



MARKET IMPACT OF BUILDING ENGINEERING PROGRAMS: ASSESSMENT OF ALUMNI AND EMPLOYER SURVEYS

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ABSTRACT

The paper outlines the growing complexity of modern building industries and their varied and involved demands. The focus and scope of the Building Engineering Program introduced by the College of Architecture and Planning of King Faisal University are explained. Alumni and employer surveys assess market and professional impact of the program and alumni performance evaluation. The alumni survey confirms favorable graduate opportunities, elevated levels of professional responsibilities and involvement and appreciable job satisfaction. Employer survey similarly expressed highly favorable response. The paper concludes with recommendation for furthering of the Building Engineering program and its national implementation with ranging emphases and spectrums, varying focuses and orientations.

Keywords: *Building Engineering, Alumni survey, Employer response.*

1. INTRODUCTION

Building and Architectural Engineering programs are evidently late development of academic disciplines over the last few decades, i.e. as illustrated by programs in USA, UK, Canada and KSA [Pennsylvania and Kansas Universities, UMIST and Loughborough Universities, Concordia University, KFUPM and KFU]. These are generally prompted by the expansive complexities of modern building industries and the involved scopes of scientific and engineering knowledge. Lately, this is further accentuated by the evolution of information media and globalization of supporting tools and resources with the modern computer age, with greater implications on interrelated fields of design, construction and management of building's processes. Innovative and specialized Building Engineering programs introduced by academic institutions, at undergraduate level, were able to address challenging demands and market professional needs, particularly in a rapidly changing technical world [UMIST, Loughborough, Concordia and KFU Universities]. Furthermore, the need for work-ready engineers, i.e. from classroom to work, also promoted development of highly specialized engineering programs [Ledbetter, 2001]. Such programs have evidently widened the horizon for graduates potential and extended their employment opportunities and involvement in diversity of fields and activities associated with the building industries [UMIST, Loughborough, Concordia and KFU Universities].

Consistency of Building Engineering programs with generally stated goal of engineering curricula preparation and professional training, which are to develop graduates who can successfully participate in engineering activities and responsibilities, are paramount. However, varying emphases are generally placed on expanded and specialized scopes of knowledge in the fields of buildings. Different universities' programs and school curricula, while focusing on the whole on providing wider technical exposure, generally reflected varied, but extensive scopes of involvement with differing emphases and specialization which are prompted by the environment in which they evolved [UMIST, Loughborough, Concordia and KFU Universities].

The situation in Saudi Arabia epitomized the growing complexity of modern building industries. Local varied and involved demands are aggravated by main numerous factors and exasperated the acute need for highly qualified professional expertise. These conditions prompted introduction of the Building Engineering program by the College of Architecture and Planning of King Faisal University . The program focus and scope were greatly influenced by local market professional needs, employment opportunities, as well as college environment and resources. This led to exposition of broad, but balanced spectrum of technological skills of pertinent scientific and engineering knowledge with sufficient depth and ranging practical experiences in addressed areas of building engineering expertise.

Current trends and calls for quality and accountability of educational systems demand that academic programs must engage in cycles of assessment and improvement. This attempts to

bring quality assurance to the field of engineering education, a key feature of newly established accreditation criteria [Duffuaa and Daya, 1999; Sarin, 2000]. It is generally recognized that assessment data are readily obtained with help of alumni and employer surveys. These essentially document alumni employment opportunities and characteristics, professional accomplishment and career development activities and satisfaction with the program and graduate performance [Numan and Bashir, 2001; Greer, 1998; Simpson, 2000 and Florida Tech. 2002]. Data collected are envisaged to provide feedback to further development and refinement of program and support its focusing, orientation, exposition and articulation of employment professional needs. As a result, ability to maintain academic excellence and achieve international standards and recognition is strengthened. This prompted the conduct of alumni and employers' assessment surveys for the Building Engineering program.

Response of alumni survey generally confirms a highly favorably rated impact for the Building Engineering program and the ranges of employment opportunities that it offers. Alumni levels of satisfaction, responsibilities entrusted and professional involvement is also shown to be highly rated. Employer response similarly confirmed favorable and commendatory evaluation rating and performance appreciation with program's graduates qualities and professionalism. Based on this experience, such Building Engineering programs and pertinent emphases can be recommended for further national implementation considerations with a range of focuses, spectrums and orientations.

2. PROGRAM SCOPE AND EMPHASIS

Building Engineering courses are not basically about architectural concerns and design. They essentially address the engineering and technical aspects of building design, construction and maintenance. These account for detailed design and specifications of materials, construction, structural design, environmental control and services systems employed in buildings as well as economic and resources management considerations [KFU, Building Engineering Program, 1993]. Thus, Building Engineering complements architectural design process, which is largely the merit of the architect.

Factors prompting the development of Building Engineering program by the College of Architecture and Planning of King Faisal University can be emphasized by the following main considerations:

- i) The massive development of building and manufacturing industries of complex interrelated and integrated engineering processes prompted corresponding extensive demands for highly qualified and professionally competent expertise in Building Engineering with board spectrum of technological capabilities and specialties of sufficient depth. This ultimately emphasizes advancement of personnel overall quality, performance and co-ordination of pertinent building activities.

- ii) Widening of students' academic horizon to effectively utilize their natural potentials and talents and maximize their capabilities and skills. Arrays of fields of studies are made available in appropriately chosen and varied areas of specialization and in line with modern technological development and continued advancements of scientific and engineering knowledge.
- iii) Realize primary objectives of university education of addressing expanding requirements of Saudi manpower and national development plans demands and the spectrum of specialized expertise and skills in accordance with professional market demands.
- iv) Provide solid base for graduates to pursue higher and advanced studies in the varied fields of building science and technology, i.e. as offered by the M.Bldg. Sc. Program of KFU.

College environment and resources, particularly staff expertise, and the need to maintain international standards evidently determine program's focus and orientation. However, the demands and priorities of local professional market and building industries are primary factors influencing program emphases and exposition. This led to the focus on four main areas of emphasis for building technological specialization, cultivating high level of proficiency with equal exposition. These are considered to have the greatest impact on building design, construction and maintenance processes and comprise:

- Construction Technology,
- Environmental Technology and Building Services,
- Building Structures, and
- Construction Management.

The overall gains in improvement of building engineering skills are evidently positively reflected in ameliorated efficiency of building industry and quality of building and built environment. Employment opportunities for program graduates are envisaged to encompass wide-ranging involvement in the building industry, as determined by market demands, which comprise:

- Supporting role for design activities, in design offices of private practice, municipal and governmental institutions, consultancy and contractual concerns.
- Building sites management, construction supervision, inspection and maintenance operations.
- Legislative authorities and institutions concerned with the development and/or implementation of standards, regulations, codes and by-laws.
- Building industry: materials and construction components manufacturing.

3. ALUMNI SURVEY

Alumni surveys are commonly employed by academic institutions in order to obtain assessment data and feed back to support programs' evaluations and cyclic revision [Numan and Bashir, 2001; Greer, 1998; Simpson, 2000 and Florida Tech. 2002]. Alumni survey was, thus, conducted for graduates of KFU Building Engineering program, where six batches graduated so far (1995-2001 AD, 1417-1422H) and for a total of 59 graduates. The purpose of alumni survey was to establish alumni employment characteristics and professional involvement, determine graduate satisfaction levels with program curriculum and evaluate compatibility and suitability of program to market professional requirements. These are envisaged to support assessment of achieving program objectives, provide feed back for direction of curriculum development and revision as well as initiating accreditation requirements. The survey was sent to all alumni of the program who had at least one year on the job, 48 graduates. Of these 34 responded, showing 71 % response rate of questionnaire returns.

The alumni questionnaire raised issues carefully addressed to cover most areas of significance for an objective appraisal of program's benefits. The questions were organized into five main categories:

- Job profile and characteristics.
- Courses content and student training and development of expertise.
- Professional confidence, job performance and communication with pertinent engineering disciplines.
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- Job involvement and professional responsibilities.
- Compatibility of program with professional involvement.

3.1 Alumni Employment Profile and Characteristics

Market and professional impacts of the program are assessed with consideration of alumni employment opportunities, job profile characteristics. Alumni employment is initially categorized with regards to two main aspects:

i) Institution categorization, comprising:

- Private companies,
- semi-private/public, and
- governmental/public.

ii) Job profile characteristics, comprising following main involvement:

- Design,
- construction site supervision,
- maintenance,
- manufacturing industries,
- legislative and standard authority, and
- Academic.

Alumni employment opportunities and job profile characteristics are established from surveys' responses and by continuous direct follow up of all programs' graduates. It is generally established that majority of Building Engineering alumni graduates, more than 63%, favored job opportunities with private firms and semi-private institutions, accounting for about 42 % and 21 %, respectively. The remaining 37 % joined governmental institutions. Such alumni employment pattern clearly confirms highly rated confidence by local market for alumni professionalism, contributing capabilities and ability of immediate professional involvement. Private and semi private sectors are profit oriented and known to hire professionals who can achieve acceptable annual revenue returns. Figure 1 shows break down of employment distribution for Building Engineering alumni.

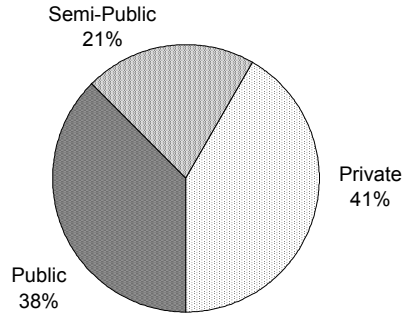


Fig. 1: Employment opportunities for Building Engineering alumni.

Alumni categorization of job profile and professional involvement shows a fair distribution for the wide-ranging involvement, as illustrated by Fig. 2. However building sites and construction supervision are generally highly rated, representing about 50 % of alumni job involvement. Design involvement comes second accounting for about 24 % of alumni job responsibilities. Such job distribution is particularly representative for graduates attached to private firms or semi-governmental institutions, which evidently reflects market priorities. Similarly, inspection and maintenance activities and academic employment each represents about 9 %. On the other hand alumni involvement with legislative, administrative as well as manufacturing employment are rather limited, where each accounted for about 4 % of alumni job involvement.

3.2 Alumni Response

The alumni questionnaire allows four levels rating scale for expressing evaluation of the issues raised. These ranged between very high, high, medium and low. Alumni response is expressed in percentage terms for rating of different questionnaire. The responses for each category of questions are averaged out and combining the very high and high ratings to express favorable alumni response. This enables general representation of alumni response ratings for the questionnaire categories, as shown by fig.3.

Graduates’ response to their involvement in professional life was particularly favorable, expressed by the very high and high rating levels. Their judgements with regard to questions’ group for courses content and student training and development of expertise, which addresses the following issues:

- Practical suitability of the spectrum of knowledge covered by the program,
- content and depth of information offered by the different courses , and
- the range of program emphases offered .

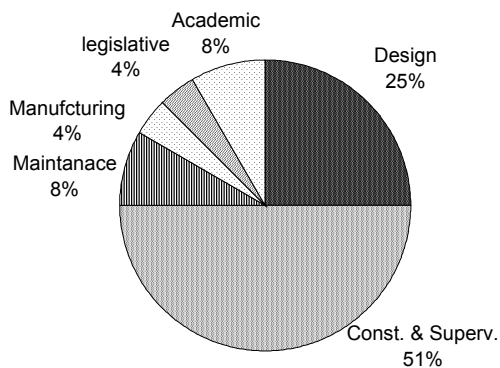


Fig.2: Alumni job profile and characteristics

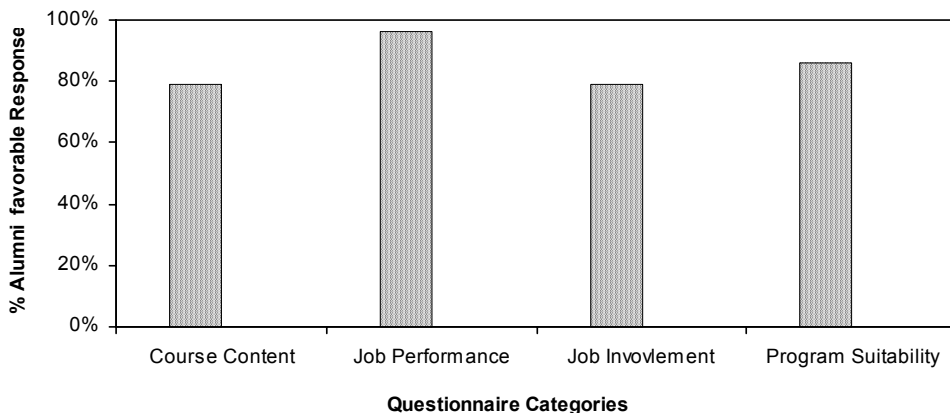


Fig. 3 : Alumni satisfaction rating for program and professional job involvement.

Appreciable satisfaction rating is indicated for question category of program course content and student training. Average of 79 % of respondents indicated rating, for such questions, ranging between very high and high, of 11 and 68 %, respectively. This asserts high level of satisfaction with both content and depth as well as diversity of knowledge and practical training offered by the program and, thus, confirming suitability of program formulation.

Like-wise, graduates' response and satisfaction with regard to professional confidence and job performance reflected favorable judgment rating. Similarly, average of 96 % of graduate's respondents expressed appreciation rating ranging between very high and high, of 54 and 42%, respectively, regarding the following pertinent questions:

- Ease of communication with other pertinent engineering disciplines,
- self confidence and competence as compared to other graduates of similar status,
and
- role supporting architectural design .

A similar favorable response was also indicated for professional job involvement and responsibilities assigned, which shows an average of about 79 % for the very high and high rating, representing 35 and 44 %, respectively. This confirms the high level of alumni professional involvement as well as responsibilities and assignments entrusted addressed in terms of:

- level of professional responsibilities entrusted,
- project and involvement size, and
- immediate professional involvement.

Compatibility of program with professional requirements was similarly explored with address to the following issues:

- Suitability of emphasis addressed by the program to professional involvement,
- suitability of technical designs training, and
- professional job conformation to student major specialization.

Like-wise, alumni response was also favorable with regard to program suitability, with an average response of about 86 % for the very high and high ratings, for the issues raised in this regard. However, a lower response is inferred from additional alumni's comments with the survey with regards professional job conformation to student major specialization. This indicates market insensitivity to alumni specific specialization. It is also concurrent with current market priorities and demands for construction supervision and maintenance involvement.

4. EMPLOYER SURVEY

The purpose of employer survey was to determine employer knowledge of Building Engineering program and establish satisfaction rating for the performance and skills of program's alumni. The questionnaire was also sent to all employers of program's alumni, with one year on the job. The response rate for questionnaire return was about 65 %, 31 responses out of 48. The issues raised by the survey are categorized into the following main groups:

- Job profile and characteristics.
- Knowledge and experience of Building Engineering program and alumni.
- Graduate quality.
- Alumni professionalism, job involvement and assignment.

4.1 Employers Response

Employer's responses for the questionnaire are also expressed in percentage term. These are presented as averages for each category of questionnaire addressed. The very high and high ratings are combined to express favorable response, as illustrated by fig. 4 for employers' response to the questionnaire. However, employers' response to impact of the program was generally highly positive.

Employers' evaluation of Building Engineering alumni qualities are assessed by the survey with consideration of such issues:

- Alumni vitality and professional abilities,
- readiness to assume immediate job responsibilities without prior extensive job training, and
- performance compared to other graduates of similar status.

Employer's response, in this regard, expressed appreciable rating, averaging about 89 % in the very high and high level , of 29 and 60 %, respectively.

Employers' evaluations of alumni professionalism, performance and suitability of job assignment and involvement are addressed by the issues:

- Level of responsibility entrusted to graduates,
- job and assignments suitability, and
- professionalism and performance ability and contribution.

Employer's responses are generally highly rated averaging about 91 % for the very high and high levels, of about 21 and 70 %, respectively. This indicates the particularly responsible involvement entrusted to graduates and the high appreciation for their professionalism and involvement.

Employer response to prior knowledge of the program and experience with its alumni was explored with consideration of the following main aspects:

- Prior knowledge of Building Engineering, and
- prior professional experience and close contact with program’s alumni.

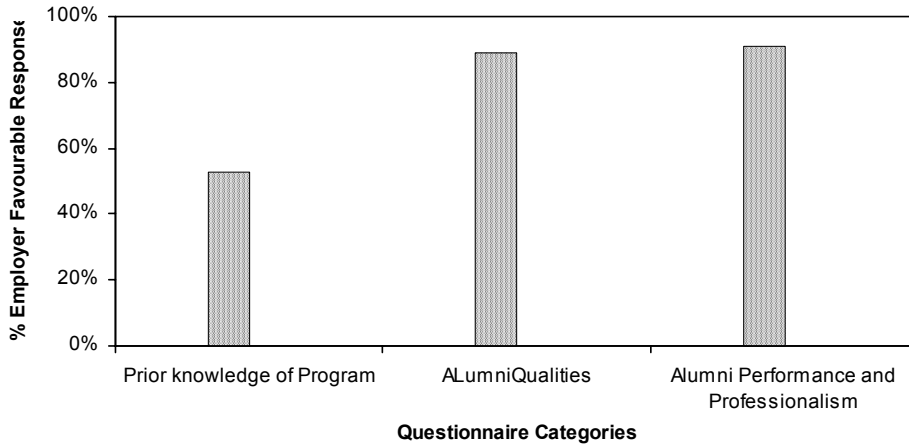


Fig.4: Employer’s response evaluation of Building Engineering Alumni qualities and professionalism.

Employers’ responses in these regards are rather mixed, but with generally low rating expressed. An average of about 47% of employer responses is in the rating of medium to low levels, representing of about 30 and 17 %, respectively. This clearly reflects the limited prior knowledge of employers about Building Engineering program. It should be pointed out that the program is relatively new and did not have sufficient exposure to wider spectrum of employers. However, the fact that experience of employers with program alumni is generally favorable. It is, therefore, expected that employer response would further improve as the program is more publicized. This also calls for better exposition of program and alumni potentials with local building industries.

5. CONCLUSION

Building Engineering program has, justifiably, expanded the outlets for students to effectively utilize their natural potentials and talents. It also successfully addresses local market special professional demands and priorities for essentially needed expertise.

Alumni and employers surveys confirm the highly favorable reception for the program by the professional community. Employers and graduates alike expressed great satisfaction,

confidence and appreciation for graduates' qualities and professional performance. Graduates from the program are in great demands with excellent and varied employment opportunities. The signs are that job opportunities and demands for building engineering graduates will accelerate with further recognition and publicity of the program and the expanding building industries.

The surveys provide essentially needed data for objective program assessment and to initiate accreditation processes. The nature of job profile characteristics for Building Engineers suggests the need for focusing of such programs and student training to comply with the great demand of construction supervision and building maintenance involvement. Thus, further extension of such Building Engineering program experience can be strongly recommended for national implementation. Different universities and institutions can realistically address varying scopes and orientations and differing spectrums and depth of emphases.

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