



# International Society of Biomechanics

## Economically Developing Countries (EDC) Workshop at ISB2013

Report prepared by: Andrea Hemmerich, EDC Project Officer

**Workshop Primary Developer & Facilitator:** Andrea Hemmerich, EDC Project Officer

**Workshop Co-Developer:** Veronique Feipel, EDC Committee Member

### Participants:

Name	Institution	Country
José Acero	Instituto de Investigaciones & Soluciones Biomecánicas	Colombia
Felipe Carpes	Federal University of Pampa (UNIPAMPA)	Brazil
Veronique Feipel	Université Libre de Bruxelles	Belgium
David Karpul	University of Cape Town	South Africa
Bart Koopman	Universty of Twente	The Netherlands
Carmen Müller-Karger	Simon Bolivar University	Venezuela
Rajani Mullerpatan	MGM Institute of Health Sciences	India
Ton van den Bogert	Orchard Kinetics	USA
Nicholas Tam	University of Cape Town	South Africa
Rafael Torrealba	Simon Bolivar University	Venezuela
António Veloso	Faculdade de Motricidade Humana da Universidade Técnica de Lisboa	Portugal

### Apologies:

John Challis	Pennsylvania State University	USA
Mohamed Lawani	Institut National de la Jeunesse de l'Education Physique et du Sport (INJEPS)	Benin
Alberto Leardini	Istituto Ortopedico Rizzoli	Italy
Julie Steele	University of Wollongong	Australia

August 5<sup>th</sup>, 2013, 8:30 am - 12:00 pm

Natal Convention Centre, Natal, Brazil

## Introduction:

The aim of the ISB's Economically Developing Countries (EDC) Program is to foster the growth of biomechanics specifically in under-resourced regions. The challenges faced by the ISB are in some respects similar to those of other development organisations, but in many ways unique due to our international context and our primary focus on research and education, which concomitantly supports clinical biomechanical applications.

In order to identify, address, and ultimately overcome the challenges in expanding biomechanics in EDCs, we invited ISB members who are currently or had been previously engaged in biomechanics work in developing countries to participate in an ISB-EDC Workshop during the ISB2013 Congress. By cooperatively developing capacity-building strategies, we hoped to find new opportunities to support our EDC members in their research and teaching related endeavors, and ultimately increase the impact of the ISB-EDC Program. Of the 37 ISB members who were invited to attend, eleven were able to participate in the morning event.

The time available for the workshop – 3 ½ hours – was limited considering what we wanted to achieve with participants from all over the world, many of whom had never met one another before. Our primary goal was to build capacity within the ISB's program, an outcome considered attainable with participants who had previously demonstrated their dedication to the ISB and to the promotion of biomechanics in EDCs. Our specific objectives for the workshop were to

- Expand our knowledge about EDC issues specific to biomechanics and the ISB,
- Reach a shared understanding (attitudes) amongst participants about challenges and opportunities, and
- Gain trust amongst members from both EDC and non-EDC regions to strengthen current and enable future collaboration.

By the end of the workshop, we furthermore intended to generate a list of strategic initiatives on which specific contributors from among the workshop participants could focus in the immediate and long term.

## Workshop Design:

Planning began a year in advance with feedback on the format of the morning's session provided by the EDC Committee. A month before the ISB congress, participants were asked to outline specific issues related to biomechanics in EDC regions on which they wanted to focus during the session. Both challenges and proposals to address them were suggested by contributors and are summarized below (see Table 1). In order to keep them open to new strategies, participants were presented with only the Central Themes prior to the workshop.

Our approach was to create an environment in which participants could converse openly about matters concerning specific projects and/or the ISB's involvement. The workshop was designed to expose our various perceptions surrounding biomechanics development, from both the EDC and non-EDC researcher's perspectives, as well as identify both challenges and opportunities for EDC biomechanics. Conceptualizing future breakthroughs in biomechanics development was followed by identifying promising initiatives that could contribute to this vision. Idea generation techniques were used to evaluate, refine, and prioritize potential proposals. Participants then put forward the initiatives to which they were interested in contributing over the next two-year period.

**Table 1: Themes summarizing the issues to address as suggested by workshop participants**

Central Themes	Ideas on how to address these challenges
1. Skills and Knowledge -- students, faculty	<ul style="list-style-type: none"> <li>• Collaboration, regional and international (south-south, north-south)</li> <li>• Exchanges</li> <li>• Training programs and qualification standards; provide teaching/training to                             <ul style="list-style-type: none"> <li>○ researchers</li> <li>○ graduate students</li> <li>○ school-age students</li> </ul> </li> <li>• Regional symposia and organizations</li> <li>• “International Week of Biomechanics”</li> <li>• Internet based lectures</li> <li>• Endowment libraries</li> </ul>
2. Resources -- technology, libraries, ...	
3. Awareness	
a. In EDC: clinical value of biomechanics b. In developed countries: <ul style="list-style-type: none"> <li>◆ Benefits of traditional activities</li> <li>◆ Endogenous development in EDC</li> </ul>	
4. Government policy affecting ability to develop biomechanics programs	

### Workshop Outcomes:

Participants discussed a number of challenges and opportunities regarding EDC biomechanics as listed in Table 2. While the list was considered a different way of viewing some of the issues that had been raised by participants prior to the workshop, it was agreed that the challenges and opportunities reflected the previously defined Central Themes.

**Table 2: EDC biomechanics challenges and opportunities**

Challenges	Opportunities
<ul style="list-style-type: none"> <li>• Funding</li> <li>• Brain-drain</li> <li>• Currency control</li> <li>• “Basic” science → publications</li> <li>• Regional networks</li> <li>• Biomechanics culture &amp; awareness               <ul style="list-style-type: none"> <li>○ Care (preventive medicine)</li> <li>○ Non-communicable disease in EDC</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Traditional activities → health promotion</li> <li>• Low-cost technology</li> <li>• Appropriate (versatile) technology</li> <li>• Growing interest in global issues               <ul style="list-style-type: none"> <li>○ North ↔ South collaboration</li> </ul> </li> <li>• Increasing global importance of non-communicable disease in EDC</li> </ul>

After critically examining the issues, participants were invited to imagine how the ISB-EDC program could achieve breakthroughs to significantly evolve biomechanics initiatives in EDC regions over the coming ten years. Keeping this vision in mind, they were asked to identify current initiatives that stand out as being exceptionally promising in contributing to our future plan. These ideas were discussed and cross-referenced with our Central Themes and are included in Table 3.

The previous exercises prepared participants for the next pivotal part of the workshop where new ideas were expected to emerge. Using the SCAMPER technique, ideas were “Substitute, Combined, Adapted, Modified, Put to another use, Eliminated, and Reversed” in order to create innovative solutions that would truly have the potential to allow us to reach our future vision. Groups simultaneously considered associated risks in order to incorporate appropriate contingency plans within their proposals. Smaller group discussion became quite animated; participants seemed excited about unique initiatives that seemed feasible in terms of their implementation and potential for success. Promising initiatives included

- Promoting regional networking through ‘public’ educational workshops or courses accompanying equipment donations.
- Focusing on practical, applied short courses or internships to educate and prepare students for research and as alternatives for graduate courses.

- Making education web-accessible with the ultimate goal of having a “virtual university” associated with existing institutions and having globally recognized qualifications.
- Creating a virtual lab with a centralized database -- several challenges, including intellectual property, would have to be addressed.
- Centralizing lab space rental management through the ISB.

**Table 3: Initiatives that have potential to promote EDC biomechanics**

Skills & Knowledge	Resources	Awareness	Government Policy
Global education – World University			
Development of educational materials available through ISB	Development of educational materials available through ISB		
Appropriate technology design, innovative solutions, traditional activities & health –		Appropriate technology design, innovative solutions, traditional activities & health	
Session at ISB congress		Session at ISB congress	
Access to literature (e.g. <a href="#">WHO-HINARI</a> )	Access to literature (e.g. <a href="#">WHO-HINARI</a> )		
Regional societies (e.g. Brazilian Society of Biomechanics)	Regional societies (e.g. Brazilian Society of Biomechanics)		
<a href="#">Science without Borders</a>		<a href="#">Science without Borders</a>	
Lab equipment donations			

Finally, following some discussion about what the ISB should continue, stop, and newly start doing in order to foster these initiatives, we were able to prioritize tasks according to importance and degree of difficulty as shown in Figure 1 and Table 4. Most of the plans of high importance focused on education, either alone or in combination with resource provisions, such as lab equipment. The motivation behind these educational programs varied. Some were included to ensure resources could be maintained and used to their full potential; in other cases (e.g. travel programs, online learning, and addressing language barriers) the objective was to facilitate cooperative education within the larger ISB community and beyond. This was reinforced by one suggestion for what the ISB should stop: equipment donation without accompanying long-term training and support, which is where failure is not uncommon in development projects.

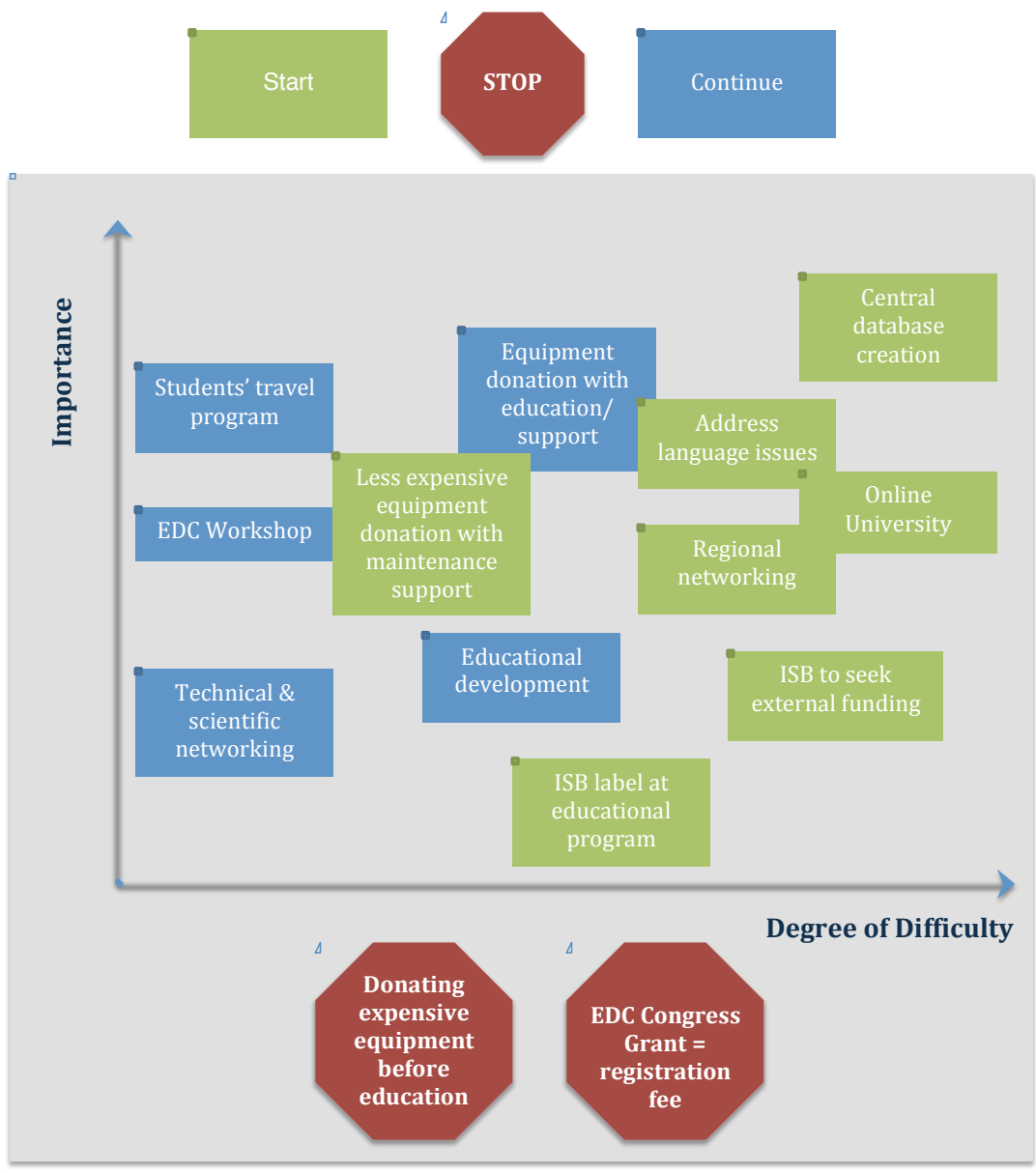


Figure 1: EDC Program Priorities relative to Importance and Degree of Difficulty

Table 4: EDC Program Priorities listed by Importance

	Continue	Start	Stop
Importance (high to low)	<ul style="list-style-type: none"> <li>Equipment donation with education / support</li> <li>Students' travel program</li> <li>EDC Workshop</li> <li>Educational development</li> <li>Technical and scientific networking</li> </ul>	<ul style="list-style-type: none"> <li>Central database creation</li> <li>Address language issues</li> <li>Less expensive equipment donation with maintenance support</li> <li>Online University</li> <li>Regional networking</li> <li>ISB to seek external funding</li> <li>ISB label at educational program</li> </ul>	<ul style="list-style-type: none"> <li>Donating expensive equipment before education</li> <li>EDC Congress Grant = registration fee (ISB to pay registration instead)</li> </ul>

At the end of the workshop, participants committed their support towards specific projects of interest to them personally and estimated times to establish them. Individual contributions towards future EDC initiatives converged upon accessible education and strengthening regional networks as shown in Table 5.

**Table 5: EDC Program initiatives to which participants have committed support**

<b>ISB-EDC Initiative</b>	<b>Time estimated (years)</b>
Online education	1
Educational material specific to individual project(s)	1
Course/conference to promote regional networking – Latin America, South Africa	2
Central database creation	2
Liaise with equipment manufacturers to support and maintain EDC labs	ongoing

### **Conclusions:**

The EDC workshop gave us, as members of the ISB community, an opportunity to explore the issues surrounding the growth of biomechanics from new perspectives, including those of individuals working both within and outside EDCs. Within our group of workshop participants, we raised awareness about challenges and opportunities, as well as several effective strategies that are already in place to facilitate development of biomechanics in EDC regions. By envisioning ‘limitless’ possibilities in future, the group was able to identify strategic initiatives on which the ISB should focus in the short term, and where each individual wanted to contribute personally.

As workshop designer and facilitator I was thrilled to hear not only the enterprising ideas emerging from group members’ conversations, but also the enthusiasm with which they were being discussed. A number of positive comments were made after the workshop, including that “great ideas had surfaced which we don’t want to lose” and that participants felt a shared sense of community.

The aim of this report is therefore to capture the ideas that emerged from the workshop so that participants may continue to make progress towards these goals. Workshop outcomes documented here are moreover intended to provide a resource to ISB members who were unable to attend the workshop and to demonstrate how individuals or groups can be supported by the ISB in their aims to develop biomechanics in EDCs.

### **Acknowledgments:**

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## External Links and Resources:

Resources related to these workshop outcomes that may be of interest to participants and other ISB members are listed below.

1. HINARI Access to Research in Health Programme. *World Health Organization*.  
<http://www.who.int/hinari/en/>
2. Science without Borders (Brazil) <http://www.cienciasemfronteiras.gov.br/web/csf-eng/>
3. Ten best sites for free online education. *Engineering for Change*.  
[https://www.engineeringforchange.org/news/2012/06/27/ten\\_best\\_sites\\_for\\_free\\_online\\_education.html](https://www.engineeringforchange.org/news/2012/06/27/ten_best_sites_for_free_online_education.html)
4. OpenSim dynamic simulation software <https://simtk.org/home/opensim>

