

Quality Assurance of Engineering Education in Private Universities in Jordan*

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The limited capacity of the seven state universities in Jordan cannot accommodate the ever-growing demand for higher education among secondary education graduates. Private universities seem to offer a solution. However, these educational bodies are operated on a commercial basis. Certain aspects of the private universities that stand in clear conflict of interest are highlighted. The business side of the new bodies seek the least possible expenditure while the quality of the educational process is demanding. The imposed accreditation values are designed to comprise a set of minimum requirements that satisfy all aspects of concern. The Jordanian experience in highlighting the conflicts when running private profit making universities provides invaluable data for the neighbouring countries which are following the Jordanian model.

INTRODUCTION

JORDAN plays a leading role in running profit-making universities in the Middle East. Twelve private universities were founded in Jordan in the last decade. These, unlike private universities elsewhere, are run on a commercial basis. The present paper will focus on the values of accreditation in an attempt to enhance the quality of graduates on the one hand and to permit the right of a commercial company to run a successful and profitable business on the other. The different colleges in these emerging universities are growing simultaneously; therefore it is difficult to single out the colleges of engineering. However, while introducing the criteria of accreditation special attention will be paid to those values that are relevant to engineering.

The number of general secondary education graduates in Jordan is greater by far than the capacities of the seven state universities in the country. The financial resources of Jordan are very limited, therefore, expanding the existing state universities or founding new higher educational institutions without foreign financial support is not attainable. The surplus of students goes for enrolment in foreign universities. This causes, for a developing country like Jordan, both social and financial problems. It is recognised that native capital may play a considerable role in solving this problem. However, private capital would mobilise its financial capability only if private schools would be operated on a commercial basis. Hence, the concept of profit-making universities emerged. Ending the continuous flow of hard currency abroad and creating job oppor-

tunities became incentives for the Council of Higher Education as well as the Jordanian government to grant local capital the opportunity to contribute to the educational process.

The Council of Higher Education (CHE) in Jordan took the initiative of granting licenses to private universities at an early stage compared with neighbouring countries. The first private university was founded in Jordan in the year 1990. Thus, Jordan gathered rich experience in encountering the problems associated with the nature of profit-making private universities.

The owners of the university have first to register as a regular commercial company. The administrative board of the latter, called the board of managers, along with the Council of Higher Education assigns the board of trustees. The university operates in a very delicate and balanced plan where the newly born body has to obey the laws and guidelines of commercial companies and to satisfy the accreditation values of the temporary law for private universities [1, 2].

The council of higher education is concerned with two forms of accreditation: the general accreditation of the university and the department or program oriented accreditation. The first form of accreditation is based on the structure of the university, leading to the determination of the largest number of students the university is permitted to accommodate. Further, it is oriented towards providing a study and research-friendly campus. Assuring the availability of the minimum required facilities and observing the faculty/students ratio are major concerns of the general accreditation. The second form cares for guaranteeing an advanced level of education in the respective program. The values and objectives of the general accreditation will be investigated below.

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The author gained unique experience, through his activities as head of eight accreditation committees, in verifying the implementation of the values of accreditation on eight private Jordanian universities.

ACCREDITATION TASKS

The general accreditation values can be classified into two groups: the bylaws and structure of the administrative councils, study plans, and requirements of graduation and the university size-determining values. The second group handles the following criteria:

1. The faculty/student ratio.
2. The overall available classrooms and their sizing.
3. The library.
4. The general and specific facilities.

Each of these criteria will reveal a number of students that the university can register. The lowest number of students in any one criterion is the maximum number of students that the university will be licensed to accommodate. The first group consists of a collection of bylaws and regulations that the private university should abide by.

Administrative structure

The structural composition of the university administration includes two major boards: the board of managers representing the business side of the private educational body, and the board of trustees which supervises the academic running of the university. The composition of the board of managers is the sole business of the company that owns the university. It usually consists of the major shareholders.

The guidelines [4] of the Temporary Law [2] state that the board of trustees consists of 15 members: the president of the university, two members to be nominated by the CHE, and 12 members that are recommended by the owner and approved by the CHE. The latter 12 members are assumed to be of high calibre and to possess considerable experience. It is conditional that five members of the board of trustees are affiliated with Jordanian state universities, with academic ranks which are associate professor or higher. It is anticipated that the state universities are strict in recruiting faculty and their presence on the board of trustees of private universities is an asset towards enhancing higher quality of education. The representation of the owners on the board of trustees should not exceed one-third the total number of members. Well-balanced composition of the board of trustees has a positive influence on the performance of the university. Among other mandates, the board of trustees is a policy-making unit when the budget and expenditures are in debate. It is noted that the owners of a

profit-making university tend to want to minimise their expenditure. This tendency, however, should not affect the quality of education in an adverse manner.

The guidelines [4] describe in details the composition of the councils of the university: University Council, Deans Council, College Councils, and Department Councils. The structure of these councils is classical and of academic nature, therefore, a list of their members is utilised for the accreditation process to verify their existence and the precise number of active faculty, to control their areas of speciality, and to avoid double assignments.

To favour objectivity in selecting high calibre academicians for the leading administrative posts the aforementioned guidelines demand that the board of trustees recommends candidates and the CHE approves them. To promote continuity and smooth transfer of offices the guidelines prescribe the term of each post: president, vice-presidents, and deans are to serve in office for four, two, and two years, respectively. Heads of departments are subjected to annual assignments by the president upon the recommendation of the respective dean.

All terms are renewable based on need and excellent performance. However, poor assignments especially in the case of presidents were sometimes observed. It seems that the owners are inclined to push for personalities such as a former minister or ex-president of a state university regardless of their credibility. They are aiming at smooth running of their institutes. This tendency influenced, in some cases, the quality of education in an adverse manner.

From the business point of view private universities prefer to offer their faculty annual contracts. This endangers smooth and consistent running of the educational process. In some cases faculty members were dismissed shortly after the university was granted accreditation. Further, it was possible to reduce unnoticed the faculty within the span of time left to the next accreditation. To favour continuity and maintain an acceptable faculty/student ratio the guidelines [4] require that the probation period for a newly hired faculty member should not exceed one year and that at least 50% of the faculty in each program should be in possession of three-year contracts.

ACCREDITATION VALUES AND THEIR IMPACT

The temporary law [2] of private universities prescribes a set of accreditation values that represents the minimum acceptable criteria for apportioning the space, personnel, and facilities. Ambitious owners and/or board of trustees that are targeting a rather luxurious campus along with more convenient facilities, and relaxed faculty/student ratios may choose to exceed the given values.

Values relevant to space

- *The total land area of the campus is based on the rate 40 m²/student for the first college and on 35 m²/student for the later founded colleges. The administrative building, or a major part of it, is to be completed along with the first college. In practice, it showed that private universities are founded in stages. As for meeting this criterion the accreditation committees faced two attempts to bypass the spirit of the land criterion. When the university starts with two colleges or more, the accreditation committee would find itself under pressure to consider the smaller college as the first college. The second observation is that the owners purchase enough land, however, all the buildings are gathered in one spot of the campus. Part of the land is used ineffectively. The modified law [2] in its guidelines [3] countered this irregular utilisation of the campus through requesting that the green area between the buildings should be 25% of the total area of the campus or 100% of the built up area whichever is larger.*
- *The maximum number of students in any laboratory should not exceed 20 students and 3m² minimum of laboratory area should be assigned for each student. This requirement leads to a standard size of laboratory that can be found in all the private universities.*
- *The classrooms in engineering, medical-related disciplines, and science colleges should not accommodate more than 40 students. The upper limit for humanities is 60 students per class. The area assigned for a student in the class should be a minimum of 1.5 m². Thus, two sizes of classrooms can be expected, namely a classroom of 60 m² for the science classes and 90 m² for the humanity classes. Difficulties were registered when a science college and a humanity college share the same building. The university would press towards increasing the number of classrooms that are assigned for humanity studies. This attitude can be explained in light of the fact that the accumulated capacity of classrooms is a determinable factor in calculating the overall capacity of the university. A building with pure science studies needs more classrooms to achieve the same capacity of a similar building where only humanity studies are offered. How to classify the classrooms in a mixed building is the subject of dispute between the involved partners. Conducting a classification that is based on the ratio of enrolled students is not precise as the number of students in each discipline might change from one academic year to another. The author suggested while practising accreditation to consider the number of faculty offices that belong to each discipline, then, to multiply this by the respective faculty/student ratio as defined in the temporary law. The ratio of the resulting number of students can be adopted in determining the number of classrooms of each of*

the aforementioned classroom sizes. The general trend is to keep the size of classrooms small; however, classrooms whose area is less than 30 m² are not permitted. The guidelines [3] allow consideration, for the purpose of calculating the total capacity of classrooms, one auditorium that accommodates 100 students in each college. One multipurpose auditorium that accommodates at least 200 persons is expected in every university. The latter is to be furnished with the appropriate audio-visual equipment and does not add to the capacity of classrooms.

- *Calculating the required total capacity of classrooms is based on the assumption that the maximum number of students present in the campus at any one time is 60% of the enrolled students. This occupation rate of students is the outcome of a study that was conducted on two private universities. A list of the registered students in all classes of each university, as they stand in the electronic files of the registrar, was obtained. The total number of students in each working hour of the day was determined. The figures obtained revealed that most students tend to register in classes between 9 am and 11 a.m. The maximum occupancy of classrooms during the aforementioned hours was found to be 60%. Partially occupied classrooms were considered in the analysis. This presence rate has been adopted as the criterion for determining the number of classrooms needed. In a reverse process, the same rate is used to determine the maximum number of students the university can accommodate based on the available classrooms.*
- *An area of 7.5 m² is assigned for every faculty member in a shared office. Single offices should have a minimum area of 9 m². It is not permitted to accommodate more than 3 faculty members in one office. Similar size of offices is recommended for the staff members. Comfortable sized faculty offices provide convenient surroundings to the faculty members and enhance their productivity. Further, the targeted size of offices allows more students to consult during office hours. The accreditation committees found offices, during their field visits, as small as 6 m². The latter offices were rejected and did not contribute to the approved capacity of the university.*
- *For every enrolled student an area of 0.8 m² should be assigned for the library. The resulting required area accumulates through adding the area of the principal library to those of the sub-libraries in the different colleges. The figure 0.8 emerged from the assumptions that 4 m² are assigned for every user of the library and that the overall area of the libraries in a university should provide seats for 20% of the registered students. As for machine shops, 60 m² are assigned for each activity. In light of the rate of 4 m²/student, no more than 15 students are allowed to take a part in any one session.*

Values relevant to faculty and education process

'The heart of any educational program is the faculty. All other matters are secondary to a competent, qualified, and forward-looking faculty that can give an overall scholarly atmosphere to the operation and provide an appropriate role model for engineering students' [6]. Therefore, it is essential to define who are the members of the faculty and to adopt reasonable faculty/student ratios. The guidelines [3] state that the faculty consists of the full-time members of the ranks, full, associate, and assistant professors, as well as the instructors. The latter are holders of a master degree in their field of speciality and has at least three years of experience in teaching at a university level. Full-time or part-time lecturers are not considered, for the purpose of general accreditation, as faculty members. It is noted that every faculty member adds a number of students, as given in the faculty/student ratio, to the overall capacity of the private university. It is intended to encourage permanent faculty to assure continuity.

- *The number of students that a university may enrol, based on the faculty criteria, is calculated in light of the following faculty/student ratio: colleges of arts, social sciences, and humanities in general 1:30, colleges of pure sciences and agriculture 1:20, colleges of engineering, pharmaceutical, nursing, and allied health. 1:15.* Some of the educational bodies founded only engineering departments and hired faculty members of a non-engineering speciality to take care of the university requirements. As the latter faculty members are available in greater numbers in the local market and can be recruited for lower salaries than the engineers, the private universities tend to inflate their number in the hope of getting licensed for greater capacity of registered students. A similar situation emerges when a university has colleges of humanitarian studies with little demand. To counter this dispute the author suggested an approach, based on the analysis of the study plan of the science programs, to determine the actual need for faculty members that teach non-engineering disciplines. The credit hours for the engineering study plan, for example, can be classified into engineering and non-engineering subjects, their ratio can be found, then based on the available engineering faculty the corresponding number of non-engineering faculty can be calculated. What exceeds this number of the non-engineering faculty cannot contribute to the overall capacity of the university.
- The Temporary Law [2] adopted a group of values that sought to control and promote the quality of education: *The number of instructors should not exceed 20% of the faculty members. The number of part-time professors should not exceed 20% of the faculty members plus the part-timers. The teaching load for a full professor is 9 credit hours (CH), for the associate and assistant*

professors 12 CH, and for the instructors not more 15 CH. Part-timers may teach up to a maximum of 6 CH. Faculty members, apart from instructors, may teach an extra 4 CH when necessity arises and they accept to do so. The practice showed that the private universities attempted to bypass these criteria in the following manner: appoint an excessive number of instructors; but even when exceeding the 20% limit they are not adding to the intake capacity of the university. The accreditation committee should reject any appointment of instructors beyond the 20% limit as the practice showed that extra class can be opened and assigned to virtual part-timers or assigned to faculty members under the misuse of the extra 4CH for necessities. The actual teachers, however, can be the illegally appointed instructors, in which case they then push for converting the latter 4CH to a regular teaching load and thus increase the calculated intake capacity due to the faculty criteria by one third. This is a clear violation of the faculty/student ratio, which should be strictly rejected by the accreditation committee. Further, it should be clear that the maximum teaching load of a part-timer is 6 CH. That makes the weight of a part-timer, as far as the intake capacity is concern, equal to a half of a full-time faculty member. Thus, the permitted physical number of part-timers is 20% of the total number of the teaching personnel while their weight in terms of intake capacity is limited to 10%.

University facilities

These are enterprises that include facilities such as restaurants, cafeterias, exhibitions, student union, classes furnished with audio-visual devices, residences for student activities and clubs, sports playgrounds, indoor sports halls, covered terraces and balconies, off-plan laboratories, computer centre, and prayer halls. It is assumed that providing the campus with the aforementioned facilities upgrades the social and scientific life within the campus. They are appealing and attract the students to spend more time on campus. One of the tasks for determining the intake capacity of a university, according to the Temporary Law [2], is the presence of university facilities. Therefore, weights are given for the availability and size of each facility as listed below in Table 1.

The facility 'restaurants – all classifications' is considered to highlight the approach of determining the conversion factors. The guidelines [3] state that the private university is to provide restaurants enough to accommodate not less than 32% and not more than 64% of the registered students. Four square meters are to be allocated for every student. Service rooms, for instance the kitchen, are included. The existing restaurants should provide room for 25% of the registered students at a time. To convert the total existing area of restaurants into intake capacity, the concerned area is divide

Table 1. Converting the area of existing general facilities into a number of students that the private university can register

Facility	Conversion factor Student/m ²	Limits as percentage of enrolled students.		Area available m ²	In-take capacity Students	Approved in-take capacity Students
		Lower limit	Upper limit			
Restaurants – all classifications	1	32	64			
Exhibition halls	1	4	8			
Prayer rooms	2	4	8			
Audio-visual	1.33	4	8			
In-door sport halls	0.8	0	20			
Covered terraces and balconies	0.67	0	8			
Off-plan laboratories	1	0	8			
Computer centre	1	0	8			
Each student club, society, or union	1	0	8			
Total intake capacity in terms of students =						

by four to find the number of students that can visit the restaurants simultaneously. As the resulting figure should represent 25% of the students, then, the total anticipated number of students that the restaurants should serve would be four times the existing number of seats. Thus, by means of simple calculation the conversion factor for restaurants is found.

To carry on determining the intake capacity of a private university utilising Table 1, an ultimate targeted intake capacity should be set, probably by the owner. The accreditation committee during the on-site visit measures the areas of the restaurants then the respective conversion factor is implemented to find the share of the restaurants in the intake capacity of the university due to the criteria facilities. If the obtained figure is less than the lower limit, the university will be notified either to increase the existing restaurant(s) or its intake capacity will be reduced to match with the available facility. On the other hand, any value that exceeds the upper limit will not be considered. The accumulated intake capacity of a university can be achieved through any combining of the weights of each facility interpreted in terms of students.

In practice, the owners of these educational bodies tend to over-size the relatively less costly facilities. It follows that one or a few facilities may play a dominant role in calculating the intake capacity of the university. Therefore, upper limits for some facilities are given by the guidelines [3] to assure diversity of facilities. Lower limits are set for facilities whose size should provide accommodation for a minimum percentage of the registered students. To encourage campus provision of distinguished but expensive facilities, lower limits are given while upper limits are removed.

Further sport facilities such as soccer, volleyball, basketball, tennis, and handball are assessed by unit. The area required for each of these activities should meet the international standards. While providing a soccer playground adds 120 students to the intake capacity, the other games add 60 students each. If multiple facilities for one or more of the aforementioned sports are made available,

then soccer contributes to the intake capacity with 200 students while the share of the rest is 100 students each.

University facilities with zero weight

The Modified Law of the Private Universities [2] and the relevant guidelines [3] require the presence of a set of facilities which have no impact on the intake capacity of the university. However, the absence of these facilities is considered a violation to the aforementioned law and guidelines. In such a case, the university would receive a letter of notification accompanied with a time limited request to remedy the deficiencies. If the educational institute fails to provide missing items, a financial fine or reduction in the licensed intake capacity may be imposed on the university.

These facilities include rest rooms, water fountains, green areas, parking places, water tanks, and drainage. It is required to provide a toilet bowl and a sink for every 50 students and for every 20 faculty and staff member. The university is to be furnished with a cold water fountain for every 60 persons. These are located in gathering points of students and staff. A total green area equal to 25% of the area of the campus or equal to 100% of the projected area of the buildings is foreseen. The university will provide sufficient parking areas that accommodate all the university vehicles, a parking place for every four of the faculty members, and a minimum of a parking place for every ten students. An area of 15 m² is assigned to an automobile, with 30 m² to a bus.

In addition to the irregular supply, there is a general shortage of water in the Middle East. Therefore, at least one water tank of 300 m³ capacity is demanded. In the case where the number of students exceeds 2000, an increase of 100 m³ in the storage capacity for every 1000 students is to be considered. If dorms are present within the premises of the university an increase of one cubic meter per student is required.

Due to economic reasons related to the cost of purchasing land, private universities are located at relatively remote places. Therefore, it is not rare

that connection to a public sewage network is not available. Consequently, a percolating pit of at least 200 m³ capacity plus a septic tank of 20 m³ are required. If the number of students exceeds 2000, the university should seek connection to the public sewage network or establish its own treatment station.

Discussion and analysis

General accreditation in the sense performed in Jordan does not, unlike program accreditation, handle the diversity of specialisations of the faculty members nor the contents of the study plan or the characteristics of equipment in the laboratories. It rather cares for the well-being of the students, faculty members, and staff. Further, it seeks to provide functional facilities and comfortable faculty/student ratio. A uniform scattering of the buildings over the entire area of the campus separated by appropriately sustained green spots is a targeted objective.

The Temporary Law of private universities provides a satisfactory detailed description for the administrative structure of the university. A well-balanced general accreditation, in addition, leads to a smooth performance of program accreditation.

The owners of the private universities in Jordan are so far real investors in the sense of a free market. A considerable number of them have no previous experience in the educational process. This is reflected clearly on the expenditures, e.g. budget items are allocated for tasks that just fulfil the requirements of accreditation. If the latter are left uncontrolled, requirements might be executed in the cheapest possible fashion.

The intake capacity of a university is based on five criteria, namely faculty, classrooms, library, offices of the faculty, and facilities. It is expected to consider the aforementioned values of accreditation when determining the intake capacity according to the said criteria. Each should provide the targeted intake capacity. In the early days of founding private universities in Jordan it was not possible, due to lack of experience, to get all tasks completed at one time. Therefore, the idea of putting weights for the different tasks and calculating an accumulated capacity was developed. In the case of the library, its weight was broken down to its three components; books, available area, number of provided seats.

Two scenarios for calculating the intake capacity are implemented: the accumulated approach and the lowest individual capacity of criteria. In the former approach, the concerned capacity of each criterion is to be multiplied by the weights:

faculty: 40%
 faculty offices capability: 10%
 classrooms capacity: 20%
 available facilities: 10%
 library: 20% (8%, 8%, and 4% are assigned to books, area, and seats, respectively).

Then the resulting number of students were added to form the approved intake capacity. It is noted that the so achieved capacity should not be less than the intake capacity based on the faculty/student ratios.

As experience evolved on both sides with the founders and the Council of Higher Education, a second scenario considering build-up was developed, i.e. that the intake capacity of each criterion is determined, then the approved capacity is the lowest of all criteria.

At the early stage of establishing a university, the buildings, facilities, and equipment consume great sums of the invested capital. Unfortunately, practice has shown that savings are made when faculty and staff are recruited. In general, junior faculty are targeted. Also graduates of Eastern or Asian universities, who faced difficulties finding affiliation with state universities, found employment in Jordanian private universities.

However, the completion of the buildings and the facilities as well as purchasing the basic equipment will soon be achieved. The real future competition as seen by the author will concentrate, if these universities want to survive, on recruiting faculty members of high calibre and known for their distinguished reputation. The genuine high-ranking programs are to be identified with the class of the faculty involved.

A final note on the frequency at which field visits and the general accreditation is appropriate. Based on the fact that there are links between high quality education/universities and the number and calibre of faculty members, then the validity of accreditation should cover a span of time directly related to the duration of contracts given to the faculty. It follows that annual contracts require annual accreditation.

CONCLUSION

Applying the accreditation values and measures on profit-making universities has a great influence towards quality assurance of education. Common areas of conflict and malpractice have been identified. Further, it is advisable to write the accreditation values, measures, and criteria in the greatest possible detail to avoid different interpretations by different accreditation bodies. The aforementioned components of accreditation are programmable, therefore, preparing an accreditation computer package would facilitate and accelerate the process. Major share holders are often business men with limited academic background. Therefore, to enhance the understanding for academic requirements in the private universities, it is advisable to restrict the shares that are held by one person or body to (less equal) 10% of the capital.

Finally, it is vitally advisable to subject all universities, including the state ones, to the same procedure of accreditation.

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