Quality assurance and the classification of universities: the case of Chile

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Abstract

Purpose – The purpose of this study is to analyze the relationship between quality assurance, the traditional *a priori* approach, and a more recently developed empirical classification of universities, as a means of assessing whether the different classification systems fulfill their original purpose. The study analyzes Chilean university classifications because they have been used in setting up higher education public policies.

Design/methodology/approach – The existing classifications of Chilean universities were identified in the literature. Researchers determined categories, criteria and/or indicators used, as well as their main purposes as described by the authors of the classifications. All the criteria and indicators identified were directly related to the quality of academic activities and to the results of the university accreditation processes. The institutional accreditation outcomes and variables were studied using univariate and multivariate statistical analysis.

Findings – The *a priori* approach proved to be consistent with the results of institutional quality assurance, despite of the variability in individual performances. The empirical systems, however, do not show any contribution to the improvement of public policies in higher education. The results clearly show that classifications based on performance do not necessarily ensure improvements in institutional quality.

Originality/value – To the authors' knowledge, this analysis is the first study of the relationship between university classification and quality assurance. The growing number of proposals for different empirical classifications in Chilean universities is evidence of institutional diversity only. However, the classification designs did not respond to purposes such as public policies improvements and other expected results from these instruments.

Keywords Case studies, Quality assurance, Higher education, Classification of universities, Chile, Universities, Classification

Paper type Research paper

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Introduction

Around the world, there are numerous case studies of quality assurance in higher education (Espinoza and González, 2013; Espinoza *et al.*, 2019; Jackson and Bohrer, 2010; Kinser, 2014; Li, 2010; Ryan, 2015). In addition, there are several studies about the classification of universities (Carnegie Commission on Higher Education [Carnegie Commission], 1973; Carnegie Foundation for the Advancement of teaching [Carnegie Foundation], 1994; CHEPS [Center for Higher Education Policy Studies], 2008; Filippakou and Tapper, 2010; Ramsden, 1999; Vîiu *et al.*, 2016; Ziegele, 2013). Despite the volume of research done, however, hardly any studies have linked quality assurance with different types of university classifications, whether *a priori* or empirical ones. One exception is a study by Brint (2013) about universities in the USA.

The most widely used method for quality assurance of universities is accreditation via external evaluation (Brooks, 2005; Stensaker *et al.*, 2011). A single set of criteria or quality standards applicable to institutions with different missions and attributes may restrict the fulfillment of the purposes of a particular university. To ensure the integrity and autonomy of the institutions, self-assessment processes and mixed systems have been incorporated so that both self-evaluation and external evaluation are considered (Brennan and Shah, 2000; Vanhoof and Van Petegem, 2007). In many countries, self-accreditation processes are being implemented (Chen and Hou, 2016).

However, taking into account that universities are different in their missions and attributes, the application of standardized procedures may restrict the fulfillment of the particular purposes of a university. The outcome of the accreditation process can also limit the access to public funds (direct and indirect) and student demands. They even may negatively affect the institutional image. These issues have, in recent decades, led to the establishment of a variety of criteria for the classification of universities (McCormick and Zhao, 2005; Ziegele, 2013).

The classification of universities assumes the existence of institutional diversity along one or more variables, and the classification procedure is carried out for various purposes. These purposes mainly include provision of information to students and stakeholders, in particular concerning certain considerations such as the quality of the academic body, research, infrastructure and equipment, generation of public financing policies and facilitation of benchmarking as a methodological instrument for research in the university (Brunner, 2013; Van Vught, 2009).

Differences among universities, or the mistaken use of these classification schemes in the quality assurance process, can have various consequences. University classification can generate controversy, especially in regard to regulatory processes and public policies. These outcomes have not been adequately assessed so far.

An *a priori* approach to university classification is based on judgments derived from intuitions, traditions or preconceptions regarding the characteristics that differentiate institutions (Brint, 2013). An empirical approach, by contrast, is generated from an analysis of data regarding institutional performance, or descriptors of each institution (Erdogmus and Esen, 2016). In either approach, the choice of criteria for establishing categories is critically important (McCormick, 2013).

These classifications can generate considerable controversy, particularly when they are used in the formulation of public policies. Perhaps with time, as more data are collected, this discussion will abate. Even though university ranking schemes have been thoroughly critiqued (Dill, 2009; Soh, 2017), classification systems have not been properly evaluated.

This issue is especially noticeable in Chile. The current higher education system in this country distinguishes between traditional and non-traditional universities. The first

category includes 18 state institutions and 9 private universities. These are organized under the Council of Rectors of Chilean Universities (CRUCH). The non-traditional universities came into existence after 1981. More than 60 Chilean universities have been created since 1981, some of which have closed and others are in the process of doing so (León and Peñafiel, 2014; Organización para la Cooperación y el Desarrollo Económico [OCDE], 2009).

As a result of the increase in the number of universities and their subsequent diversity, a normative typology was generated:

- state universities;
- traditional private universities and their spin-off universities, which receive public funding for teaching; and
- new private universities, which do not receive public funding for teaching.

While public universities receive direct public subsidies, many private traditional and new private universities also receive public funding, albeit indirectly, such as in the form of state endorsement. The first two groups are associated with CRUCH. Additionally, there are differences in the levels of control over the destination of public funds between state and private universities, which receive those funds. In fact, only the former are subject to state control over spending. Funding policies have sparked criticism of the traditional classification method and led to the construction of empirical classifications.

Until now discussion in Chile has focused on the relationship between public financing and quality. Proponents of empirical classification argue that the current process ignores differences in institutional quality, especially in undergraduate training (Garrido and López, 2007; Lavados *et al.*, 2016; Paredes, 2015; Urzúa, 2012). A second issue concerns whether it is reasonable to apply uniform criteria to all institutions, given that universities may have different purposes. In fact, in Chile there are both teaching universities and those dedicated to high-level research. In addition, there are national universities as well as others whose mission focuses on a particular region of the country.

The purpose of this paper is to analyze the results of institutional accreditation processes in relation to university classification. The case of Chilean universities is used for two reasons: first, the formulation and application of public policies are based on an *a priori* classification approach and, second, institutional accreditation does not consider the differences between different types of universities.

Methodology

Classification of Chilean universities

The existing classifications of Chilean universities were identified in the literature. We listed the categories, criteria and/or indicators used, as well as their main purposes, as described by the authors of the classifications. All the criteria and indicators identified could be linked directly to the quality of academic activities and to the results of university accreditation processes.

The three categories of universities (state CRUCH, private CRUCH and private non-CRUCH) currently in use in quality assurance assessment have been defined by CRUCH membership and direct financial contributions from the State. As of 2016, four private universities not affiliated with CRUCH also began to receive financial support from the State, in an effort to provide free education to students in need. The requirements demanded by the State were that these institutions should be accredited by the National Accreditation Commission (Comisión Nacional de Acreditación) (CNA) for at least four years, and that their owners should not profit. In addition, 11 private universities that are not associated

with CRUCH have to date incorporated the CRUCH university admissions system based on a proficiency test similar to the scholastic assessment test or American College Testing tests used in the USA (Pearson, 2013).

Statistical analyses

Univariate analysis. Institutional accreditation outcomes for the period of 1999-2017 were analyzed. The accreditation outcomes were considered indicators of the quality assurance of universities, since they indicate each performance individually. Universities were classified into three groups according to legal status: those belonging to CRUCH were classified either as state-owned (hereafter called state-CRUCH) or privately owned (hereafter called private-CRUCH), the third group consisted of privately owned universities without direct state financial support (hereafter called private non-CRUCH). The data base of the National Accreditation Commission (2017) provided information on 58 Chilean universities with respect to their legal status, current number of years of accreditation and the number of accreditation processes to which each has been submitted to. However, three universities were excluded for different reasons (closure and institutional re-accreditation in process).

For each group, we recorded the percentage of accredited universities and the average number of years of institutional accreditation time as of June 2017, the standard deviation, the rank and the coefficient of variation (CV), which represents the relationship between the standard deviation and its arithmetic mean. The latter indicates the level of heterogeneity in the performance within each group of universities. Five areas were considered in institutional accreditation (undergraduate teaching, institutional management, postgraduate teaching, research and community linkage). With this information, we recorded the average number of areas that received accreditation as well as the average number of accreditation processes for each university of each group.

We compared the years of accreditation from the last process according to the legal status of universities using a generalized linear model, applied to a negative binomial distribution with a logarithm link function (Lawless, 1987). Modeling was based on the number of years of accreditation of the last period, using as a covariate the number of accreditation processes each university has previously undergone. The model used was: "number of years of accreditation of the last period = legal status of university + number of accreditation processes." All statistical tests were done with R 3.4, using the MASS package (R Development Core Team, 2017).

Multivariate analysis. For each university (n = 58), the following variables, associated with accreditation processes, were considered:

- number of areas accredited: both obligatory areas (institutional management and graduate teaching) and optional areas (research, public outreach, graduate programs), were considered. Data source: National Accreditation Commission;
- percentage of accredited graduate programs: Those leading to the accomplishment of the first academic degree after secondary education that have been accredited by the CNA in 2017 in relation to the total number of programs offered by each university. Data source: National Accreditation Commission;
- percentage of accredited postgraduate programs: Master degrees and PhD programs accredited by the National Accreditation Commission. Accredited programs belonging to more than one university were considered as a program in each institution. Data source: National Accreditation Commission;

- length of the last period of institutional accreditation. Number of years awarded in the last period of institutional accreditation. Data source: National Accreditation Commission;
- total number of years of accreditation. Number of years of accreditation awarded for each institution, according to the number of accreditation processes submitted. Data source: National Accreditation Commission; and
- number of accreditation processes. Amount of institutional accreditation processes submitted. Data source: National Accreditation Commission.

The institutions were numbered from 1 to 58, where numbers 1-16 represented state-CRUCH universities, numbers 17-25 represented private-CRUCH universities and numbers 26-58 represented private non-CRUCH universities. Based on the six variables listed above, a matrix was constructed. The matrix was built using Euclidean distance between pairs of universities, after standardization of each variable, according to their mean and standard deviation. A cluster analysis was performed using the clustering criterion unweighted pair group method with arithmetic averages (Manly, 2005). To verify the statistically significant clusters ($\alpha < 0.05$), a similarity profile analysis was performed using 1,000 permutations. All statistical tests were performed with R 3.4 using vegan and cluster packages (R Development Core Team, 2017).

Results

The classification of Chilean universities

The various classification proposals for Chilean universities are listed below in Table I. Their main objectives are to influence, facilitate or improve public policies in progress. The criteria and indicators used are diverse. Considered as a whole, the empirical classifications of Chilean universities are based on variables taken as indicators of quality, regardless of the institution's major mission. The most frequent variables are the years and areas of accreditation and research performance (projects awarded by competitive funds and number of publications in mainstream journals). Measures of teaching quality are ignored.

Additional quality indicators include number of doctorates, performance in accreditation, selectivity and teaching staff. There are also classification systems that have used economic variables (Urzúa, 2012) or a combination of these variables with quality variables (Rodríguez-Ponce *et al.*, 2015). For similar purposes, the relationships between the university and the economic contributions of the State have been explored (Améstica *et al.*, 2014). Although these authors do not formally set up differentiated groups of universities, they generate categorizations of the universities according to the differences existing in the contributions of the State received through various instruments.

The general trend has been to use empirical criteria of institutional performance, consistent with the purposes of these classifications. Variables other than quality, such as territories, disciplinary specialization and size, have been used marginally (Torres and Zenteno, 2011).

Performance in quality assurance according to the normative classification of Chilean universities. In 2016, 77.2 per cent of Chilean universities were accredited. Only 21 per cent of universities have accreditation in all five areas: the graduate area (23.6 per cent) and research (32.7 per cent) are the areas with the lowest frequency of accreditation.

While all the CRUCH universities, state and private, are accredited (Table II), some new private universities have been unable to get accreditation. The latter have a shorter average

Table I.
Principal classifications of Chilean universities

Type of classification	Authors	University categories	Criteria/indicators	Purpose
A priori	Congreso Nacional de Chile (1954), Congreso Nacional de Chile (1990), Congreso Nacional de Chile (2009)	State-CRUCH Private CRUCH Private not CRUCH	Legal Historical (linked with traditional universities)	To determine systems of financing To control the expenditure of public funds
	Congreso Nacional de Chile (1954)	Belonging to CRUCH Not associated with CRUCH	Legal Historical (linked with traditional universities)	To establish an admission mechanism To determine a system of financing
Empirical	Brunner *et al.* (2005)	With institutionalized academic leadership Private with national projections Private with selective leadership Specialized metropolitan state institutions Less selective regions Private with low-medium selectivity Public and private with low selectivity Private, not selective	Type of university Size Coverage Selectivity Density of knowledge (research postgraduate programs, accreditation, research projects, publications)	To contribute to public policy To provide evidence of institutional diversity
	Torres and Zenteno (2011)	Selective Of research With research Specialized Not selective Selective teaching Non-selective teaching of medium size with a high/medium level of accreditation Non-selective teaching of a larger size	Selectivity Institutional function WOS (web of science) publications Number of research projects and allocated funds Size Years of accreditation	To provide evidence of institutional diversity

(*continued*)

Table I.

Type of classification	Authors	University categories	Criteria/indicators	Purpose
Empirical	Urzúa (2012)	With degree programs of high-economic returns (profitability of degree) With degree programs with rate of returns close to the system average With degree programs of low rate of returns	Ratio of economic return to average with 0.5 standard deviation in a group of 4 degree programs (journalism, psychology, commercial engineering and law)	To influence public policies based on private profitability
	Thieme *et al.* (2012)	Ten clusters of homogenous groups	Number of students Research projects Teaching of Master's and Doctorate programs Campuses Areas of discipline Areas of formation Advertising investment	Institutional diversification To support public policies
	Reyes and Rosso (2013)	Teaching Teachers with research projections Research and doctoral programs in selective areas Research and doctoral programs	Number of publications Number of accredited doctorate programs	To influence public policy To provide evidence of institutional diversity

(*continued*)

Table I.

Type of classification	Authors	University categories	Criteria/indicators	Purpose
	Muñoz and Blanco (2013)	Of research Massive Of accreditation Elite Non-elite	Campuses Undergraduate programs Master and Doctoral programs Institutional accreditation Accredited areas Total enrollment First year enrollment Degree programs Research projects Publications Selectivity Enrollment by type of secondary school	To provide evidence of institutional diversity
Empirical	Rodriguez-Ponce *et al.* (2015)	High accreditation and low profitability High accreditation and high profitability Low accreditation and low profitability Low accreditation and high profitability	Years of institutional accreditation Profit	To provide evidence of levels of quality and profitability for public policies
	Lavados *et al.* (2016)	Four clusters for each of the dimensions according to indicators of quality, productivity and social responsibility	Dimension of quality (years of accreditation; accredited areas and percentage of full time professors) Dimension of productivity (years of accreditation in research; licenses and indexed publications) Dimension of social responsibility (years of accreditation of community linkage amount of state support and students)	To facilitate implementation of public policies

Variables	Types of universities: State-CRUCH (n = 16)	Private-CRUCH (n = 9)	Private non-CRUCH (n = 30)*
Percentage of accredited universities	100%	100%	70%
Range (R), average (A) and coefficient of variation (CV) of years of accreditation	R: 4 (3-7) A: 4.5 CV: 0.235	R: 3 (4-7) A: 5.66 CV: 0.186	R: 5 (0-5) A: 2.63 CV: 0.73
Average number of accredited areas	3.8	4.4	2.16
Number of total accreditation processes/number of universities	3.87	3	3.36

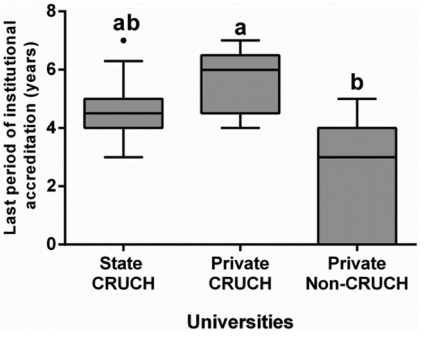
Note: *Some universities of this type that have not been submitted to institutional accreditation processes were not considered
Source: National Accreditation Commission

Table II. Results of the processes of institutional accreditation in the three categories of universities

accreditation time, greater variability in their performance in institutional accreditation and fewer accredited areas.

Significant differences were found between universities, according to their legal status (pseudo-R^2 = 0.323, df = 2.55, $p < 0.001$). The number of years of accreditation for the last period were higher in the private-CRUCH universities (mean = 2.4 ± 2.0 years), while the state-CRUCH universities showed intermediate values (mean = 4.5 ± 1.1 years) (Figure 1). As in the case of the other variables directly related to the processes of institutional accreditation, CRUCH universities have performed better than the non-CRUCH universities. There was no correlation between the length of the last period of institutional accreditation and the number of accreditation processes that occurred in each university (p = 0.38).

According to the variables associated with these accreditation processes, there were eight statistically significant groups (group A-H, Figure 2). The traditional typology of



Note: (a) and (b) are statistically different ($p < 0.001$)
Source: National Accreditation Comission. Chile

Figure 1. Average ± 1 SD and statistical differences of last period of institutional accreditation (years) of three groups of Chilean universities

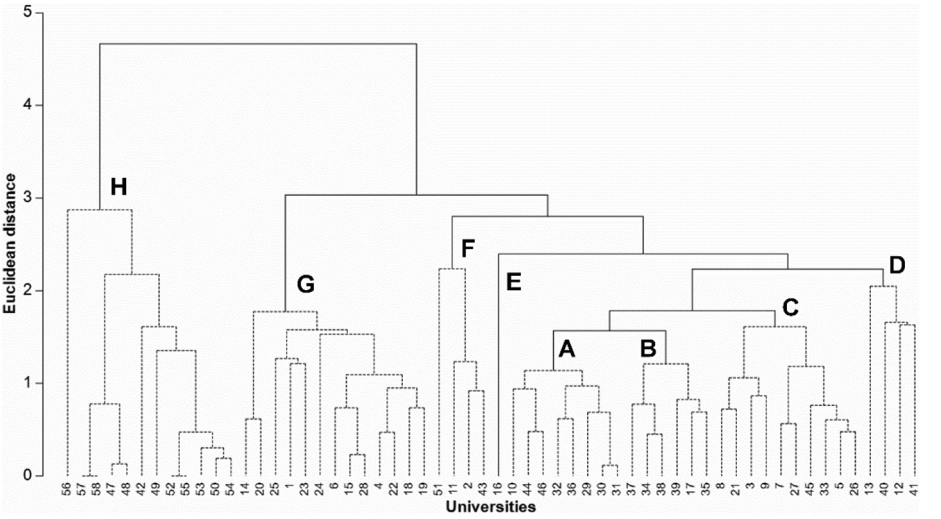


Figure 2.
Groups of Chilean universitites, according to their performance in institutional quality assurance

Notes: 1 to 16: state-CRUCH universities; 17 to 25: private-CRUCH universities; 26 to 58: private non-CRUCH universities
Source: National Accreditation Comission. Chile

Chilean universities (state-CRUCH, private-CRUCH and private non-CRUCH) is consistent with the data. That is, of the seven mutually exclusive groups, private-CRUCH universities are found in three groups. One group includes 77.7 per cent of the total. The state-CRUCH universities are represented in five groups but 62.5 per cent of them are located in two groups. Private non-CRUCH universities are found in all groups, and form an exclusive group with the lowest performances (group H). The group with the best performances (group G) is made up of seven private CRUCH universities, five state universities and only one private non-CRUCH university (Figures 1 and 2).

Discussion and conclusions

There is little direct evidence that classifications are effective in changing university quality. This has important practical implications. University classification, at least in Chile, has an impact on institutional finance and, in recent years, on higher education policy. The findings reached in this study might lead to the introduction of improvements in institutional funding practices, and they might guide the future implementation of funding policies.

- The analysis of the results of quality assurance processes (using the Chilean case study), makes it possible, for the first time, to evaluate the use of university classifications in the regulatory processes in universities and public policy. The results clearly show that classifications based on performance do not necessarily ensure progress in institutional quality. This calls into question the value of formal classification. However, obvious differences in status, mission and legal standing can lead to an unintended *a priori* or informal classification scheme that affects the treatment of the university by the State and its stakeholders.
- The growing number of empirical classifications for Chilean universities only shows evidence of institutional diversity. However, the classification design does not

respond to purposes such as public policies improvements and other expected results from these instruments.

For the most part, empirical classifications seek to establish categories of quality, assuming that public policies and state financing should be reoriented according to institutional quality. As in most of the classifications and rankings of universities worldwide, the variables that guide the formation of categories are more heavily associated with research productivity rather than with quality of teaching and certainly not with learning outcomes (Brint, 2013).

Unfortunately, it is not easy to include variables linked to teaching and learning practices in university classifications and rankings. This difficulty arises because the processes involved are complex and resist conventional operationalization. It is possible, however, to operationalize some of the results of these formative processes, for example, with indicators of employability and income of graduates. This approach would yield classifications that reveal the strengths and weaknesses of the institutions. For example, the German Accreditation Agency (ASIIN) specializes in accrediting degree programs in Engineering, Informatics, Natural Sources and Mathematics. The accreditation process involves various quality assessment criteria and data related to teaching and learning practices that could be applied as a basis of university classifications. In this case, standardized evaluations refer to individual academic programs or institutions, and to evaluation for quality development and organizational development (ASIIN, 2019).

Empirical classification systems seek to influence, facilitate and improve public higher education policies in Chile. These have arisen as a response to the current distribution mechanisms for state funding. They are defined mainly by an *a priori* university classification system, based on legal status and historical considerations. This classification system recognizes universities belonging to CRUCH, which is formed by eight traditional universities (state and private, created prior to the 1981 reform) and their "spin off universities" set up over the past 35 years, as well as a third group of new private universities, which emerged as a result of reforms carried out during the military regime (Bernasconi and Rojas, 2004). The arguments for dismissing the *a priori* classification as a reference for state funding of universities are based on quality assurance processes, which relate primarily to teaching, given that a significant number of new private universities do not perform research, or if they do, do so marginally (Organización para la Cooperación y el Desarrollo Económico [OCDE], 2009).

The analysis of these empirical classifications only reveals institutional diversity. There is also a diversified matrix of inter-institutional associations, depending on the variables used and their relative weight. Institutional diversification is static, so that it considers variables in a defined time. Thus, classifications do not contribute to the dynamic concept of differentiation among universities (Van Vught, 2009). The factor of institutional quality has been defined using indicators based on research activity and graduate programs being offset in some classifications by variables of size, territorial location, economics, as well as other factors not related to quality.

The empirical classifications proposed for Chilean universities have used various criteria and indicators to establish categories. Quality indicators are more closely related to results in research and graduate programs than to teaching, and reveal institutional diversity but do not reveal categories of universities according to their quality. The classification and ranking of universities depend on the variables chosen and their weighting (McCormick and Zhao, 2005). In this study, even though common purposes were declared when proposing typologies to classify institutions, the results are heterogeneous and their contribution to these purposes is not clear. With respect to quality, these classifications do not demonstrate

higher levels of consistency than those achieved by the legal-historical classification, as used in public policies.

- The criticism of the traditional system of Chilean universities classification is not consistent with the results achieved in the quality assurance processes.

The analysis of institutional accreditation processes developed over the past three decades in Chile reveals significant differences in the length of accreditation time between CRUCH universities and new universities. Therefore, it is not possible to infer that state funding is inimical to the quality levels established by the regulatory processes at the institutional level.

The identification of groups of Chilean universities according to their characteristics and performances using variables not associated with accreditation indicates that there is a wide range and high dispersion both between and within the university groups. Discriminant analysis indicates that the first discrimination function is influenced by the number of students, full-time teachers, accredited programs, accredited graduate programs, the average length of institutional accreditation and the length of accreditation in the last process. The classification analysis among the types of institutions suggested a higher level of homogeneity between the CRUCH private universities and state universities. However, some universities of these three types deviated from this pattern, mainly state universities (López *et al.*, 2015). Hence, if variables strictly associated with the results obtained in the accreditation processes of universities and their undergraduate teaching programs are used, it is possible to establish the existence of seven mutually exclusive groups, which are clearly distinct from the *a priori* classification. However, the new private universities show a high dispersion in all groups. The state universities were present in five of the seven mutually exclusive groups but almost two thirds of them were located in only two groups. The private-CRUCH universities were concentrated in three groups but more than three quarters of them were located in a single group.

The best performing group was made up of seven private-CRUCH universities, five state universities and only one new private university. In contrast, the group with the worst performance was made up of only new private universities. López *et al.* (2018) see this as evidence of institutional learning in CRUCH universities, particularly in the case of state universities. Such a situation, in contrast, has not occurred among new private universities. Overall, there was no significant relationship between the length of the last period of institutional accreditation and the number of processes that occurred in each university, which suggested low institutional learning. However, universities are learning how to improve, as evidenced by changes over time in the levels of accreditation awarded by the National Accreditation Commission. An improved level accreditation over time indicates that an institution has overcome deficiencies and fulfilled the demands made by the accrediting agency. Lack of improvement in level suggests that the institution is not able to overcome its limitations but also reflects on the accreditation processes.

Although there are cases of low-performing state universities and new private universities with good results, the three traditional groups of universities ratify previous analyses that determine consistency based on quality (López *et al.*, 2015). In conclusion, there is not enough evidence to suggest that unique procedures of quality assurance (institutional accreditation) could limit the purposes of these processes:

- The Chilean case demonstrates the need to establish causal relationships between results in quality assurance, academic and management variables, and how they

operate within each university. Various cultural, organizational and management variables interact in a broad way in the quality assurance process of higher education institutions (Bendermacher *et al.*, 2017). The governance of universities can also play an important role (Brunner, 2010). The results can be explained by the similarity in the governance of each type of university with the *a priori* classification approach. The new private universities show a predominance of entrepreneurial governance, while CRUCH universities prioritize the governance of interested parties, with a greater emphasis on the collegial system in the case of state universities.

- The study's results contribute to what we know about higher education and should be used in formulating public policy. Growing interest has revealed a number of areas in which we lack information. The increasing importance given to quality assurance emphasizes attending to institutional diversity, not only in Chile but also in most countries. Evidence-based policies, that take the relationship between quality and type of university into account, have effects at various levels. At the national level quality is affected by regulatory policies that define quality in terms of financial efficiency and effectiveness. At the institutional level, policies impact funding, demand for services and their public image or prestige. Students and stakeholders benefit from better services, which increase public confidence in policies and regulations.

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