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THE IMPACT OF THE PROGRAMS FOR HIGHER EDUCATION QUALITY IN THE SUBSYSTEM OF POLYTECHNIC UNIVERSITIES IN MEXICO

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ABSTRACT

This study presents the analysis, which describes the impact that has had the politics of higher education in Mexico, particularly in the subsystem of polytechnic universities, into the field of accreditation for educative programs. These programs are associated to the financial resources which are extraordinary in two particular programs: "Program for Strengthening Quality in Educational Institutions (in Spanish: Programa de Fortalecimiento de la Calidad en Instituciones Educativas", PROFOCIE) in 2014 – 2015, and the Program for Strengthening Educational Quality (in Spanish: Programa de Fortalecimiento de la Calidad Educativa, PFCE) in 2016 - 2017. Due to this reason, it is indispensable to provide evidence to improve the granting of economic resources to these institutions. Before the existence of a subsystem of higher education, based on competencies is essential for the measurement of the resources, granted that it allows reaching its institutional objectives. The information collected has the purpose of showing, what the institutions received from the extraordinary public fund in order to have a better education quality and the greatest growth in the years 2014 and 2015.

KEYWORDS: PFCE, Higher Education, Ordinary Public Funds, Academic Programs & Mexico.

INTRODUCTION

In the subsystem of polytechnic universities in Mexico, it is essential to evaluate the quality of education, the granting of sufficient ordinary public subsidy supplemented with extraordinary funds of the Program for Strengthening Quality in Educational Institutions (PROFOCIE/PFCE). This is to determine how they influence the quality of academic programs and their educational indicators into these institutions. Therefore, the antecedents of the educational policies in the system of higher education in Mexico must be analysed in order to know how the ordinary and extraordinary public fund affect the enrolment. These elements are the bases, which contain the design of the strategy, and will permit under a financial viability scheme to manage the resource as a factor to increase the quality and competitiveness of the programs (Cruz, Y. & Cruz, A., 2008).

In Mexico Public Higher Education is composed of several subsystems, which are classified as follows: Federal Public Universities, State Public Universities, State Public Universities with Solidarity Support, Technological Institutes, Technological Universities, Polytechnic Universities, Intercultural Universities, Public Research Institutes, Public Normal Schools, Other Public Institutions, which until May 2015, totalled 1038 Public Institutions and 350 Private Higher Education Institutions (CGUTyP, 2015). Currently, the Polytechnic Universities Subsystem contains 60 universities distributed in 25 states of the Mexican Republic. The Polytechnic Universities as public higher education institutions are an educational project, created in 2001 to offer engineering, undergraduate and postgraduate studies at the specialty level. Its programs are on the competency-based educational model and are oriented in the application of research and

technological development, through agreements with the productive sector; at the same time, they work closely with organizations in the productive, public and social sectors (CGUTyP, 2015).

In recent years, there has been a need to increase regular resources and seek increases in extraordinary funds for the financing of these institutions, and various measures are improving the public financing mechanisms to overcome the schemes. Which operated exclusively in the twentieth century, schemes that operated by criteria that were far from the measurement of the results of the institutions, unclear and transparent (Valle et al., 1973). Subsequently, the government defined innovative programs, for the distribution of financing, taking in consideration the quality and efficiency controls of institutions dedicated to academic programs (Márquez, 2004).

The Sub-secretary of Higher Education from the Federal Government through the General Coordination of Technological and Polytechnic Universities (CGUTyP, 2015), is responsible for managing and coordinating the transfer of financial ministries for the infrastructure of each institution, as well as for its operation within the federal and state government. Currently, the Polytechnic Universities are decentralized public education institutions from the governments of the states, with legal personality and own patrimony.

However, the subsystem of polytechnic universities faces the problems of performance of their quality indicators, such as accreditation of educational programs, structural problems, academic plant, and teacher training among others. Because of that the allocation of subsidy and competition of the additional resources of the different national announcements, is part of the questions of high impact in the operation and performance of the polytechnic institutions of the country (SES, 2014). The challenge of these new universities is to train the superior professionals who are representing the development detonator that the country requires in these times. Because of their geographical location, polytechnic universities put particular attention to segments of the population in conditions of social and economic disadvantage (Gaceta Parlamentaria, 2011).

An important key factor that led to the implementation of the competency-based educational model, in the Polytechnic Universities was the project with the Inter-American Development Bank (PROFORHCOM) (BIC, 2003). This project promotes the operation of educational models based on competencies, particularly those oriented to the training for work. There is a strong influence of international organizations such as the Inter-American Center, for Knowledge Development in Vocational Training and labour competency norms, which are into the curricular design process, as validation sources of pertinence of content (Vargas, 2004).

In addition to the fact that the educational model provides its graduates with the training tools so that they have the possibility of establishing their own business, which in turn generates labour spaces for the operational levels. Students have spaces in which they have to apply knowledge, do, attitudes, skills and values learned in schools, to face real situations and problems of work; Flexibility and relevance of educational programs, which cover the third cycle of training (Arguelles, 1996).

The Integral Program for Institutional Strengthening (in Spanish: Programa Integral de Fortalecimiento Institucional, PIFI), in 2011, the Mexican Congress approves resources directly for the PIFI, which has meant an important achievement, for the consolidation of the program, in which are benefited the State Public Universities, State Public Universities of Solidarity Support, Polytechnic Universities, Technological Universities and other related institutions (DOF, 2013). Those programs contributed since 2001, to support the strategic planning of higher education institutions,

through the allocation of extraordinary funds under competition. PIFI/PROFOCIE/PFCE, is a strategy of the Ministry of Public Education (SES, 2014), to achieve better levels of quality in its educational programs and services offered. Through this program, institutions receive resources in response to priorities that derive from a participatory strategic planning exercise, under the evaluation of the ANUIES (NATIONAL Association of Universities and Higher Education Institutions), and Council for the Accreditation of higher Education (COPAES, 2012).

From the 2016-2017 call, it transformed into the Program for Strengthening Educational Quality (in Spanish: Programa de Fortalecimiento de la Calidad Educativa, PFCE). PFCE represented as a support for reflection and action that will strengthen the process of strategic and academic planning and institutional management, whose objectives are the achievement of the quality of education and the services offered by Public Higher Education Institutions. The general objective is: "To contribute to strengthening the quality and relevance of basic education, higher education and training for work, so that they contribute to the development of Mexico, through the strengthening and implementation of plans and programs of study. “With Points of Emphasis: Coverage with Equity, Flexible and Comprehensive Programs, Relevant Real-Life Teaching, Information and Communication Technologies, Internationalization, Linkage, Transversal of Gender Equality, Accountability in PFCE Guide 2016-2017, (SES, 2016).

METHODS

The method is descriptive, in which the following variables are analysed: ordinary public subsidy, the granting of the Program for Strengthening Quality in Educational Institutions, academic programs and enrolment. The universe of study is the subsystem of polytechnic universities of the country with its various educational programs. The limitation of the analysis corresponds to the academic programs, the financing granted by the states and the federation and the respective assignment of PROFOCIE in the fiscal years 2014 - 2015. The procedure for the collection of the information is in a database of the polytechnic universities called MECASUP (in Spanish: “Modelo de Evaluación de la Calidad del Subsistema de Universidades Politécnicas”), field research in the Sub-secretary of Higher de Education of Federal Government, the General Coordination of Technological and Polytechnic Universities (Hernández et al., 2014).

RESULTS AND DISCUSSIONS

The Subsystem of Polytechnic Universities in 2015 added 60 universities, distributed in 25 states of the republic, which serve 70,812 students and through their graduates, professors and researchers provide services to the productive sector of goods and services, as well as to the society in general. The Subsystem of Polytechnic Universities grew from having 58 institutions in 2014 to 60 institutions in 2015 (MECASUP, 2015).

Faced with the growth of enrolment in which polytechnic universities have to advance, in compliance with public educational policy, in issues of expansion of enrolment and have a better competition for extraordinary resources, where these announcements have their bases in the indicators of inputs, Processes and results associated to a good financial compliance exercise based on operating rules.

Granting of the financing program, for the Strengthening of the Quality in the Polytechnic Universities (PROFOCIE) 2014-2015.

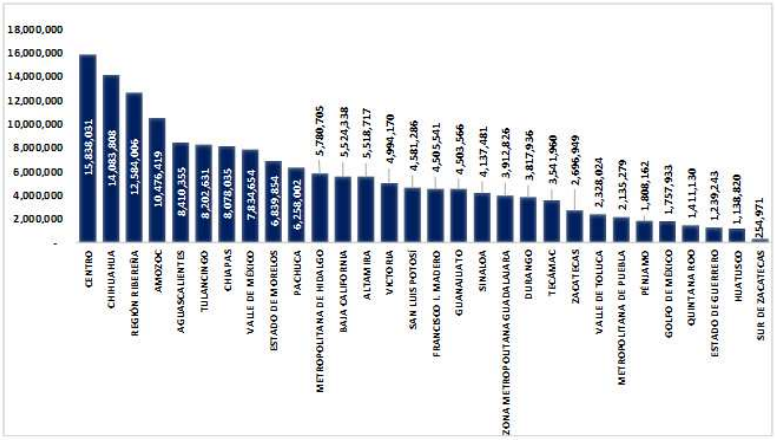
With the objective of increasing higher education in Mexico, the Ministry of Public Education (SEP) promotes the funds of the program for strengthening quality in educational institutions (PROFOCIE). The quality of the academic

programs of the public higher education institutions related to the economic amount given to the institutions through the PROFOCIE.

Through competitions allocates the funds to the institutions of higher education, these are through mechanisms of educational and administrative evaluation.

The amount granted in 2015 was $2,655,970,000 million pesos (SHCP, 2015), of which the amount of $164,194,832 million pesos was granted to the Subsystem of Polytechnic Universities, representing 6.18% of The total federal allocation in 2014 - 2015, it should be mentioned that the educational institutions of the country are not obliged to participate in the calls for PROFOCIE.

However, the program encourages institutions to undertake strategic planning, train academic staff, and stimulate evaluation and accreditation of academic programs (MECASUP, 2015).

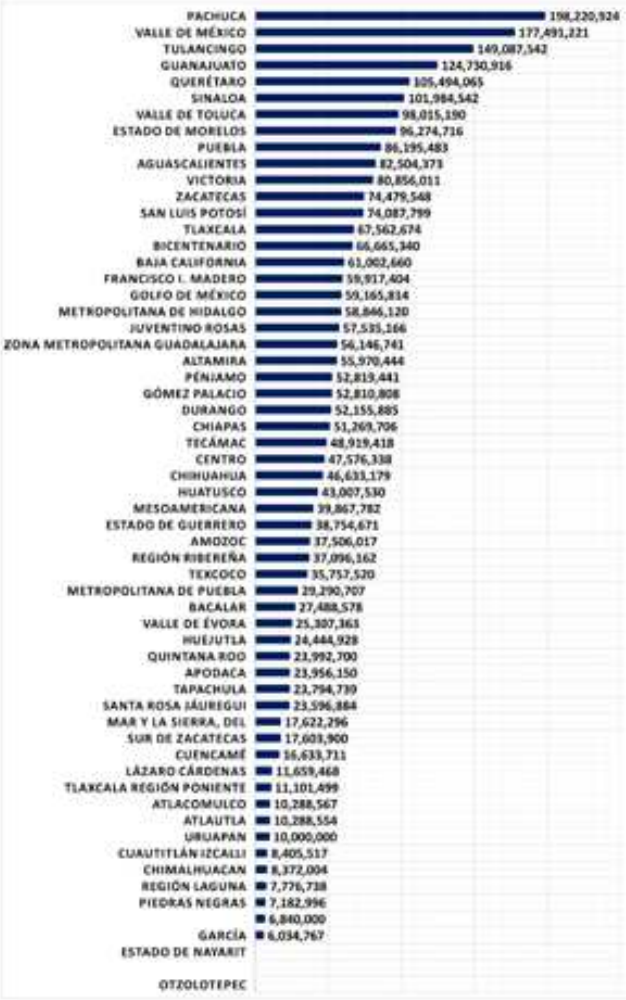


Source: MECASUP, 2014 & 2015

Grafic No 1: Total of Allocation of the Profocie Fund in 2014 and 2015 (Mx)

The allocation of ordinary public subsidy turns out to be very complex because, it has contributions of shared responsibility, resulting from negotiations between the federal government and the governments of the states, which is usually consisting of a regular subsidy with 50% federal and 50% state.

Seeking to meet the demand for public educational services, this modality of financial funding, responds to the problem of insufficient federal resources, to meet the needs of educational institutions (CONEVAL, 2013).



Source: MECASUP, 2014 & 2015

Grafic No 2: Allocation of Ordinary Subsidy in the Years 2014 - 2015

Comparing with the total enrollment of 70,812 students, in the evaluated programs where 59.2% of the total enrollment population of the Polytechnic Universities is concentrated, 29,537 students were distributed; based on the evaluable enrollment with level 1, 2 and 3 have 12,438 students (MECASUP, 2015).

TABLE NO 1: ENROLLMENT EVALUATED REGISTRATION 2014 – 2015

Enrollment with-out Evaluation	Enrollment with Evaluation	Evaluable Enrollment Level 1	Evaluable Enrollment Level 2	Evaluable Enrollment Level 3	Total Enrollment
28,837	29,537	8,579	3,817	45	70,812

Source: MECASUP, 2014 & 2015

The curricular structures developed are under the competencies approach, curriculum design, teacher training, school control, study regulations, forms of evaluation and accreditation of learning, follow-up of graduates, teaching a second language are the most important.

In the subsystem of polytechnic universities according to the statistical information shown by the General Coordination of Technological and Polytechnic Universities, until December 2015 had 332 academic programs in the

country (MECASUP, 2015). 35 programs of them are nationally accredited by a certified institution, of which 96 are evaluable and with diagnostic evaluation level 1: 67, with level 2 they have: 20 and with level 3: 3; In turn there are 146 programs that are considered non-evaluable. This generates 56% of certified programs in the country (MECASUP, 2015).

Table No 2: Evaluated Educational Programs at Politechnical Universities During 2015

Total of Education Programs Evaluated	Evaluable Education Programs	Diagnostic Evaluation Level 1	Diagnostic Evaluation Level 2	Diagnostic Evaluation Level 3
332	96	67	20	3

Source: MECASUP, 2014 & 2015

Table No 3: Comparative of the Allocation of the Ordinary Public Subsidy, The Profocie Fund and Enrollment Total 2014 - 2015

Polytechnic University 2014-2015	Enrollment total 2014 - 2015	Budget (MX) 2014 – 2015	PROFOCIE 2014 – 2015 (MX)
San Luis Potosí	9,590	$ 74,087,799	$ 4,581,286
Pachuca	7,649	$ 198,220,924	$ 6,258,002
Valle de México	8,525	$ 177,491,221	$ 7,834,654
Tulancingo	5,619	$ 149,087,542	$ 8,202,631
Guanajuato	4,864	$ 124,730,916	$ 4,503,566
Querétaro	4,107	$ 105,494,065	N/D
Sinaloa	4,510	$ 101,984,542	$ 4,137,481
Valle de Toluca	6,852	$ 98,015,190	$ 2,328,024
Tlaxcala	6,716	$ 67,562,674	N/D
Estado de Morelos	4,621	$ 96,274,716	$ 6,839,854
Puebla	3,709	$ 86,195,483	N/A

Source: MECASUP, 2014 & 2015

Table No 4: Comparative of Enrollment in the Years 2014 - 2015

	Polytechnic University 2014	Enrollment 2014	Polytechnic University 2015	Enrollment 2015	Difference 2014 - 2015
1	San Luis Potosí	4,708	San Luis Potosí	4,882	174
2	Valle de México	4,070	Valle de México	4,455	385
3	Pachuca	3,716	Pachuca	3,933	217
4	Valle de Toluca	3,101	Valle de Toluca	3,751	650
5	Tlaxcala	3,242	Tlaxcala	3,474	232
6	Tulancingo	2,675	Tulancingo	2,944	269
7	Guanajuato	2,319	Guanajuato	2,545	226
8	Sinaloa	2,035	Sinaloa	2,475	440
9	Aguascalientes	2,137	Aguascalientes	2,274	137
10	Querétaro	1,835	Querétaro	2,272	437
11	Estado de Morelos	2,440	Estado de Morelos	2,181	-259
12	Puebla	1,632	Puebla	2,077	445
13	Metropolitana De Hidalgo	1,590	Metropolitana De Hidalgo	2,035	445
14	Francisco I. Madero	1,528	Francisco I. Madero	2,023	495
15	Chiapas	1,211	Chiapas	1,650	439
16	Victoria	1,293	Victoria	1,579	286
17	Baja California	1,150	Baja California	1,550	400
18	Zacatecas	1,594	Zacatecas	1,544	-50
19	Gómez Palacio	1,201	Gómez Palacio	1,464	263
20	Golfo de México	1,275	Golfo de México	1,449	174
21	Tecámac	1,099	Tecámac	1,339	240
22	Zona Metropolitana	1,054	Zona Metropolitana	1,324	270

	Guadalajara		Guadalajara		
Table 4: Contd.,					
23	Durango	1,003	Durango	1,215	212
24	Bicentenario	887	Bicentenario	1,173	286
25	Quintana Roo	900	Quintana Roo	1,151	251
26	Juventino Rosas	959	Juventino Rosas	1,081	122
27	Estado de Guerrero	856	Estado de Guerrero	1,063	207
28	Altamira	860	Altamira	960	100
29	Santa Rosa Jáuregui	768	Santa Rosa Jáuregui	921	153
30	Pénjamo	806	Pénjamo	858	52
31	Centro	704	Centro	828	124
32	Chihuahua	727	Chihuahua	792	65
33	Amozoc	606	Amozoc	707	101
34	Bacalar	482	Bacalar	676	194
35	Tapachula	399	Tapachula	650	251
36	Texcoco	585	Texcoco	649	64
37	Metropolitana de Puebla	457	Metropolitana de Puebla	648	191
38	Mesoamericana	475	Mesoamericana	550	75
39	Sur de Zacatecas	400	Sur de Zacatecas	459	59
40	Huejutla	305	Huejutla	423	118
41	Tlaxcala Región Poniente	327	Tlaxcala Región Poniente	409	82
42	Apodaca	307	Apodaca	403	96
43	Cuencamé	249	Cuencamé	384	135
44	Cuautitlán Izcalli	163	Cuautitlán Izcalli	375	212
45	Valle de Évora	283	Valle de Évora	366	83
46	Mar Y La Sierra, Del	198	Mar Y La Sierra, Del	322	124
47	Lázaro Cárdenas	100	Lázaro Cárdenas	316	216
48	Región Ribereña	271	Región Ribereña	306	35
49	Región Laguna	78	Región Laguna	269	191
50	Atlautla	176	Atlautla	263	87
51	Atlacomulco	34	Atlacomulco	253	219
52	Uruapan	118	Uruapan	212	94
53	García	57	García	106	49
54			Ramos Arizpe	93	93
55	Huatusco	415	Huatusco	3	-412
56	Estado de Nayarit	0	Estado de Nayarit	0	0
57			Monclova Frontera	0	0
58	Piedras Negras	48	Piedras Negras	0	-48
59	Chimalhuacan	120	Chimalhuacan	0	-120
60	Otzolotepec	122	Otzolotepec	0	-122
	Total	**62,150**	**Total**	**72,104**	**9,954**

Source: MECASUP, 2014 & 2015

Table No 5: Comparative of the Allocation of the Ordinary Public Subsidy and The Profocie Fund 2014 - 2015

Polytechnic University 2014	Budget 2014 (MX)	PROFOCIE 2014 (MX)	Polytechnic University 2015	Budget 2015 (MX)	PROFOCIE 2015 (MX)	Budget 2014 – 2015	PROFOCIE 2014 - 2015
Pachuca	99,110,462	2,303,163	Pachuca	99,110,462	3,954,839	198,220,924	6,258,002
Valle de México	71,613,059	5,189,203	Valle de México	105,878,162	2,645,451	177,491,221	7,834,654
Tulancingo	73,370,000	5,866,337	Tulancingo	75,717,542	2,336,294	149,087,542	8,202,631
Guanajuato	61,094,880	2,966,398	Guanajuato	63,636,036	1,537,168	124,730,916	4,503,566
Querétaro	49,699,376		Querétaro	55,794,689		105,494,065	
Sinaloa	46,435,965	4,137,481	Sinaloa	55,548,577		101,984,542	4,137,481

Table 5: Contd.,							
Valle de Toluca	8,488,139	2,214,801	Valle de Toluca	89,527,051	113,223	98,015,190	2,328,024
Estado de Morelos	48,137,358	4,053,629	Estado de Morelos	48,137,358	2,786,225	96,274,716	6,839,854
Puebla	42,000,000		Puebla	44,195,483		86,195,483	
Aguascalientes	36,964,000	4,925,226	Aguascalientes	45,540,373	3,485,129	82,504,373	8,410,355
Victoria	41,889,099	1,843,753	Victoria	38,966,912	3,150,417	80,856,011	4,994,170
Zacatecas	40,202,030	1,746,860	Zacatecas	34,277,518	950,089	74,479,548	2,696,949
San Luis Potosí		1,598,926	San Luis Potosí	74,087,799	2,982,360	74,087,799	4,581,286
Tlaxcala			Tlaxcala	67,562,674		67,562,674	
Bicentenario	26,167,347		Bicentenario	40,497,993		66,665,340	
Baja California	29,002,660	531,499	Baja California	32,000,000	4,992,839	61,002,660	5,524,338
Francisco I. Madero	25,810,860	2,878,954	Francisco I. Madero	34,106,544	1,626,587	59,917,404	4,505,541
Golfo de México	28,300,000	1,757,933	Golfo de México	30,865,814		59,165,814	1,757,933
Metropolitana Hidalgo	24,000,000	2,830,233	Metropolitana Hidalgo	34,846,120	2,950,472	58,846,120	5,780,705
Juventino Rosas	24,295,127		Juventino Rosas	33,240,039		57,535,166	
Metropolitana Guadalajara	29,073,618	2,449,768	Metropolitana Guadalajara	27,073,123	1,463,058	56,146,741	3,912,826
Altamira	26,200,000	1,594,497	Altamira	29,770,444	3,924,220	55,970,444	5,518,717
Pénjamo	22,619,441	469,490	Pénjamo	30,200,000	1,338,672	52,819,441	1,808,162
Gómez Palacio	25,555,991		Gómez Palacio	27,254,817		52,810,808	
Durango	24,338,650	3,817,936	Durango	27,817,235		52,155,885	3,817,936
Chiapas	51,218	5,476,656	Chiapas	51,218,488	2,601,379	51,269,706	8,078,035
Tecámac	19,648,508	3,541,960	Tecámac	29,270,910		48,919,418	3,541,960
Centro	23,395,466	6,934,425	Centro	24,180,872	8,903,606	47,576,338	15,838,031
Chihuahua	23,892,529	10,421,813	Chihuahua	22,740,650	3,661,995	46,633,179	14,083,808
Huatusco	19,200,000	855,030	Huatusco	23,807,530	283,790	43,007,530	1,138,820
Mesoamericana	19,609,376		Mesoamericana	20,258,406		39,867,782	
Estado de Guerrero	18,847,782	1,239,243	Estado de Guerrero	19,906,889		38,754,671	1,239,243
Amozoc	16,999,999	5,819,916	Amozoc	20,506,018	4,656,503	37,506,017	10,476,419
Región Ribereña	16,085,824	1,304,830	Región Ribereña	21,010,338	11,279,176	37,096,162	12,584,006
Texcoco	15,371,400		Texcoco	20,386,120		35,757,520	
Metropolitana Puebla	15,077,304	1,183,571	Metropolitana Puebla	14,213,403	951,708	29,290,707	2,135,279
Bacalar	13,774,468		Bacalar	13,714,110		27,488,578	
Valle de Évora	11,769,121		Valle de Évora	13,538,242		25,307,363	
Huejutla	12,222,464		Huejutla	12,222,464		24,444,928	
Quintana Roo	25,070	1,411,130	Quintana Roo	23,967,630		23,992,700	1,411,130
Apodaca	10,661,150		Apodaca	13,295,000		23,956,150	

Table 5: Contd.,							
Tapachula	9,637,631		Tapachula	14,157,108		23,794,739	
Santa Rosa Jáuregui			Santa Rosa Jáuregui	23,596,884		23,596,884	
Mar y La Sierra, Del	7,000,000		Mar y La Sierra, Del	10,622,296		17,622,296	
Sur de Zacatecas	17,603,881	150,591	Sur de Zacatecas	19	104,380	17,603,900	254,971
Cuencamé	6,596,137		Cuencamé	10,037,574		16,633,711	
Lázaro Cárdenas	4,171,000		Lázaro Cárdenas	7,488,468		11,659,468	
Tlaxcala Poniente			Tlaxcala Poniente	11,101,499		11,101,499	
Atlacomulco	10,288,554		Atlacomulco	13		10,288,567	
Atlautla			Atlautla	10,288,554		10,288,554	
Uruapan	5,000,000		Uruapan	5,000,000		10,000,000	
Cuautitlán Izcalli			Cuautitlán Izcalli	8,405,517		8,405,517	
Chimalhuacan			Chimalhuacan	8,372,004		8,372,004	
Región Laguna	5,000,000		Región Laguna	2,776,738		7,776,738	
Piedras Negras	7,182,996		Piedras Negras			7,182,996	
			Ramos Arizpe	6,840,000		6,840,000	
García			García	6,034,767		6,034,767	
Estado de Nayarit			Estado de Nayarit				
			Monclova Frontera				
Otzolotepec			Otzolotepec				
TOTAL	**1,213,479,940**	**91,515,252**	**TOTAL**	**1,714,611,276**	**72,679,580**	**2,928,091,216**	**164,194,832**

Source: MECASUP, 2014 & 2015

CONCLUSIONS

According to the results shown, it is possible to increase the academic programs of higher level with the accredited quality by means of the application of measures of monitoring and impulse of educational indicators of management with the incorporation of an appropriate orientation to the use of the existing public resources.

Although, criteria has been established for the granting of ordinary and extraordinary subsidies, the institutions that have benefited most from resources are those that have accredited academic programs.

Another challenge faced by Polytechnic Universities is the continuous evaluation of engineering education programs and a lower subsidy to assess and comply with the quality matriculation to measure their academic performance and capture of resources by the calls to extraordinary federal resources.

After analyzing the data that currently exist, the institutions, which have greater resources, are those that achieve a higher quality in their academic programs.

The analysis of the information leads to us to conclude that there is a correlation between the budget and the educational quality; however, it will be necessary to deepen in a future work the existing correlation.

In some cases, we have detected exceptions from the rule of about a higher budget - better quality, since we have found inequitable educational policies based on the subjective criteria and the levels of development from the different states. We will discuss this point with more detail in a subsequent study.

The Polytechnic Universities for being a sub-system of higher education with less time in Mexico, still present many lags in different states of the country and mainly in the institutional indicators performance, as is the case of the quality enrolment, in educational programs.

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