

PROPOSALS FOR THE ESTABLISHMENT OF CONTINUING EDUCATION CREDIT SCHEMES

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SUMMARY

The paper reviews briefly the various types of continuing education courses for engineers and the different formats used in various countries. An examination of the existing systems of measuring and recording both the individual and institutional outputs from such activities is undertaken with particular reference to the Continuing Education Unit (CEU) which has been developed in the U.S.A. as a uniform national standard of measurement for non-credit continuing education. Some of the criticisms of such a system are summarized and proposals are made whereby the concept of the CEU could be expanded to overcome such criticisms.

It is concluded that it is both possible and desirable to establish a continuing education credit scheme by combining the CEU with a flexible system of accreditation based on a modular approach to continuing education courses in order to record and measure both the individual and institutional outputs from such activities.

1. INTRODUCTION

The need for Continuing Education of practising engineers is now fully recognised and accepted by most professional engineering associations, universities and employers throughout the world^{1,2} in order that engineers may keep abreast of ever-increasing technological advances being made in the engineering field today. Failure to pursue some form of continuing education or mid-career training as is sometimes called can well lead to an engineer's skills and knowledge becoming obsolescent within several years after graduation. Consequently many professional societies now have mandatory continuing education for either license renewal or continued society membership. Standards for continuing education professional development range between ten hours to fifty hours per year with an evaluation either a two year or three year basis. Furthermore, in some countries such as France there is now a legal obligation on the part of employers to set aside a portion of their employees wages to be used exclusively for continuing education. Under a French law passed in 1971³, employers with more than ten employees are required to contribute 2.0% of their payroll to provide for further education and training.

Continuing education can be defined as education undertaken after an individual's initial technical qualification and it is interesting to note the proliferation of terminology currently used to describe such education as follows:

Postgraduate education
 Post degree education
 Refresher education
 Updating education
 Recycle education, etc.

However, in broad terms continuing education can be classified into four main categories as follows:

- (i) Refresher courses which provide the necessary updating of an engineer's knowledge and skills in an era of rapidly developing technology.
- (ii) Specialized courses whereby an engineer broadens his knowledge in his own particular field.
- (iii) Multidisciplinary courses during which an engineer diversifies his skills and obtains training in other fields such as management.
- (iv) Post-graduate courses which enable an engineer to pursue a formal programme of academic training and research leading to a higher degree or diploma.

2. METHODS OF CONTINUING EDUCATION

Various methods and formats have been used in different countries involving both traditional and non-traditional approaches in the running of such continuing

education courses. The inherent dangers of using non-traditional methods have already been discussed at various forums^{4,5}. However in order to meet the ever increasing and diverse needs for continuing education at all levels of the profession, it is generally accepted that full use must be made wherever possible of the non-traditional methods available, such as correspondence courses, instruction through radio and television, satellite links, video-cassettes and programmed learning. One of the main reasons for reluctance of the academic institutions to fully accept non-traditional instruction has been the lack of complete assurance that quality control would be maintained in all cases and it has therefore become necessary to ensure proper planning of such courses in order to minimize some of these inherent dangers. The advantages and disadvantages of the various methods have been discussed by Klus⁶. In selecting a particular method for any continuing education activity it is essential to take into consideration the following factors:-

- (i) convenience to the participants
- (ii) convenience to the lecturers
- (iii) comparative costs
- (iv) quality of learning available through that system
- (v) required motivation
- (vi) nature and flexibility of course content

3. EXISTING SYSTEMS OF MEASURING OUTPUT OF CONTINUING EDUCATION ACTIVITIES

Whilst it may be said that there is a proliferation of different approaches in conducting continuing education activities, the same remark cannot be made in regard to systems of measuring output of such courses except in the case of post-graduate courses by traditional methods where the system most widely used throughout the world is by means of semester credits, credit hours and examinations leading to the award of a postgraduate degree or diploma. As far as the other types of continuing education courses are concerned such as refreshers, institutes, short courses and other non-credit courses the majority of countries do not up till now have any rational system of measuring and recording the output from such activities. One exception is the U.S.A. where, in 1968, the need to develop a parallel system to measure and record institutional output of non-credit educational activities was recognised and a National Planning Conference was held in July of that year to discuss the feasibility of a uniform crediting and certification system for continuing education. The outcome of that conference was the creation of a National Task Force to determine the feasibility of a uniform unit of measurement and to develop a proposal for such a unit in order to reduce the confusion and fragmentation inherent in the use of a variety of systems for recording and reporting continuing education activities.

4. THE CONTINUING EDUCATION UNIT

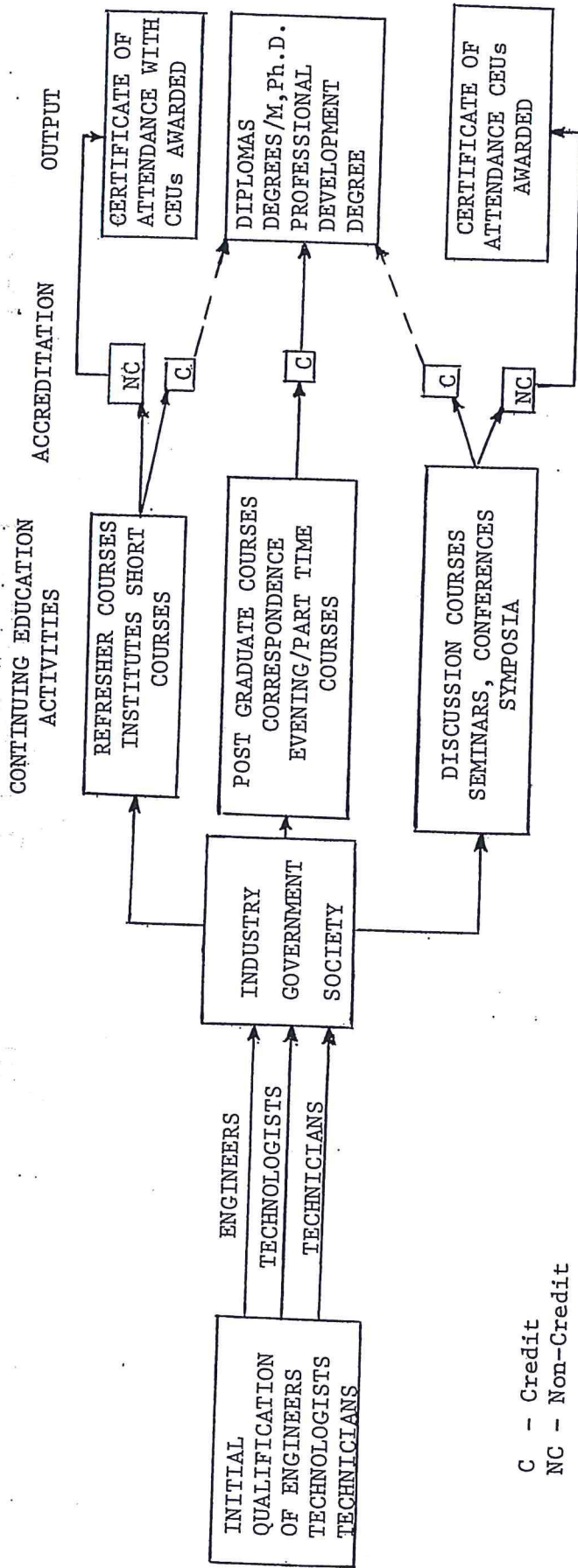
On the basis of their deliberations over a period of two years the National

Task Force in 1970 recommended the use of the Continuing Education Unit (CEU) as basic instrument of measurement for an individual's participation in and an institution's offering of non-credit classes, courses and programs. One CEU has been defined as ten contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction and qualified instruction. Full details of the CEU have been published by the National University Extension Association. Since then a large number of academic institutions and professional organizations in the U.S.A. have adopted the CEU as their unit of measurement. However opinions vary widely on the usefulness of the CEU, and certain reservations and fears have been expressed by various people that the CEU could activate a "Gresham's Law" of training programs whereby longer, less efficient programs would drive out shorter, more efficient programs since the number of CEUs awarded would be based on contact hours rather than on the basis of trainee achievement or proficiency - and the name of the game would be "How many CEUs can I get from the program". There is merit in the suggestion that some form of assessment should be made of the trainee's achievement or proficiency during a continuing education course if an academic award is to be made.

If however, one regards the CEU as being simply a means of recording attendance then the question of achievement need not arise. In this connection it should be noted that in several countries certificates of attendance are in fact being awarded on completion of certain continuing education courses. On the other hand, if one wishes to use the CEU as a vehicle for obtaining licensure, certification or registration as a professional/technician engineer or as credits towards a post graduate diploma or degree then there should be a mechanism whereby some form of assessment is made at the end of a particular course. For example in France, the Conference des Grandes Ecoles (CGE) is currently studying how continuing education courses can be linked together to form a rationally planned continuing education program. Under one proposal, each student would be given credits for each course completed, the credits accumulating to earn a certificate, then a diploma, and finally a degree. For instance, completion of thirty hours of courses would lead to the award of a training certificate, five such certificates would entitle the student to a diploma, provided he has passed the test covering the total content all five sessions. Lastly a student obtaining four separate diplomas, and presenting to a board of examiners a thesis (based on at least 300 hours work over a year) would be entitled to a continuous-training degree. This approach to a continuous training degree is similar to the professional development degree being offered by the University of Wisconsin Extension Engineering and other institutions in the U

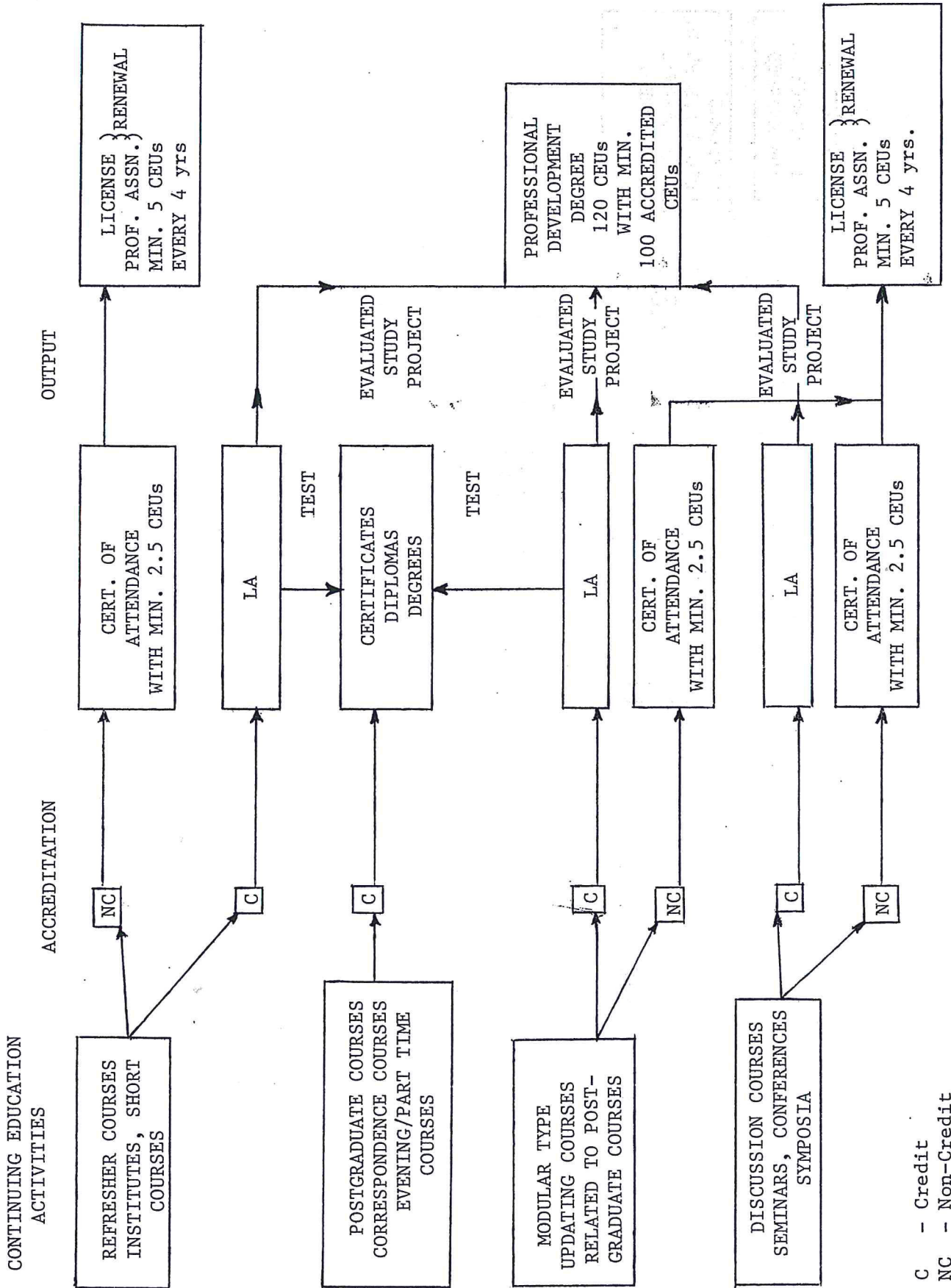
5. PROPOSAL FOR A CREDIT SCHEME FOR CONTINUING EDUCATION COURSES

Figure 1 attempts to summarize the present situation in so far as existing systems of recording outputs from continuing education activities are concerned a Figure 2 outlines some proposals whereby flexible credit schemes could be incorporated into the existing system to both measure and record the outcome of continuing education activities. It must be emphasized that such schemes should be geared to the particular needs of the region concerned and should be based on the realization that not all participants in continuing education courses would wish to obtain accreditation for such courses.



C - Credit
 NC - Non-Credit

FIGURE 1 EXISTING SYSTEMS OF ACCREDITATION IN CONTINUING EDUCATION COURSES



C - Credit
 NC - Non-Credit
 LA - Letter of Accreditation based on

The following procedures outline the steps to be taken by the sponsoring institution to both record and assess the outputs from its various continuing education courses:

1. Adopt the existing procedures outlined in reference 7 for determining the number of CEUs for a particular non-credit course.
2. Develop a simple means of assessing each participant's performance and achievement during the course. This could take the form of a simple question and answer assessment paper to be done at the end of the course by those wishing to obtain credits for it.
3. All participants are awarded certificates of attendance stating the number of CEUs obtained. Such certificates of attendance should only be awarded for programs of 2.5 CEUs and over.

For those participants who wish to obtain credits, a letter of accreditation is given by the sponsoring institution based on the results of the assessment paper.

4. Wherever possible continuing education courses should be developed on a modular basis in relation to existing post-graduate courses so that on completion of a number of such modules by an individual, a certificate or diploma could be awarded to him after he has passed a further test covering the total content of the various modules.
5. The concept of a professional development degree based on continuing education courses coupled with an independent study project which is evaluated by the sponsoring academic institution should be regarded as an excellent means of motivating engineers to participate in continuing education courses and should be encouraged by both employers and professional bodies.

6. CONCLUSIONS

The various types of continuing education courses available and the formats used in their presentation have been reviewed and the current methods of measuring and recording their output have been examined and their inherent short-comings identified. Proposals for the development of flexible credit schemes within the context of the existing Continuing Education Unit have been put forward. In conclusion therefore, it is appropriate to summarize the foregoing discussions as follows:-

1. Continuing Education Courses must utilize both traditional and non-traditional methods in order to meet the ever increasing and diverse

needs of the individual engineer, professional engineering societies, employers of engineers and engineering educational institutions.

2. The present existing systems of measuring and recording individual and institutional output from continuing educational activities can be improved and streamlined by making them more flexible by adopting a modular approach and by incorporating some means of assessing the individual's participation and achievement at the end of each course.
3. A combination of the Continuing Education Unit (CEU) as developed in the U.S.A. and a flexible system of accreditation by means of assessment by examination on a modular basis will provide a simple credit scheme for both recording and assessing an individual's and an institution's output from continuing education courses.
4. There is need for more academic institutions to introduce professional development degree programs based on evaluated continuing education courses as a means of further motivating individuals in the pursuit of professional development.
5. Engineering educational institutions must cooperate fully with professional engineering societies and employers of engineers in developing modular continuing education programs and credit schemes whereby engineers can maintain and demonstrate their competency. The implementation of such schemes must be done with the full co-operation of the educational institutions, the regional professional societies and the employers of engineers in order to ensure their success.
6. It is recommended that the academic institutions, the regional professional engineering societies such as UPADI, FEANI and the academic accrediting institutions such as the Engineers Council for Professional Development (ECPD) in the U.S.A. collaborate with each other in developing and maintaining records of accredited institutions and courses with the financial assistance of such bodies as UNESCO.

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