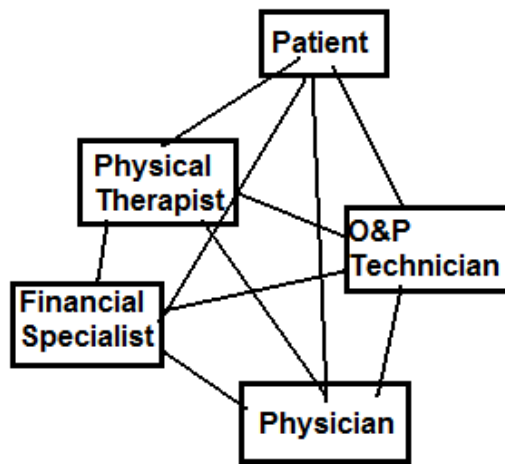
The group breakdown is as follows:

| | 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> | |
| *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. Budget

Overall, the main goal of this IPRO 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 IPRO budgets.

| | |
|-----------------------------|-----------|
| Fabrication/Manufacturing: | \$700.00 |
| Transportation/Field Trips: | \$200.00 |
| Printing/Supplies/Apparel: | \$300.00 |
| | ----- |
| Total: | \$1200.00 |

6. Schedule

| Task | Team Mem. | Skills | Hours | Start Date | Due Date |
|---------------------------------|---------------|--------------------------------|-----------|--------------------------|-------------------------|
| Project Plan | | | 8 | Thursday, Jan. 29 | Friday, Feb. 6 |
| Initial Planning | All | Communication Knowledge on O&P | 1 | Thursday, Jan. 29 | Thursday, Jan. 39 |
| Choose Topic | All | O&P | 1 | Tuesday, Feb. 3 | Tuesday, Feb. 3 |
| Rough Draft | All | Writing | 4 | Thursday, Jan. 29 | Thursday, Feb. 5 |
| Editing/Final Details | All | Editing | 2 | Thursday, Feb. 5 | Thursday, Feb. 5 |
| Preliminary Research | | | 21 | Saturday, Feb. 7 | Monday, Feb. 17 |
| O&P Intro. Field Trip | All Available | Availability | 12 | Saturday, Feb. 7 | Saturday, Feb. 7 |
| Choose Ind. Research | All | Knowledgeable | 2 | Thursday, Feb. 5 | Tuesday, Feb. 10 |
| Basic Research | All | Research | 7 | Tuesday, Feb. 10 | Monday, Feb. 17 |
| Mid-Term Presentation | | | 14 | Tuesday, Feb. 17 | Monday, March 2 |
| Initial Planning | All | Communication | 1 | Tuesday, Feb. 17 | Tuesday, Feb. 17 |
| Rough Draft | All | Writing | 5 | Tuesday, Feb. 17 | Monday, Feb. 23 |
| Compile Work | 2 or 3 | | 2 | Monday, Feb. 23 | Tuesday, Feb. 24 |
| Initial Editing | Matt + help | | 3 | Tuesday, Feb. 24 | Thursday, Feb. 26 |
| Final Editing/Prep. | All | | 3 | Thursday, Feb. 26 | Sunday, March 1 |
| Prelim. Research (cont.) | | | 11 | Tuesday, March 3 | Monday, March 9 |
| Basic Research | All | | 8 | Tuesday, March 3 | Wed., March 4 |
| Begin Refining Idea | All | | 3 | Thursday, March 5 | Monday, March 9 |
| Advanced Research | | | 10 | Tuesday, March 10 | Friday, March 13 |
| Group Talk/Planning | All | | 1 | Tuesday, March 10 | Tuesday, March 10 |
| Specific Research | All | | 7 | Wed., March 11 | Friday, March 13 |

| | | | | | |
|---------------------------------|-------------|------------|------------|---------------------------|-------------------------|
| Interviews (?) | Greg | | 2 | ???? | ???? |
| Spring Break | All | Relaxation | 216 | Saturday, March 14 | Sunday, March 22 |
| Adv. Research (cont.) | | | 22 | Monday, March 23 | Monday, March 30 |
| Specific Research | All | | 7 | Monday, March 23 | Monday, March 30 |
| Interviews/Field Trip | Greg | | 12 | ???? | ???? |
| Compile Research | All | | 3 | Thursday, March 26 | Monday, March 30 |
| Workshops/ Prob. Solving | | | 20 | Tuesday, March 31 | Monday, April 13 |
| Initial Planning | All | | 1 | Tuesday, March 31 | Tuesday, March 31 |
| Rough Draft | All | | 12 | Tuesday, March 31 | Sunday, April 5 |
| Initial Editing | Matt/Amber | | 5 | Monday, April 6 | Thursday, April 9 |
| Final Editing | All | | 2 | Thursday, April 9 | Tuesday, April 14 |
| Exhibit & Poster | | | 16 | Tuesday, April 14 | Monday, April 27 |
| Initial Planning | All | | 1 | Tuesday, April 14 | Tuesday, April 14 |
| Rough Draft | All | | 7 | Tuesday, April 14 | Monday, April 20 |
| Compile Work | 2 or 3 | | 2 | Monday, April 20 | Tuesday, April 21 |
| Initial Editing | Matt + help | | 3 | Tuesday, April 21 | Thursday, April 23 |
| Final Editing | All | | 3 | Thursday, April 23 | Sunday, April 26 |
| Abstract/Brochure | | | 6 | Tuesday, April 21 | Monday, April 27 |
| Initial Planning | All | | 1 | Tuesday, April 21 | Tuesday, April 21 |
| Rough Draft | All | | 3 | Tuesday, April 21 | Thursday, April 23 |
| Initial Editing | Matt + help | | 1 | Thursday, April 23 | Friday, April 24 |
| Final Editing | All | | 1 | Saturday, April 25 | Sunday, April 26 |
| Presentation | | | 16 | Tuesday, April 14 | Wed., April 29 |
| Initial Planning | All | | 1 | Tuesday, April 14 | Tuesday, April 14 |

| | | | | | |
|--------------------------|-------------|--|----------|---------------------------|----------------------|
| Rough Draft | All | | 7 | Tuesday, April 14 | Monday, April 20 |
| Compile Work | 2 or 3 | | 2 | Monday, April 20 | Tuesday, April 21 |
| Initial Editing | Matt + help | | 3 | Tuesday, April 21 | Monday, April 27 |
| Final Editing | All | | 3 | Tuesday, April 28 | Tuesday, April 28 |
| I PRO Day | | | 5 | Thursday, April 30 | Friday, May 1 |
| Planning | Amber | | 2 | Thursday, April 30 | Thursday, April 30 |
| Practice | All | | 3 | Thursday, April 30 | Friday, May 1 |
| Final Report | | | 7 | Tuesday, May 5 | Friday, May 8 |
| Initial Planning | All | | 1 | Tuesday, May 5 | Tuesday, May 5 |
| Rough Draft | All | | 4 | Tuesday, May 5 | Thursday, May 7 |
| Editing | All | | 2 | Thursday, May 7 | Thursday, May 7 |
| Team Work Product | | | 7 | Tuesday, May 5 | Friday, May 8 |
| Initial Planning | All | | 1 | Tuesday, May 5 | Tuesday, May 5 |
| Rough Draft | All | | 4 | Tuesday, May 5 | Thursday, May 7 |
| Editing | All | | 2 | Thursday, May 7 | Thursday, May 7 |