

**AC 2009-304: PRACTITIONERS AS ADJUNCT CLINICAL PROFESSORS: THEIR
ROLE IN TEACHING REAL-WORLD ENGINEERING APPLICATIONS IN
DESIGN AND CONSTRUCTION**

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Practitioners as Adjunct Clinical Professors: Their Role in Teaching Real-World Engineering Applications in Design and Construction

Abstract

In the schools of engineering and technology, it is a common practice to hire adjunct faculty from industry to deliver instruction in select areas of design and construction, such as bridge design, construction contracting, special problems, etc. The reasons are two-fold: One, to avoid hiring full-time tenure-track faculty to comply with the budgetary constraints, and Two, to utilize the expertise of practitioners in specialized courses. Practitioners utilize engineering codes, standards, and specifications on a routine basis, and are well-equipped to transmit this knowledge to the students in an interesting and challenging manner. Practitioners face a variety of problems in their day-to-day practice and are open to sharing them with the students. Students enjoy exposure to real-world problems and feel connected to the profession through the experiences of these practitioners. The author has had the privilege of working with and utilizing adjunct clinical professors from industry in the areas of mechanical and electrical systems of buildings, materials testing, structural design, construction management and project scheduling. This paper cites select case histories, describes areas in which senior level courses in design and construction can be delivered more effectively by adjunct clinical professors. Practitioners, as adjunct clinical professors, bring technical relevance and currency to engineering curriculums, and students benefit from their experiences. In addition, participation of adjunct clinical professors opens up opportunities for students in gaining internships, field trips to projects, and professional networking. This paper also raises issues related to remuneration of adjunct faculty to insure a balanced approach to hiring of adjunct faculty.

Introduction

The reasons for hiring adjunct faculty in higher education circles, whether part-time, or full-time (non-tenure track), are two-fold: One, to avoid hiring full-time tenure-track faculty to comply with the budgetary constraints, and Two, to utilize the expertise of practitioners to enhance instruction in courses related to engineering design and construction. This practice is quite common in two-year and four-year colleges. This practice is also prevalent in research universities. Generally speaking, in undergraduate institutions, the practice of hiring part-time faculty is more to substitute for, or replace full-time faculty, or to add additional sections in a particular course. In specialized areas, sometimes departments seek out qualified individuals from industry to bring the specialized expertise because of non-familiarity of full-time faculty with the current practices in the field. In that context, part-time faculty, who are full-time practitioners, are hired as Adjunct Faculty in the role of Clinical Professors. This paper addresses the key role the Part-Time Adjunct Clinical Professors play in helping departments stay current on the practice side of the fields in engineering design and construction. Some case studies are cited where part-time clinical faculty have not only done a remarkable job in instruction but have added value to the department by opening up doors to students in gaining internships, field trips to projects, and professional networking. The paper also addresses issues related to remuneration of adjunct faculty.

What is a Clinical Professor – Adjunct Faculty as Part-Time or Full-Time

There are two main routes to employment in the institutions of higher education for individuals who wish to teach: One, is to get employment as a Part-Time adjunct faculty member, or as a temporary full-time instructor (a non tenure-track position). And, the Second, is to seek a tenure-track faculty position which usually requires an earned doctorate. Individuals who do not possess the academic credentials for a tenure-track position but wish to teach full-time, can be hired as Clinical Professors...they are expected to do everything that a tenure-track faculty does except 'Research.' These kinds of non-tenure track positions are gaining acceptance in fields such as Nursing and Engineering Technology.

The clinical professors, whether part-time or full-time, bring a wealth of practice know-how to the departments. Learning from the practitioners-turned-clinical professors, students come closer to understanding of their profession. Also, departments benefit from the industrial experience of the clinical professors as they help departments upgrade and update their curriculums. Clinical professors validate the input from the program advisory board members, and help departments make curriculum decisions in the proper context. "Been-there-done-it-all," also gives credibility to the input that the clinical professors provide to the departments, and students are the primary beneficiaries of a technically current curriculum. Because the practitioners come from the real world of applications, they are conversant with the latest trends in equipment, codes, specifications, and their applications, and thus provide a wealth of information to the programs and the department.

Practitioners as Adjunct Clinical Professors

Case Study 1

The author learned the first programming language (FORTRAN) from an adjunct faculty whose prime job was that of a practitioner in engineering design and development. The instructor did not have the title of a clinical professor; he was simply a part-time evening instructor. He was a partner in an engineering company and had written several computer programs related to engineering analysis and design. He knew the ins and outs of computer programming. He adopted the manuscript of a book that was yet not published. Another section of the same course was taught during the day time by a regular full-time faculty member. More students wanted to join the evening session of the course but were turned away due to the number limitation in the class...the reason that students wanted to join the part-time instructor's class was that he made the class more reflective of the real world engineering applications. It brought students closer to what they would do in a real job situation. It is not a question of who the better instructor was but it is a question of who the students would have wanted to learn from. The inference is that the practicing engineers turned clinical adjunct faculty can build student interest in the subject, and can provide beneficial interests in terms of student learning. The departments that attract these kinds of adjunct faculty also benefit because it builds their reputation.

It is interesting to note that the Chronicle of Higher Education reported that "nearly half of undergraduate courses are taught by non-tenure-track instructors."¹ The article goes on to state, "Such faculty members, most of whom work part time, teach nearly 49% of the more than 1.5

million undergraduate courses offered at public community colleges and four-year comprehensive and research institutions each term...”. The article refers to them as contingent faculty members...these are faculty members who are neither tenured nor on the tenure track. The author’s above-noted adjunct professor was one of these contingent faculty members who did an outstanding job yet was not a part of the real academic world, and one who did more than an effective job yet was not paid enough for his services.

In the key findings of the report, “Reversing Course: The Troubled State of Academic Staffing and a Path Forward,”² one finding that needs to be seriously looked at is the following one:

Contingent faculty members are earning disproportionately lower wages per class than are full-time tenured and tenure-track faculty members.

In the author’s opinion, it is an extremely important issue to address due to non-availability of well-qualified adjunct faculty in certain areas of specialty. Although money is not the only reason why some part-time faculty elect to teach, yet it is essential that they be given respectable wages to invite their full engagement in the overall student development beyond the class time.

Case Study II

A research university hired a highly successful project manager from a big consulting engineering company to teach their graduate-level bridge design course on a part-time basis. There is no question that the same course could have been taught by one of their own full-time faculty members but the department chose to go with a registered professional engineer with a master’s degree and bridge design experience. The real consideration was: Who will be able to make the course more realistic for the students? Will an engineering faculty with doctoral degree but no bridge design experience, or a registered professional engineer with master’s degree and years of actual bridge design experience, do a better job to teach students in a course on Bridge Design? Of course, the answer was obvious, and does not need to be spelled out. The experienced practitioner as an adjunct clinical professor provided all the ins and outs of problems confronted in a real bridge design to the students and taught them about specifications, and various code applications. He was able to connect theory with practice because he had done it in the real world, and the students enjoyed learning from someone who had actually designed bridges, not one but many.

This adjunct clinical professor is called upon to teach this course often at this university. He teaches because he wants to teach, and enjoys teaching. The university cannot pay him enough for his services but he continues to teach.

Case Study III

A research university hired a senior design engineer from a structural engineering company to teach their structural design course on buildings. Though they had doctoral faculty on hand to teach the course, the department opted to give their own faculty release time to do research, and hire instead an adjunct clinical professor to deliver the course on structural design of buildings. The adjunct faculty who did not have a doctoral degree but had a master’s degree and a

professional engineer's license delivered a highly effective course because of his years of experience in design of buildings and parking garages. He pulled a real design project from his office shelves, and had the students start from a scratch, starting with the first step of dead and live load determinations which the regular full-time faculty generally take for granted. The course was a huge success, and he is now called often to come back and teach again. Because of his responsibilities as a senior partner at the firm, he does it whenever he can. He is also invited to guest-lecture in other universities.

Case Study IV

An adjunct faculty member recently introduced construction management students in a Construction Management Capstone course at an institution to specific content and books required for certification from the Construction Management Association of America (CMAA). The instructor holds a B.S. degree in Civil Engineering and is a Certified Construction Manager. He has other certifications as well. He is a Senior Partner in the Company. Learning from a real-world construction manager was a whole new experience for the students. It was a totally new perspective for the students as previously the course had been taught on a purely theoretical basis. The (Construction Manager) instructor emphasized the following:

“Unlike most other professionals, such as those in the design disciplines, law, and medicine, construction managers do not generally share a common academic framework of substantive knowledge or professional orientation. The Capstone is designed to add essential elements to the CM body of knowledge that may not have been obtained through formal academic training or required experience.”³

The students were impressed by the instructor's background and professional experience as a construction manager, and felt invigorated to take the certification examination once they qualified after graduation to take the examination. The instructor, in a way, was instrumental in developing a goal for the graduates of the program.

A fresh approach to instruction such as the one introduced by the above-noted instructor builds student interest, and helps programs take a critical view of their curriculum with renewed interest.

Analysis of Qualifications of Adjunct Faculty

While the schools of engineering are involved in theoretical research, schools of engineering technology are involved in the applied research. While the schools of engineering have hard and fast rules as to the academic degree requirements for tenure-track faculty, such as an earned doctorate, some reputed schools of engineering technology continue to hire individuals with master's degrees plus industrial experience and professional registration for tenure-track faculty. Majority of engineering technology faculty have industrial experience and are well equipped to teach applied engineering. However, credentials for adjunct faculty vary from institution to institution, and there is no one answer to all situations. Adjunct faculty provide an excellent blend of academic preparation and real-world experience. Due to their industrial background, they bring realism into the classroom, and students enjoy learning about engineering design and

construction applications from the practitioners. Students also get first-hand information about the nature of the work in industry, and feel closeness to the profession while learning from the clinical faculty. They also are exposed to opportunities for field trips to construction sites, part-time jobs, and internships. While learning from the adjunct faculty, students also get exposure to opportunities for networking with the professionals.

The following table describes the acceptable and most prevalent qualifications of adjunct faculty.

Table 1: Qualifications of Adjunct Faculty

Faculty Type	Tenure-Track	BS Degree	MS Degree	Industrial Experience	Professional Registration PE,RLS, CPC,CCM, etc.
Part-Time	No	Yes	May Be	Yes	May Be
Temporary Full-Time	No	Yes	Yes	Yes	May Be
Clinical Professor	No	Yes	Yes	Yes	Yes

Job Description of an Adjunct Clinical Professor

Much has been said about the advantages of practitioners as clinical professors, and their role in teaching real-world applications in engineering design and construction. A few case studies have also been described above. But what are the real academic and practical qualifications of these Clinical Professors?

To begin with, clinical professors are practitioners. They can be hired as adjunct part-time faculty, or as full-time clinical professors. To give an idea of the position description of a Clinical Assistant Professor, some of the information is being reproduced from a recent Purdue University Position Announcement.³ The announcement reads as follows:

“Purdue University is accepting applications for a Clinical Assistant Professor of Computer Graphics Technology commencing August 2009. This is an academic-year, 10-month position with a two-year initial appointment continuously renewable based upon successful job performance and enrollment. This position includes all benefits of a Purdue University faculty member with advancement through Clinical Full Professor possible. The successful candidate will have industry-based expertise in computer graphics with a strong understanding of aesthetics and technology.....A master’s degree in an area closely related to the teaching assignment and 3 to 6 years of work....experience required.”

For an Adjunct Clinical Professor's position, the work experience with a master's degree is required and a combination of educational background, experience, and professional registration would suffice to meet the instructional and educational objectives of the program.

The focus is to utilize practitioners as adjunct clinical professors to teach real-world applications; hence their work experience must be technically relevant. The adjunct faculty need to be mentored and given full administrative support by the department to be successful in their role as faculty members. It is only through cooperation and collaboration of the adjunct clinical faculty and the department that a good instructional experience can be managed for the students. The department chair can play a pivotal role in making these collaborations work for the ultimate good of students and the department as a whole.

Conclusion

The author has described several case studies that speak well of the role that adjunct clinical professors can play in teaching real world applications in engineering design and construction. The students are the primary beneficiaries of good instruction received at the hands of the practitioners. Due to changing technology in the work place, and a myriad of changes that occur year after year in engineering codes, the practitioners-turned-clinical professors, are best positioned to teach students about the latest trends and applications taking place in the industry. Adjunct clinical professors, whether part-time, or full-time, continue to make a significant contribution in the delivery of engineering and technology education though they earn disproportionately less wages...It is an issue that needs to be considered.

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