PROSTHETIC & ORTHOTIC EDUCATORS MEETING

Developing strategies for the future of P&O university education

POST MEETING BOOK

14 – 17 August 2002

Department of Rehabilitation, School of Health Sciences

Jönköping University, Sweden

www.IAPOE.org

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Introduction

Background

The Prosthetic and Orthotic Educators Meeting (POEM) was held in Jönköping Sweden from the 14th to the 17th of August 2002. The meeting was hosted by the Department of Rehabilitation, School of Health Sciences, Jönköping University and was attended by 40 delegates representing 13 countries and 20 educational institutions.

The concept for the meeting was derived by a group of educators who recognised that many of the challenges they face in the development and delivery of prosthetics and orthotics curriculum are common across educational institutions and countries. The prosthetics and orthotics educators meeting was subsequently designed as a forum for sharing of ideas and facilitating discussion of key educational issues.

The prosthetics and orthotics educators meeting represented the first formal gathering of prosthetics and orthotic educators since 1984. This previous meeting was held in Toronto, Canada.

Meeting aims

Specific aims of the prosthetics and orthotics educators meeting were to:

1. Facilitate discussion among educators involved in university level prosthetics and orthotics education
2. Discuss and debate key issues pertaining to the development and delivery of curriculum for prosthetics and orthotics education
3. Discuss strategies for advancing university level education in prosthetics and orthotics

Meeting themes and structure

The four day meeting was developed around six key themes, which formed the basis for discussion among meeting participants. These themes were:

1. Professional Identity
2. Entry-level curriculum
3. Mode of delivery
4. Practical/Applied/Clinical curriculum
5. Post-graduate education
6. Collaboration

In order to facilitate discussion and debate, each theme began with one or two keynote addresses presented by an invited speaker or speakers. These individuals were invited because of their expertise in the topic area, and were asked to present points of view related to the theme. Following the keynote addresses, participants were divided into small discussion groups to consider one of two questions pertaining to the theme at hand. Each group was required to formulate a response to the question and present their findings to all participants in a subsequent plenary session.

Post meeting book

It is hoped that this post meeting text will serve as a useful reference for those who participated in the Prosthetics and Orthotics Educators meeting and others with a specific interest in University level prosthetics and orthotics education. This text is divided up into six key themes of the meeting. Each theme includes:

1. Keynote summaries: a summary of keynote addresses given by each of the invited speakers, presented as a text version of each speaker's PowerPoint presentation.
2. Workshop summaries: a summary of participant responses to discussion questions, which were formulated in group break-out sessions and presented to the meeting participants. Each group was asked to identify major and other issues and then formulate a response to the question.
3. Plenary discussion: an account of comments and discussion made by participants.

While every attempt has been made to ensure that information presented in this text accurately reflects that which was presented and discussed at the meeting, it is acknowledged that discussion summaries are the editors' perception and recollection of proceedings.

Appendices to this text include:

1. Results of a survey of prosthetics and orthotics schools collected prior to the conference.
2. Summary of conference evaluation forms
3. A list of POEM participants

Additional copies of the book

Please contact any of the editors, listed below, for additional copies of this publication. Alternatively, you may access the document on the web page: www.IAPOE.org

POEM convening committee and editors

The POEM was the result of collaborative work between the following people.

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POEM supporting organizations

The meeting was supported by the following organizations:

- School of Health Sciences, Jönköping University, Sweden
- British Colombia Institute of Technology, Canada
- National Centre for Prosthetics and Orthotics, La Trobe University, Australia
- School of Medicine, Southern Illinois University, USA
- Jönköping City, Sweden
- County Govenor, Jönköping, Sweden
- Jönköping University, Sweden
- Jönköping County Council, Jönköping, Sweden
- Otto Bock, Germany
- Össur Hf, Sweden

Keynote Address: Professional Identity

Catarina M Löwenadler, CPO

Director

Code of Practice AB

Norrköping, Sweden

Background information

Catarina Löwenadler is the Managing Director for *Code of Practice AB*. The primary focus of *Code of Practice AB* is the "Development and marketing of competitive quality management systems and education programs for the health care market". *Code of Practice AB* has customers working with their quality management system in Sweden, Norway, Denmark and Belgium. India and China will soon begin to use the system.

PROFESSIONAL IDENTITY - TOPICS FOR DISCUSSION

- Who are we?
- Where are we?
- What do we do?
- What could we do?

There is still a big difference in how we work and how we see the identity of our profession.

It would be beneficial to see more people recognize the opportunity of our profession, with new technology, scientific outcomes, assessment tools and multi-disciplinary approach to problem solving.

How do we name our profession?

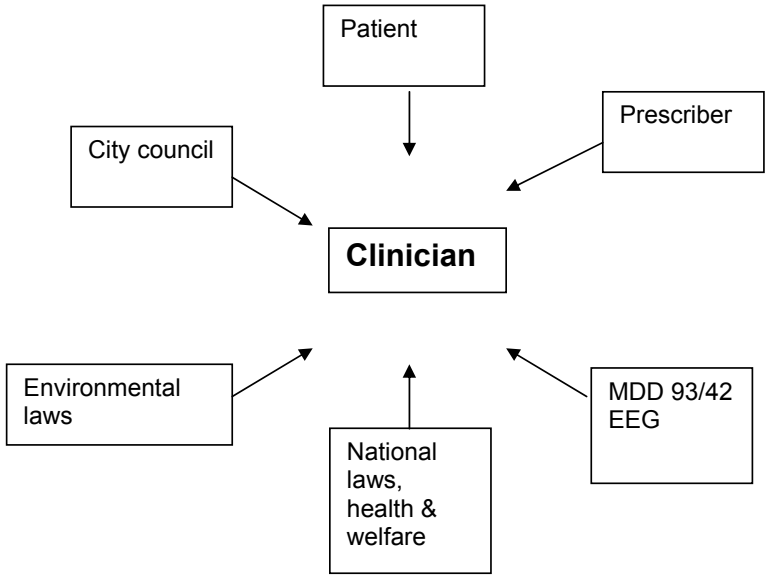
- Prosthetist Orthotist
- CPO
- Orthopaedic engineer

    - Do we mean the same in different countries?
    - Are we only making orthoses and prostheses?
    - Today there are several other professionals encroaching into our areas of practice. Why?
        - Are these groups untrained?
        - Do these groups pose a substantial risk to patients?

- I think we have opened the door ourselves by not having defined our own profession and by not marketing our skills.

Today we are working in a rather complex health care environment.

We are supposed to serve several different ”customers” with different needs and expectations. Of course the most important customer is the patient but we must also consider all other stakeholders.



Communication is very important. We must define and communicate the goal in beginning of the rehabilitation process in order to satisfy all parties. We need to investigate all the customers' requirements, solve the defined problem and assess our effectiveness in meeting performance requirements.

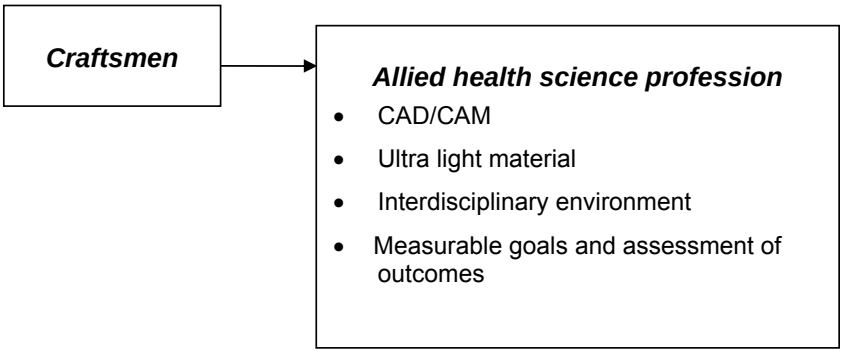
We also need to fulfill different laws and demands for the O & P business

- Most national laws of health and welfare have demands for Quality systems that include documented procedures, measurable goals, documented requirements, traceability of medical devices and risk analysis.

Historically, orthotic and prosthetic practitioners were skilled craftsmen.

Today the profession has evolved into an allied health science profession that is involved in patient evaluation, assessment of problems, diagnostic processes, (implementation of interventions), and assessment of outcomes.

By using new technology such as CAD/CAM, introducing new materials, working closely with other professions and using evaluation and assessment forms, we have changed the way of working over the last several years.



Multi-disciplinary team

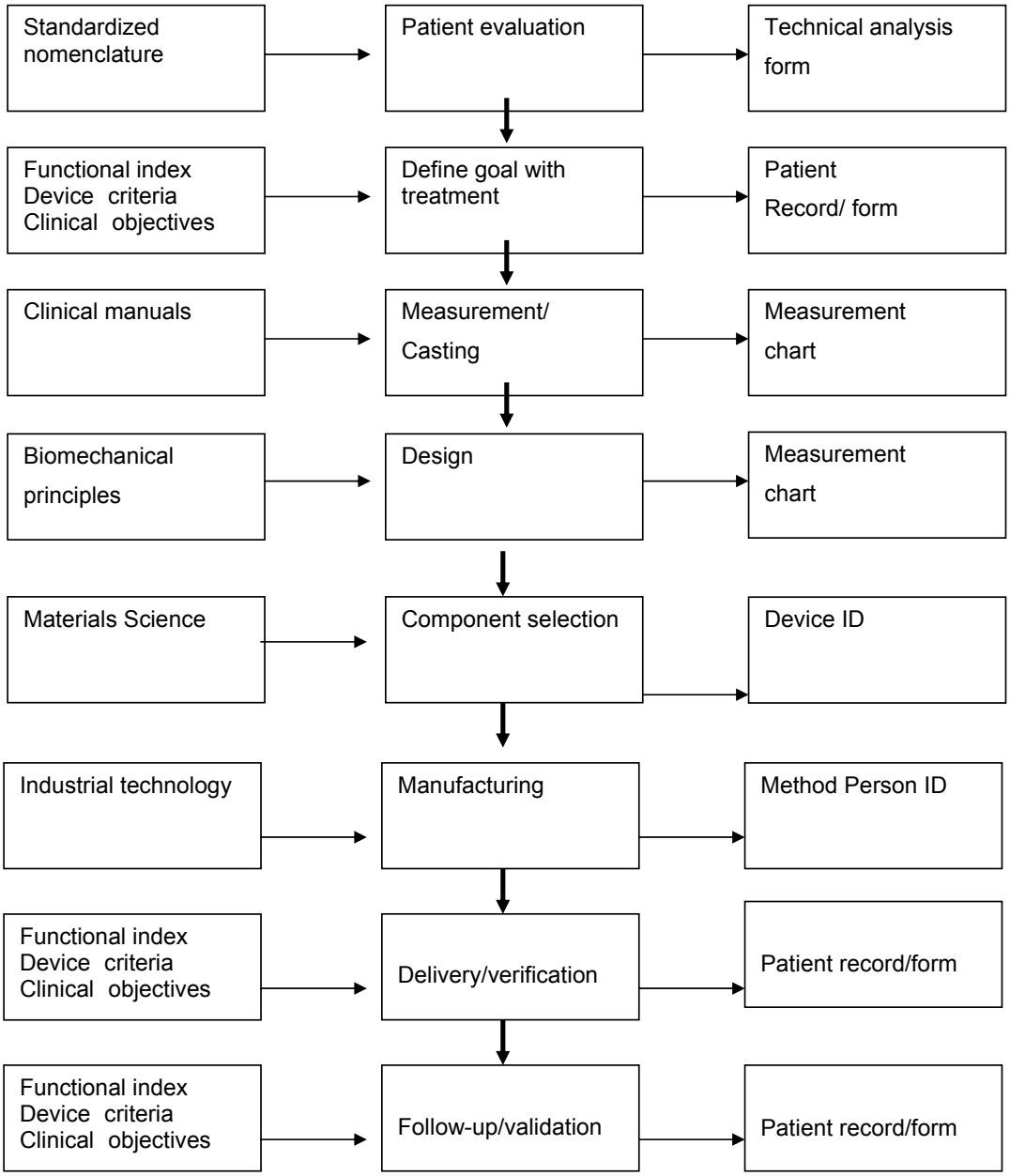
Working as a multidisciplinary team offers great benefits to everyone involved in the rehabilitation process. We need to have a multi-disciplinary approach to problem solving and to communicate the intention of the treatment as measurable goals. In order to work as a team we need to speak the same language, terminology and nomenclature and to use the same evaluation, assessment and follow up forms for all professions involved.

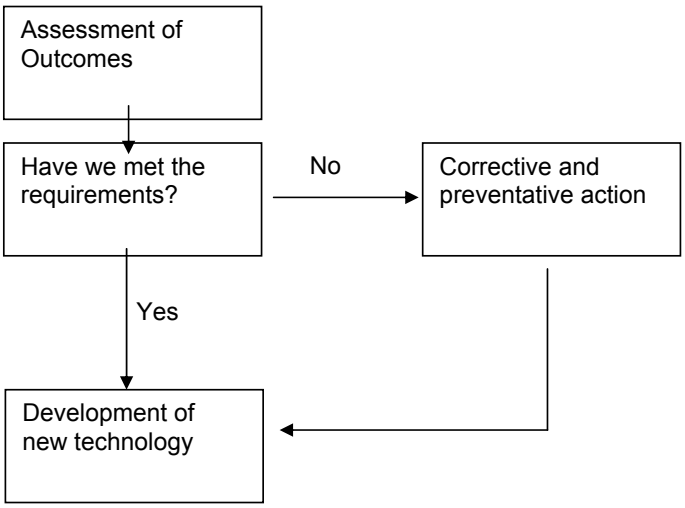
In Sweden, Code of Practice and Össur are working in collaboration to develop a quality system for the whole rehabilitation treatment from pre amputation, post-op treatment, physiotherapy active therapy, prosthetic fitting and follow up. Team members will be using the same procedures, measurement, evaluation and assessment forms during the whole process. This gives us an opportunity to assess the effectiveness of the whole treatment. This multidisciplinary approach I believe will benefit the whole O&P business

- Communicate with other professions
- Market the skill of our profession

The scope for our profession

I believe the flowchart below defines the scope of our profession.





All this work makes it possible to push the development forward, develop new technologies, working methods, designs of orthoses and prostheses and also components.

Assessment

- Status, condition
- Environment
- Functional test
- Patient values
- Patient concerns
- Patient expectations

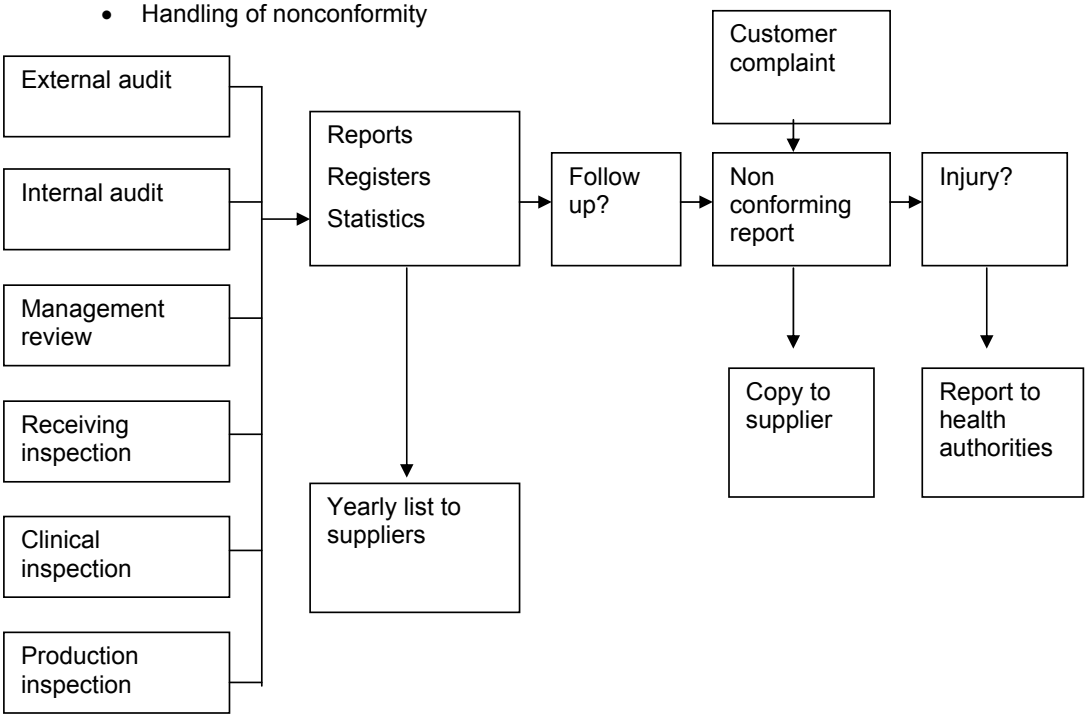
- Who assesses the functionality of the medical devices and customer satisfaction today?
- Who measures performed requirement?

In many cases I am sad to say, it is other professions than the one who has designed and manufactured the device. Why?

- There are too few tools for O&P assessment
- The technology that is used has too many sources of error
- The knowledge of those who use new technology and assessment tools are in many cases deficient (poor).

It must also be recognised that our daily work involves:

- Communication with other profession
- Handling/storage of medical devices
- Documentation requirement
- Handling of nonconformity

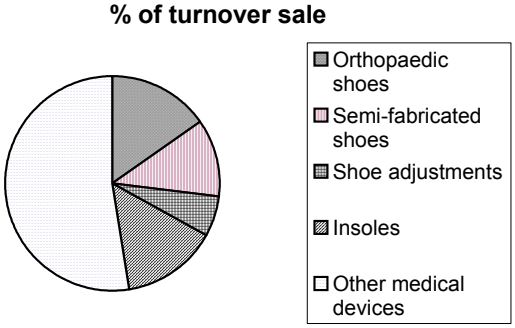


O&P Today in Sweden

What kind of devices do we work with at an O & P branch?

- Handikappinstitutet i Sverige (Hi), together with *Code of Practice AB* have conducted an investigation on this particular issue in Sweden. It was demonstrated that 47,6 % of the total turnover sale and around 40% of the total employee working hours per year were related to shoes and insoles.

That means that if we don't want to work with shoes, insoles and also semi-fabricated orthoses there will not be so much left of the "old" CPO work.



It is necessary to determine - Who is the Prescriber?

Our collaborative study with Hi also addressed the question of who really is the Prescriber. Our results, which have been documented in a publication from Hi and the National Law of Health and Welfare in Sweden, indicate that the CPO should be seen as the prescriber when:

- The CPO has had the patient contact
- Chooses an appropriate medical device
- Makes an assessment of patients needs

What we need to do…

- Design and specially modify orthoses and prostheses
- Develop functional index, device criteria and standardized clinical objectives
- Develop tools for assessment
- Develop new methods, ”code of practice” and products
- Academic research
- Improve prosthetic and orthotic technology
- Define and market our professional identity

Do we dare to burst the frame?

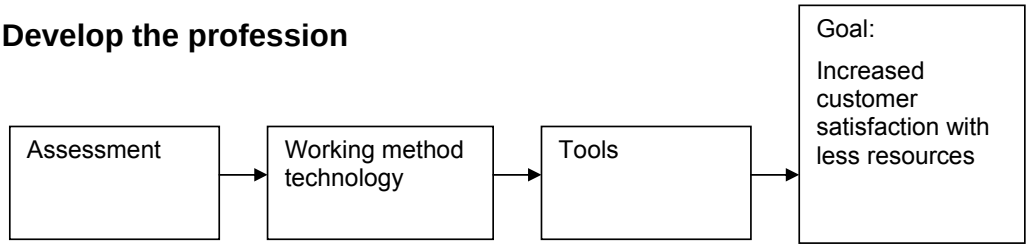
Do we want to burst the frame and expand our market outside orthotics and prosthetics? ‘Look outside the box’ into areas such as:

- Ergonomics
- Development of assessment tools and new technologies
- Development of rehabilitation plans
- Adjustment of home facilities

- Is the name of our profession right?
- Does it have the same meaning in different countries?
- Do we narrow the field of work by calling it orthotics and/or prosthetics?

It is hard to get legitimating/licensing as we are working for in Sweden right now, when you don't have a clear defined professional identity.

Develop the profession



Workshop Summary: Professional Identity

Two questions were presented for discussion by small groups of participants. These questions were:

Question 1. How can prosthetic and orthotic schools play a leading role in shaping the identity of P&O as a profession?

Question 2. What curricular elements are needed to allow graduates to play a major role in maintaining/developing a professional identity for P&O?

Below is a summary of issues raised during workshops around both questions.

Major issues

Agreement is required regarding 'what the profession is'

- Broaden the scope of education
- Need to define competencies of the profession
- Whose responsibility is it to define the profession?
    - Depends if the country has a regulatory body
- Maybe we should eliminate/modify technical training
    - Student must produce something to know that they are successful
    - Who is teaching the technicians?
    - Students must understand the problems the technician may face
    - Expectation of employers is that students can do technical work (need to educate employers)
    - Less technical emphasis will identify us as a more clinical profession

Outcomes

- Evidence based practice
- Research
- Standardize across schools
- Utilize multi-center training/research
- Distance learning
- Literature

The more uni-professional we become the more divorced we become from the clinical team (Are seen as competent by our peers)

- Traditionally, we were not part of a team because we were led by physicians
- More emphasis on team
- Students educated together with 'other' professionals

- Teach students that they are at the center of the communication
- Teach students that physicians refer and P&O's prescribe (teaching students that they are specialists)

Can P&Os refer patients?

- Involve other allied health students in the education so students learn to appreciate each others role
- Raises professional profile

Schools can not push too hard as students must meet the needs of employers upon graduation

- The more we spread our role, the less defined our professional identity becomes
- Need to graduate more students
- Should increase the scope of teaching in order to reclaim some of the areas we have lost and develop new areas
- Gait analysis
- Pressure mapping
- Upper extremity orthotics
- Assistive devices
- Home and work modifications
- Increasing specialization through modular teaching

Educating for the future

- Teaching the best current clinical practice
- Can P&O schools take control of our destiny? (new tech, funding, central fab, constantly changing practice)
- Instil self-confidence in our graduates.
- Preparing them for constant change AND retaining traditional clinical skills & knowledge
- Provide transferable knowledge
- Teach about the multidisciplinary approach to rehabilitation and awareness of changes in other fields
- Define professional goals expected of the profession that are accurate
- Data base of P&O material made available to all students

Post Graduate Education

- Equip our graduates to improve profession
- Prepare graduate to practice evidence based research, outcome measurements.
- Become responsible for their own profession.
- Changes the way other disciplines perceive P&O
- Clinical and academic disciplines provide opportunities for collaboration with other professions.
- Allow other disciplines to do a post-grad in P&O

- Allow specialization
- Must have a staff able to provide this service

Difference of opinion regarding level of technical training required

- Must define the profession before this can be answered

Schools need to teach 'evidence based practice' if we are to improve identity

- Required research and a sound body of knowledge

Schools should explore ways to encourage a working 'team' environment (define the role of the P&O within the team)

- Involve other allied health students in the education so students learn to appreciate each others role

There is a value but also a danger in expanding the roles of P&Os

- Schools should work to provide post-graduate opportunities
- Requires qualified supervisors. Teachers should be involved in clinical practice, research, and/or evaluation

Prepare students for constant change AND best current clinical practice

Evidence based practice needs to be emphasized throughout

Summary of other issues

- Need to define competencies of the profession and to define the position of the school within the health community and the university
- Is it the school that plays a role or the national certification body (if there is one)?
- There is a need to increase marketing of the profession
- Perceived as businessman
- In some countries, P&Os are not compensated for assessment time
- Biomechanical knowledge and materials knowledge and use distinguishes us from other professional groups
- In order to improve the professional identity we must have some students with higher degrees
- Define & develop curriculum of schools, broad scope of practice
- Who should be responsible to define curriculum?
- Who should be doing research: engineer, Dr, P&O?
- Need to educate on current clinical content first, validated by research, to prepare for future practice
- Need to be involved nationally
- Educate students to use assessment tools, to take responsibility of whole process
- Professional Identity is of secondary importance from the perspective of the total curricula
- Schools need to consider their relationship to other professions

- Equip our graduates to improve the P&O profession and be responsible for it
- Changes the way other disciplines perceive P&O

Plenary Discussion: Professional Identity

Limited time prevented further comments and discussion regarding this theme

Keynote Address 1: Entry-Level Curriculum

Mark L. Edwards, CP

Director of Prosthetics Education

Instructor in Physical Medicine and Rehabilitation

Northwestern University's Feinberg School of Medicine

ENTRY-LEVEL PROSTHETICS AND ORTHOTICS CURRICULUM IN THE UNITED STATES

A FOCUS ON NORTHWESTERN UNIVERSITY

Levels of Training in the USA

Practitioner

Bachelor's of Science in Prosthetics and Orthotics

- 2 years of basic science and math
- 2 years of orthotics and prosthetics

Bachelor's of Science with an Academic Certificate in Prosthetics/Orthotics

Technician

-Associates Degree in Prosthetics and Orthotics

Programs

Certificate Programs

Northwestern University (IL)

Rancho Los Amigos (CA)

Newington Certificate Program (CT)

Century Community College(MN)

Degree Programs

University of Texas (Dallas)

University of Washington (Seattle)

California State University at Dominguez Hills (Los Angeles)

Accreditation Standards

The Commission on Accreditation of Allied Health Education Programs accredits all programs. CAAHEP is an outside association that grants accreditation to 17 different allied health education and training programs.

Students must complete pre-requisite course work in the following:

biology

chemistry

physics

human anatomy

human physiology

psychology

mathematics

Formal Core Courses are required in the following topic areas:

biomechanics

gait analysis/pathomechanics

kinesiology

pathology

materials science

research methods

Core Knowledge Areas

Prosthetics

Measurement, impression taking, model rectification, diagnostic fitting, definitive fitting, postoperative management, external power, and static and dynamic alignment of sockets related to various amputation levels, including partial foot, Syme's, trans-femoral, trans-tibial, trans-radial, trans-humeral and the various joint disarticulations.

Orthotics

Measurement, impression taking, model rectification, fitting and alignment of orthoses for lower limb, upper limb, and spine. Systems will include foot orthosis, ankle-foot orthosis, knee orthosis, knee ankle-foot orthosis, hip-knee-ankle orthosis, hip orthosis, wrist-hand orthosis, shoulder-elbow orthosis, cervical orthosis, cervico-thoracic-lumbo-sacral orthosis, thoracolumbo-sacral orthosis, lumbo-sacral orthosis, HALO, fracture management, RGO, standing frames, and seating.

Entry-Level Competencies

Ethics	Professionalism	Terminology
Examination Techniques	Patient Handling	Orthometry Forms
Measurements	Instruments	Impression Taking
Model Rectification	Ground Reaction	Orthotic-Prosthetic Design
CAD/CAM	Materials	Components
Fabrication Process	Suspension Techniques	System Alignment
Rehab Team Practices	Training and Maintenance	Tissue Management
Manufacturer's Products	Health Economics	Documentation
Disease Prevention	Psychology of the Physically Challenged	

Clinical Experience

- 500 hours of clinical patient care experience is required.
- 250 hours per discipline
- Usually accomplished at an accredited facility under the supervision of a Certified Prosthetist/Orthotist

Residency

- All graduates must complete a 12 month residency training program in each discipline.
- Students are mentored by ABC certified practitioners.
- Must complete a research project.
- Students are evaluated for competency quarterly**.**

There are currently 370 NCOPE accredited residency sites. Since 1995, NCOPE has tracked a total of 600 residents through this program. At the present time, there are a total of 237 residents matriculating through one of the accredited residency sites.

Northwestern University
Prosthetics-Orthotics Center

Est. 1958

Feinberg School of Medicine

Department of Physical Medicine and Rehabilitation

Rehabilitation Institute of Chicago

NUPOC has educated and trained over 20,000 individuals in prosthetics, orthotics and rehabilitation since 1958. NUPOC has a unique learning environment that combines education, research and clinical practice in one building. *US News and World Report* has voted the Rehabilitation Institute of Chicago the #1 Rehabilitation Hospital in the USA for 12 years in a row.

Typical Student Profile

Students who are accepted into NUPOC's certificate program usually attain a minimum of a BS degree in a science, engineering or allied health major.

Many of the accepted students have gained valuable experiences in the profession as assistants or technicians before entering the program. NUPOC encourages and promotes these experiences.

Average age ranges between 24-28 years old. Typically, most students are Caucasian males. Orthotics tends to attract younger students and more women.

Students returning for extension of titled (CO-CPO) usually attend orthotics first and then return for prosthetics 1-2 years later.

Prosthetics Curriculum

The prosthetics curriculum is separated into three training blocks.

Upper Limb Prosthetics

Transtibial Prosthetics

Transfemoral Prosthetics

Students receive lectures, demonstrations, lab experiences, supervised clinical experiences, case-based learning, and web-based learning throughout their semester in prosthetics. Class hours are 8:00 to 16:30 hours Monday-Friday. This does not include independent learning, assigned reading, group projects and homework.

Students are assessed through a variety of methods. Examinations, checklists, and rating scales are used to give both formative and summative feedback.

Orthotics Curriculum

The orthotics curriculum is separated into three training blocks.

Spinal Orthotics

Lower Limb Orthotics

Upper Limb Orthotics

Students receive lectures, demonstrations, lab experiences, supervised clinical experiences, case-based learning, and web-based learning throughout their semester in orthotics. Class hours are 8:00 to 16:30 hours Monday-Friday. This does not include independent learning, assigned reading, group projects and homework.

Students are assessed through a variety of methods. Examinations, checklists, and rating scales are used to give both formative and summative feedback.

Supplemental Courses

- Human Anatomy
- Applied Biomechanics
- Material Science
- Research Methods
- Pathology Series
- Gait and Pathomechanics

Students in both courses must attend supplemental classes in these areas of concentration.

Keynote Address 2: Entry-Level Curriculum

Mrs Elaine Figgins, BSc MBAPO SR Prosth/Orth

Senior Lecturer Prosthetics/Orthotics

National Centre for Training and Education in Prosthetics and Orthotics

University Of Strathclyde, Glasgow, Scotland

UNDERGRADUATE PROGRAMME: BSC HONOURS PO

UNIVERSITY OF STRATHCLYDE, GLASGOW, SCOTLAND

The BSc (Honours) degree programme in Prosthetics and Orthotics at Strathclyde University is a four year course.

The Entry Requirements for UK applicants is four B passes ("BBBB") at Scottish Highers to include Mathematics as an essential subject with Physics and Biology as preferred subjects.

For English candidates three C passes ("CCC") at GCSEs are asked for with the same subject specification.

Accreditation of Prior Learning (APL) is also individually assessed by the department.

All candidates are interviewed prior to being offered a conditional or unconditional offer.

The Core Subjects within the Undergraduate Honours degree course can be divided as follows:

Topic	**hours**
Prosthetic & Orthotic Science	1614
Mechanics & Biomechanics	324
Life Science	360
Professional Development Studies	216
Prosthetic and Orthotic Clinical Practice	1610

In the first to third years the students attend for 40 weeks per year.

During that time both theoretical teaching and supervised practical instruction is undergone. The prosthetic and orthotic science supervised practical instruction is subject based. This means that demonstration patients are used within an in-house clinical environment and the clinical practice is not part of patients actual treatment programmes.

In the 4th Year the students spend a total of 46 weeks in clinical practice. This is subdivided into 23 weeks in Prosthetic clinical practice and 23 weeks in Orthotic clinical practice. In total in the four year the student will spend 805 hours in Supervised Practical

Instruction which is patient based in each discipline. This is carried out at Approved Clinical Centres throughout the UK with a few in Europe (Sweden and Dublin).

The Undergraduate Teaching Programme

The course includes the following subjects within the 1st Year:

Mathematics/ Statistics	72 Hours
Electrotechnology	72 Hours
Graphical Communication	72 Hours
Professional Development Studies	72 Hours

This subject of Professional Development Studies includes the following components:

- Transferable skills
- Written and verbal communication
- Problem solving / critical thinking
- Disability awareness
- Time management
- Financial awareness
- Life-long learning

Also included in the in the 1st Year are the core subjects:

Life Science (Anatomy/Physiology/Pathology)	120 Hours
Mechanics + Biomechanics	96 Hours
Prosthetic + Orthotic Science	438 Hours
	942 Hours TOTAL

The Undergraduate Teaching subjects in the 2nd Year include:

Computer Science	24 Hours
Professional Development Studies	72 Hours
Life Science	120 Hours
Mechanics + Biomechanics	120 Hours
Prosthetic + Orthotic Science	588 Hours
	924 Hours TOTAL

The Undergraduate Teaching subjects in the 3rd Year include:

Material Technology	72 Hours
Professional Dev. Studies	72 Hours
Life Science	120 Hours
Mechanics + Biomechanics	120 Hours

Prosthetic + Orthotic Science	588 Hours
	972 Hours TOTAL

The Undergraduate Teaching if analysed as percentages within year's first to fourth of the course shows the following ratios:

% Subjects Years 1 – 4

Theoretical teaching	28 %
Supervised Practical Instruction	72%
Subject Based	50%
Patient Based	50%

The Assessment of the theoretical subjects is carried out in a number of varied methods depending on the subject and aspect being assessed. The assessment does always include the following methods:

- Course Work
- Class Test
- End of Session Examinations (Degree Examinations)

The Supervised Practical Instruction which is Subject Based within 1st - 3rd Years of the Prosthetic and Orthotic Science programme is taught in modules which include:

Introductory Core Skills	168 Hours
Lower Limb Prosthetics	450 Hours
Upper Limb Prosthetics	264 Hours
Lower Limb Orthotics	492 Hours
Upper Limb Orthotics	90 Hours
Spinal Orthotics	150 Hours
	Total 1614 Hours

The assessment of the Subject Based Clinical Work within the Prosthetic and Orthotic Science modules also can be subdivided as follows:

- Continuous assessment by instruction (A-E)
- Class tests (varied)
- End of session examination

The practical instruction given is taught and assessed on all of the following aspects of the modules:

- Examination + Assessment
- Prescription
- Measurement / Casting
- Modification /Rectification

- Manufacture
- Alignment / Fitting
- Checkout / Critique
- Technical Skills

The assessment in 4th Year varies and constitutes elements from each of the following assessments:

- A three month and six month report by continuous assessment by the Clinical Supervisors at the clinical placement centres
- A clinical essay which must include at least two patients' experiences.
- A final clinical examination, one in each discipline. Both containing 6 stations lasting 30 minutes with two different examiners in each station. Each station denotes different clinical aspects, either by levels or by diagnoses/treatments.
    - Prosthetics 3 hours
    - Orthotics 3 hours

The benefits of an undergraduate teaching programme in prosthetics and orthotics with the features mentioned can be highlighted as follows:

- It allows for all 4 YEARS to include Specialised Training.
- It is comparative to all other Health Care Professionals in U.K.

  (such as Physiotherapist / Occupational Therapist / Podiatrist / Speech Therapist)

The Development of the Profession of Prosthetics and Orthotics in the U.K.

The Professional Body in the UK is called the British Association of Prosthetists and Orthotists (BAPO). The profession is regulation by the Health Professions Council which was established in April 2002. This means that practitioners become STATE REGISTERED in the UK. This was previously carried out by the Council for Professions Supplementary to Medicine. Both these bodies are set up by the UK Government to give protection to the public and within the National Health Service (NHS) in the UK.

Further Benefits of an Undergraduate teaching programme in PO include:

- A percentage progression of the profession to enter Higher Degrees, both MSc and PhD. This allows the growth and profile of the profession to develop.
- The economics of Higher Education funding in the UK means that UK students at undergraduate level have their fees paid by the Government. They may be eligible for a means tested bursary and a student loan throughout all four years of the undergraduate course.
- Within the UK the cultural and social aspects of the education system deem that school leavers actively seek a course that will lead to employment and /or professional status at that time.

Future directions and curriculum changes

Within the undergraduate teaching programme at Strathclyde University the course is constantly reviewed by subject and with an overview to look at various aspects of the programme. These include the following:

- Breadth of technique in clinical practice
- Expanding materials technologies and their application
- Supporting an 'Evidence Based Practice' for the graduates
- Encourage 'Active Learning' and 'Continuing Professional Development'.

Finally when looking at the development of the PO Profession in the future it is the teaching establishments role to produce graduates with an ability to assess, evaluate, audit and research their own practice

Workshop Summary: Entry-Level Curriculum

A summary of the workshops for each question is presented below.

Question 3. How much experience with real patients should students in entry-level programs have?

Major issues

Number of exposures

- We need to measure clinical competency to determine if level of 'experiences', patient contact, is sufficient (standards of achievement)
- Multiple contacts is preferred so that student can apply knowledge (2-4 each level)
- Other resources are available to indicate how many exposures to patients that students will have. (UK: 20 TT, 10TF in 6 months; NCOPE: 500 Hours)
- We cannot easily provide real patients to cover a range of pathologies for orthotic management, which has implications for continuity of education. That is: students will have different experiences

It is vital to see some patients because:

- Patient interaction
- Exposure to particular pathologies (origin)
- In some instances a surrogate may be used (can be other students)
    - Spinal fractures, foot orthoses
- In others, pathologies cannot be adequately simulated, for example: cerebral palsy
- Computer simulations are helpful to provide additional repetitions and exposures to additional pathologies, clinical problems

Resource issues

- Economic limitations affect the amount of patient experience provided
- Providing patient experience impacts on the resources of the overall programme
- Time – Integrative learning with a real patient does not take away from limited time available. Patient contact is part of the means towards competency
- Human Resources

Issues of Real patient v. Model (volunteer) patient

- Important to note that a model patient is REAL to the student
- Limitations
    - Real patient in school does not represent typical patient population
    - Usually adult, male and cooperative
    - May be a 'reversal of roles', the experienced patient and the nervous caregiver
- Responsibility for treatment is not the same

- There are differences in exposure when a patient is seen as a demonstration versus as a person in need of a caregiver

Patient experience as an undergraduate is different from that gained following graduation.

Patient experience (undergraduate)

- Does not necessarily reflect real patient populations
- There is a limited level of complexity of patient type or device
- Availability of patients may be limited
- Cost of experience with patients is borne by universities

Patient experience (post-graduate)

- Some countries have a one year post-graduate internship (minimum)
    - In either P&O?
    - In both P&O?

Summary of other issues

- Do we expect job-ready graduates, or do graduates still need supervision?
- University system does not provide a fully trained professional
- There should be an internship period that is monitored, and is concluded with a national certification examination
- Government regulations should require a standard competency, which still needs to be defined
- In time, P&O qualifications may be standardized internationally
- There is a need to get feedback from graduates/employers, evaluating the performance of the graduates
- Students need theory relating to their responsibilities prior to patient contact
- Educational institution should control the experiences in the internship as much as possible
- Differentiate the use of patient models only for demonstration and situations where student can care for the patient
- What are types of clinical patient contact?

Responses to question 3.

It is vital for students to see some patients because:

- Powerful mode of learning
- Patient interaction more important than time in technical work
- Exposure to particular pathologies
- In some instances a surrogate may be used (can be other students)

How much experience with patients should students receive?

- Multiple contacts are preferred so that student can apply knowledge (2-4 each level)

- We cannot easily provide real patients to cover a range of pathologies for orthotic management, which has implications for continuity of education. That is: students will have different experiences
- We need to measure clinical competency to determine if level of 'experiences', patient contact, is sufficient (Standards of achievement)

When should patient experience be provided?

- Great variability, it isn't known what is best
- Motivating to students (early in education?)
- Students can see if clinical career is a good fit

Resources

- Cost and impact on resources of program overall.
- Time – Integrative learning with a real patient does not take away from limited time available.
- Patient contact is part of the means towards competency

Issues of 'Real' Patients v. Demonstration Models

- It is important to remember that the patient is REAL to the student

Differences in exposure as a demonstration versus as a caregiver

- Real patient in school does not represent typical patient population
- 'Reversal of roles' The experienced patient and the nervous caregiver

Question 4. What educational level (diploma/bachelor/etc) should be required to enter the P&O profession?

Major issues

Is programme content more important than educational level?

- Learning outcomes / Competencies
- Theory – bridge theory / practice gap
- Lifelong learning facilitation
- Potential for independent practice?
- Awareness of limitations – ask for help when required
- Education cannot produce experienced clinicians
- Period of supervised practice upon qualification
- Problem solving
- Key skills (communication, numeracy, information technology, problem solving, working with others, managing own learning)

Equity/parity of qualification with other Health Care Professionals in your country

- Entry level qualification
- Similar licensure/registration regulations

- Pay and conditions
- Autonomy (prescription responsibilities)
- Continuing education – responsibility lies with professional body and P&O schools rather than companies
- More evidence based research
- Number of practitioners

Educational level is influenced by government

- Can we influence the government?
- Gain experience in political lobbying
- Marketing the profession
- More P/O in government decision making bodies
- Clinical audit to influence policy gain experience in political lobbying
- Quantitative and qualitative research

Equivalent levels of qualification across countries makes employment possibilities wider, student exchanges easier

- Define common competencies across world
- Can others without P&O qualification use the same title: 'P/O', 'Orthopaedic engineer'?
- Equity of Continuing Professional Development across the world?
- International point system for P&O entry-level qualification?
- International collaboration
- Research
- Exchange of staff members

Summary of other issues

- Are different qualifications equitable?
- Educational level may be politically important
- Is there worldwide acceptance of what different levels of education constitute?
- Country specific politics/ National frameworks
- Other professions appear to more easily gain employment in other countries
- Lifelong monitoring of competence – Continuing Professional Development
- Clinical competence
- Reflection of culture
- Relationship to competition (Health care)
- International structure
- EU issues
    - Categories I and II (ISPO)
- Significance of hours of study to level of reward

- Entry requirements
- Single training versus combined P&O training
- Combined P&O at degree level

Responses to question 4.

- Internationally, programme content is more important than educational level
- Nationally, educational equity with other health care professions is important
- Educational level is set by government but we can and should influence this
- We could work towards international recognition of P&O educational equivalency
    - Examinations of varied types
    - Number of clinical encounters
    - Measures based on knowledge, skills and understanding
- An outside accreditation body may certify graduates for practice
- Base line entry-level curriculum must equip the graduate to meet patient needs, provide basic competence
- Entry-level curriculum should provide the graduate with a strategy of handling information
- Evaluation of Faculty/School/Individual may be needed, including
- Competence of faculty
    - Role models – motivators with a passion
        - Learn to be teachers
        - Some researchers remain clinicians
- The relationship of P&O to competition (Health care) must be considered
- Level of qualification may be a reflection of culture
- Economics has an impact on the level of qualification awarded

Plenary Discussion: Entry-Level Curriculum

The following presents the editors' account of discussion that took place among participants at the conclusion of the theme ‘Entry-level Curriculum’.

Definition

There was discussion about the definition of ‘real’ patient. The following categories of patients were established.

Real patient

A person who has possesses a pathology and requires treatment. The student provides services and student work is provided to the patient.

Model or volunteer patient

A person who is a regular user of P&O services and possesses a real pathology, but does not require new treatment. The student practices service provision, but student work is not provided to the model patient. ‘Hands-on’ experience for the student is possible.

Simulated patient

A person who does not possess a real pathology, often a student colleague, who pretends to require treatment. The student practices service provision, but student work is not provided to the simulated patient. ‘Hands-on’ experience for the student is possible.

Virtual patient

A case presentation of a person with real pathology who requires treatment, presented via various modes. The student practices theoretical service provision. No ‘hands-on’ experience is possible.

Discussion points

Schools represented at the POEM used a mixture of these patients in teaching.

Exposure to patients during training is limited by time and funding.

All POEM participants thought that P&O students must have some experience with patients. Such experience should involve model or volunteer patients under supervision during practical classes, plus real patients seen on clinical placements under supervision.

It is expected that new graduates will require some supervision during their first couple of years of practice and that they will continue to learn during that time.

The educational level for entry to the P&O profession should

- Be sufficient to enable clinical competence
- Reflect the level of learning required to cover the programme content
- Have parody with other health professions in the country concerned
- Qualify the person for entry to post-graduate programmes

Keynote Address: Mode of Delivery

Tommy Öberg MD PhD

Director of Research

School of Health Sciences

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PROBLEM-BASED LEARNING IN P&O

I started my lecture by asking the audience about the three biggest towns in Albania. No one could tell me! I then asked about the three biggest rivers, the three highest mountains. The result was the same. No one could answer. Neither could I. Why?

I then asked the same questions about Syria, and with the same result in the audience. But, this time I could answer. What was the difference?

The answer of both questions is MOTIVATION. To learn, you must be motivated. All of us have studied geography at school, but none of us was motivated to learn about Albania. In the case of Syria, however, I have a daughter who has lived in Syria for a year. So, in contrast to the audience, I was motivated to learn about this country. But what did I do? Did I take lessons in geography? No. Did I buy new schoolbooks? No! I looked in a Swedish encyclopedia, I searched the internet, I went to the library. And, after some time, I knew quite a lot about Syria. This was an example of Problem-Based Learning (PBL). I looked for knowledge when I needed it, and I used all the sources available to me. And I remembered what I learned because I was motivated.

When students come out into working life, employers complain because students have not learned how to solve real problems, they have difficulties when working collaboratively with other professionals, and they have poor written and verbal skills. With PBL they learn all these things together with the learning of facts.

Today, the bulk of knowledge is so great, that whatever ambition we have, we can never be complete. We can only deliver illustrative examples, and hope that these examples will help students to understand how to find appropriate knowledge in situations where you need it. During our whole working life we will become confronted with problems which have no obvious and clear-cut solution. We do not only want students to know facts, but to understand the underlying relation between facts, and how to use knowledge in practical life situation. One way to express this is in the SOLO TAXONOMY:

Bigg's Solo Taxonomy

- Prestructural

  Use of irrelevant information, or no meaningful response

- Unistructural

  Answer focuses on one relevant aspect only

- Multistructural

  Answer focuses on several relevant features, but they are not coordinated together

- Relational

  The several parts are integrated into a coherent whole; details are linked to conclusions; meaning is understood

- Extended abstract

  Answer generalizes the structure beyond the information given: higher order principles are used to bring in a new and broader set of issues

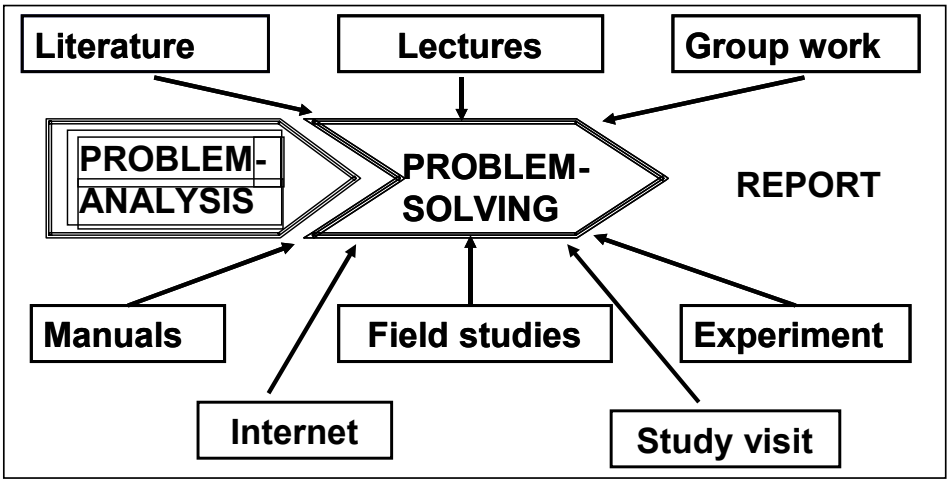
Pedagogics is more than teaching technique; it is a close cooperation between teaching, examination/assessment, and follow-up. If some component is changed, that will have consequences for the others as well. Thus, if problem-based learning is introduced, this will have consequences for the assessment of knowledge.

Traditional teaching is teacher-oriented, well prepared, well structured, and can be compared to spoon feeding. The material is already digested, and there is no need for students' own processing and structuring. Many studies have shown, that such teaching gives bad retention of knowledge, and learning is badly adapted to real life. Problem Based Learning is the opposite to this.

Modern research has shown that learning is most effective if it satisfies the needs of the student, and it is easier to memorize if learning takes place in a situation similar to the situation where the knowledge will be used.

PBL is working with problems based on real problems, for example patient cases. The problems should not be well structured – rather the opposite – students learn by doing the structuring of the stuff themselves. PBL focuses on problem solving. By solving problems, a learning process starts within the student himself. And even better, if this process is performed in a group of students, they learn from each other, and they learn how to cooperate in a working group. The teacher does not teach, he participates as a supervisor. Working this way makes the studies more meaningful, develops the students' ability to find and use knowledge when there is a need for it, makes the student rely on him/herself and his/her own ability, and develops a will to take personal responsibility for the student's own learning.

Necessary conditions for PBL are: changes of the teacher role from a “sage on the stage” to a “guide on the side”, construction of ill-structured problems similar to real life situations, small student groups with 5-10 individuals in each, other resources such as group rooms, books, a good library, the internet etc. Working like this assists the students to assume an “expert role” for the topic they explore. Lectures are not forbidden, but instead of being the main component of teaching, it has changed to become a complement to the student’s own learning. The problem solving process can be illustrated by the following figure:



Resources for PBL

The teacher acts more like a coach, an instructor or a facilitator. Instead of answering questions with ready made answers, he asks new questions like:

How do you know that?

What assumptions might you be making?

Can you tell me how you think about it?

What alternatives do you have?

A week with PBL can look like:

Monday	Introductory lesson Explaining the task Delivery of the task
Tuesday	Group work
Wednesday	Group work
Thursday	Group work
Friday	Final presentation of results Discussion of results Alternative interpretations

During the group meetings the students should ask themselves:

What is the point?

Why did our teacher choose this case/problem?

What will be the final result of the group's work?

How should we distribute the work within the group?

Next meeting?

Where do we find problems? They are everywhere around us! In real life, in the TV, in videos and films, in books, magazines, newspapers, on the internet, in databases. Just keep your eyes open.

New teaching methods also need new methods for evaluation. The evaluation method influences on the students' attitudes to what they read, directs what the students' choose to read, works as a feed-back and control instrument, influences the memory process and the retention of knowledge. Alternative methods for assessment are: written examinations, practical examinations, peer assessment, self assessment, tutor assessment, oral presentation, written reports.

I think, that the most common objection to PBL is: That sounds very good, but it will never work in our study program. But it really works in almost any program. Below a list of programs where PBL has been used:

- Medical schools
- Schools of health sciences
- Nursing
- Dentistry
- Pharmacy
- Veterinary medicine
- Public health
- Schools of architecture
- Schools of business
- Schools of engineering
- Schools of forestry
- Schools of police science
- Schools of social work
- Schools of education

Workshop Summary: Mode of Delivery

A summary of the workshops for each question is presented below.

Question 5. How do we prepare students and teaching staff to accept different Modes of Delivery of P&O curriculum?

Major issues

Why change modes of delivery?

- A mode may prepare the student to perform in a situation that is more realistic
- A program that uses varied modes of delivery will transfer more information across a varied student body
- Why do you need a teacher at all? You can let a group of kids kick a soccer ball around, but you need a coach to build a soccer team
- A mode may allow role-playing in a multidisciplinary situation
- Reflection and immediate feedback is standard practice in some modes

How do you change modes of delivery?

- Start with smaller pilot projects where the subject matter can easily be adapted and the instructor believes in the new mode of delivery
- Identify a course that is not currently not optimally taught
- Use the group as a resource

Prepare faculty: staff development related to teaching methods

- Faculty should be motivated – 'breathing new life'
- Communication skills are important
- Background knowledge required by teachers is more extensive
- Collaboration with teachers from other areas
- Staff will need training for the implementation of new techniques
- Most schools have programs set up to teach new teachers how to teach. These range in length from around 2 days to 2 years
- Staff to be encouraged and supported to undertake initial and ongoing training in education methods
- Staff must be trained in questioning techniques
- Evaluation of new methods must be performed to see how effective it is
- Teachers like to tell other people how to do things, so it may be difficult to make the teacher apply Problem Based Learning (PBL)
- In PBL, it may feel like the teacher loses control, because it is less structured
- Assessment of clinical competence using standardized patients and an objective structured examination revealed limitations of non-PBL modes. This may provide incentive for staff to change modes
- If all faculty takes training in the new mode together, it is easier to implement

- Ensure the change in mode of delivery is accepted by the university

Prepare students / student motivation

- Students would be more motivated if they were aware that the teaching methods instil 'life long learning'
- Students need to be taught about the purpose of new modes of delivery
- Need to sell the mode of delivery to the students. Students will tend to prefer didactic-based retention
- Students need to know that the teacher is well prepared and competent
- Begin a section by outlining how the information will be taught and evaluated
- Implement a new method in a way that is less intimidating to the students, ie., group work
- Student orientation or training for more technically involved methods (i.e., new equipment)
- Environment of learning is critical
- More complex problems/tasks have to be implemented appropriately so they have a better effect
- Formative evaluation
    - Students provide feedback on how they feel they should be evaluated
    - Re-assess and reflect so that mode of delivery and evaluation can be modified
- Assess work habits that students have from previous schooling
- Conduct a demonstration of a clinical scenario to illustrate expected outcomes

Time and resources required

- Staffing and resource needs differ depending on the mode used
- Initial investment and financing is required to support new modes
- Expect that a new process may involve a learning curve. More time may be required initially to achieve the same output
- Changing modes takes tremendous effort, time, and resources

Summary of other issues

- To affect students you have to deal with the teachers first in terms of implementing new methods – this is the harder step to accomplish
- Faculty may not be so open to various methods
    - Will take time to learn, change and adapt to new methods
    - Staff who are comfortable using a mode may feel foolish using another mode
    - Access to materials/literature needed for faculty may not be available
- Changing modes may provide continuing education opportunities for staff
- Students tend to like new modes
- Students are open to various methods of delivery

- Students have to like and accept method or they will 'turned off'
- May be dangerous to ask students what method they prefer
- Sometimes students like to sit back and be told and don't like to put forth the effort
- Students need to be gradually exposed to more intense methods

Responses to question 5.

Staff development

- Staff to be encouraged and supported to undertake initial and ongoing training in education methods
- The teacher needs to be well prepared and competent in the delivery method

Motivate students

- Students need to be well prepared regarding the purpose, process and expectations of new modes of delivery
- Students need to know what is expected of them

Provide time and resources

- Staffing and resource needs differ depending on the mode used
- Initial investment and financing is required to support new modes
- Expect that a new process may involve a learning curve. More time may be required to implement and evaluate

Need to motivate both students and faculty to accept change in modes of delivering P&O curricula

- Motivate by explaining benefits of the change
- Motivate by explaining deficits of previous modes
- Best way to sell the concept is to demonstrate it
- Use the students as a reference, let them act as teacher as well. Work in a group setting

Question 6. How do Modes of Delivery influence the students' ability to learn?

Major issues

Student take responsibility for learning

- Encourage independent and self directed learning
- Encourage exchanging ideas and group work
- Start early in course -first year/first day
- In introduction, give clear instruction on how a specific mode of delivery works
- Also set out learning objectives
- Motivate student
- Assessment should be explicit

- Increased progress in learning if student takes responsibility

Students take different approaches to learning therefore we need to combine learning/teaching strategies

- Evaluate students prior methods of learning and their expectations of learning
- Need to allow students the time to get used to the learning mode / Teach students to learn
- Support for students
- Group dynamics / students learn from each other / allows for students different knowledge / evaluate own learning against others
- Lecturers teaching & learning conceptions
- Environment

Personnel involved in process

- For example: Professor versus student peer
- Different tutors may be involved in the clinical setting
- Appropriate staff training /development/exposure
- Prior experience of tutor / teacher

Select a Mode of Delivery that is appropriate to the learning task

- We need more information on the most effective mode of delivery for the learned task
- Creative use of modes of delivery
- Increasing complexity (start with simple and progress)
- Learn from other institutions experience
- Evaluation of the course to encourage development
    - Standard forms
    - Group discussion
    - Used to promote change where necessary or confirm good approaches

Different modes will affect the way students learn

- Certain situations will prevent students learning
- Continuum of different modes of delivery
- Entirely lecture-based format to action learning (students create problems)

Attributes of positive and negative modes

Positive modes

- Combine theory and practice
- Involve real situations
- Encourages deep approach to learning
- Different skills/subjects are suited to different modes

- Encourage reflection
- Provide clear goals

Negative modes

- Lack of time to find information
- Unreal situations
- No feedback

Provide clear goals / outcomes for the students – holistic viewpoint

- Must be clinically relevant
- Goals must be achievable
- Level of difficulty increases as they progress through the course
- Goals must be measurable
- Assessment must be clear and aligned with the learning and teaching method

Summary of other issues

- Learning should be Active NOT Passive
- Definition - Teaching Methods
- PBL- good but has limitations
- Lack of P&O resources are a problem in PBL
- Students prefer surface learning if not motivated
- Experience of tutor in relevant mode
- Limitations of money, staff and time – constricting
- A mode may work because we have small groups/numbers

Responses to question 6.

- Are we able to answer this question? Do we need to do some PBL? Where is the library?
- A variety of teaching and learning modes should be used to match different strengths and weaknesses of different students
- Student should take responsibility for learning
- Student-centred: encourage students to be self-directed in their learning
- Some modes of delivery may have a longer term benefit beyond the assessment
- Some modes of delivery encourage deeper learning
- Receptiveness to mode of delivery may influence student learning
- The mode should be selected to suit the learning task

Plenary Discussion: Mode of Delivery

The following presents the editors' account of discussion that took place among participants at the conclusion of the theme ‘Mode of Delivery’.

Although the meeting participants were reminded to consider other modes in addition to Problem Based Learning (PBL) when discussing the question, much of the discussion centred on PBL.

Definition

The definition of ‘Problem Based Learning (PBL)’ was discussed. PBL was viewed by many participants as a ‘mixture of things’ or a mixture of modes. However, the meeting participants were reminded that a mix of modes, including ‘problem-solving techniques’ may not constitute PBL as defined in the literature.

Discussion points

Problem Based Learning

Many of the POEM delegates reported that they have tried, or currently use, some PBL techniques in teaching. PBL was thought to require time for reflection, evaluation and the provision of feedback. The following points were made when PBL was compared to ‘traditional’ teaching modes:

- There is little evidence that students gain knowledge better through PBL
- The ‘right’ method of PBL in health care education may not yet be known
- PBL may produce better life-long learners
- Other modes may have similar benefits to PBL. For example: in distance learning, students work independently.
- Some topics may be better suited to PBL than others

Modes other than Problem Based Learning

POEM delegates agreed that it is important to modify the mode of delivery to suit the audience or student group.

P&O Educators should focus on teaching ‘learning processes’ (how to gain knowledge when it is needed) because such skill is important in this changing world. Therefore, modes of delivery that encourage responsibility for learning are more useful than modes involving passive learning.

P&O Educators should be evolving and learning new delivery techniques throughout our teaching careers.

P&O Educators should work with staff to find their best style or mode, because an individual may be better suited to a particular or a few styles of delivery.

P&O Educators also need to learn new skills and to use the best mode for the students and the situation.

When selecting an appropriate mode, we need to consider the associated costs, limited available funding and the difficulty in recruiting teaching staff.

Evaluation of the effectiveness of different delivery modes

P&O Educators should use our research skills to evaluate the effectiveness of our programmes.

- We could access educational experts from within our institutions to assist with such evaluation.
- As clinicians, we are more comfortable with the idea of evaluating clinical outcomes, but as educators, we should test the outcome of our teaching methods.

Some programmes represented at the POEM have or are currently evaluating modes for effectiveness.

Motivation of P&O Educators

The following strategies to keep P&O Educators motivated to improve P&O educational programmes were suggested:

- Recruit the right people, who are passionate about P&O education
- These people will tend to do unpaid overtime to improve the programme, but such unpaid work should not be expected by employers
- Pay small incentives to P&O Educators. Although a small amount of money may be involved, some payment recognizes the value of the work and so motivates people. One example was given of a University that distributes finances gained through academic activity (research, student counselling) to staff members who do useful overtime
- Create an environment that fosters teamwork rather than expecting individuals to work in isolation
- Academics become associated with programmes and the quality of the programme reflects on the academic's reputation. This may motivate an individual to produce a high quality programme

P&O Educator workloads

Pressure to improve P&O Educational programmes tends to cause P&O Educators to use up their research time to improve teaching. Teaching the programme takes priority over research.

- We should try to reduce teaching workloads to make time for research, programme development etc.
- We should learn from other industries rather than working within P&O in isolation, this should reduce the time required for educational programme development
- It is difficult to take time for research when the survival of the P&O educational programme is dependent on teaching output

Keynote Address 1: Practical/Applied/Clinical Curriculum

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PRACTICAL/APPLIED/CLINICAL CURRICULUM IN P&O.

Report on the United Nations Inter-regional Seminar on Standards for the Training of Prosthetists, Denmark 1968 (Holte Report)

- Program objective should meet local or regional needs
- Instruction for basic knowledge and technical skills

  should be closely coordinated with
- Adequate instruction of subjects in medicine, engineering and social sciences

Recommendation from Holte Report - Clinical and Laboratory Practices

- Clinical education should be gradually expanded as knowledge, experience are acquired and understanding of professional responsibilities becomes clear
- The ratio of clinical and laboratory practice hours to those of lectures and demonstrations should be approximately 4:1
- Not less than 3,500 class and laboratory hours followed by one year of internship

Environment

- Ever advancing biological and medical “science & technology”
- Aging of the global population
- People in general becoming more concerned about health issues
- Common health care devices become more visible consumer products
- More informing diagnosis approaches
- More effective medical interventions
- More enabling rehabilitation care

Challenges and Potentials in Prosthetics & Orthotics

- To demonstrate a more independent clinical judgement
- To demonstrate a higher degree of technical competence

- To provide more cost effective and higher quality service
- To extend the degree of rehabilitation of the patients

Broarder Meaning of Prosthesis & Orthosis

- Prosthesis: substitutes or replacements of body parts
- Orthosis: augmentations for the body functions

Potential Role of "P&O"

- The most technically trained member in the clinical rehabilitation team
- Tradition – focus on external devices for limbs, and head & trunk
- The potential to take a more active role in solving clinical problems by using appropriate technologies
- The potential to narrow the service gap in the provision of more types of rehabilitation engineering services

BSc (Hons) in P&O HKPU - 1995

- Multidisciplinary Programme
- Education in both Engineering and Biomedical Sciences
- To teach "When" and "How" and "Why" to employ various P&O technologies to formalize solutions for clinical problems

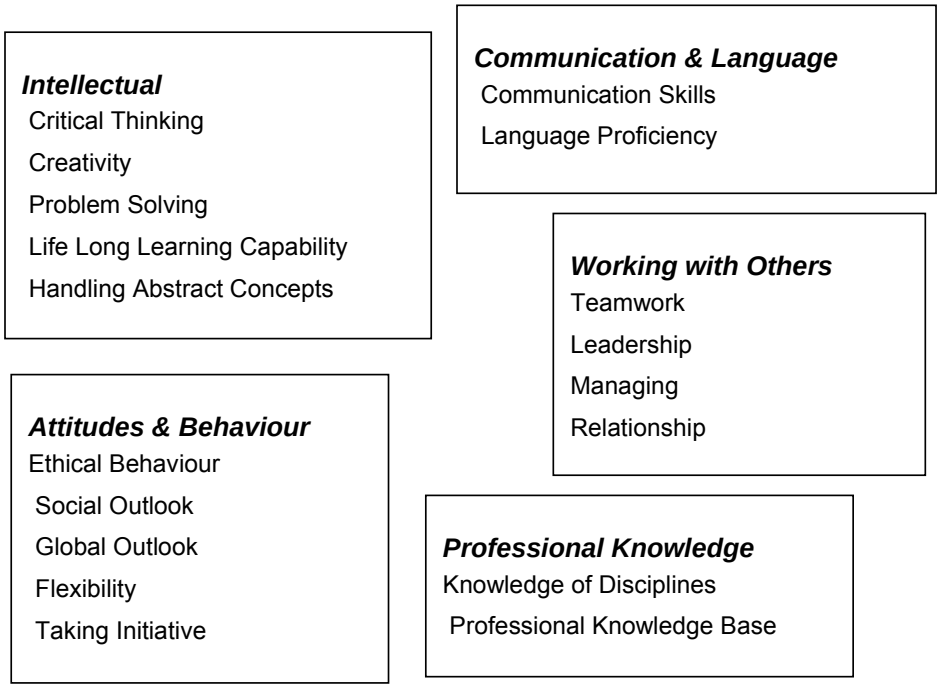
Annual Programme Review 1999

- University Requirements
- Professional Requirements
- Graduates' Employment and Career Development

University Requirements

- University Regulations
- Programme Aim
- Learning & Teaching
- Library, Laboratory & Related Facilities
- Academic & Professional Standards
- All Round Graduates

All Round Graduates



Professional Requirements

- Professional Courses
- Professional Knowledge
- Professional Skills

Employment Categories & Further Studies

- Rehabilitation service delivery, involving direct interaction with persons with disabilities
- Product development and marketing or sales
- Research Studies or Positions

Career Transitions

- The typical professional in our society will undergo several significant career transitions over a life-time
- The educational process should not only help prepare the student for short-term career objectives in service delivery and/or research, but also provide a foundation that will help make long-term career transitions more realizable

Recommendation

- To provide a solid multidisciplinary foundation in health science, engineering, professional studies and liberal studies, and leave on-the-job training to industry (internship?)
- To produce appropriate “deliverables” – graduates – who are reasonably equipped to meet both short-term employment objectives and future changes and opportunities

BSc (Hons) in Health Technology

- With Concentrations in Prosthetics, Orthotics and Bioengineering

Curriculum Design

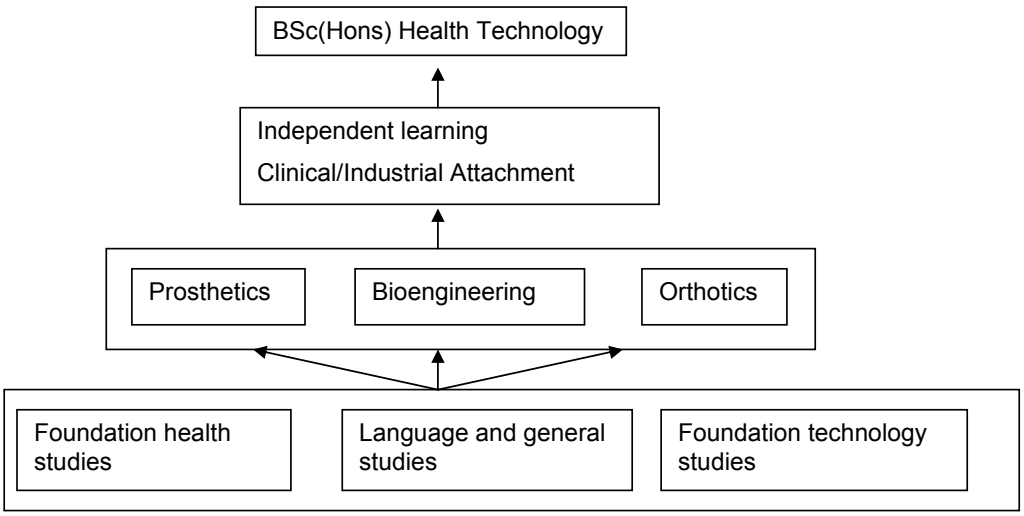
- Curriculum designed to provide balance between broad knowledge base and competent professional training in Orthotics, Prosthetics & Bioengineering (Programme Aim)
- Graduates with a broader based training for further development, and not to be overly trained for a narrow discipline

To Equip Students

- To apply technology for improving the health status of our community
- Clinical & Technological skill for providing health and rehabilitation services to the community
- To be self-motivated enquirer and solution seeker

Clinical P&O Professional Pathway

- Undergraduate Study
- Internship (Clinical Graduate Training Programme)
- Certification/Registration
- Life-Long Learning



Theory and Practice in P&O Education

- Too much practical (skills training) is simply job training?
- Too little actual experience leaves graduates with naive problem-solving skills; no appreciation for approximation, optimization and error
- Theory in Practice

Theoretical Sessions

- Deliver the BASICS to Students
- Problem Based Approach Encouraged
- Multi-media and Web Tools

Laboratories Planning

- Course Objective
- Students' Background
- Achievable Task
- Resources & Limitations
- Students' Effort should be more than the "Staff-Student" Contact Hours
- Additional Lab Hours available for Completion of Assignment (with lab staff)

Essential Elements to be Practiced in Laboratory

- Safety
- Patient Assessment
- Prescription
- Measurement & Design
- Technical Procedures
- Fitting Procedures
- Evaluation
- Communication

P&O Laboratory Approach

- To cover "Essential Elements" rather than "As Many As Possible"
- Pre-Lab Discussion
- Planned Demonstrations
- Various Levels of Supervision
- Check Points
- Post-Lab Discussions, Peer Critique, as well as Extended Case Study (technical or clinical)

Clinical Attachments

- Real world experience
- To test students' ability to integrate knowledge and practice
- Mentor-student relationship
- Preparation for Beginner of the profession

The Internship Programme

- As wide a range of case mix as possible and in an order which can lead to progressive development of clinical skills
- The "intern" carrying responsibility under decreasingly close supervision
- Not merely "Learning by Experience" But also encourage and facilitate participation in related academic & professional activities

Keynote Address 2: Practical/Applied/Clinical Curriculum

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POST-GRADUATE INTERNSHIP/RESIDENCY AND CERTIFICATION PROCESSES

To ensure that clinical, applied and technical competencies have been met, what role should be played by a post-graduation internship/residency and/or certification process which is governed by an independent body?

Issues of discussion

- Current state of the credentials/certifying process in various countries.
- What are the benefits and disadvantages of the internship/residency process?

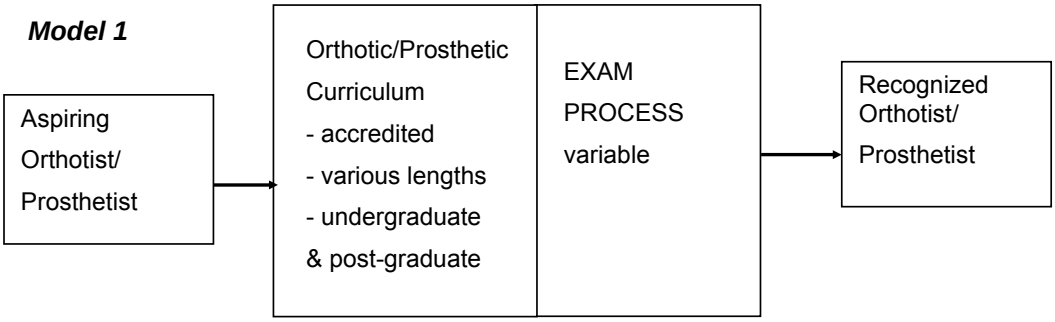
Current state of the credentials/certifying process in various countries.

Upon graduation our students may or may not be affected by government and/or professional regulations.

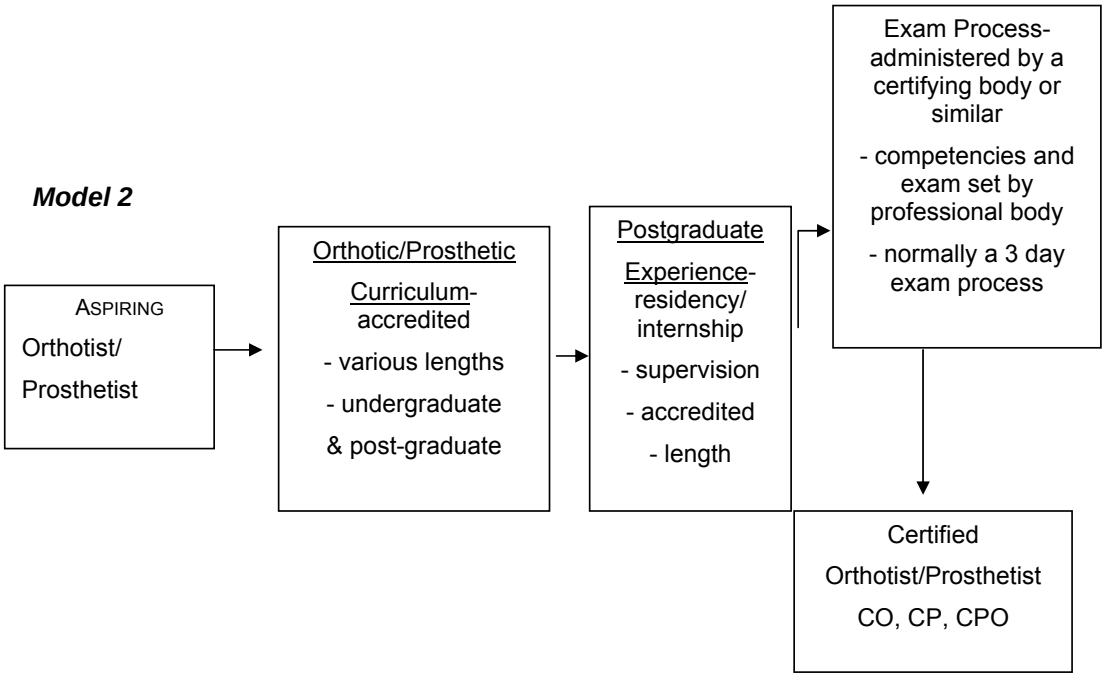
- Some systems award a license, certificate of competency, receive official government recognition or similar upon graduation. A final examination process may also be involved.
- Others may have to go through a process instituted by a professional body and or government.

What are some of the pathways utilized by our profession for recognition to practice?

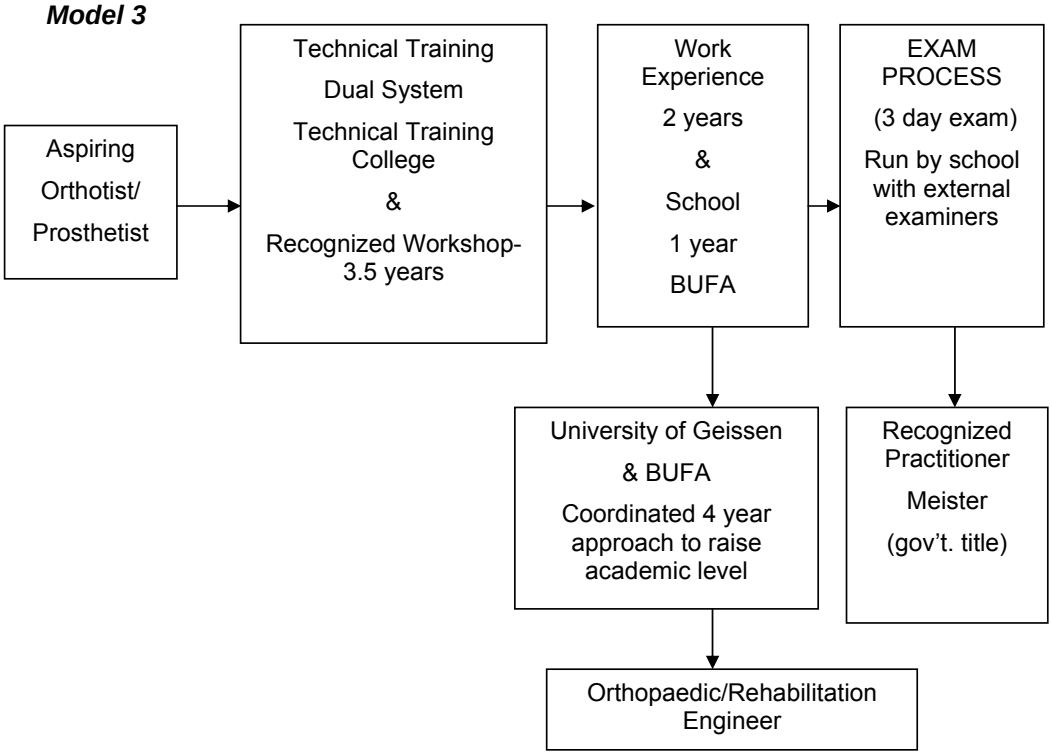
Model 1



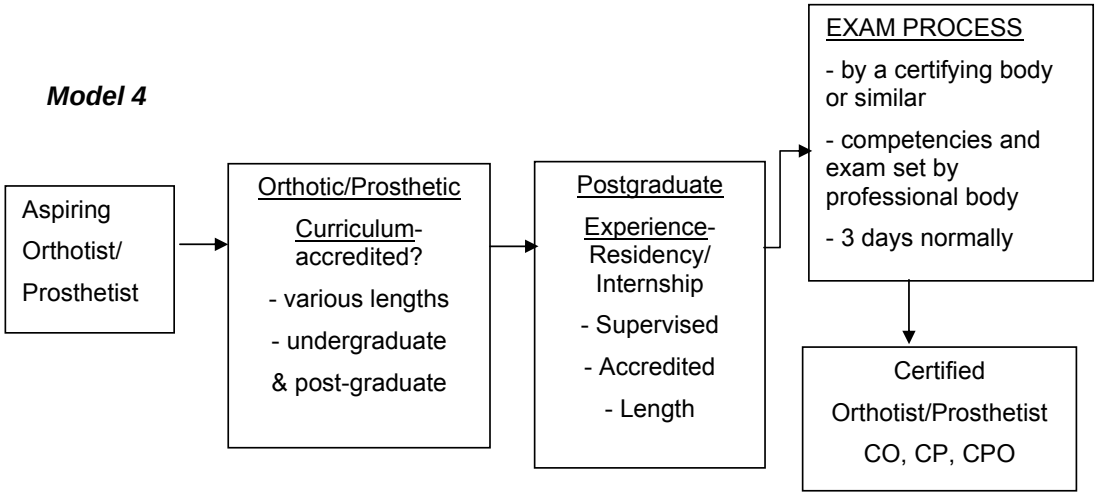
Model 2



Model 3



Model 4

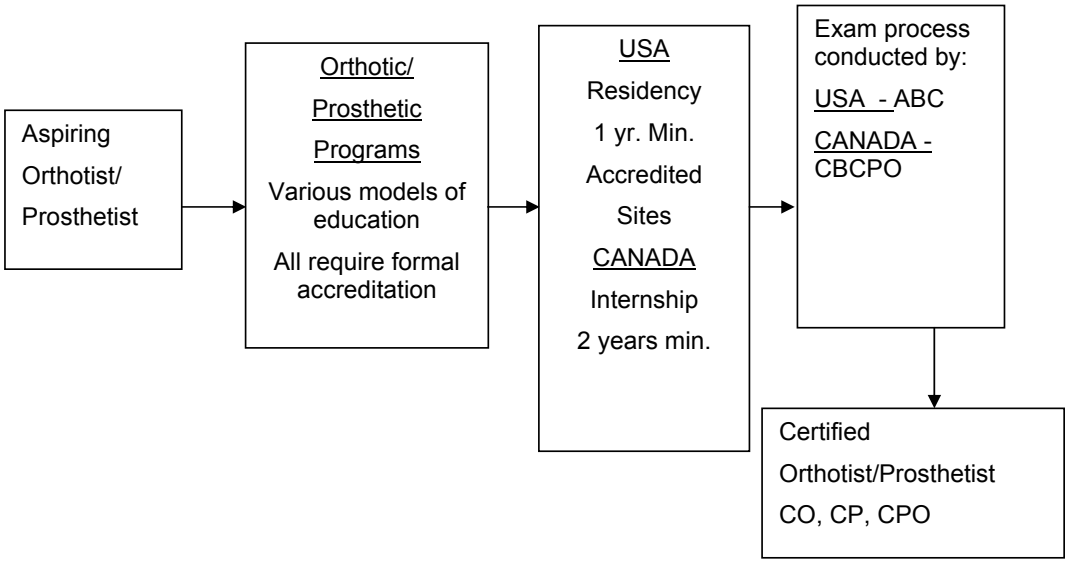


Post Graduate Internship/Residency & Certification Process

Purpose

- Assures both the public and other health care professionals of the highest quality of prosthetic and orthotic care
- Provides practitioners with professional recognition of their training and skills

North American Process



What are the benefits and disadvantages of the internship and examination process?

Advantages:

- Facilitates the transition from student to intern to certified practitioner.Allows the graduate to better apply theory and practical skills acquired in school programs to the "real life" practical world.Facilitates the strengthening of patient management issues:

  - assessment, patient follow-up, clinic note taking, patient/practitioner relationshipDevelops a better knowledge and understanding of practice management issues.
- Final check on the competency of practitioners.Independent process from examinations given by a school.Comprehensive exam multiple day exam - testing all areas of either prosthetics or orthotics.The public is better served & protected.
- Provides a final check on competency of practitioners that schools don't provide.
- Helps the profession better define who we are and what are baseline skill levels are.
- Independent process from examination given by a school.
- The process may give more professional credibility.

- Helps foster a continued relationship between the schools and the professional body involved.

Disadvantages

- Internship/Residency lacks structure and doesn't ensure a consistent experience for each graduate.
- Too long of a process when the need for qualified practitioners is high.
- Too expensive of a process to run.
- Conflicts of graduates with supervising professionals.
- Schools are more qualified in the process of teaching and testing/examining.
- The curriculum of schools could become diluted in terms of practical content.
- Perceived bias with profession running the process - ie: conflict of interest.

Questions for consideration

- What process supplies our graduates and future practitioners with the greatest potential to serve those who are in need of prosthetic and orthotic services?
- Is a graduate who has no or little post graduate experience in day to day clinical practice competent to practice on his/her own once they step out of our doors?
- In the end, how much influence does a school have on a profession and government regulations?
- Do schools tend to be in situations where they have to work within the parameters of a process that has been historically established?
- Should a post graduate internship/residency play a role in the technical, theoretical and practical development of a practitioner?

"If you hear, you forget.

If you see, you remember.

If you do, you understand"

Workshop Summary: Practical/Applied Clinical Curriculum

A summary of the workshops for each question is presented below.

Question 7. How should a school determine what emphasis should be placed on technical, clinical and theoretical knowledge?

Major issues

Definitions

Technical

- Manufacture of P&O devices
- Reality of requirements of job in many instances
- Benefit of knowing how things are made to know how they should be made

Clinical

- Assessment, prescription, design, fit, evaluation, adjustment, documentation and follow-up

Theoretical

- Core Studies (Medical, Anatomical, …)
- Communications skills
- Understanding of structures and materials
- Production of knowledge
- All students should be able to be very different from each other

A school does not determine this issue on it's own

- Due to imposed standards set by regulatory agencies, university and government

Begin by defining the competencies required for graduation

- Requires collaboration with profession – i.e.: meetings, workshops, etc.
- Define the type of graduate you want to produce for now and in the future.
- This requires regular reviews with identified groups

Economics and resources

- Financial restrictions to implement what is needed
- Pressure of class size
- Lack of resources such as equipment, tools, staffing, subjects/models, etc.

What are we hoping to achieve?

Technical

- Should have skills to be able to manufacture optimal solution for patient

Clinical

- Treat patients in a safe and effective way
- To be able to fit P&O care into overall rehabilitation needs of patient
- Communication
- Referral, referring, ability to explain in a multidisciplinary team setting

Theoretical

- Graduates can review literature
- Understand 'why', based on
    - Biomechanics, kinesiology, clinical sciences, material sciences, appreciation of related health professions

How we determine the relative emphasis is in part determined by point of view

- Past:
    - Inertia inhibits changing this balance
    - Pre-existing expectations of patients
- Present:
    - trying to establish ourselves as professionals
- Future:
    - be proactive to challenges to professional identity
    - Need to control the future
    - To anticipate future changes and how alternative strategies may work or not

Summary of other issues

- Accepted standards – locally, internationally
- Standards set by the accreditation body, if one exists, must be met
- Satisfy university administration/faculty regulations
- Conduct a field survey
- Identify and prioritise what things are most important then have the curriculum reflect this
- Theoretical and practical must complement each other
- Increased knowledge in the various subject areas of P&O has put pressure on the schools to give the students more information – i.e.: material sciences
- The technical-clinical mix in a curriculum is affected by the training of technical personnel in a region/country. Remove technical training from education?
- High material expense for teaching technical portion

- Cost per student are relatively high compared to other allied health professionals so administrations question value to institution
- Limited space
- Transfer of theory to practice is a requirement that needs to be fulfilled
- P&O is a clinical activity

Responses to question 7.

- There is no justification for teaching anything, in any way, just because that is the way it has been done before.
- Emphasis on clinical skills, provide for needs in practice now which are specific to the local situation and consider
    - Evidence based practice and research
    - Changes in technology
    - Changes in health care environment
    - Changes in patient populations
- Schools should lay out the future alternatives and anticipate. There should be more alternatives and schools can lead.
- A school does not determine this issue on it's own
    - Regulatory bodies may set standards for curriculum via certification/registration
    - Collaboration with profession to meet or exceed needs
- Economics and resources affect the ability of schools to implement the balance between theory, technical and clinical aspects
- Define the competencies required for graduation
    - Some are defined or set
- Consider modes of learning including distance learning
- Where is the division between technical and clinical tasks/procedures?

Question 8. How should University P&O curriculum relate to the learning associated with an independent post-graduate internship and/or certification?

Major issues

What should a school be teaching?

- Good basics
    - Theoretical subjects
    - Practical subjects
    - Technical and clinical skills
- Controlled clinical practice as well
- Student self evaluation skills (personal skills)
- Professional knowledge, attitude and awareness

- 'Confidence' for internship
    - By experiential learning
- Study skills

Relationship of the School to the final certification exam

- Schools should have an awareness of the certification exam content so curriculum is compatible
- Exam: Minimum level of competence to practise independently – the final hurdle
- Information about the Cert. Exam should be available from the Certification Body

Close relationship between university education and internship

- Does the internship have to be independent?
- Are we teaching to the exam or beyond?
- Can we influence the certification body / work with them?
- Need feedback and cooperation from Certification Body
- Feedback from internship supervisors and from internees
- Influence the pace of the internship (start slowly and build up)

Essential skills included in the curriculum

- Transferable skills / knowledge
    - Time management
    - Life long learning
    - Safety
        - Are these the same range worldwide?
- Interpersonal skills
- Problem solving / critical thinking
- Teach students to influence pace of internship

Continuous evaluation of the university curriculum in relation to the current clinical environment

- National environment: politics, funding, health care system, patient demographics

Summary of other issues

- Curriculum should meet the minimum needs required for an internship/ and or certification
- Schools should NOT base their curriculum's on final certification exam
- What content is provided by the university and what is provided by the internship?
- Are certain subjects/skills better taught at university and vice versa
- Can you include the internship into the curriculum?
- Different learning environment – help students in this transition
- What are the objectives of the internship? Guidelines for internship

- Should the internship supervisors be trained?

Responses to question 8.

- There should be a close collaboration between the universities, the internship and the certification body, and this is interdependent
- There should be essential transferable skills included in the university curriculum
- There should be continuous evaluation of the university curriculum in relation to the current clinical environment

Plenary Discussion: Practical/Applied Clinical Curriculum

The following presents the editors' account of discussion that took place among participants at the conclusion of the theme ‘Practical/Applied/Clinical Curriculum’.

Definitions

POEM participants found it is difficult to define the terms used in question 1, because they overlap (technical vs clinical vs theoretical).

The term ‘practical subjects’ includes a mixture of clinical and technical areas.

Independent internship

The term ‘independent’ required definition to distinguish between

- Undergraduate clinical placement, managed by the University
- Post-graduate internship, not managed by the University. This was accepted as the meaning of ‘independent internship’

Discussion points

Universities cannot control independent internships or the profession that manages such internships or certification.

In one country, the independent post-graduate internship:

- Is the graduate’s first paid employment as a prosthetist and orthotist
- Involves a rotation through a number of clinical areas
- Is controlled by the Ministry of Heath, not by the University

In countries in which post-graduate internships are required before a certification or licensure process, delays in qualification can be caused if internships are not available. The graduate’s qualification is ‘at the mercy of the profession’.

Keynote Address: Post-graduate Education

Christopher Hovorka, Ms, CPO

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APPROACHES TO POST-GRADUATE EDUCATION IN PROSTHETICS AND ORTHOTICS

Outline

- Types of post graduate degree programs that could be offered in P&O
- New entry-level master's degree program in P&O
- Types of post graduate degree programs that could be offered in P&O

Master's degree programs:

A. 3+2 (single discipline P or O)

- In the first 3 years: students complete majority of baccalaureate coursework and some P&O supervised experiences
- Year 4, begin P&O coursework and complete bachelor's degree
- Year 5, complete P&O coursework and master's degree

B. 4+2

- Traditional 4 year bachelor's degree in any subject
- Additional prerequisite coursework required
- Additional prerequisite clinical P&O experience requirements
- 2 year P&O coursework in master's degree

C. Post professional

(entry level P&O requirements completed, i.e. diploma, baccalaureate degree before entry)

(1) Research track

- No formal coursework
- Self-directed research toward eventual completion of a thesis

(2) Thesis with coursework track

- Formal coursework in addition to completion of a research thesis

(3) Clinical track

- Focus on clinical practice and may include a specialization area (i.e. adult rehab orthotics, pediatric prosthetics, etc.)

D. Entry Level

- Students complete bachelor's degree in a related field (biomechanics, engineering, etc.)
- Possible prerequisite coursework
- Prior exposure/experience in P&O not required

- Ideally, a diversity of degree programs available would enrich the production of knowledge in P&O

New Entry-Level Master's Degree Program in P&O

- Feedback from P&O employers
  - Graduates entering clinical residency lack:
    - clinical skills
    - technical skills
    - problem solving
    - possess little formal knowledge in research
    - struggle with completion of resident research requirement
- Develop entry-level MSPO program at Georgia Tech
  - Responsive program to address P&O employers feedback
  - Address lack of qualified P&O professionals vs. need

Entry Level Master's Degree Program in P&O

- Aims and Objectives

1.) Clinical problem solving skills for lifelong learning combined with advanced biomedical engineering education

2.) Improve P&O care

3.) Conduct investigations to expand the body of knowledge in P&O

Philosophy

- Pseudo-medical school model
  - integrate structured clinical practice modules early in curriculum
  - stress applied learning
  - student is responsible for their learning
  - performance expectations beyond baccalaureate or certificate education program
- Interdisciplinary

- Enhance perspective on role of health care provider as scientist, engineer and medical specialist

Unique clinical practicum

- Independent learning modules
  - Medicine
    - Orthopedics, Neurology, Vascular, Rehab., Cardiopulmonary
  - P&O
    - Upper/lower limb, spinal, cranial
  - Electives
    - Restoration prosthetics, assistive technology, sports P&O, etc.
- Learning goals and objectives
  - pre-clinical rotation preparation assignments
  - clinical rotation skills and experience exposure
  - post-clinical rotation assignments
- Student evaluation
  - clinical knowledge/reasoning competence
  - clinical skills and technical competence
  - professionalism

Curriculum (48 credit hours over 4 semesters)

- Theme 1: Applied Physiology and Engineering (30%)
  - Biomechanics and Kinesiology
  - Biomedical Imaging
  - Clinical Pathology
  - Clinical Gait Analysis in P&O
  - CAD/CAM in the P&O Lab
  - Assistive Technology
- Theme 2: Clinical Medicine and P&O (48%)
  - Safety Training (Pass/Fail)
  - Introduction to P&O Fabrication Lab (Pass/Fail)
  - Lower Extremity Orthotics
  - Trans Tibial prosthetics
  - Trans Femoral prosthetics
  - Spinal Orthotics
  - Trans Radial/Trans Humeral Prosthetics
  - Augmented Clinical Practica in Medicine and P&O
- Theme 3: Applied Professional Medicine & Science (7%)
  - Research Seminar (Pass/Fail)

- Values in Science Seminar (Pass/Fail)
- Ethics Seminar (Pass/Fail)
- Research Project and Completion

- Theme 4: Specialization Area (15%)
  - Management Elective
  - Engineering Elective
  - Special Topics Elective
  - Clinical Practica
    - Medicine
    - P&O (Materials Science, Design, and/or Fabrication)

Diagram of Curriculum in the Entry-Level Master's Degree Program in P&O

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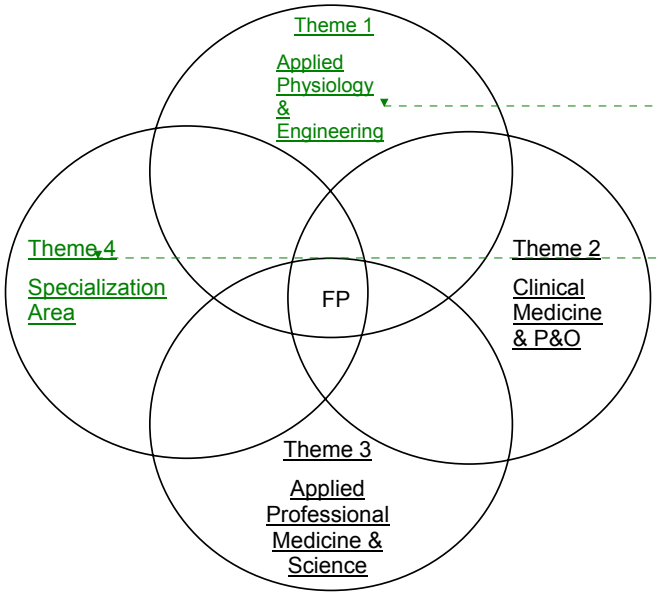

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Specialization Area

- Interrelationship of the four curricular themes around a central focal point (FP)

Summary

- There are a variety of approaches to development of master's degree programs in P&O
- Master's degree programs in P&O can address:
  - Generation of knowledge through research
  - Need for qualified professionals
  - Credibility
  - Leadership/Management for the future of the profession

Workshop Summary: Post-graduate Education

A summary of the workshops for each question is presented below.

Question 9. What are the potential contributions of post-graduate educational programs in P&O to advancements in (a) the quality of patient care and (b) the P&O and Rehabilitation sciences?

Major issues

What does the profession need from post-graduate education?

- Clinical specialities
- Applied research and development
- Competent, confident and skilled people to undertake the research
- Resources: people, funding etc
- Technology and new ideas
- Sufficient PhD's to be leaders in P&O

Masters level post-qualifications are also required

- Must include a research aspect
    - Experimental, applied, quantitative and qualitative
- Focus on research methods of all types
- Creating a Masters programme is more complex than a PhD programme because it requires P&O coursework at a higher level, and we don't have appropriate texts

How much P&O clinical content should be included?

- Are there subjects of sufficient depth for the post-graduate level?
- Make the knowledge from other subjects belong to P&O

Quality of Patient Care

- People with research skills are essential for evidence based practice
- People with higher degrees should be able to apply analysis skills clinically
- People with higher degrees should be able to implement a way of thinking in clinical practice among all practitioners and students
- Research should include aspects that improve patient care

Consideration of a post-baccalaureate entry-level course

- Does this type of course contribute to Quality of Care?
- There is No Benefit to entry-level training
    - Anything that can and should be taught at the graduate level for clinical care should be and can be taught at the undergraduate level.
    - There may be short-term benefits
    - Could be detrimental (eg: lack of contact time)

- There is Benefit
    - Improved knowledge of the body of knowledge
    - Higher level problem-solving skills
    - Potential to improve treatment of patients
    - Gives greater power within system (varies by country)
    - Better ability to exert influence

Consideration of post-clinical training in research

- Does this type of course contribute to Quality of Care?
- There is No Benefit to training
    - No one thinks this
    - We all accept the need for research to contribute to quality of care and understanding
- There is benefit
    - Lower cost to society to train clinicians compared to post-graduate

What is quality: the best care or the affordable care?

- P&O training takes a lot of time
- P&O is special in that there are not other professions that have the expectation that new graduates need to be professionals
- Is someone with a higher degree to be paid more?
- How much is society willing to pay for training?
- Now there is lack of financing for post-graduate level, but do we need to establish the trend before one can get the funding?

Summary of other issues

- Post-graduate definition is required
    - Post clinical qualification graduate research training (not to be confused with CPE)
    - Post-baccalaureate entry-level course
    - Qualification taken after completing P&O primary education
- Relation of clinical experience to ability to do clinical research
- Lack of financing for post-graduate level
- Opposition from existing profession
- Undergraduate degree is required for entry to post-graduate degree
- Masters programmes should include some study of a subject other than P&O

Responses to question 9.

- We must ensure that first, we produce good clinicians.
- The P&O profession should take responsibility for development of P&O knowledge to support evidence-based practice

- We must share experiences and strategies in developing post-graduate programmes
- People with PhD's are required before people with Masters level in order to lead and expand the profession and PhD programmes are easier to design
- Post-graduate education should produce competent, confident, skilled people to undertake the research
- Studying other subjects will provide P&O with a wider perspective, new ideas and respect from other professionals
- We need to sell the benefits of clinicians with higher degrees to employers, professional associations, health systems and funding bodies
- People with higher degrees should be able to apply advanced analysis in the clinical setting, and affect the practice of all clinicians
- Post-graduate education encourages clinicians to participate in the scientific debate, of practice within P&O and across disciplines

Question 10. What important knowledge/skills could be taught at the post-graduate level rather than the baccalaureate?

Major issues

Knowledge or skills gained from research

- Increased level of
- Research methods/Scientific methods (knowledge and skills)
- Ethics
- Directed study (appropriate background to area of study)
- Critical and creative thinking
- Clinical evaluation
- Analytical skills
- Communication
- Ability to transfer knowledge
- Must include a significant contribution to the area

Post-graduate coursework

- Research methods
- Professional subjects (P&O and related) in depth
- Advanced Clinical skills and practice
- Quality management
- Ethics
- Philosophy
- Aspects of Rehabilitation
- Holistic Health Care
- Elective courses - not necessarily in the field of P&O

    - E.g.: Business and marketing
    - Legal issues
- Requires input from profession and industry

Post-grad = P&O qualification first, followed by 'post grad' degree

- Knowledge: theoretical understanding
- Skills: application and integration of theory
- Post-grad qualification requires that basic skills and knowledge are taught at the undergraduate level
- Post-grad requires a deeper understanding of these skills
- Must incorporate 'other' points of view

What do we expect from a person with a higher qualification?

- Masters qualifications may not make better clinicians
- Evidence Based Practice is a prime objective of higher education thus improving patient care and professional recognition
    - A set of clinicians with advance skills however defined will enrich the knowledge base
- Allows a broader knowledge base
- Masters programs could increase knowledge and specialties in the profession
- MSc/PhD graduates will be perceived as more marketable
- Core P & O competencies should be gained at any accredited P & O program (however defined)
- Additional elements of a qualification should build on core competencies
- Should a higher degree specifically named as P & O mean clinical competence?
- Should we offer different levels of higher degree?
    - One in Prosthetics and Orthotics to include clinical competencies?
    - One in Another Name to encompass related disciplines
    - A higher degree student would have to complete their residency and sit competence exams before they can practice in Prosthetics & Orthotics

4 routes to higher degrees

- First degree in P & O then higher degree
- First degree in related discipline then higher degree without a need for P & O clinical competence
- First degree in related discipline then higher degree which includes P & O competencies
- Professional doctorate (Clinical doctorate in Prosthetics and Orthotics)

Summary of other issues

All issues were included in the major issues section.

Responses to question 10.

- Purpose of Post-graduate education is to promote a higher level of understanding of knowledge and skills through coursework and research activities
- Assume that basic clinical knowledge and skills have been learned at the undergraduate level
- Central focus should be research. The research element should be at an appropriate academic level (must include a significant contribution to a P&O related area)
- Should include complimentary courses

Plenary Discussion: Post-graduate Education

The following presents the editors' account of discussion that took place among participants at the conclusion of the theme ‘Post-graduate Education’.

Definition of ‘post-graduate’

Two alternatives definitions were presented:

- Education for prosthetists and orthotists who hold a bachelor degree in P&O. Post-graduate education involves a higher degree that follows a bachelor degree
- Education for people who hold a non-P&O degree, to qualify them for entry to the P&O profession

The first of these definitions was used by POEM participants for most of this discussion.

Discussion points

P&O schools offering post-graduate programmes

A show of hands indicated that most P&O schools represented at the POEM offered one or more post-graduate programmes. These were generally higher degrees by research, not clinical qualifications.

Analytical abilities resulting from higher degree programmes

There was debate about the analytical abilities resulting from higher degree programmes. The following views were raised:

- A higher degree should result in more advanced analytical ability than an undergraduate degree (bachelor degree)
- A higher degree does not necessarily result in more advanced analytical ability
- A higher degree improves clinical practice because the advanced analytical skills learned should be transferable to clinical problems
- A higher degree may not benefit clinical practice at all
- The best clinicians can use/interpret other people’s research, can critically review literature and apply findings in practice. Such clinicians do not need higher degrees, but people with research skills are needed to produce research
- Advanced analytical skills may interfere with clinical ability

Combined clinical and research skills

There was discussion about whether a single individual could possess clinical skills and research skills. Such combination was thought to be occasionally possible by some participants and not possible by others.

The meeting discussed differences in the aims of undergraduate and post-graduate education:

- Undergraduate programmes aim for clinical competence
- Post-graduate programmes aim for research competence and analysis skills
- The model exists for clinical skills to be developed first, and then research skills follow

Research skills required by clinicians

There was discussion about the amount of research skill required by clinicians. The following points were made:

- Not all clinicians require research skills
- As the production of an evidence base for P&O is important, perhaps P&O Educators should be enhancing the ability of clinicians to produce evidence via research
- It is important to produce P&O researchers, whether or not they are also clinicians
- The recognition of P&Os as 'consultants' or responsible health practitioners may depend on the number of clinicians who hold higher degrees

Value of credential

Debate about the importance of the credential, or name of the qualification (Masters versus Baccalaureate Degree etc) included the following ideas:

- The credential, or name of the qualification, is not important
- A credential of at least a bachelor degree is needed to access post-graduate training
- A credential may be useful to gain influence politically or within the health sector

Which is easier to establish: a PhD or Masters programme?

The ease of establishing a PhD programme or a Masters programme was discussed and the following observations were made:

- It is easier to conceptualise a PhD by research programme than a Masters programme
- It is harder to create a Masters by coursework programme because coursework must be created
- Therefore, a PhD programme is easier to establish than a Masters programme
- People with PhDs can set up a Masters programme, but people with Masters qualifications cannot set up a PhD programme
- Non-P&O academics can supervise P&O PhDs, which facilitates the establishment of PhD programmes
- It is harder for non-P&O academics to teach Masters-level coursework
- Little Masters-level coursework literature exists and P&Os with PhDs would be well-suited to create such coursework

Admission of Masters to entry-level P&O programmes

Of the schools represented at the POEM, three had accepted students with a non-P&O Masters degree into an entry-level programme.

Some schools represented at the POEM offer, by distance learning:

- Masters degrees by coursework
- Masters degrees by research
- PhDs by research

Challenges facing P&O higher degrees

The following challenges facing existing higher degrees were noted:

- Identification and recruitment of suitable supervisors
- Funding for projects
- Teaching materials for coursework are difficult to obtain or require creation

P&O education in the USA

There was discussion of the model of P&O education in the USA

- The existence of a Masters level programme, for people with a P&O bachelor's degree, was questioned
- Funding cuts to P&O Education in the USA have limited P&O schools abilities to offer such programmes
- Although the new Georgia Tech. programme, which offers entry to P&O at the Masters level, would accept students with a P&O bachelor degree, the attractiveness of such action for people already qualified to practice is questionable

Keynote Address 1: Collaboration

David Boone CP, MPH

Assistant Professor

The Hong Kong Polytechnic University

ACADEMIC EXCHANGE AND COLLABORATION

We Believe...

- Academic exchange broadens our students and helps them in their futures
- Graduates who are more diverse, in turn benefit the home P&O program
- Academic exchange leads to better understanding of other methods and closer collaboration with other P&O educators
- Can be academic or clinical

Curriculum Differences

- P&O curriculum around the world is more alike than different
- Need to look for commonality and see differences as broadening our graduates
- They will NOT learn EXACTLY the same thing, the same way
- Accreditation Issues
- But… Flexibility will foster Opportunity!

Curriculum at HKPU

- General Studies
- Clinical Training
- Technical Training
- Research Opportunities

Facilitating Exchange

Formal bi-lateral agreements

- Number of students
- Number of exchanges
- Calendar of exchanges
- Subjects Available to Students - May be outside of P&O
- Tuition (mutual waiver typical)

Outbound Students

- We need to understand the situation that our students will experience
- We need to be accepting of some differences from their classmates and be considerate of them

Inbound Students

- Preparing for differences in preparatory subjects
- Living abroad may require our aid
- Language
- Goals and Motivations

Example Inbound Timeline

- Formal Agreement Made
- March - Department accepts and reviews individual applications
- Apr-May Department asks University to send admissions pack to student.
- May - Student accepts position, accommodation reserved.
- May-June Visa Application, Advise student on subjects for enrollment.
- July-Aug Subject registration
- Late Aug Student Arrives for Sept 1 start of classes.

Faculty

- POEM, a GREAT start.
- Make a point of knowing other programs.
- How about exchange instructors?
- Be open to broadening our own experience through exchange. Look for opportunities to invite and be invited

Other Forms of Collaboration

- Aside from our students and faculty. We should welcome ways to share:
- Experience
- Materials
- Joint Publication - Solicit other points of view on our issues
- Joint Research - Education programs will be better thought of in their own institutions with active research

My own experience...

- Has been positive
- Collaboration does not have to be difficult
- We should be open to it
- We must respect and recognize each others' work

Keynote Address 2: Collaboration

Paul Prusakowski, BS, CPO

Founder and president of O and P Digital Technologies

Creator of the website *OandP.com* ***and*** *the OandP list serve*

INTERNET TECHNOLOGY AS A TOOL FOR COLLABORATIVE EDUCATION

Background

Paul was unable to attend the conference due to professional scheduling conflicts. Paul had created a unique, automated PowerPoint presentation, which was presented in his absence with an accompanying digital voice-over.

Presentation Summary

This is an exciting time for prosthetic and orthotic (P&O) educators to discuss the future of P&O education in terms of content, methodology, and collaboration. Through creative thinking, planning and utilization of computer technology such as the internet, this technology will facilitate intellectual transactions among university educators. In order to achieve this, there are several requirements:

- Futuristic mindset – all participants of the intellectual exchange must embrace new technology
- New ideas – All participants involved in developing an intellectual exchange must brainstorm to generate ideas and goals of the system
- Access – Students and faculty must be able to have access to and to utilize a computer. Broadband technology is not necessary but is helpful to utilize this system.
- Discipline – In order to develop an intellectual exchange and to provide a consistent direction, on-line tools must be adopted and be driven by the faculty, not the students.

There are many benefits of an on-line collaborative exchange that allows intellectual exchange among educational institutions such as:

- Collaboration – an on-line system will allow collaboration such as the sharing of ideas and course content
- Accountability – The on-line collaboration system must be password protected
- Documentation – An on-line collaboration system can provide a means of providing a written record and allow the sharing of written files, notes and other information as part of a database accessible by keyword searches.
- Interaction – An on-line collaboration provides a more rapid means of interaction and the exchange of ideas
- Globalization – Through an on-line collaboration, a more unified approach to O&P education can be achieved. For example, a single course in trans-tibial prosthetics could be developed by an institution for all other universities to utilize as part of their curriculum. In this regard, there would be consistency in course content delivered to students around the world.

There is a model for developing a starting point to create a method for intellectual information exchange.

- Development of a list server (an e-mail based discussion group). The list server could be developed for educators, for students or for a combination of students and educators.
- Development of combined web based education system. In this regard, a medium for sharing of PowerPoint presentations, course notes, etc. could be developed as a faculty/educators domain. The system could be utilized as part of a password protected system allowing secure access to individuals participating in the global education and information exchange. A student domain cold be developed in which course notes, on-line quizzes or other media could be created also as part of a password protected environment. Some sites could provide specific access by universities for specific notes and other information.

  A forum for students and educators discussion could be developed to create a means for international dialogue, debate and discussion of pertinent issues in P&O.

  The power of the system is limitless. On-line quiz building, on-line P&O information database access, complete on-line lectures, storage of video education – all of these media may already be available through some universities. Again, these systems could be created and formulated as part of a password protected network.

What can be done now?

An international P&O education list server can be easily established. In order to achieve this, two elements are needed:

- A list of the e-mail addresses of all collaborating P&O educators needs to be formulated
- An individual needs to be appointed for managing the upkeep of the list server system and the maintenance of closed subscriptions for protection.

A list server for independent universities can also be created. Each university can have its own local list server, which could also be linked/merged with an international list server. Subscription to the list server at each university would need to be managed by an appointed individual. Paul Prusakowski's computer company, O and P Digital Technologies is willing to provide free support to establish the P&O educator list server network.

Development of an on-line information exchange is possible. Most important to this effort is in planning. The P&O educator/collaborators need to create a vision for the on-line world. All educators should open their minds to the future and their aspirations for information sharing with regard to the expansion of curriculum, research, and other collaborations. There are limitless possibilities for information exchange through this initial list serve forum.

Plenary Discussion: Collaboration

The following presents the editors' account of discussion that took place among participants at the conclusion of the theme ‘Collaboration’.

Discussion points

List server

Information sharing among P&O educational institutions was discussed. The meeting participants agreed that a world wide forum, such as a list server, would be an effective and efficient means of P&O Educator communication and information exchange. A participant indicated he may be able to act as moderator of such a list server.

Staff and student exchange

Representatives of several P&O schools expressed an interest in learning more details to actively participate in student and faculty exchanges. Because education programmes curricula varies, the details of how to award transfer credit for similar courses was discussed .

Ideas for collaboration

Other collaborative ideas suggested included:

- Website for P&O Educators
- Circulate POEM information to institutions not represented
- Another POEM in 2-3 years

Appendix 1: Results of P&O Programmes Survey

Preceding the Prosthetics and Orthotics Educators meeting, registrants and interested parties were invited to complete a survey that would provide information related to their respective educational programmes. Survey results were presented at the meeting by Dr Magus Lilja. All completed surveys are included in alphabetical order in this appendix.

Baker College of Flint
1050 W. Bristol Rd.
Flint, Michigan 48507-5508
USA

Phone **+1 810 766-4194**
Fax **+1 810 766-4049**
E-mail **craig.smith@baker.edu**

Jurisdiction		
Final award		Diploma in Prosthetics and Orthotics Associate of Applied Science
Type of program		Full time program
Duration of Course		2 Years
No of weeks in academic year		30
Study weeks per year	Year 1	30
	Year 2	30
	Year 3	
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students

Entry qualifications	Students applying for acceptance into the program must have completed the prerequisite courses with a "B-" or better. English Composition I, English Composition II, College Success Strategies, Introduction to Health Care, Information Systems Theory, Word Processing, Basic Human Anatomy, Medical Terminology, Introductory Algebra, Human Relations, Introduction to Orthotic/Prosthetic Tech, Basic Chemistry, Oral Communication, Workplace Communication
Fee paying	Yes. $150.00 lab fee, Lab Coat, Safty Glasses, Respirator

Mode of education	Lecturing in a traditional way Each course in the professional portion of the curriculum is 6 hours. Four hours lecture and 2 hours lab.

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork

Research project required in program	No
Research student directed or faculty directed	N/A
Operating a clinic	No
Modules for exchange students	No
International links	No
National certification exam after graduating	Yes
Professional research in P&O	No
Research funded	
Staff members in P&O	3

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
				1		1	1 Cped

British Columbia Institute of Technology

3700 Willingdon Ave

Burnaby, BC. Canada. V5G 3H2

Phone ++**604 432 8813**

Fax ++ **604 435 5153**

E-mail **Nerrolyn_Ford@bcit.ca**

Jurisdiction		Ministry of Education
Final award		Diploma in Prosthetics and Orthotics
Type of program		Full time program
Duration of Course		2 Years
No of weeks in academic year		35
Study weeks per year	Year 1	35
	Year 2	35
	Year 3	
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
	11	

Entry qualifications

High school graduation.

English 12, Math 12, Physics 11

C+ average or better in all academic requirements.

Fee paying: Yes, Students pay a tuition fee of approximately $4,686.60 for the two year program

Mode of education: Lecturing in a traditional way

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork

41	22	7

Research project required in program	Students are required to complete a research project that addresses an original problem or question related to prosthetic or orthotic management. The project may take the form of an evaluation of an existing product or procedure, or design of an original concept.
Research student directed or faculty directed	Choice of research topics are largely student initiated. Faculty assist individuals on matters related to project design.
Operating a clinic	No
Modules for exchange students	No
International links	No
National certification exam after graduating	Yes
Professional research in P&O	Yes. Quality systems for prosthetics Interface pressure measurements. Product development. Product evaluation medical device design
Research funded	Yes, grants and private industry
Staff members in P&O	4

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
2		1		1	2		Reg Technician

Bundesfachschule für Orthopädie
Schliepstrasse 6-8
44135 Dortmund / Germany

Phone **+49 231 5591 0**
Fax **+49 231 5591 333**
E-mail **zentrale@ot-bufa.de**

Jurisdiction		Economical private under supervision of ministry of education und economic
Final award		German Meister
Type of program		Full time program
Duration of Course		3 1/2 years apprenticeship CAT II (ISPO)
No of weeks in academic year		40
Study weeks per year	Year 1	36(CATII)
	Year 2	36(CATII)
	Year 3	36(CATII)
	Year 4	16(CATII)
	Year 5	40 BUFA

Student enrolled annually	Undergraduate students	Post-graduate students
		32

Entry qualifications: Apprenticeship (technologist, CAT II)
plus BUFA entry examen

Fee paying: Yes, all inclusive

Mode of education: 1. semester more taditional way
2 semester PBL

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork

28	10,5	80 before BUFA weeks

Research project required in program	Nothing
Research student directed or faculty directed	
Operating a clinic	No
Modules for exchange students	No
International links	Yes
National certification exam after graduating	Yes
Professional research in P&O	No
Research funded	
Staff members in P&O	8 + 80 external lecturers

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
Ext. lect.	Ext. lect.	Ext. lect.		Ext. lect.			8 P&O Meisters

China training centre for orthopaedic technologists

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P.R.China 101601

Phone + **86 (0)10 61590976**

Fax + **86 (0)10 61594942**

E-mail **chicotfang@263.net**

Jurisdiction		Ministry of Civil Affairs
Final award		Diploma in Prosthetics and Orthotics Certificate in Prosthetics and Orthotics
Type of program		Full time program
Duration of Course		3 Years
No of weeks in academic year		40
Study weeks per year	Year 1	40
	Year 2	40
	Year 3	40
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
	30	

Entry qualifications	National entry examination for those who have 12 years basic education
Fee paying	Yes
Mode of education	Other, lecturing, practice, clinic

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork

56	50	14

Research project required in program

Research student directed or faculty directed

Operating a clinic	Yes
Modules for exchange students	Yes, Ak & BK practice, Language of delivery; German, Number of hours taught in: Lecture; 8 laboratory; 40 clinic; 16
International links	Yes
National certification exam after graduating	Yes

Professional research in P&O

Research funded	No
Staff members in P&O	11

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
	3	3	4	7		1	

Fontys University of professional Education

P.O. Box 347

5600 AH Eindhoven

Netherland

Phone **++ (0)877 875510**

Fax

E-mail **f.holtkamp@fontys.nl**

Jurisdiction		Ministry of Education
Final award		Bachelor's in Prosthetics and Orthotics, Diploma in Prosthetics and Orthotics
Type of program		Full time and part time programs
Duration of Course		4 Years
No of weeks in academic year		42
Study weeks per year	Year 1	40
	Year 2	40
	Year 3	40
	Year 4	40

Student enrolled annually	Undergraduate students	Post-graduate students
	15-20	

Entry qualifications: HAVO, VWO or MBO

Fee paying: Yes (eg fees for fabrication lab supplies, clinical supplies, medical insurance, etc)

Mode of education: PBL

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork
	100	30	30

Research project required in program	Yes, during half a year a student has to work an a research project
Research student directed or faculty directed	Yes
Operating a clinic	No
Modules for exchange students	No
International links	Yes
National certification exam after graduating	No
Professional research in P&O	Yes, prosthetic and orthotic product research and development
Research funded	Yes, Workfield
Staff members in P&O	6

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
	3	2		1			

George Brown College - P&O Programs

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Toronto, ON, CANADA, M4N 3M5

Phone ++ **416-480-5783**

Fax + + **416-480-5975**

E-mail **cocdan@ica.net**

Jurisdiction		Min. of Colleges & Universities
Final award		Diploma in Prosthetics and Orthotics, one diploma is a post-graduate diploma
Type of program		Full time program
Duration of Course		Both programs are 2 years in length
No of weeks in academic year		33
Study weeks per year	Year 1	33
	Year 2	33
	Year 3	
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
	55-60 (16 Clinical / approx 40 for Technical)	
Entry qualifications	Practitioner program - baccalaureate degree or higher and/or P&O Technical Program diploma. For the P&O Tech program - prerequisite is a secondary (high school) school diploma.	
Fee paying	Yes, $700-800 CDN for tools/supplies, $250-300 for other fees	
Mode of education	Lectures & PBL for the most part. There is a beginning of curriculum being delivered via computer or web-based	
Composition if curriculum		

Number of study weeks	Theory	Practical	Fieldwork
	30%	70%	

Research project required in program	Yes - full year research project in the second year of the post-grad clinical program (grads of this program are eligible to become CO's & CP's
Research student directed or faculty directed	Both - student and faculty decide focus and topic. But faculty responsible direct/advise.
Operating a clinic	No
Modules for exchange students	No
International links	Yes
National certification exam after graduating	Yes
Professional research in P&O	No
Research funded	
Staff members in P&O	3 full time and approx. 11 part time

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
	1	12		1	6	5	4

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BOX 4031, FIN-00099 City of Helsinki

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E-mail **Markku.Ripatti@Stadia.fi**

Jurisdiction		Ministry of Education
Final award		Bachelor's in Prosthetics and Orthotics
Type of program		Full time
Duration of Course		3 ½Years
No of weeks in academic year		40
Study weeks per year	Year 1	40
	Year 2	40
	Year 3	40
	Year 4	20

Student enrolled annually	Undergraduate students	Post-graduate students
	20/2yrs	

Entry qualifications: They have to be graduates from high school and they have to pass the atitude test, which focus to test mathematical power of deduction.

Fee paying: No

Mode of education: PBL. It depends on the topic. Traditional way is mixed with PBL. In every subject there is independent study section for students.

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork
	90	50	34

Research project required in program	Yes. Final Thesis is 10 weeks.
Research student directed or faculty directed	Yes, it is allways directed but it is preferred that thesis is initiated by a student. It can be a joint project with physios etc
Operating a clinic	Yes
Modules for exchange students	No
International links	Yes
National certification exam after graduating	Yes
Professional research in P&O	No
Research funded	
Staff members in P&O	2½

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
		1		1½			

Hong Kong Polytechnic University

REC

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E-mail **rcdboone@polyu.edu.hk**

Jurisdiction		Ministry of Education
Final award		Bachelor's in Health Technology (with concentrations in up to 2 of the following: Orthotics, Prosthetics and/or Bioengineering), MSc Health Technology, PhD Health Technology
Type of program		Full time and part time programs
Duration of Course		3 Years BSc, 2 Years, Part Time Master's
No of weeks in academic year		35
Study weeks per year	Year 1	34
	Year 2	36
	Year 3	36
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
	12	13

Entry qualifications	Undergradute students must enter through a joint university admission system for all of Hong Kong, usually after their 13th year of schooling.
Fee paying	18% of the total cost
Mode of education	All

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork

60%	40%	18 weeks

Research project required in program	Yes, The degree carries the BSc(Hons.) designation and requires a research project and significant thesis.
Research student directed or faculty directed	The students research is selected from several options provided by each of our 14 academic staff
Operating a clinic	Yes
Modules for exchange students	Yes
International links	Yes
National certification exam after graduating	Yes, Certification examination offered by professional society.
Professional research in P&O	Yes, Gait biomechanics, CAD/CAM, Interface mechanics
Research funded	Yes, Hong Kong University Grant Council and other external sources.
Staff members in P&O	13

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
7	4	2		2		1	

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Belgium

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Jurisdiction		Ministry of Education
Final award		Bachelor's in Prosthetics and Orthotics
Type of program		Full time program
Duration of Course		3 Years
No of weeks in academic year		27
Study weeks per year	Year 1	27
	Year 2	27
	Year 3	27
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
	60	

Entry qualifications: Minimum = highschool level = minimal age = 18

Fee paying: Yes. The general annual fee (€ 400) includes all the necessary supplies for lab exercises and insurance. Not included are work outfit, small hand tools, visits to companies, subscription to expositions and conferences, books and course notes. (Estimated €200/y)

Mode of education: Lecturing in a traditional way

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork

34	15	32

Research project required in program	During the last year students have to write a thesis, which describes extensively the orthopedic solution to a given patient related problem, or their work in orthopedics, related research. The work has to cover the different aspects that have to be taken in account during the treatment: anatomy, physiology, pathology, biomechanics, design criteria, construction, materials used,...case report and final assessment of the patient or conclusion.
Research student directed or faculty directed	The work is directed in close cooperation between faculty and a responsible representative of the location where the work is being done
Operating a clinic	No
Modules for exchange students	Yes, name of the module: complete course for Fontys students, language of delivery: dutch, number of hours taught in: lecture 1090, laboratory: 480, clinic: 1040, number of credit points awarded: 180 (60 credits per year)
International links	Yes
National certification exam after graduating	Yes
Professional research in P&O	Yes
Research funded	National government, European community
Staff members in P&O	5

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
2	12	4		2	1		

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501-85 Fukushima Sanda-City
Hyogo 669-1313 JAPAN

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Fax ++ **0795-63-1294**
E-mail **uchida@kmw.ac.jp**

Jurisdiction		Ministry of Health
Final award		Diploma in Prosthetics and Orthotics Certificate in Prosthetics and Orthotics
Type of program		Full time program
Duration of Course		3 Years
No of weeks in academic year		30
Study weeks per year	Year 1	30
	Year 2	30
	Year 3	30
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
	30	

Entry qualifications	Graduate of high school
Fee paying	Admission fees: 300000 yen, college fees: 1000000 yen/year, fabrication lab supplies: 300000 yen/year, the cost of maintenance: 150000 yen/year, accumulated fund for study abroad: 100000 yen/year, others: 300000 yen/year
Mode of education	Lecturing in a traditional way

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork

60	30	15

Research project required in program	It is necessary for a graduation thesis
Research student directed or faculty directed	Before promotion of last grade
Operating a clinic	Yes
Modules for exchange students	No
International links	Yes
National certification exam after graduating	Yes
Professional research in P&O	No
Research funded	
Staff members in P&O	6

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
	2	3	1	6			2

Landesfachhochschule fuer Gesundheitsberufe

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E-mail **michael.mais@claudiana.bz.it**

Jurisdiction		Ministry of Health
Final award		Bachelor's in Prosthetics and Orthotics, Diploma in Prosthetics & Orthotics
Type of program		Full time
Duration of Course		3 Years
No of weeks in academic year		40
Study weeks per year	Year 1	40
	Year 2	40
	Year 3	40
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
	15	

Entry qualifications: A-levels (Italian), bilingual italian/german, entry examination

Fee paying: Yes, University registration fees at Universita Cattolica di Sacre Cuore in Rome

Mode of education: Lecturing in a traditional way

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork

40	75

Research project required in program	Yes. A Thesis on a agreed topic
Research student directed or faculty directed	No
Operating a clinic	No
Modules for exchange students	No
International links	Yes
National certification exam after graduating	No
Professional research in P&O	No
Research funded	
Staff members in P&O	1

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
		6					

National Centre for Prosthetics and Orthotics La Trobe University

La Trobe University Bundoora

Vic Aust. 3086

Phone + **61 03 9479 5862**

Fax + **61 03 9479 5784**

E-mail **Rod.Cooper@latrobe.edu.au**

Jurisdiction		Ministry of Education
Final award		PhD in Prosthetics and Orthotics Master's in Prosthetics and Orthotics Bachelor's in Prosthetics and Orthotics
Type of program		Full time and part time programs
Duration of Course		3.5 Years degree, 4 years honors degree
No of weeks in academic year		26
Study weeks per year	Year 1	27
	Year 2	29
	Year 3	26
	Year 4	16 or 32 (Hons)

Student enrolled annually	Undergraduate students	Post-graduate students
	25-30	0-2

Entry qualifications	VCE with minimum of C average in English and two of Physics, Chemistry, Mathmatics or Biology
Fee paying	No
Mode of education	Lecturing in a traditional way, some web based delivery is utilised
Composition if curriculum	

Number of study weeks	Theory	Practical	Fieldwork
	39	39	20

Research project required in program	Research project conducted in third year. Hons student complete a 10,000 word thesis
Research student directed or faculty directed	Some of each

Operating a clinic	Yes
Modules for exchange students	No
International links	Yes
National certification exam after graduating	No

Professional research in P&O	Yes
Research funded	No, some grants obtained.
Staff members in P&O	8

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
1 2 in progr.	1	1					BPO (Hons) 2

National Centre for Training and Education in Prosthetics and Orthotics

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Glasgow G4 0LS, Scotland U.K.

Phone **+44 141 548 3298**

Fax **+ 44 141 552 1283**

E-mail **e.figgins@strath.ac.uk**

Jurisdiction		Other
Final award		PhD in Prosthetics and Orthotics, Master's in Prosthetics and Orthotics, Bachelor's in Prosthetics and Orthotics Masters, Diploma and Certificate in Rehabilitation Studies
Type of program		Full time and part time programs
Duration of Course		4 years Honors degree programme (full time)
No of weeks in academic year		40
Study weeks per year	Year 1	40
	Year 2	40
	Year 3	40
	Year 4	46

Student enrolled annually	Undergraduate students	Post-graduate students
	28	~10

Entry qualifications	4 Scottish Highers at B grade including Maths and Physics or Biology. or GCSE A levels 3 passes at level C.

Fee paying	U.K. students all have fees waived. Foreign students all generally have to pay fees.
Mode of education	Active Learning using varied methods of teaching including small group teaching, traditional lectures, project work, student presentations etc.

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork
	65	55	46

Research project required in program	Only a short clinical essay in the 4th year.
Research student directed or faculty directed	A combination of the two, allowing the student to have an interest in the topic chosen.
Operating a clinic	Yes
Modules for exchange students	No
International links	Yes
National certification exam after graduating	No
Professional research in P&O	Yes. Lower limb prosthetics
Research funded	Yes, Scottish Health Service Research Committee
Staff members in P&O	12

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
3	3	6					6

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USA

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E-mail **mle@northwestern.edu**

Jurisdiction		CAAHEP
Final award		Certificate in Prosthetics, Certificate in Orthotics,
Type of program		Full time program
Duration of Course		6 months per discipline after a bachelor's degree.
No of weeks in academic year		26 weeks
Study weeks per year	Year 1	
	Year 2	
	Year 3	
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
		40

Entry qualifications	Students must obtain a minimum undergraduate education of a bachelor's degree favoring science or engineering. They must have included in their degree: biology, chemistry, physics, psychology, math, human anatomy and physiology. We recommend some experience in the profession as a technician or assistant. A GPA of 2.5 or higher, letters of recommendation, and a graded essay.
Fee paying	Yes. Tuition to our program is 12,000 US dollars per discipline.
Mode of education	We use a combination of teaching methodologies. Web-based, PBL, lecture, peer-teaching, etc.

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork
	12	8	6

Research project required in program	A research proposal is required in their coursework. It is meant to be used as a template for the students to take into their residency training.
Research student directed or faculty directed	The research is student directed with faculty input and mentoring.
Operating a clinic	No
Modules for exchange students	No
International links	
National certification exam after graduating	Yes
Professional research in P&O	Yes. Both prosthetics and orthotics research is being done at our institution.
Research funded	Yes, NIDRR, VA
Staff members in P&O	12

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
4	3	3		1	3	4	

Oslo University College - Faculty of Health Sciences - Prosthetics and Orthotics Programme

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N-0461 OSLO - Norway

Phone **+47 22 45 25 35**

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E-mail **Jarle.Aga@hf.hio.no**

Jurisdiction		Ministry of Education
Final award		Bachelor's in Prosthetics and Orthotics
Type of program		Full time
Duration of Course		3 Years
No of weeks in academic year		40
Study weeks per year	Year 1	40
	Year 2	40
	Year 3	40
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
	12	

Entry qualifications: Minimum requirements from upper secondary school

Fee paying: No

Mode of education: All, We use both traditional lecturing, PBL and web based lecturing

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork

82 38

Research project required in program	Yes, The degree designation and requires a research project and significant thesis
Research student directed or faculty directed	The students research is self selected and assessed by the staff members
Operating a clinic	No
Modules for exchange students	No
International links	Yes
National certification exam after graduating	Yes
Professional research in P&O	No
Research funded	
Staff members in P&O	4

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
	1 in progress	3		3			1 techn

University School of Health Study
Prosthetic and Orthotic Course
Linhartova 51
SI-1000 Ljubljana, Slovenia

Phone **+386 1 4376 600**
Fax **+386 1 4376 589**
E-mail **crt.marincek@mail.ir-rs.si**

Jurisdiction		Ministry of Education
Final award		Diploma in Prosthetics and Orthotics
Type of program		Full time program
Duration of Course		3 Years
No of weeks in academic year		30
Study weeks per year	Year 1	30
	Year 2	30
	Year 3	30
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
	30 / 3rd yr	

Entry qualifications	University entry qualifications i.e. after 12 yrs of education
Fee paying	No
Mode of education	Lecturing in a traditional way

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork
	60	30	

Research project required in program	Yes, diploma thesis publication
Research student directed or faculty directed	Faculty initiated
Operating a clinic	Yes
Modules for exchange students	No
International links	No
National certification exam after graduating	Yes
Professional research in P&O	No
Research funded	
Staff members in P&O	18 part time

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
4	5			8			

Rancho Los Amigos Rehab Center
Orthotic Dept. 7450 Leeds St
Downey, CA 90242

Phone + **001562-940-7655**
Fax **+001 562-803-5202**
E-mail **dclark280@cs.com**

Jurisdiction		Private
Final award		Certificate in Orthotics,
Type of program		Full time program
Duration of Course		1 Year
No of weeks in academic year		50
Study weeks per year	Year 1	50
	Year 2	
	Year 3	
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
		4

Entry qualifications	4 year degree. NCOPE prerequisites
Fee paying	Yes, $8000 (USD) This includes all lab supplies, tools, texts, and medical insurance
Mode of education	Lecturing in a traditional way, other methods are also incorporated into the curriculum.

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork
	12	13	25

Research project required in program	No
Research student directed or faculty directed	
Operating a clinic	Yes
Modules for exchange students	No
International links	No
National certification exam after graduating	No
Professional research in P&O	Yes, Rancho has a Rehab and Research Engineering Center
Research funded	Yes, NIH; NIDRR
Staff members in P&O	8

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
		7		1	6		

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SE 551 11 Jönköping, Sweden

Phone **+46 36 15 73 30**

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Jurisdiction		Ministry of Education
Final award		Master's in Prosthetics and Orthotics Bachelor's in Prosthetics and Orthotics
Type of program		Full time and part time programs
Duration of Course		3 Years
No of weeks in academic year		40
Study weeks per year	Year 1	40
	Year 2	40
	Year 3	40
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
	30	3

Entry qualifications	Basic requirements according to Swedish standard called "E3". Mathematics corresponding to Swedish level "D". Physics corresponding to Swedish level "B". Chemistry corresponding to Swedish level "A".
Fee paying	No
Mode of education	Both PBL and lecturing in a traditional way

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork

85	25	10

Research project required in program	The student must complete a thesis (10 weeks) during their last semester.
Research student directed or faculty directed	Student initiated
Operating a clinic	No
Modules for exchange students	Yes, We are in the process of building modules for foreign students.
International links	Yes
National certification exam after graduating	No
Professional research in P&O	Yes, We have research in prosthetics at our department. The research is focused on transtibial prostheses.
Research funded	Grants
Staff members in P&O	4

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
4	1	3		5			

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the Netherlands

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Fax **+31-30-6051120**
E-mail **info@svgb.nl**

Jurisdiction		Ministry of Education
Final award		Diploma in Prosthetics and Orthotics
Type of program		One school day a week and four days of practical work in a workshop
Duration of Course		level 2: 2 years level 3: 2 years level 4: 2 years
No of weeks in academic year		36
Study weeks per year	Year 1	36
	Year 2	36
	Year 3	36
	Year 4	36
	Year 5	36

Student enrolled annually	Undergraduate students	Post-graduate students
	15	

Entry qualifications: Position in a Workshop, older than 18

Fee paying: No

Mode of education: Lecturing in a traditional way

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork
	36	46	0

Research project required in program	No
Research student directed or faculty directed	
Operating a clinic	No
Modules for exchange students	No
International links	Yes
National certification exam after graduating	No
Professional research in P&O	No
Research funded	
Staff members in P&O	10

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
				*			

University of Texas Southwestern Medical Center, Prosthetics-Orthotics Program

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USA

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Jurisdiction		State of Texas
Final award		Bachelor's in Prosthetics and Orthotics
Type of program		Full time program
Duration of Course		2 Years
No of weeks in academic year		44
Study weeks per year	Year 1	44
	Year 2	44
	Year 3	
	Year 4	

Student enrolled annually	Undergraduate students	Post-graduate students
	28	

Entry qualifications

60 semester credits of defined prerequisite courses

2.5 GPA Science

2.5 GPA last 60 credit hours

Fee paying	Yes, http://www2.swmed.edu/stuaff/stuinfo/Tuitfee.htm
Mode of education	Lecturing in a traditional way

Composition if curriculum

Number of study weeks	Theory	Practical	Fieldwork
			18

Research project required in program	Yes, research project
Research student directed or faculty directed	Faculty directed.
Operating a clinic	Yes
Modules for exchange students	No
International links	No
National certification exam after graduating	Yes
Professional research in P&O	No
Research funded	
Staff members in P&O	7 faculty, 7 staff

Highest academic level of faculty

PhD	MSc	BSc	Associate's	CPO	CO	CP	Other
	2	5		3	2	2	

Appendix 2: Participant Evaluation of the POEM

At the conclusion of the Prosthetics and orthotic educators meeting all participants were invited to complete a meeting evaluation form, which contained three open-ended questions:

1. Please write down three positive things about this meeting.

2. Please write down three things that can be improved until (sic) the next meeting.

3. Suggestions of topics for a future POEM.

Participant responses to each question are listed below.

Responses

Please write down three positive things about this meeting:

- Personal interaction
- Emphasizing the educator as innovator
- Reflection on teaching methods
- The fact that it has been arranged
- The group works – high degree of participation
- Good mix of issues to discuss of great importance or educators
- I have learned a lot about the education in other countries
- The organization was very good, excellent, thanks
- The opportunity to meet colleagues worldwide
- Sharing of ideas
- Underpinning of direction and evolution of own practice
- Enthusiasm of all participants
- Sharing of ideas, beliefs etc.
- Excellent social events
- Meeting with colleagues, becoming friends, who are also interested in development and education topics
- Fun and without prestige
- Ideas and exchange in many ways
- Meeting colleagues from all around the world
- Discussing topics
- Collaboration
- Meeting colleagues in an international setting with no hidden agendas
- Deeper understanding of education in different places
- Discussion on different viewpoints
- Common view on the need of boarder knowledge and skills
- Breakout sessions

- Excellent organizations
- Social activities (to promote collaboration)
- Good time keeping
- Exchange of ideas
- See the differences in educational programs
- Small group discussions
- Different topics during the week
- The social aspect
- Educators get together
- Discussions of different views
- To get new ideas for own work
- This was a great meeting and nicely organized
- To meet other educators and to get to know each other
- To get overview about the different ways
- Very good organization and hospitality
- Contacts
- Have learned about other educational ways
- Organization
- Opportunity to meet international colleagues and exchange ideas
- Excellent setting and surrounds
- Very well organized program, both day and night time activities
- Bringing people together
- Exchanging ideas
- A very good idea and very good arranged with groups and speeches
- Very interested to meet other educators
- Very good social program
- Networking with other educators
- Exchange of ideas and knowledge of education systems
- Very good venue and social program
- The organization of the congress was perfect (time table, food, cultural)
- Good subjects
- Getting so many people together and talking
- Increased wariness of what others are doing
- Awareness of how other schools work
- Contacts with other educators
- Networking
- Meeting and talking with fellow educators

- Some keynote talks
- Visiting the facility
- Burning topics to discuss
- Cohesive and efficient team
- Identifying common interests
- Widen perspective in O&P education
- Catalyzer and energizer for the future
- Similarities of view points – most of the time
- Maybe set a first step in definition of terms used and minimum requirements and
- Programs in P&O education
- Thanks to organisation – very well done
- Job well done
- Good to know a number of colleagues

Please write down three things that can be improved until (sic) the next meeting:

- Better definition of meeting purposes before start
- Focus on fewer issues
- Print outs of power point slides for facilitators feedback
- Focus keynote talks – sometimes not clearly focused to workshops
- Can't think of anything
- Confirmation of meeting arrangement/ program could be sent to participants early before the meeting
- Should work towards a conclusion – proposition – suggestion after the workshops
- Time to short – very compressed program
- Some of the topics hard to discuss
- More different modes from other countries
- More time for discussion
- More information beforehand
- Perhaps a longer meeting
- Perhaps more information before the meeting
- The discussions following group discussions too short and informal
- Not all keynote addresses properly introduced, short group talks
- Too intense – more breaks
- Selection of keynote speakers – keep specific to P&O and also give those speakers selected more time to present on their topic - presentations seemed a little rushed
- Maybe it would be easier for everybody to take part in the group discussions if the group structure was organized better. Some did not say a word during the whole workshop
- Form official POEM organisation

- Facilitate contacts among colleagues
- Presentation material handed out just before – useful to be able to make notes directly close to the slide, translations etc.
- Would have been nice to get some representative from more low income countries
- Aim for a more inclusive group, give greater direction to speakers
- Two hole days and two half days very demanding, perhaps “some what” loser timetable
- Solicit educational topics from all educators (i.g survey to educators with list of topics)
- Pursue all O&P education institution again to participate in future meetings
- Questions during workshop are not specific
- Discussions are not to the point and very vague
- The goals of the meeting are not specific
- Form official POEM organisation
- More information on questions for workshops to speakers & facilitators
- More information on dress codes
- More detailed topic – a bit too general so workshops results very general
- Break down the barriers between this and more ”traditional” groups by information exchange – not just correspondence, but discussion
- Find out what else is happening globally for P&O education change (group working…ISPO/ICRC/WRF etc)

Suggestions of topics for a future POEM:

- Collaboration, means and results and plans
- Evaluation of student performance
- Showing books etc from other schools
- How to encourage students to reflect
- Curriculum development
- Faculty development courses
- Examination assessment
- Set clear definitions and formulations of the profession, its needs, exact minimum levels of educational levels up to the PhD level
- Definition of terms: What is exactly meant by: for instance, research, (experimental laboratory, comparative)
- Internship (what should it exactly include etc)
- Lay out proposals for O&P educational resources
- Msc and PhD degree
- Would like to attend regular annual meetings where actual methods/ processes are discussed and implemented, especially on the area of collaboration of curriculum.
- Topics with more depth in the curriculums
- Try to involve more institutions

- Sharing of teaching materials
- Determine topics through the listserver
- Teaching materials (textbooks, software, computer etc.)
- Describe questions to the point
- Describe questions that you can use in your normal education of P&O
- Perhaps form own classification of academic courses instead of (ISPO)
- Standardise third world courses
- Recognition of academic and professional qualification among different places
- Teaching materials, use of literature
- Emotional intelligence to P&O development
- Consider inputs from students, graduates, faculty workers in curriculum design
- Benchmark standards for P&O curriculum consensus views
- Commissioned research – identify + commission (manage) research topics globally
- Consensus on best practice for particular core curricula

Appendix 3: List of Participants

Name	*Country*
Aga, Jarle	Norway
Blocka, Dan	Canada
Boone, David	Hong Kong, China
Broman, David	Canada
Brodtkorb, Thor-Henrik	Sweden
Cooper, Rod	Australia
Dykes, William	Scotland
Edwards, Mark	USA
Figgins, Elaine	Scotland
Fishman, Sidney	USA
Ford, Nerrolyn	Canada
Govan, Norman	Scotland
Helmbring, Anita	Sweden
Hill, Sophie	England
Hodge, Margaret	Australia
Holtkamp, Fred	The Netherlands
Hovorka, Christopher	USA
Hutchins, Stephen	England
Jacobs, Norman	Scotland
Johansson, Sven	Sweden
Kallin, Sara	Sweden
Klaus, Lambert	The Netherlands
Kogler, Géza	USA
Kokegei, Detlef	Germany
Leung, Aaron	Hong Kong, China
Lilja, Magnus	Sweden
Lindland, Vibeke	Norway
Löwenadler, Catharina	Sweden
Mak, Arthur	Hong Kong, China
Malas, Bryan	USA
Marincek, Crt	Slovenia
Peeraer, Louis	Belgium
Ripatti, Markku	Finland
Ruder, Gordon	Canada
Sexton, Sandra	Scotland

Starholm, Inger-Marie	Norway
Uchida, Mitsuhiko	Japan
Vermetten, Dirk	Belgium
Williams, Reed	USA
Wong, Man Sang	Hong Kong, China
Öberg, Tommy	Sweden