2006-1632: NEW STRATEGIES IN ENGINEERING AND TECHNOLOGY EDUCATION – SEEDING FOR FUTURE

Claudio Brito, Council of Researches in Education and Sciences

Claudio da Rocha Brito is Professor of Electrical and Computer Engineering; President of Council of Researches in Education and Sciences (COPEC), President of Brazilian Nucleus of Environmental Researches and Health (NBPAS), President of Fishing Museum Friends Society (AAMP) and President of (Brazilian) National Monitoring Committee of "Internationale Gesellschaft für Ingenieurpädagogik" (IGIP). He is Chairman of Working Group "Ingenieurpädagogik im Internationalen Kontext" and Member of International Monitoring Committee in IGIP, Council Member of "International Council for Engineering and Technology Education" (INTERTECH), Board Member of "Global Council on Manufacturing and Management" (GCMM) and Director of Brazilian Network of Engineering (RBE/SP). He was President of Brazilian Chapter of Education Society of the Institute of Electrical and Electronics Engineers, Inc (IEEE-EdSoc)and Member of Administrative Committee of Education Society of the Institute of Electrical and Electronics Engineers, Inc (IEEE-EdSoc) in USA.

Melany Maria Ciampi Tenente da Rocha Brito, Council of Researches in Education and Sciences

New Strategies in Engineering and Technology Education – Seeding for Future

Claudio da Rocha Brito, Melany M. Ciampi
COPEC – Council of Researches in Education and Sciences

Abstract

COPEC – Council of Researches in Education and Sciences has been looking for new strategies of action for the next five years. The goal of its efforts is to provide new programs and projects in Engineering and Technology for applications that encounter the real necessities of society. Brazil Superior Education has a history of success despite some problems of social and financial order. And it starts with the creation of Public Universities in the many states of the country, which have worked very well for many years. The Country has achieved and has built a solid reputation even abroad also creating generations of Brazilian scientists and educators. These people fortunately have refused to accept the ominous and narrow-minded neo-liberal policies for education having started a fighting to keep up the achievements already gotten and actions that help to maintain and to enhance the researches in every field of science and technology.

1. Introduction

History shows that education for all is not enough; it has to be quality education. In superior education, this is a special issue because it is responsible for the formation of the minds that will be in charge of the Country. In Engineering Education field, it constitutes of a huge task once it is necessary to form the professional that will have an important role in the development of science and technology of a Country.

COPEC – Council of Researches in Education and Sciences has been looking for new strategies of action for the next five years. The goal of its efforts is to provide new programs and projects in Engineering and Technology for applications that encounter the real necessities of society. To reach this target it was necessary to get an integrated vision of the several variables of its historical process like social, political, cultural, and scientific and others. It was also necessary to abandon some stereotyped ideas and conceptions of policy and science and look to the future with not only optimism and hope but also having in mind that to achieve success it is fundamental to take into account the social conditions of the people. Sustainable development with social promotion of individuals and society has been the constant search of scientists, educators and some politicians of this Nation.

2. The starting point of Engineering in Brazil

The colonization of Brazil plus the insurance aspect of Portugal made the royal government to recognize the necessity of forming the national engineer and so it became of crucial importance.

It was made attending the evolution of French Schools of Engineering and so in 1641 in Lisbon born the Artillery and Square Classes becoming in 1647 the Special Class of Fortification and Architecture. The Portuguese engineer Luiz Serrão Pimentel (1579-1613) managed the school and it is considered the starting point of Lusitanian-Brazilian engineering. Portuguese style of construction can be seen everywhere in Brazil and the engineering schools still keeps the European schools style obviously because of the great influence of its countries along the colonization process. The evolution of engineering in Brazil follows very close the world trends. From the construction of Fortifications through electrical engineer to what is called today, Mechatronic engineering it has been developed in according to the necessities of promoting the development of the Country seeking for the best applications of sciences achievement to the local resources.

Many accomplishments of big proportions can be seen through the time, not only public buildings and houses but also practical applications of electricity like telegraphy, telephony and lighting. The insertion of electrical energy in Brazil happened in the same historical moment of industrial expansion and development of developed countries. Since the Fortification Classes and Military Architecture founded in Bahia, in 1699 until more than 200 engineering schools, engineering education has had a history of success full of many conquests and accomplishments [1].

3. Main Aspects of Education in Brazil

With the creation of Public Universities in the many states of the country, which have worked very well for many years, the Country has achieved and has built a solid reputation even abroad also creating generations of Brazilian scientists and educators [2]. These people fortunately have refused to accept the ominous and narrow-minded neo-liberal policies for education having started a fighting to keep up the achievements already gotten and actions that help to maintain and to enhance the researches in every field of science and technology [3]. Valuable discussions at national level during conferences, all communication Medias like radio, TV, etc took place for many years and still takes place and it may seem to be lonely fight once economical speculations seems to be more powerful with more sharp actions world wide.

Despite all the problems, professionals and educators of every field of science and technology have been discussing the destiny of education in the country taking into account the historical moment of the world. Certainly some of these discussions have generated some practical actions at governmental level as a response to the society that see itself as the most interested part in the issue. In Brazil in engineering and technological fields, the situation is very delicate. Although the proliferation of private universities all over the country expanding the number of 3rd grade students it does not assure the increase of students in engineering and technology areas.

4. The Present Status of Engineering Education.

In order to understand the present situation of teaching in Brazil it is important to know something about the direction of public policies to education adopted with the objective of democratizing the teaching. These policies present two important points [4]: the Sampaio Doria Reform made in 1920 and the Expansion of Junior High School implanted in the period 1968-70. The first one reorganized the elementary school changing from four years to two years, with the objective of allowing more children to have access to the school. The second one introduced modification in the public policy related to the Admission Exam, because to pass in this exam

was an essential condition for children to continue studying. These two policies were objectives of hard criticism. In the first case, the criticism forced the revocation of the policy. The main criticism was that it led to the teaching mass production, which limits the originality and the creativity, essential items to construct a new order. In the second case, the policy brought a big resistance from the institutions in relation to the profile of the new students, because this policy gave the opportunity for the students from the poorer level of the population to attend school. This situation created the figure of the "problematic student". The consequence of this was that it led to a culture of failure and further exclusion of the student from the educational process.

5. Science and Technology Investments in Numbers

It is not possible to understand the status of Education and Research of a Country without looking to its numbers of investments in these fields. Bellow there are some tables with figures that can show a bit of Brazil investments. The source of information is Ministry of Science and Technology of Brazil.

TABLE I

BRAZIL: FEDERAL GOVERNMENT EXPENDITURES ON RESEARCH & DEVELOPMENT (R&D), 1996-2002

Year	Current R$			In million 2002 R$ (1)		
	Government	Higher education (2)	Total	Government	Higher education(2)	Total
1996	2.041.229.989,35	...	2.041.229.989,35	3.630,43	...	3.630,43
1997	2.115.169.256,86	...	2.115.169.256,86	3.486,11	...	3.486,11
1998	1.976.031.081,29	...	1.976.031.081,29	3.134,93	...	3.134,93
1999	2.257.197.580,62	...	2.257.197.580,62	3.216,86	...	3.216,86
2000	2.518.374.436,15	1.275.492.980,61	3.793.867.416,76	3.154,63	1.597,74	4.752,38
2001	3.003.991.606,06	1.321.301.083,00	4.325.292.689,06	3.409,66	1.499,74	4.909,40
2002	3.017.140.855,20	1.556.650.219,06	4.573.791.074,26	3.017,14	1.556,65	4.573,79

Source: Federal Government Integrated Financial Administration System (SIAFI): Special extraction completed by Federal Data Processing Service (SERPRO); Statistical Synopsis of Higher Education - 2000, of National Institute for Educational Studies and Research (INEP), from the Ministry of Education (MEC); Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education (MEC).Produced by: Indicators Coordination - Ministry of Science and Technology. Notes: Monetary values expressed in 2002 Reais, updated by the General Price Index - Internal Availability (IGP-DI) of the Getúlio Vargas Foundation (FGV) estimated from post graduation expenditures.

TABLE II

BRAZIL: FEDERAL GOVERNMENT EXPENDITURES ON RESEARCH & DEVELOPMENT (R&D), BY BODY 1996-2002 (VALUES IN MILLIONS OF 2002 R$)

Body / Budgetary Unit	1996	1997	1998	1999	2000	2001	2002
Total	3.630.425	3.486.107	3.134.926	3.216.864	3.154.634	3.409.664	3.017.141
Electoral Justice	-	-	29	11	106	87	257
Ministry of Agriculture and Supply	884.357	806.793	770.195	696.654	683.760	666.554	606.663
Ministry of Science and Technology	1.567.087	1.517.293	1.254.359	1.264.437	1.290.785	1.509.144	1.208.461
Ministry of Culture	-	-	-	-	395	391	-
Ministry of Defense	93.123	56.647	50.376	56.317	44.507	44.487	32.982
Ministry of Education	724.906	709.205	598.366	655.072	534.562	479.477	481.277
Ministry of National Integration	2.058	830	183	120	37.510	5.918	1.924
Ministry of Health	336.621	373.342	428.252	519.638	553.442	690.160	662.208
Ministry of the Environment	14.083	11.598	12.906	11.246	8.896	13.220	14.757
Ministry of Mining and Energy	1.277	-	-	-	-	227	359
Ministry of Agrarian Development	-	352	358	36	-	-	-
Min. of Development, Industry and Foreign Trade	-	-	-	-	-	-	161
Ministry of Sports and Tourism	-	-	-	-	-	-	584
Ministry of Planning, Budget and Management	-	3.358	15.543	-	-	-	-
Ministry of Labor and Employment	-	-	69	-	-	-	-
Presidency of the Republic	6.913	6.687	4.289	13.334	671	-	7.508

Source: Federal Government Integrated Financial Administration System (SIAFI): Special extraction completed by Federal Data Processing Service (SERPRO) Produced by: Indicators Coordination - Ministry of Science and Technology. Notes: Monetary values expressed in million 2002 R$, updated by the General Price Index - Internal Availability (IGP-DI) of the Getúlio Vargas Foundation (FGV). Synthesis made from the administrative structure of the 2002 Budget Technical Manual (MTO-02) of the Ministry of Planning, Budgets and Management.

TABLE III

BRAZIL: FEDERAL GOVERNMENT EXPENDITURES ON RESEARCH & DEVELOPMENT (R&D), BY THE MINISTRY OF SCIENCE AND TECHNOLOGY, 1996-2002 (VALUES IN THOUSANDS OF 2002 R$)

Body / Budgetary Unit	1996	1997	1998	1999	2000	2001	2002
Ministry of Science and Technology	1.567.087	1.517.293	1.254.359	1.264.437	1.290.785	1.509.144	1.208.461
Ministry of Science and Technology - Direct Administration	388.566	314.693	339.613	322.778	288.942	470.912	331.843
Brazilian Space Agency - AEB	35.386	39.297	30.580	5.215	12.490	15.575	11.041
National Nuclear Energy Commission - CNEN	32.657	34.767	34.851	22.174	22.836	18.962	13.353
National Council for Scientific and Technological Development - CNPq	982.196	999.775	742.631	765.593	735.815	581.426	525.520
Computer Technology Center - FCTI	21.565	22.385	18.626	18.153	9.896	-	-
National Fund for Scientific and Technological Development - FNDCT	106.718	106.376	88.058	129.895	220.805	422.268	326.704
Cabinet Office of the Minister of Special	-	-	-	629	-	-	-

Source: Federal Government Financial Integrated Administration System (SIAFI). Special extraction produced by the Federal Data Processing Service (SERPRO). Produced by: Indicators Coordination - Ministry of Science and Technology. Notes: Monetary values expressed in a thousand 2002 Reais, updated by the General Price Index – Internal Supply (IGP-DI) (annual average) of the Getúlio Vargas Foundation (FGV). Consolidation made from the administrative structure of the Budget Technical Manual (MTO-02) of 2002, of the Ministry of Planning, Budgets and Management. Extinct Budgetary Units have been allocated to the Body where they existed before becoming extinct.

TABLE IV

BRAZIL: STATE GOVERNMENT EXPENDITURES ON SCIENCE AND TECHNOLOGY (S&T) BY REGION AND ACTIVITY MODALITY, 1990-2002. R&D – RESEARCH AND DEVELOPMENT AND SCIENTIFIC AND ACTC - SCIENTIFIC AND TECHNICALLY RELATED ACTIVITIES (VALUES IN THOUSANDS OF 2002 R$)

Year	Modality	Total	North	Northeast	Southeast	South	Center-west
1990	R&D	655.197	3.550	66.709	427.052	135.253	22.633
	ACTC	290.191	30.646	33.562	178.967	28.792	18.224
	Total	945.388	34.196	100.271	606.018	164.045	40.857
1991	R&D	730.492	-	87.675	533.294	109.301	222
	ACTC	501.035	34.170	82.642	363.783	2.780	17.659
	Total	1.231.527	34.170	170.318	897.077	112.081	17.882
1992	R&D	727.342	866	35.378	540.594	150.500	4
	ACTC	458.866	3.675	64.030	289.338	37.393	64.431
	Total	1.186.209	4.541	99.408	829.931	187.893	64.435
1993	R&D	648.576	6.200	29.247	496.073	117.009	47
	ACTC	787.091	8.096	85.114	610.969	34.858	48.055
	Total	1.435.667	14.296	114.360	1.107.042	151.867	48.101
1994	R&D	782.323	8.454	26.371	567.201	176.221	4.080
	ACTC	602.732	13.774	94.849	334.807	52.977	106.327
	Total	1.385.056	22.228	121.220	902.007	229.198	110.407
1995	R&D	921.184	2.669	16.449	571.859	330.207	-
	ACTC	341.604	2.359	117.426	117.073	33.305	71.442
	Total	1.262.788	5.029	133.876	688.932	363.512	71.442
1996	R&D	901.785	1.373	20.316	570.283	309.787	27
	ACTC	675.622	1.499	121.331	486.047	7.596	59.149
	Total	1.577.407	2.872	141.647	1.056.329	317.384	59.176
1997	R&D	1.166.317	3.108	42.499	757.742	316.914	46.056
	ACTC	557.896	9.070	139.692	372.537	24.986	11.613
	Total	1.724.213	12.178	182.191	1.130.279	341.900	57.669
1998	R&D	1.130.885	4.355	24.133	743.061	319.711	39.622
	ACTC	584.248	9.617	174.784	374.851	10.612	14.385
	Total	1.715.133	13.972	198.917	1.117.912	330.323	54.007
1999	R&D	1.174.463	4.110	36.245	871.948	223.569	38.593
	ACTC	429.058	5.357	102.941	314.259	1.752	4.750
	Total	1.603.521	9.467	139.185	1.186.206	225.320	43.343
2000	R&D	1.091.463	8.873	45.396	932.597	102.874	1.722
	ACTC	385.914	24.057	52.086	150.418	114.482	44.872
	Total	1.477.376	32.930	97.482	1.083.015	217.356	46.594
2001	R&D	1.158.522	8.502	76.911	960.114	111.160	1.836
	ACTC	414.016	21.307	80.401	164.121	113.640	34.546
	Total	1.572.538	29.810	157.312	1.124.234	224.800	36.382
2002	R&D	848.556	9.129	55.589	701.845	79.203	2.791
	ACTC	484.418	17.570	78.815	235.420	143.595	9.018
	Total	1.332.973	26.699	134.404	937.264	222.798	11.809

Source: General Balance of States and surveys achieved by the State Secretariats of Science and Technology or similar institutions. Produced by: Indicators Coordination - Ministry of Science and Technology. Notes: Monetary values expressed in thousands of 2002 Reais, updated by the General Price Index - Internal Availability - IGP–DI - (annual average) of the Getúlio Vargas Foundation (FGV).

As we can see in table 5, the investments in Science and technology are not so low. It is a large Country with deep differences among the regions, which makes it more interesting under the point of view of development. It is a Country with different stages of development among its units. It reflects in the Education too.

Comparing with other smaller Countries like Japan it has a small attention to the development of Science and technology. There are other variables that are subject for another paper and that will not be discussed in this one.

5. Engineering in Science and Technology

Brazil is five hundreds years old with a history of races meeting to the construction of a peoples' identity marked by the diversity and cultural richness. Five hundred years that brings the challenge of starting this new millennium building up a new Brazil, a Country where quality of life in daily basis is a concept of its 166.113.000 in habitants and not only of a minority. Having a look at the present history of humanity it is easy to notice the importance of engineering and engineers in the development of science and technology, which have shaped a new social world order having as a straight consequence the new life style and so a new way of thinking.

TABLE V

NATIONAL EXPENDITURES ON RESEARCH AND DEVELOPMENT (R&D), IN RELATION TO THE GROSS DOMESTIC PRODUCT, PER CAPITA AND BY RESEARCHER, IN AVAILABLE RECENT YEARS, SELECTED COUNTRIES

Country	Year	Research and development expenditures (R&D)	Research and development expenditures (R&D) in relation to the gross domestic product	Research and development expenditures (R&D) per capita	Research and development expenditures (R&D) by researcher (full time equivalent)
		(current million PPP$)	percentage	(current PPP$ per capita)	(current PPP$ by researcher)
Germany	2002	55.054,9	2,51	667,5	(2)205.706,9
Argentina	2002	1.560,2	0,39	(2)49,0	59.816,7
Australia	2000	7.803,7	1,55	404,9	118.060,8
Brazil	2000	12.452,9	1,00	73,2	192.837,7
Canada	2002	17.340,2	1,82	552,0	(1)161.507,5
China	2002	72.076,8	1,29	(2)44,9	88.926,1
Singapore	2002	2.129,7	2,19	(2)477,4	117.533,1
Korea	2001	22.009,2	2,92	464,9	161.432,3
Spain	2001	8.227,2	0,96	204,3	102.736,0
United States of America	2002	277.099,9	2,67	963,7	(1)193.481,3
France	2002	36.143,8	2,20	590,3	(2)201.875,2
Israel	2002	6.359,7	4,73	(2)1.060,8	…
Italy	2000	15.475,3	1,07	267,9	234.084,1
Japan	2001	103.846,4	3,06	816,3	153.642,1
Mexico	1999	3.505,0	0,43	35,9	160.199,3
Portugal	2002	1.714,4	0,93	165,4	(2)86.357,5
United Kingdom	2001	29.353,5	1,89	499,3	(3)151.677,0
Russian Federation	2002	14.190,4	1,24	(2)89,1	28.845,6

Source: Organization for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (SIAFI). Special extraction produced by the Federal Data Processing Service (SERPRO); Industrial Research on Technological Innovation (PINTEC) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000 to Resident population: www2.ibge.gov.br/pub/Estimativas_Projecoes_Populacao/Estimativas_1980_2010/Estimativas_e_taxas_1980_2010.zip, extract on 04/13/2004. The World Development Indicators (WDI).Produced by: Indicators Coordination - Ministry of Science and Technology.

Brazil as any other Country has recognized the importance of engineering in world scenery. It has been working to get the competitiveness of national goods and services by means of incentive to create projects of qualification of professionals through continuing education for example and others. Many representative groups, leaderships and agencies have been implemented programs to prepare the engineers to increase the efficiency of research system, experimental development, engineering, producing system and market [5-8].

All these efforts have been having a kind of smooth effect once it is one of the most difficult programs of College level and expensive that does not help very much the inclusion policy. However, some Colleges have opted for a softer engineering program offering them in the evening. These programs are lighter, more focused in technical knowledge, and less focused in basic sciences. The students in general work all day and choose engineering programs because it is a way to be promoted at work. A superior degree diploma opens some doors, it means not only the possibility of earn more money but also to reach an upper status, socially speaking. It is a fact that even being a lighter program for the students it is very hard and in general it takes them more than five years to finish it. The diploma has the same value of a program that prepares engineers of conception. In certain way it helps the inclusion policy of education although the number of engineers has been decreasing considerably in the last 10 years. Notice that the diploma in almost any field with the exception of Law is not only a degree certificate but also the professional permission to act professionally. It is this way due to the fact that the programs provide solid knowledge in Basic Sciences and Basic Sciences of the field, Engineering or Business Administration and etc. besides the internship as part of the programs.

6. New Strategies

After a study and the analysis of contemporary history COPEC has established new strategies in the community. It has also detected some aspects that will ensure the success of its activities like

- The Natural Vocation of a Region
- The Necessities of a Community
- The Global Aspects of Present Development Model
- New Technologies and Social Enhancement

Altogether these aspects have to be taking into account in order to act properly and develop programs and activities that will really enhance the science and technology for national needs. It is the global awareness and local identity.

7. Final Considerations

It is a fact that the scientific research continues being developed massively in the universities and in the public institutes in Brazil. The superior education system is of quality, although it only reaches 12% of the youths between 18 and 24 years. The problem is that the private sector has been investing a little in the scientific and technological development, partly due to the national economical instability and to the continuous change of rules. Specialists of the whole country are unanimous in affirming that there is little research in the business atmosphere. The data reveals that in Brazil about 90 thousand scientists and active engineers in research field only 9 thousand works directly in private companies, in the development of products or services.

Any effort in this direction is valuable if it is considered the size of the territory and the continuous growth of development for the betterment of society. New good programs principally in Engineering are welcome.

Despite all the low investment in science and technology it does not mean that the Universities are doing a bad job forming new professionals. So far the traditional old European style of education has worked very well. In Engineering the programs follow the old French model of education forming still the “Engineer”, a professional with solid knowledge in Basic Sciences of Engineering.

Bibliography

1. Vieira, A. H. G.; Brito, C. da R. História da engenharia elétrica no Brasil. In: Vargas, M. Contribuições para a história da engenharia no Brasil. São Paulo, EPUSP, 1994. p. 259-272.
2. Brito, C. da R.; Ciampi, M. M. The Hundred Years of a Nation’s Engineering Education History and its Results as the Basis for New Strategies. In: International Conference on Engineering and Computer Education, 4., Madrid, 2005. Proceedings ICECE-2005. Madrid: ICECE, 2005. (in CD-ROM).
3. Brito, C. da R.; Ciampi, M. M. Engineering Education and Global Economy in Five Centuries of a Nation. In: ASEE/IEEE Frontiers in Education Annual Conference, 35., Indianapolis, 2005. 2005 FIE Annual Conference Proceedings. Indianapolis: FIE, 2005. (in CD-ROM).
4. Brito, C. da R.; Ciampi, M. M. Setting the Starting Point to Encounter the Path to the Future of Engineering and Technology Education. In: Flueckiger, F. (Hrsg.) Design of education in the 3rd Millenium. Alsbach/Bergstraβe: Leuchtturm-Verlag, 2005. p. 383-392.
5. Brito, C. da R.; Ciampi, M. M. Aspects of Engineering and Education in Five Centuries of a Nation Existence: a History of “Holly Graal's” search. In: SEFI Annual Conference, 33., Ankara, 2005. Engineering Education at the Cross_roads of Civilizations. Ankara: SEFI, 2005. p. 192-198.
6. Brito, C. da R.; Ciampi, M. M. Fishing Engineering: A Customized Engineering Program. In: American Society for Engineering Education Annual Conference, 112., Portland, 2005. 2005 ASEE Annual Conference Proceedings. Portland: ASEE, 2005. (in CD-ROM).
7. C. Giovedi, M. M. Ciampi, Education as an Instrument of Social Transformation in Brazil. In: F. Fluckiger, R. Ruprecht & R. Scheurer (Hrsg.) Local Identity Global Awareness Engineering Education Today. (Schriftenreihe Ingenieurpadagoigik, Band 50, 2004), p. 592-595.
8. Brito, C. da R.; Ciampi, M. M. Integrating the WEB into Teaching Telecommunication Engineering. In: International Conference on Information Technology Based Higher Education and Training, 3., Budapest, 2002. 2002 International Conference on Information Technology Based Higher Education and Training Proceedings, Budapest, ITHET, 2002 (in CD-ROM).

CLAUDIO DA ROCHA BRITO

Claudio da Rocha Brito is Professor of Electrical and Computer Engineering; President of Council of Researches in Education and Sciences (COPEC), President of Brazilian Nucleus of Environmental Researches and Health (NBPAS), President of Fishing Museum Friends Society (AAMP) and President of (Brazilian) National Monitoring Committee of "Internationale Gesellschaft für Ingenieurpädagogik" (IGIP). He is Chairman of Working Group "Ingenieurpädagogik im Internationalen Kontext" and Member of International Monitoring Committee in IGIP,

Council Member of "International Council for Engineering and Technology Education" (INTERTECH), Board Member of “Global Council on Manufacturing and Management" (GCMM) and Director of Brazilian Network of Engineering (RBE/SP). He was President of Brazilian Chapter of Education Society of the Institute of Electrical and Electronics Engineers, Inc (IEEE-EdSoc), Member of Administrative Committee of Education Society of the Institute of Electrical and Electronics Engineers, Inc (IEEE-EdSoc) in USA, Secretary of Santos region of SBPC - Brazilian Association for the Advancement of Science, Adviser for International Subjects of the Presidency of Brazilian Society for Engineering Education (ABENGE), Dean of International Relations of SENAC School of Engineering and Technology, Member of Executive Committee of Asociación Iberoamericana de Instituciones de Enseñanza de la Ingeniería – ASIBEI (Iberian-American Association of Engineering Education Institutions), Councilor of Urban Development City Council (CMDU) and Councilor of Economics Development City Council (CDES). He is Member of IGIP (International Society for Engineering Education), SEFI (European Society for Engineering Education), ASEE (American Society for Engineering Education) and INTERTECH (International Council for Engineering and Technology Education). Dr. Claudio da Rocha Brito has received a B.S. degree in Electrical Engineering, B.S. degree in Mathematics, B.S. degree in Physics, M.S. and Ph.D. in Electrical Engineering all from the University of São Paulo. He is listed in "Who's Who in the World", "Who's Who in America", "Who's Who in Science and Engineering", "Five Thousand Personalities of the World", "Dictionary of International Biography", "Men of Achievement" and others similar publications. Although he was born in São Paulo City he has received the title of Santos Citizen from Santos City Hall and he was the first professor non European who has received the title “International Engineering Educator” of IGIP. Dr. Claudio da Rocha Brito has coordinated and has participated of dozens of organizing committees of events in Brazil and abroad like: General Secretary of ICECE’99 (International Conference on Engineering and Computer Education), the Technical Program Chair of ICECE’2000, the General Chair of INTERTECH’2002 (International Conference on Engineering and Technology Education), of ICECE’2003, of WCETE’2004 (World Congress on Engineering and Technology Education), of GCETE’2005 (Global Congress on Engineering and Technology Education), of WCCSETE’2006 (World Congress on Computer Science, Engineering and Technology Education); of GCMM’2006 (Global Congress on Manufacturing and Management), of CBPA’2001 and CBPA’2002 (Brazilian Congress of Environmental Researches) and CBPAS’2003, CBPAS’2004 and CBPAS’2005 (Brazilian Congress of Environmental Researches and Health) and EHWC’2006 (Environmental and Health World Congress).

MELANY M. CIAMPI

Melany M. Ciampi is Vice-President of Council of Researches in Education and Sciences (COPEC), Vice-President of Brazilian Nucleus of Environmental Researches and Health (NBPAS), Vice-President of Fishing Museum Friends Society (AAMP) and Vice-President of (Brazilian) National Monitoring Committee of "Internationale Gesellschaft für Ingenieurpädagogik" (IGIP). She is Vice Chair of Working Group "Ingenieurpädagogik im Internationalen Kontext" in "Internationale Gesellschaft für Ingenieurpädagogik" (IGIP), Member of Administrative Committee of Education Society of the Institute of Electrical and Electronics Engineers, Inc (IEEE-EdSoc) in USA and Council Member of "International Council for Engineering and Technology Education" (INTERTECH). She was Vice-President of Brazilian Chapter of Education Society of the Institute of Electrical and Electronics Engineers, Inc (IEEE-EdSoc), , State Councilor of SBPC - Brazilian Association for the Advancement of Science and Manager of International Relations of SENAC School of Engineering and Technology. She is Member of IGIP (International Society for Engineering Education), SEFI (European Society for Engineering Education), ASEE (American Society for Engineering Education) and INTERTECH (International Council for Engineering and Technology Education). She was the first woman non European who has received the title “International Engineering Educator” of IGIP. She has coordinated and has participated of dozens of organizing committees of events in Brazil and abroad like: the Exhibits Chair of ICECE’99 (International Conference on Engineering and Computer Education), the Publications Chair of ICECE’2000, the General Secretary of CBPA’2001 and CBPA’2002 (Brazilian Congress of Environmental Researches), the Technical Program Chair of INTERTECH’2002 (International Conference on Engineering and Technology Education), of ICECE’2003, of WCETE’2004 (World Congress on Engineering and Technology Education), of GCETE’2005 (Global Congress on Engineering and Technology Education), of WCCSETE’2006 (World Congress on Computer Science, Engineering and Technology Education); do GCMM’2006 (Global Congress on Manufacturing and Management); of CBPAS’2003, CBPAS’2004 and CBPAS’2005 (Brazilian Congress of Environmental Researches and Health) and EHWC’2006 (Environmental and Health World Congress) and the International Chair of FIE’2003 (Frontiers in Education Annual Conference), FIE’2004, FIE’2005 and FIE’2006.