

**ACTUARIAL RESEARCH CLEARING HOUSE
1996 VOL. 1**

SoA E&E Task Force Report

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REPORT TO MEMBERSHIP

Introduction

In the past few years, SoA members and leaders have raised questions about future needs for actuarial skills, globalization of markets, and the appropriate focus of the present education system in preparing actuaries for their professional futures. As a consequence of these questions, the SoA Board of Governors set aside a major portion of its January 1994 meeting to discuss the education of actuaries, with primary consideration being given to a longer horizon than the immediate future. The Board invited Chris Daykin, representing the Institute of Actuaries (U.K.), to discuss the thinking of the Institute on these matters as well. He reported that the Institute was incorporating fundamental changes to its basic education and examination system. These changes were aimed at focusing more on fundamental principles and away from details of practice. Specifically, the system would require all actuaries to have a grounding in the fundamentals of various practice areas, thus making it easier for actuaries to move into nontraditional areas of business and to practice outside the U.K.

The issues raised in the interchange between Mr. Daykin and the SoA Board further added to the questions SoA members and leaders were raising. To pursue these matters, the Board then named a Board Task Force on Education (a presidential task force) and asked it to recommend the best way to educate actuaries. In particular, the Task Force was asked to address how to enhance the core competencies that distinguish actuaries from professionals in related business areas. After several months of study, the Task Force concluded that fundamental change in the SoA education system was necessary for actuaries to operate with maximum effectiveness in the future, and the Task Force recommended specific educational principles which the Board of Governors has accepted.

The actuary is a highly skilled and well-trained professional with a strong analytical and practical approach to the financial problems posed by the uncertainty of the future. As a goal, the actuary should be—and be perceived to be—the professional who assesses and manages the financial aspects of risk (or uncertainty). The Task Force concluded that this goal calls for an education process that successfully meets the challenges posed by a changing environment. The process should be designed to focus on the current, recognized strengths of the actuary and then to expand and enhance those strengths. In that way, the value of the actuary is enhanced and the actuary is increasingly distinguishable, in a positive sense, from potential competitors.

What ultimately convinced the Task Force that fundamental change in basic education is needed? Let's consider the case for change.

The Case For Change

The effective actuary brings a distinctive set of competencies to his/her business environment. Those competencies must be in sync with the needs of the business environment, not only today but also in the future, for the actuary's potential value to be recognized and appreciated. Because the business environment changes at an accelerating rate, flexibility and tolerance for unstructured environments are becoming increasingly essential. Clearly, the following skills and attributes are of increasing importance to actuaries and should be emphasized in the education system:

- Unstructured problem solving
- Flexibility
- Adaptability to change
- Expertise in modeling techniques
- Global thinking
- Stochastic/dynamic approaches
- Nontraditional contingencies
- Imaginative responses (e.g., to regulation)
- Business value added.

Actuaries have been in an enviable position. Stable employment markets in major industries have valued their skills. Career paths within the company or the consulting firm were clear and well-defined, and led to desirable places. The CEO and the primary financial executive (such as the CFO) of an insurance company were often actuaries. At present, other professionals compete for many of the same business opportunities, and computers and technical software provide less expensive ways to obtain some of what the actuary has offered. The future is no longer virtually guaranteed; fewer actuaries may be needed to provide the same or even an enhanced level of traditional services to the traditional client/employer.

In the future, the environment will place demands on all actuaries to develop the full range of skills and knowledge needed to assume strong, challenging, and rewarding roles, and to assume those roles both within and outside traditional markets. The SoA is committed to maintain and further enhance the value of the FSA as we move toward the future. To that end and to counter competition from other business professionals, it must be firmly established that the actuary adds value to the business enterprise that extends well beyond technical proficiency.

Currently actuaries possess knowledge and skills that are recognized, appreciated, and valued in fulfilling traditional (technical and practice or product-line) roles within traditional markets. In addition, individual actuaries have effectively demonstrated their value outside that range in new roles and new markets (e.g., banking, investment firms). Nonetheless, for actuaries in general to expand into new roles (e.g., investment analysis) in traditional markets and to move into new markets (e.g., manufacturing), there is a real need to demonstrate the value that the

actuary adds in those areas. The demanding and concentrated practice-specific basic education attained with the present system does not translate directly into the broad, adaptable skills and knowledge required for these new roles.

To demonstrate therefore to potential clients and employers not familiar with what the actuary can do (and to traditional employers who may not recognize the full range of the actuary's skills) the system must be perceived from the outside as providing for the development of essential mathematical and business-related knowledge and capabilities, with clear applicability beyond traditional markets. Further, the education system must recognize that a professional education builds on the general education and experiences that individuals acquire elsewhere.

What Distinguishes Actuaries from Other Professional and Business People?

Actuaries deal with the intersection of risk and finance. They solve problems, primarily in the insurance and pension industries, involving contingencies and financial risk. It is the mathematical rigor applied to this type of practical problem-solving that makes actuaries unique. This uniqueness, or competency, need not be limited to the insurance and pension industries. In fact, with proper training, actuaries should be able to use these same elements to solve problems for all kinds of businesses, thus suggesting new and different roles in the future. It is conceivable that the actuary, as the expert in modeling techniques applied to any discipline, will often be part of a team, working with other experts who provide the comprehensive knowledge of a specific industry.

Effectively accomplishing this, however, will call for actuaries to focus on enhanced development of mathematical education with broader business application. The education system, therefore, must specifically develop and further enhance the core competencies of the profession, including construction of models, setting of assumptions, testing of data, sensitivity testing, and the interpretation, communication, and management of results. The specific knowledge of the actuary should also include mathematics and logic, economic security programs, investment and finance vehicles, and asset/liability management. The Society of Actuaries must provide these essentials to ensure the future viability of the profession.

There are other basic subjects that contribute not only to the competency of the actuarial profession but also to the competency of many other technical and scientific disciplines. Mastery of these subjects is essential to becoming an actuary, but specifically providing the education for that mastery in the SoA system is redundant when it is widely available elsewhere.

What then becomes the focus of the education process and, specifically, the syllabus for the actuary? The Task Force believes the SoA education system should encompass the following four principles. The system should:

- (1) Examine only those subjects that cover essential elements of an actuary's education

- (2) Provide a business context with rigor consistent with that of the current mathematical education
- (3) Include all kinds of contingencies, not just life contingencies
- (4) Include models from outside the insurance and pension fields.

In addition, the Task Force believes that applying these principles suggests a restructuring of actuarial education into four categories, with a defined role for the SoA in each category (as shown in the table):

- 1. Preliminary Education: subjects that are probably necessary but are not actuarial and are generally taught in universities and colleges. Examinations given in the other categories will explicitly assume knowledge of these preliminary subjects.
- 2. Basic Education: subjects that are actuarial and encompass significant mathematical rigor along with business knowledge that all actuaries need to master.
- 3. Advanced Education: subjects that actuaries in a particular field need to master, but that are relatively stable over time and are not primarily country-specific.
- 4. Professional Development: subjects that are highly specialized, are primarily country-specific, and/or can change quite rapidly. The SoA would require some minimum initial Professional Development content before granting the FSA designation. The Task Force also recognizes that fulfilling the responsibility for professional development will require the individual to take ownership for determining and meeting his/her own needs.

Table 1

Categories of Education	SoA Role
Preliminary Education	Recommend sources and advise
Basic Education	Provide, with explicit testing
Advanced Education	Provide, with explicit testing
Professional Development	Enable (one of many providers)

E&E System Redesign: "Tweaking Won't Do It"

The present E&E system is remarkably *comprehensive*, covering topics from set theory to the Black-Scholes option valuation method, from the normal distribution curve to managed competition. The present system is remarkably *effective*, consistently producing a high quality actuarial professional. And the present system is also extraordinarily *complex*.

Comprising 60 distinct courses and 5 different fellowship specialty tracks, the E&E system is the source of numerous inefficiencies. Students spend hours planning the best path to take from calculus to fellowship. Employers of actuaries spend hours deciphering course catalogs to develop effective study programs. And finally, E&E committees spend hours developing courses and exams, coordinating study material, and maintaining full topic coverage while minimizing overlap.

The desired changes could be implemented by again tinkering with the present E&E system, although it is hard to envision fitting in any more courses. However, the Task Force believes that tinkering is a strategy that would lead to increased *complexity*, *confusion*, and *frustration* for everyone involved—students, employers, and E&E volunteers. A new E&E system could be streamlined and enhanced, but still rooted in fundamental actuarial skills and based on the essential principles of actuarial science.

The Task Force has therefore concluded that the E&E system should focus its educational investment on the core competencies of actuaries. The E&E system has been a proven, effective method of educational testing and training at the preliminary levels of actuarial education. However, the significant effort expended on these courses could be more effectively invested in increasing the coverage of business and modeling topics and in expanding the coverage of contingencies to all kinds of contingencies. In addition, each category of education (preliminary, basic, advanced, and professional development) should be obtained from the best available source. For example, preliminary education should be obtained through recommended undergraduate university and college courses and tested only indirectly through later examinations.

A new entry-level, "attractor" examination would act as a recruiting examination in a manner superior to that of Courses 100 and 110. The examination would comprise work problems consistent with the challenges actuaries face every day. The course might also include case studies of actuarial problems and touch on topics found in standard business school course work. It would have the kind of rigorous mathematical content needed to demonstrate the level of mathematical skills required of an actuary and would also provide some insight into the work of an actuary.

What Will the New Syllabus Look Like?

While the detailed new syllabus is not yet in the design stage, some general comments can be made about how the syllabus would likely evolve.

Calculus, linear algebra, introductory probability and statistics, numerical analysis, and operations research might be labeled Preliminary and, if so, would not be tested by the SoA.

Essential topics such as contingencies, interest theory, survival models, credibility, and loss distributions will be labeled Basic. They would be required courses and therefore would be tested by the SoA. Life contingencies would be expanded to include problems showing applications in various situations involving contingencies, such as survivorship rate of light bulbs, municipal bond default rates, and the like. A business context would be built into all this syllabus material.

The nonmathematical Basic courses would cover the fundamentals of such topics as: valuation of liabilities; financial reporting; pension funding; design, administration, marketing, underwriting, and pricing of financial security programs; employee benefit programs; risk management programs; and banking and securities programs. The Basic courses in investment would cover an introduction to asset management, corporate finance, and the principles of asset/liability management.

Advanced material would build on the Basic material and educate the actuary in a chosen practice area. However, these courses would not require the actuary to master detailed, nation and time-specific legislation or regulation. While some legislative and tax material might be introduced, it would only provide background on the genesis and framework of the systems being studied. Nation and time-specific material would move to Professional Development. It is anticipated that some pre-Fellowship Professional Development requirement would exist. However, fulfilling this requirement would include the flexibility of several alternatives, such as conferences, seminars, and colloquia.

Where Do We Go from Here?

The Task Force believes that this new structure for the E&E system will provide the effectiveness, efficiency, and clarity of purpose needed to meet the educational needs of actuaries for the 21st century and has recommended to the Board of Governors that this new structure be adopted.

The Board strongly endorsed this direction at its January 1995 meeting and encouraged the Task Force and a Design Team to proceed with the full redesign of the SoA's basic education system.

As we proceed with a redesign of the SoA's basic education system, considerable time and effort will be required to ensure that the right steps are taken, the right courses are developed and the fairest provisions are made to protect the legitimate interest of clients and employers as well as current and future candidates.

A Design Team has been formed to develop the syllabus for the new system in accordance with the four principles approved by the Board of Governors. The Design Team will start by determining the subjects that must be covered within the Basic and Advanced categories of the new education system. Each course will be defined in terms of specific objectives, topics, testing methods, credit value, and so forth. The work of the Design Team will be presented to a Review Group of diverse composition for critique/comment. A Board-level task force is charged with overseeing the design and implementation of the new system.

Input from the SoA membership and related constituencies is being actively solicited by the Task Force and the Board of Governors. The ideas generated and obtained from the membership will be given to the Design Team for its use.

The Design Team will report its progress on the proposed new system at each Board meeting. We anticipate that final approval of the proposed syllabus and system will occur in 1996, with full implementation starting in 1998.

Presentations on the redesign of the education system and the work of the Task Force have already been made to several audiences of actuaries: sessions at each of the SoA spring meetings, the Chief Actuaries Forum, and the Nebraska and the San Francisco Actuaries Clubs. Presentations have also been made to the Canadian Institute of Actuaries Council and the Casualty Actuarial Society Executive Council. In total, several hundred interested actuaries have listened to these ideas, and many of them have provided ideas and input.

Support and approval for the general principles and framework guiding the redesign have been strong. Those who have attended and participated in the presentations have endorsed the goals and direction and made positive suggestions.

Naturally, concerns have been raised. The need for early and effective screening to benefit both prospective actuaries and potential employers has been expressed. The need to maintain sufficiently high standards for attaining membership in the SoA has been voiced. Study time and expense are also concerns. These concerns are all valid and will be among the factors carefully considered in designing the new education system and the transition to it.

Your Chance To Be Heard

We are very interested in hearing from each of you. What are your ideas about redesigning the education system? What is essential to consider? What concerns do you have? Complete

the survey or drop us a line at the SoA office. We are committed to creating the best possible education system for actuaries in the future, and we need your help to make that happen.

Q & A

- (1) **This is a radical change in the education process. How are you going to involve the membership?**

We have, are and will continue to solicit input via a series and variety of communication opportunities. We need the ideas of the membership to develop an education system that will provide current and future actuaries with the knowledge and tools needed to practice effectively in the future.

The educational and examination requirements are the responsibility of the SoA Board of Governors, but the support of the membership is essential to the success of such a major effort. The SoA membership and other constituents will have a real voice in this process as it moves forward.

- (2) **Is the change intended to attract more people to the profession?**

The intention is not particularly to attract more people, but rather to do a better job of attracting and educating the people who want to become actuaries. Business skills are needed as well as mathematical skills, critical thinking, communication skills and facility with all aspects of modeling, along with the more traditional strengths of actuaries, will enable entrants (and seasoned practitioners) to put their skills and knowledge to the most effective use in the future professional environment.

- (3) **If the SoA no longer tests the rigorous mathematics, how will the high standards of the profession be maintained?**

The mathematics will be tested, but in an applied business setting. The new courses, such as those covering all aspects of modeling and all types of contingencies, will be mathematically rigorous. The "attractor" exam as it is envisioned will be rigorous. The shift in focus is not away from mathematics but towards placing the mathematics in a context of real-world actuarial applications. Standards on the mathematical examinations will not be compromised. What is being eliminated is the extensive testing of general mathematical subjects.

- (4) **Screening has always been a major function of the examinations. How is that changed by the new education system as currently envisioned?**

Effective screening will still be a major function of the examinations in the new system. High standards will be established for the Basic and Advanced courses; the result may be fewer but higher hurdles.

An area of concern for employers has been the need for a front-end screen. The "attractor" examination is intended to fill that need, testing candidates on general/fundamental mathematical skills such as calculus, probability and statistics within a real-world context. The candidate passing this attractor exam will thereby have a more realistic sense of the environment in which the actuary operates and will bring to the employer more than a facility with pure calculus and statistics.

- (5) **What happens to candidates who are currently in the system or ready to start taking actuarial examinations?**

The changes envisioned for the education system are not going to take place immediately. Candidates who are ready to start taking examinations should go ahead and start. They may have made significant progress by the time these changes take effect.

One of the principles established to guide the transition process is that candidates should be minimally dislocated by the changes. Transition rules will be equitable in crediting achievement in the current system, and the focus will be on encouraging candidates to take the most essential courses within the new system.

- (6) **Within the Professional Development category, it appears that there may be an examination component for some candidates. Does the Task Force envision a need to make the examination requirements the same for everyone?**

Candidates who need to satisfy the requirements of organizations or agencies outside the SoA may have to write examinations to satisfy those requirements. For example, the enrolled actuaries (EA) examinations are required for pension practitioners in the US. The CIA could have some additional requirements for actuaries practicing in Canada. Such specialty and regulatory topics would be expected to fit within the Professional Development category to meet the professional needs of the individual, not the SoA per se. A strict equivalence of examination requirements within the category is not viewed as necessary. We see this category as a way for the individual to fill in the gaps in his/her own professional education.

- (7) **What about the potential for overlap or conflict with the CAS? Is that a concern?**

One of the guiding principles for the design of the new system is to obtain education from the best available source. For subjects that cover traditional property/casualty topics we regard the CAS as that source and will rely on the CAS for the appropriate courses and examinations. Discussion is under way on developing a joint CAS/SoA course that encompasses risk theory, credibility theory, and loss distributions.

We have had discussions with the leadership of the CAS and have been pleased by their openness/receptivity to the proposed changes. Every effort will be made for the two organizations to work cooperatively as we progress.

- (8) **How will the new ASA be defined?**

There are two likely possibilities for the level of the ASA.

First, the level of ASA requirements could be set at the point most comparable to the July 31, 1995 standard: the required basic mathematical courses (155 credits), the four core courses covering basic practice and investments (100 credits), and 45 candidate-selected elective credits. Under this proposed structure, the comparable level would be at completion of the Basic category and would represent demonstrating attainment of the core knowledge and competencies needed by all actuaries.

Second, the level of ASA requirements could be set at the point that signifies full exposure to fundamental principles within a selected practice area as well as the attainment of the universal core knowledge and competencies. Under this proposed structure, the comparable level for ASA would come at completion of the Basic and Advanced categories of education.

BOARD TASK FORCE ON EDUCATION SURVEY



We are interested in your reaction to the information presented. Your input and ideas can be very helpful as we enter into the design of the future education system.

- (1) Do you support the general direction taken by the Board Task Force on Education? If not, what concerns you about the general direction?

- (2) Have you observed specific trends in the business environment relevant to the actuarial profession that should be addressed in the redesign? If so, what are those trends?

- (3) The Board adopted a set of four principles for the focus of the syllabus (see pages 3-4). Do you agree with these principles? How could they be improved?

- (4) The Board adopted a set of four categories of actuarial education (see page 4). Do you agree with these categories? How could they be improved?

(5) Are there specific concerns that you believe should be addressed in the design process? If so, what are those concerns?

(6) What other comments or questions do you have on the direction proposed by the Board Task Force on Education?

Thank you for taking the time to respond. You may preserve anonymity. However, if you are interested in staying informed on the progress of this effort or if you would be willing to discuss your ideas further, please provide us with your name and affiliation.

Name	Affiliation	
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