Compensation Criteria In Higher Education In Israel And Elsewhere: Evaluation Of Research And Teaching Outcomes

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ABSTRACT

Teachers in academia are usually not required to have teacher training but must often be evaluated by their students who expect them to have much better teaching qualifications than their high school teachers. However, teachers in elementary and high schools are required to go through several years of teacher training, resulting in a teaching certificate, which is usually mandatory in the secondary school system. This anomaly causes great tension in colleges and universities and often results in pressure to "improve" teaching evaluation in regard to academic level. In many countries, a doctorate degree in any field automatically allows its holder to teach in academic institutions because the students are expected to learn on their own while the professor is the expert responsible for helping with complicated questions. These discrepancies often hamper the advances of higher education.

This paper presents the situation of teaching in higher education in selected countries, while presenting various paradigms for improving the state of teaching in higher education. The aim is to study the methodologies used to assess the quality of teaching in higher education systems, in general, and in Israel, specifically.

Keywords: Teaching Evaluation; Higher Education; Quality Of Teaching; Israel

INTRODUCTION

*I*n the twentieth century, higher education experienced a transformation – from a limited elitist system, it became a system for the masses. This process, called the "massification of higher education" (Trow, 1973), was manifested in a huge increase in the number of students throughout the 20th century all over the Western world. In Europe in the 1950s, the percentage of undergraduate students was 3%‑5% of the relevant age group. In the late 1990s, the number ranged from 36%‑53%, and today it has reached more than 60% in most European countries (Lindberg, 2007). In the United States, a similar trend is evident, with the numbers currently encompassing 73% of the relevant population (Toutkoushian & Shafiq, 2010). Canada and Australia have undergone a similar process and the number of undergraduate students has exceeded 50% (Finnie & Usher, 2007). Israel also has joined this global trend and is part of the revolution in higher education. The 1990s saw the beginning of a huge demand for higher education in Israel, together with the opening of new institutions in response to this demand. The growth rate of Israeli students in the 1990s reached an annual average of 8.1%, and their numbers jumped from 76,000 in 1990 to 166,000 in 2000 (CBS, 2012). At present, with full utilization of the relevant age group for undergraduate studies, the annual growth rate has dropped to 3% and the total number of students is now 298,400 (ibid.). From a wide point of view, this means a growth rate of several hundred percent in a matter of two decades. The huge increase in the relative number of students has resulted in an array of changes, challenges, and difficulties in systems of higher education (Davidovitch, Soen & Sinuany-Stern, 2011). One of the immediate implications of the transition to "mass education", particularly in a public educational system, is the burden on the national budget (Weiler, 2000). Countries invest from 0.5%‑1.5% of their GNP in funding higher education and in OECD countries, this rate is particularly high, reaching 1.3% (Docampo, 2007). Tuition paid by students has

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remained low and institutions need a variety of external funding sources. Nonetheless, despite the significance of external funds, research universities rely mainly on internal-public funding sources. For example, internal funding of research universities in OECD countries in 2003 covered 94% (Auranen & Nieminen, 2010) of their budget, while the rest came from private funding.

The utilization of a public budget, together with the growth in the system of higher education and the demand for accountability, led many countries to embrace a new model of budgeting and resource allocation, attributing more significance to the evaluation and measurement of academic outcomes. Where formerly the main budgeting indicator was the proportion of students at the institution, at present, in light of the huge increase in this number in all institutions and the public budget that is not growing in direct proportion, many countries around the world have begun to assimilate additional indicators for budgeting institutions (Frolich & Strom, 2008). These indicators refer to the general teaching and research output of the institutions and less to the input invested in teaching and research activities (PBC, 2012). This is a fundamental change on the policy level that emphasizes competition and outcome-related incentives, with the intention of turning universities into efficient productive systems (Auranen & Nieminen, 2010) – both by promoting research and by improving how resource allocation decisions are made (Pontille & Torny, 2010). Governments use various different competitive elements in the process of determining how institutions of higher education are budgeted and how resources are allocated. For example, resource allocation is determined by assimilating performance indicators by means of a "budgeting formula" or based on the evaluation of project proposals (Liefner, 2003). This is in addition to differences in the mix of external and internal funding in different countries. The aim of the current article is to review budgeting models applied around the world, as well as various funding mixes, and to present the model utilized in Israel, while discussing the efficiency of the various models.

Mixed Budget Combinations

In general, it is possible to classify the various models for budgeting institutions of higher education by the degree to which they are based on external or internal funding or, in other words, the combination of external and internal funding. *Internal funding* relies mainly on government funding and on the university's assets. This budget is awarded to the institution as a block grant, without listing the different sections of the budget, to be used as it sees fit subject to a full report at the end of the year (Planning and Budget Committee, 2012). From the universities' point of view, government funding may also be perceived as external funding by nature if the university can decide on how the resources will be allocated within the organization (Auranen & Nieminen, 2010). In contrast, *external funding* is defined as private and public funding that is not part of the core budget and it may come from a variety of sources, such as public projects, grants, contract with the public administration, competitive research funds, donations, payments as a result of the commercialization of knowledge, and more (Hottenrott & Lawson, 2012). Auranen and Nieminen (2010) proposed an analytical framework (see Table 1) for mapping the institution's budget environment, which includes three parameters for determining the budgetary environment - funding sources, total rate of funding, and scope of incentives. The nature of the institution's budgeting environment is determined by the relationship between external and internal funding and the input-output orientation of core resources allocated.

Table 1: Analytical Framework For Positioning The Budgeting Model Of Research Universities

Output-oriented core funding Small share of external funding	Output-oriented core funding Great share of external funding	Output	**Orientation Of Core Funding Devoted To Research**
Input-oriented core funding Small share of external funding	Input-oriented core funding Great share of external funding	Input	
Small	**Great**		
Share Of External Funding For Research (Other Than Core Funds And Universities' Own Assets)			

The figure comprises two dimensions. The left side refers to a core budget based mainly on government funding. In such a case, the state has a significant role as institutions are dependent on this budget and affected by political decisions. On the right, universities have more funding sources and some of the government funding is provided by budgeting agents. In this case, the state's role is not necessarily weaker compared to the left rather less direct. In this case, there are other players (for example, private industry) and interest groups (Tandberg, 2010) that can directly affect the university's research orientation (see, for example, Hottenrott & Thorwarth, 2011) versus the other situation where these interests are represented indirectly by the state's decisions (Auranen & Nieminen, 2010).

The lower part describes a system of input and the upper part describes systems with an output orientation. In cases of output-based government budgeting, the effect of state decisions is usually weaker than a system with an input orientation. When the government budgeting is input-based, the state mainly stresses resource efficiency, where in cases of an output-based system there is a direct expectation that the university be efficient and produce measurable outcomes. In general, institutions where funding is mainly governmental are more sensitive to changes in how resources are allocated and to incentives provided by public funding. Nonetheless, the advantages of government funding are in increasing the system's stability. Then again, external funding might also present an opportunity for innovation and expansion of existing activities. Input-oriented systems are considered less dynamic that output-oriented systems (Auranen & Nieminen, 2010). Following this typology, different models of budgeting utilized in different countries will be presented.

Funding Models Around The World

Traditionally, most of the funding of institutions of higher education around the world came directly from the state, which allocated an input-based core budget (Hottenrott, 2012). In such a funding method, resource allocation is based on the budget of previous years, and the government may reduce or increase this budget based on changing needs of the institution (Liefner, 2003). This method, also called "trust-based funding", has been gradually neglected in recent decades in favor of "performance-based funding" which is awarded based on compatibility with performance indicators assimilated as part of the budgeting policy. Today there are almost no institutions that do not use performance indicators to some degree (Sörlin, 2007). For example, in a study by the OECD, 77% of all OECD countries were found to have assimilated performance indicators in the period 2000-2005 and about 50% of these countries reported a combination of input and output indicators (OECD, 2005, cited in Robinson, 2007). Nevertheless, the manner and degree in which these indicators dictate funding differs between countries.

North America

The Anglo-American model of budgeting higher education is characterized by low external funding, high commitment to research and development, and extensive investment of private funds (Docampo, 2007). Funding models customary in the United States and Canada will be presented next.

United States

Performance-based funding is a common policy in the United States (Barnetson & Cutright, 2000). From the early 21st century, organizations began to use terms of outcome-based policy (Kong, 2005) while from the late 1970s, policy makers began to evaluate and budget institutions of higher education based on performance (Gaither, Nedwek & Neal, 1994). Higher education in the United States includes both private and public institutions. Private universities in the United States rely mainly on external budgeting and do not receive public funds. For example, MIT uses research grants, donations, contracts, and tuition as its main source of funding. In order to receive research funding, it is necessary to meet competitive terms. At MIT, the internal allocation of resources to departments and faculties is not based on performance, but rather on the previous year's budget and on the number of faculty positions. Hence, the allocation of resources within the institution is not based on performance indicators. Nonetheless, the fact that all funding comes from students and from external investments requires academic personnel to take an active part in raising external funding (Liefner, 2003).

In addition to the private universities, in the United States there are also public institutions that receive performance-based government funding (Layzell, 1999). These include public universities, community colleges, and government colleges. The public universities usually belong to states (for example, the University of California, Berkeley, and the University of California, Los Angeles, belong to the State of California; Indiana State University belongs to the State of Indiana) and community colleges belong to a city or district (for example, the Baruch College belongs to the City of New York) but may also belong to a state (for example, the New College of Florida belongs to the State of Florida). Public colleges are required to comply with federal norms defined in the Vocational and Technical Education Act (2006) that requires institutions to raise the proportion of graduates with degrees, the proportion of graduates in industry, and the proportion of those who continue to graduate studies. Colleges' indicators are evaluated by federal norms, but they do not receive bonuses for meeting goals (Sharma, 2004).

Moreover, each state has its own measures for evaluating the performance of its public institutions, both colleges and universities. Dougherty and Natow (2009) reviewed the number of states that opted for performance-based budgeting during 1979-2007 and concluded that these total 26 states. Nonetheless, the review shows that as of 2007, a large proportion of the states abandoned this method of budgeting and, at present, only 14 still use it. The researchers suggest that this is due, among other things, to the sharp drop in state funding of higher education as well as the lack of support for continued outcome-based funding by institutions of higher education and by business communities.

US states that still maintain a strong link between budgeting and resources tend to use varied indicators that reflect the significance given by the state and policy shapers to certain educational outcomes (Toutkoushian & Danielson, 2002). Toutkoushian and Danielson (2002) summarized the main indicators for evaluating research outcomes and input (see Appendix 1). The most prevalent input and output measures in US education include the number of publications per faculty member and the number of degrees awarded (outcomes) as well as the rate of graduates, average duration of studies, research foundations, student satisfaction, extent of donations, and other outcomes.

Canada

Until 1995, higher education was funded by the federal government of Canada directly through transfer payments. Previously, the federal government sponsored mainly research activities at universities and funding was transferred to the various institutions as a global budget. In 1995, the federal government decided to change the budgeting method to enable more extensive monitoring of research. This change included separating budgeting for research and for other needs of the institutions, including teaching (Shanahan & Jones, 2007).

Funding of higher education with regard to the teaching component in Canada, excluding research, comes from two channels - the government and tuition paid by students. Over the years, the ratio between these two funding channels grew. For example, in the 1960s and 1970s, the government covered 90% of the budget; in the 1980s, 84%; and in the 1990s and 2000s, 60%. Today government funding covers 57% of the total budget. As a result of the decrease in government funding, tuition gradually increased by 50% from 2002 to 2012. At present, the Canadian government awards most of the budget as grants for projects, covering 50% of project costs. This funding model, called the "Cost Sharing Model", requires governments of the provinces to invest their own money in order to receive the support of the federal government. If the province chooses to cut costs, federal funding will diminish accordingly. As a result, institutions must find funding in the province government or private resources (Canadian Federation of Students, 2013). In addition to its part in covering costs, from 2004 and due to pressure from the provinces, the government decided to transfer budgets to institutions of higher education in the form of block grants. This budget is provided in only two fields - health (Canada Health Transfer) and social sciences (Canada Social Transfer). The federal government transfers funds to institutions to develop these programs, but, in practice, there is no mechanism supervising the allocation of these resources within the institution and it is free to channel the funds as it sees fit (Canadian Federation of Students, 2013).

Funding for research comes from the federal government and is allocated by three different agencies (see Appendix 2) - The Canadian Institutes of Health Research (CIHR), the Networks of Centers of Excellence of Canada (NCE), and the Canada Foundation for Innovation (CFI). Universities and researchers submit requests to the various agencies who grant scholarships or funds according to the research plan. Each agency has its own criteria and requirements for funding research projects.

Due to the federal budgeting method, performance is evaluated on the provincial level rather than on the federal level. For example, in the Province of Alberta, some 13 performance indicators have been introduced since 1996 to determine the scale of the budget, including, among other things, number of students, satisfaction of graduates, employment rate of graduates, demand for the program, costs of the program, etc. Public colleges, in contrast, have only five indicators for determining the scale of annual government grants. An institution of higher education in Alberta can increase its core budgets by up to C$1.5 million if it meets the criteria (Sharma, 2004). Nonetheless, the significance of performance-based funding is relatively marginal. It is a bonus or a prize awarded to schools rather than a reliable source of funding.

Europe

Beginning in the 1980s, the European system of higher education was required to incorporate changes in its method of budgeting institutions and research. These requirements created a system that stresses, today more than ever, external funding of universities, competition between institutions, and the need for a more practical and economic approach to evaluating research and teaching outcomes (Tammi, 2009). In general, it is possible to describe the European model as characterized by high commitment to research and development and extensive investment of public funds in higher education (Docampo, 2007). Nonetheless, over the years the outcome-based funding approach emerged in many European countries as well. At present, funding methods in Europe are highly diverse; some countries adhere to the traditional model while others have chosen to fully embrace outcome-based funding.

UK

Higher education in the UK is funded by a double system of support that combines general funding of the institution with grants and contracts. The Higher Education Funding Council (HEFCE) is responsible for funding and for evaluation of the institutions' performance. Over the last decade this agency developed methods for evaluating research that are considered the most advanced in Europe (Tapper & Salter, 2004) as well as methods for evaluating the quality of teaching (for a more extensive review see: Cave, 1997). In principle, the country channels 24% of the total budget to research and 76% to teaching. Allocation of budgets to each institution for research is achieved by evaluating the quality of research, both on the level of the individual researcher and on the institutional and national level. The Research Assessment Exercise (RAE) is part of the HEFCE and is responsible for the evaluation. The RAE rates the quality of the research units - a rating that forms the basis for HEFCE resource allocation. The evaluation process makes no distinction between applied research and theoretical research, which receive the same weight. For example, applied research in medicine receives the same grading as research in the humanities. The evaluation process uses the peer review method, with university research activities divided into six units of assessment (UoA). A group of 6-15 experts, who form the reviewer panel of the research unit, is responsible for each unit. Each year the panel receives detailed information on the faculty's performance - scientific publications, number of research students, details of revenues and external funding sources, description of the research environment, and more. Based on this information, the panel reviewers assess the quality of each department on a scale of one to five stars. The global funding of each unit is determined by this rating (HEFCE, 2012). The directives limit the average number of publications per department to four publications a year for each faculty member as part of the policy that seeks to emphasize quality over quantity and to limit what the British call "rush publications".

Funding of the teaching component is covered by student tuition and by the global grant awarded to institutions by the HEFCE. The size of the grant is determined by indicators evaluating the teaching component. The main indicator is the number of students from the UK or the European Union (foreign students are not counted). In addition, institutions receive funding according to the number of students who complete their studies. Budgeting by the number of students is differential depending on the various subjects and levels. For example, science students who need a laboratory will receive higher funding and students for advanced degrees will receive higher funding than students for lower degrees (HEFCE, 2012). In addition, the UK Quality Assurance Agency follows the Quality Code for Higher Education which includes, among other things, nine indicators for assessing the quality of teaching at the various institutions, constituting a type of declaration about the requirements. Two examples are: "Higher education providers articulate and implement a strategic approach to learning and teaching (a goal- and outcome-based approach) and promote a shared understanding of this approach among their staff, students and other stakeholders" (Indicator 1) and "Learning and teaching activities and associated resources provide every student with an equal and effective opportunity to achieve the intended learning outcomes" (Indicator 2). The code provides standards demanded of academic institutions. These are "the system of expectations required of all institutions of higher education in the UK" (HEFCE, 2012). The Quality Assurance Agency that monitors the work of the institutions uses this code as a main reference point for assessing the institutions and for writing its reports.

Norway, Sweden, And Switzerland

In Norway, as in many European countries, tuition is very low or nonexistent, with all funding coming from taxes. For this reason, in 2003 a "quality reform" was enacted, with the aim of linking government funding of the institutions to performance in teaching and research (Nyborg, 2002). In the new reform, the budget is divided as follows: 25% of the budget, on average, is awarded based on teaching outcomes; 60% based on research outcomes; and 15% based on the institution's basic expenditures. The teaching component is budgeted by the number of students who pass their exams and the number of degrees awarded (Frolich & Strom, 2008). The research component is budgeted by outcome indicators that include the proportion of doctorate degrees awarded (30%), funding provided by the European Union (20%), funding provided by the Research Authority (20%), and number of scientific publications (30%) (see Appendix 3) (Fägerlind & Strömqvist, 2004).

In Sweden, the resource-based budgeting model was implemented in 1993. In regard to the teaching component, each institution receives resources based on the annual number of both registered and graduating students. Nevertheless, each institution has a budget ceiling for the teaching component such that beyond a certain sum, the institution receives no added funds for admitting students. Institutions may allocate the resources to the different faculties as they see fit. Internal allocation of resources is usually performed in the "uniform price tag" method such that each field has a set budget. For example, there is a difference between the budgeting of the teaching component in the social sciences versus the humanities or the exact sciences. Courses are budgeted according to their discipline and not according to their study level, location, or size. Some claim that such a budgeting policy causes institutions to hesitate to develop innovative or experimental courses anticipated to have a low number of credits (Fägerlind & Strömqvist, 2004). In contrast to budgeting of the teaching component, the budgeting of the research component in Sweden is very competitive. Research funding is channeled by the National Research Embassy (NRS), which receives requests and proposals from researchers operating in traditional and non-traditional institutions of higher education (Fägerlind & Strömqvist, 2004). Allocation of resources is based on the proposals and the task orientations submitted by researchers and institutions and is limited to certain fields. Accordingly, resources are not allocated equally to the different disciplines.

In Switzerland, most of the universities' funding comes from the government and consists of 85% of the entire budget. This budget does not depend on performance and is awarded to the institution annually on a regular basis, aside from accumulative changes determined by the government. The prevalent approach in Switzerland is that maintaining regular resource allocation ensures academic freedom, perceived as an essential condition for research stemming from inquisitiveness and long-term development (Liefner, 2003). This outlook is also embraced within the institutions as internal distribution of the budget is based on the number of lecturers in the department and faculty. Lecturers' positions are usually constant and, therefore, the internal distribution of the budget, as well, remains more or less constant (Liefner, 2003). Thus, in Switzerland, there is no implementation of performance indicators – neither for teaching nor for research.

In Finland, the new Universities Act was enacted in 1997, increasing the internal autonomy of universities while at the same time setting an outcome-based model assimilated in the internal resource allocation model of the universities. This act introduced competition into the universities, although some claim that it was externally enforced (Tammi, 2009). Budgeting in Finland, also called "outcome-based budgeting", is a government implemented approach to resource allocation, whereby budgets are awarded based on achievements and outcomes. In Finland, there is no separation between budgeting for teaching and for research. There are several indicators determined as outcome measures which include, among other things, the number of doctoral students, the number of master's students, the number of credits taught by lecturers, the scope of external funding, and the number of publications. Based on these measures, the Ministry of Education first allocates a budget for each university and then a budget for each faculty and department. Due to this budgeting method, each university, faculty, and department is required to retain an enormous amount of data that constitute empirical measures of the resources invested and the outcomes and applications attained (Fägerlind & Strömqvist, 2004).

Germany

The government budget forms the majority of the higher education budget in Germany. This budget constitutes 80% of all revenues of the institutions, while 18% come from external funding and only 2% from operational profits. Due to the high dependency on government funding, from the 1990s the federated states (Länder) began to implement outcome-based models in higher education. In principle, every independent state can make its own decisions about allocating resources; therefore, there is no single German model. Nonetheless, 11 of the 16 states use a funding formula for resource allocation (see Appendix 4). For example, in Hesse and Brandenburg, 95% of the budget is awarded based on performance indicators, while in Mecklenburg-Vorpommern and Bavaria, only 5% are allocated thus (Orr, Jaeger & Schwarzenberger, 2007).

Regarding the teaching component, the most common performance indicators are the number of students and the number of MA students. These indicators are applied very diversely in the various institutions; for example, the number of students in the first semester, in several semesters, or the number of students currently studying in a certain discipline. Sometimes the indicators are applied only to students who earn degrees in the standard study duration determined for the discipline. In addition, some teaching-related performance indicators reflect international tendencies in education, such as the proportion of foreign students at the institution. With regard to the research component, the indicators focus mainly on the institutions' revenues from external sources, with the type of source evaluated by importance. For example, public revenues have a higher weight than private sources of funding. Other prevalent indicators for evaluating research performance are the number of doctoral and post-doctoral students. Surprisingly, the number of scientific publications serves as a measure of performance only in Bavaria, as of 2005. In general, most German universities emphasize teaching more than research due to a lack of consensus regarding the proper weight of various publications (Orr et al., 2007).

Russia

The budgeting of higher education in Russia, similar to the other former Soviet states, is fully supported by government funding. The prohibition against charging tuition is anchored in the Russian constitution, which states that students should not be charged tuition (Johnstone, Arora & Experton, 1998). Within this constitutional constraint, post-Soviet Russia was required to find ways of funding higher education. In 1992, it was determined that organizations and industries could be charged tuition – but not "real people". In 1994, it was determined that the number of those studying free of charge should not exceed 10% of all students registered. Despite the flexibility and the legal loopholes, Russian higher education still had to perform a series of cuts and changes in order to survive despite the lack of resources.

In 2003, a reform was enacted in the budgeting of Russian higher education in order to reduce the budgeting of local education and increase its efficiency, to decrease the burden on the taxpayer, and to transfer responsibility to the institutions and the students. Until that time, budgeting was global and federal. In 2003 an initial attempt was made to implement the performance-based budgeting method. The reform determined that institutions would be required to justify their budget by writing reports and reporting actual performance. Each institution was required to submit a yearly budget proposal based on annual goals and targets. The budget proposal is backed by a report listing the strategic goals of the institution, its general aims, the institution's functions, presenting input versus output, as well as performance indicators and goals. The government ministries approve the budget according to the correspondence between the required budget and the performance report (Timoshenko, 2011). The government also developed questionnaires aimed at evaluating this correspondence in reports submitted by the institutions.

Despite the attempt to include performance indicators in methods of resource allocation, little progress was achieved in linking performance to budget allocations, developing modes of reporting, and evaluating performance (Belyanova, Hovland & Lavrov, 2007). This means that, in practice, performance-based budgeting was not fully implemented in the country's higher education institutions. The main reason stated by Belyanova et al. (2007) for the difficulty in implementing the reform is the formulation of overly-general performance indicators that are hard to measure. Nonetheless, theoretically and fundamentally, Russia has set itself a goal of emulating the West's method of budgeting institutions of higher education, and this is evident in extensive legislation (Belyanova et al., 2007) aimed at linking government budgeting to the institutions' performance as much as possible.

Australia

Australia began to express interest in the connection between budgeting policies and resource allocation – and between academic achievements as early as the 1960s. This interest grew in the 1990s with the emphasis of policy research on outcomes in higher education (Sharma, 2004) and with the establishment of the agency for quality assurance of university outcomes (Australian Universities Quality Agency – AUQA). In some Australian universities, budgeting is on two levels - department and faculty, with the aim of combining the process of internal resource allocation and strategic planning. First, all the university's revenues from all sources of funding - public and private - are evaluated. In addition, costs of project proposals and innovation that departments seek to develop are taken into consideration. The proposals reach the management, which considers the teaching costs of each department. The management decides which fields it wishes to develop and to fund. In 1999, when the budgeting method based on research outcome on the departmental level was first introduced, some departments were adversely affected. Therefore, a decision was made that, together with continued assimilation of outcome-based budgeting, competition for funding would be divided in two – on the research level (81% of the overall budget) and on the departmental level (19% of the overall budget).

Budgeting of research was performed on a quarterly basis for research institutions and departments, based on outcome, while budgeting of Bachelor degree programs was based on teaching and learning and includes four identically-weighted indicators - evaluation of the subject, students' progress, employment rate of graduates, and placement of the faculty in the national teaching survey. Budgeting of the research component in Australia, as of 1995, is based on number of publications, particularly those cited in the ISI. Criticism toward this type of evaluation was that this approach encourages quantity at the expense of quality. The new organization set itself a goal to evaluate research quality by implementing additional indicators, not including number of publications or citations. The organization examines extensive research activity, including not only publications, but also participation in conferences and publishing books.

Israel's Budgeting Model

In Israel, higher education institutions receive most of their budget from the government in the form of an annual grant without requiring them to detail how this grant will be utilized and entitling them to use it at their exclusive discretion (aside from the obligation to provide full budgetary reports throughout the year). In addition to the global budgetary grant, each institution is also budgeted by outcome indicators. Unlike the global grant allocated for the regular operational expenditures of the institution, outcome-based budgeting is provided to each institution based on its performance (Council for Higher Education, 2012). The budgeting model operated by the universities includes two components - teaching and research. In the colleges, the budgeting model includes only the teaching component, adjusted to these institutions (Kirsch, 2010). In the teaching component, institutions are rewarded by how close they are to the student/faculty ratio determined by the PBC (21.5 for universities and 35.5 for colleges) and by the rate of graduates who complete their studies in the standard number of years. The institution's progress is examined annually, as well as its normative teaching budget, calculated by the number of students, the number of graduates, and the updated normative rates, multiplied by a formula that reflects how close the institution is to its goals. The closer the institution gets to the goal, the larger the relative part it receives of its normative teaching budget, up to a maximum of 100% of its normative budget when it reaches the goal. Evaluation of teaching outcomes is based only on data consisting of student numbers and disciplines. In the Israeli model, there are no indicators that refer to the quality of teaching, such as satisfaction surveys. The universities themselves hold such surveys each semester, but ranking of lecturers, faculties, or institutions for teaching holds no weight in the budgeting model. In the current model, the teaching component is evaluated quantitatively to cover the costs of teaching. The student/faculty ratio is considered an indicator that reflects the quality of teaching, under the assumption that the less students there are in a class, the better the quality of the teaching.

The research component is based on competitive resource allocation and calculated by the relative ratio between each university and all other universities in Israel. The five outcomes calculated according to the outcome rate are receiving competitive research funds (34.0%), receiving other research funds (15.0%), training research students for PhD degrees (15.0%), publications in scientific journals (34.0%), and MA graduates in the research track with thesis (2.0%). Each component has a relative weight reflecting its relative significance in determining

distribution of the budget. In this hierarchy, the two main outcomes in the research component are receiving competitive research funds and scientific publications.

Together, competitive funds and publications comprise about 68% of the outcome-based research budget, while the rest of the components comprise less than one-third of the entire budget. This budgeting model reflects an attempt to encourage research outcomes and particularly outcomes perceived as "representing a significant part of the outcomes of scientific work…while undergoing external academic judgment that is mostly international" (Council for Higher Education, 2012, p. 69).

RECOMMENDATIONS

Table 2 lists possible criteria for budgeting the component of enhancing teaching quality in Israeli institutions of higher education. The individual pricing of each component should be performed by professional entities such as the PBC staff. This proposal does not seek to replace the existing Israeli system structuring the teaching and research components. The proposal suggests an addition to the current budget, based on the quality of teaching as measured by several parameters listed in Table 2.

Other indicators that should be used to measure the quality of learning are the rate of graduates who continue to MA and PhD degrees; the mean achievements on entrance exams to MA studies, where relevant, such as the GRE Psychology test; and the rate of graduates licensed in their professions, where relevant, such as law, accounting, etc. The problem is that Israel has no uniform national entrance exams in most disciplines and therefore they cannot be used to compare between institutions.

Table 2: Suggested Criteria For Budgeting The Component
Of Enhancing The Quality Of Teaching In Israeli Institutions Of Higher Education

	Activity	Budget Key
Personnel	A faculty member with a PhD in education and a teacher's certificate should be in charge of the quality of teaching at the institution.	Part-time position
	Staff: teaching advisors, teaching and ICT (information and communication technology) division, video team	One position
Promoting Processes Of Teaching And Evaluation ***Hours Of Contact= No. Of Workshop Participants Multiplied By No. Of Workshop Hours**	Feedback on faculty members' level of teaching	No. of students, rate of respondents, statistical processing
	Workshops for improving teaching Continuing education programs and study days Personal support and individual guidance for faculty	*Number of faculty members who participated in workshops every year *Number of contact hours received by faculty members* *No. of teaching assistants and lab assistants at the workshops *No. of contact hours of teaching assistants, etc. *Group workshops by faculty/school, by new and veteran faculty members, by feedback – to advance the faculty *No. of participants in individual guidance *No. of hours of individual guidance
	Activities for encouraging excellence in teaching: appreciation certificates, publicizing outstanding workers, examples of good teaching on the internet, financial reward for faculty members for excellence	*Number of outstanding lecturers *Proportion of outstanding lecturers, no. of financial reward recipients, total sum of rewards
	Checking exams *Multi-choice type: scanning exams and generating grade reports – including scanning multi-choice forms and generating reports of scores and of various statistical data. *Open-ended type of exam Bettering exams while maintaining their reliability	* No. of students, guidance for writing exams, statistical processing

	(including helping faculty members develop multi-choice exams). Steps are taken to prevent grade inflation on the level of the institution (in the institution's regulations and not only incidental examples).	
Producing Study Materials	Help and support with publication of teaching materials (readers and textbooks)	*No. of textbooks published each year, no. of readers
Integration Of Technologies In Teaching	Use of technologies to advance teaching, videotaping classes for students, videotaping classes to advance lecturer's evaluation	*No. of courses videotaped in full, average no. of semester hours of these courses ICT study materials – their use by no. of courses in the system, number of lecturers, nature of materials
Advancing And Improving Learning	Academic support of students with the aim of preventing dropout, personal training, "group heads" – students tutor students	*No. of student tutors, total no. of hours tutored per year
Quality Assessment	The center's activities are accompanied by assessment studies aimed at improving, developing, and measuring the effectiveness of each project, coordinating quality assessment and teaching advancement processes, graduate surveys to follow the effectiveness of learning and its outcomes (their success in the field), comparative surveys in a certain discipline between parallel Israeli departments	*Workshops, study days, statistical processing, number of questionnaires processed
Research activity in a certain discipline	Encouraging research and research grants in this discipline. Initiatives for inter-school collaboration in this discipline in Israel and abroad. Leading educational projects and conducting research	*No. of articles published by the faculty on academic teaching and its advancement in Israel and abroad

SUMMARY AND CONCLUSIONS

A review of public policy on the funding and budgeting of higher education institutions in Israel and abroad shows that most institutions use outcome indicators, to some degree, in order to determine the allocation of resources. Outcome indicators constitute a means for evaluating the two main functions of universities - teaching and research. Evaluation of the quality of teaching is performed by a wide variety of indicators, which include the number of students, the rate of graduates (Archibald & Feldman, 2008), the rate of those employed, satisfaction of graduates, grades on licensing exams, etc. Evaluation of the quality of research is measured by indicators such as the number of publications in scientific journals, the number of citations, scope of external funds, participation in conferences, and more (Shin, 2010).

Table 3 summarizes the main criteria for performance-based budgeting in institutions of higher education in several countries. In international rankings of academic institutions, indicators refer mainly to research outcomes and less to learning outcomes. This table is not related to budgeting, but it gives an indication of the parameters that serve to measure academic excellence. It is interesting to compare between the US and Russia in their attitude to teaching. In the US, PhDs who teach in schools of higher education are not required to have a teaching certificate or teaching-specific training, but the quality of their teaching is evaluated by American students. In contrast, in Russia PhDs are required to have a teaching certificate, but the quality of their teaching is not evaluated by Russian students. This indicates a paradox, a contrast between the demands for training versus the demand for student evaluation in the two countries.

Considering the current budgeting model in Israel, Israeli student organizations claim that the model gives insufficient attention to encouraging advancement of the quality of teaching; namely, not enough attention is given to the quality of teaching in lectures, advanced learning methods, student feedback, etc. An index, such as student-to-lecturer ratio (which has a major place in the budgeting model), does indeed mean smaller classrooms, albeit indirectly, but this is not necessarily so and the diversity is considerable, both in the number of teaching hours per lecturer and in classroom size.

Table 3: Main Criteria For Performance-Based Budgeting Of Institutions Of Higher Education In Several Countries

	No. Of Students	Rate Of Graduates	Employment Rate Of Graduates	Occupation And Proportion Of Those Continuing To MA Studies	Funding By The State	Research Measures	Research Students	No. Of Publications	Costs Of Programs	Other Criteria	Comments
US		v	V	v		x	x	x			Varies significantly between states
Canada	v		V		X	X		X	v	Graduate satisfaction	Given as bonus in addition to basic budget
UK	v	v			x	x		x			Limited to 4 publications per person annually
Norway	v	v			x	x	x	x			
Sweden	v	v				x	x	x	x		
Germany	v			v	X					Proportion of foreign students in the school	
Australia			V					X	Evaluation of the program's subject	Placement of faculty in national teaching survey Student progress Participation in conferences and publishing books	
Russia					X						Required to submit performance report to federal government
Israel	v	v		v	v	v	v	v	By discipline	Payment by student/faculty ratio set by PBC (21.5 at univ. and 35.5 at colleges)	

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APPENDICES

**Appendix 1: Common Performance Indicators In US Higher Education (From Toutkoushian & Danielson, 2002)**

Category	Common Performance Indicators
Input	Student headcounts
	Percentage from underrepresented race/ethic group
	Average SAT/ACT scores of freshmen
	High school GPA or class rank of freshmen
	Percentage of applicants who are admitted
	Percentage of admitted students who enroll
	Average faculty salaries
Production Process	Expenditures per student
	Student-to-faculty ratio
	Credit hours per faculty member
	Percentage of courses/students taught by tenure-track faculty
	Expenditures per student by major Category
	Revenues per student by major Category
	Level of deferred maintenance
Output	Number of faculty publications
	Number of degrees awarded
Outcomes	Reputational rankings (e.g. USNWR)
	Percentage of alumni who have donated to the institution
	Retention rates (2, 3 and/or 4 years)
	Graduation rates (4, 5 and/or 6 years)
	Average time to degree
	Research grant dollars received
	Student satisfaction (from surveys)

**Appendix 2: Scope Of Funding Provided By The Three Research Agencies
By Province In Canada (Higher Education Quality Council Of Ontario, 2013)**

Rank	Province	Funding Per Faculty	Percentage Share Of Funding	Percentage Of Canadian Population	Total Funding
1	QC	$ 58,404	26%	24%	$ 562.4M
2	ON	$ 52,648	40%	38%	$ 858.5M
3	BC	$ 50,113	14%	13%	$ 306.9M
4	AB	$ 39,820	9%	11%	$ 193.0M
5	SK	$ 33,958	3%	3%	$ 56.4M
6	NS	$ 28,656	3%	3%	$ 62.2M
7	MB	$ 27,513	2%	4%	$ 48.9M
8	NL	$ 24,043	1%	2%	$ 22.7M
9	NB	$ 18,710	2%	2%	$ 23.0M
19	PE	$ 12,808	0%	0%	$ 3.2M
Canada		$ 47,561	100%	100%	$ 2,137.1M

Sources: CIHR Search Engine, NSERC Search Engine, SSHRC Search Engine And Statistic Canada. Table 477-0018-Number Of Full-Time Teaching Staff At Canadian Universities, Canada, Provinces, Annual, CANSIM Database. Census Canada, 2011

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Appendix 3: The Weight Of Various Indicators (%)
In Performance-Based Budgeting At Norwegian Institutions Of Higher Education (Adapted From Schmidt, 2012)
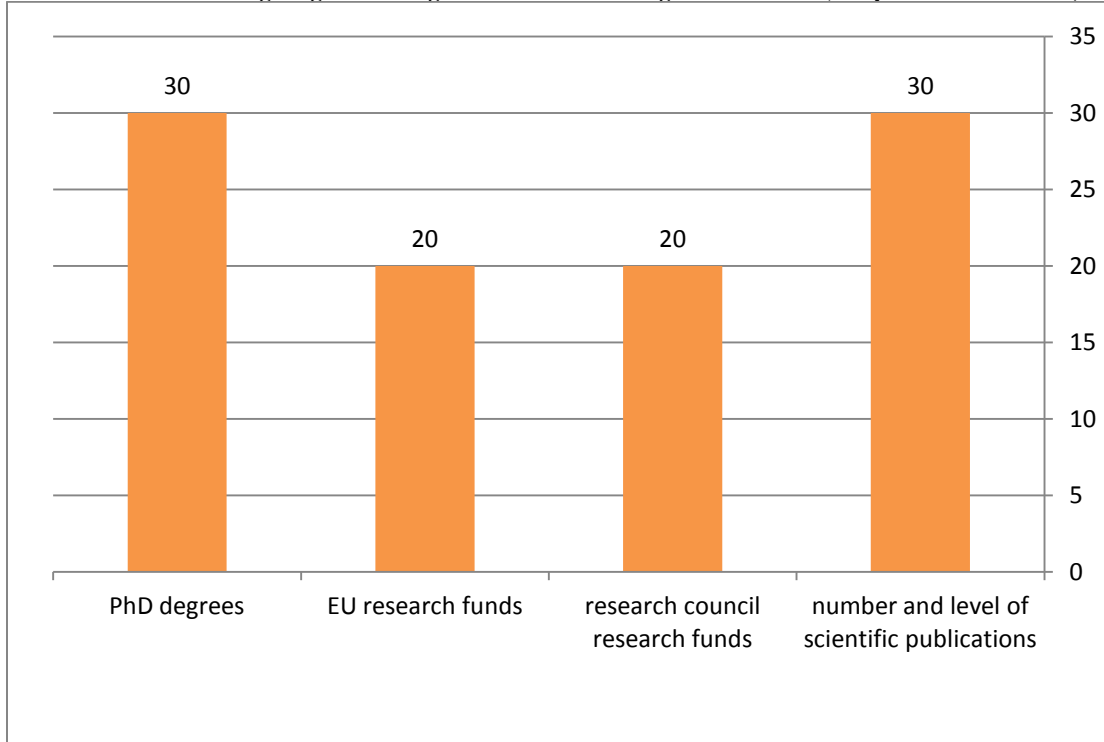
Appendix 4: Proportion Of Outcome-Based Budget
In Each Of The German Federated States (From Orr Et Al., 2007)

Bavaria	3%
Mecklenburg-Western Pomerania	3%
Bremen	5%
North Rhine-Westphalia	14%
Berlin	15%
Thuringia	15%
Baden-Wurttemberg	21%
Hamburg	88%
Hessen	95%
Brandenburg	95%
Rhineland-Palatinate	95%