

ACTUARIAL EDUCATION FOR THE 21ST CENTURY

C. D. Daykin

Government Actuary of the United Kingdom

Abstract. This paper is a contribution to the current discussion about future developments in actuarial education. The actuarial examination systems administered by the Society of Actuaries, the Casualty Actuarial Society, the Faculty and Institute of Actuaries and the Institute of Actuaries of Australia have recently been reviewed, with new structures brought into place in 2005. The International Actuarial Association is going through the final stages of accrediting actuarial organizations as Full Members of the IAA, according to whether they meet the education requirements of the IAA Core Syllabus and Guidelines. The Review of the Actuarial Profession in the UK by Sir Derek Morris proposed further fundamental changes to both initial and continuing education, to broaden the scope and impact of the profession and to provide better assurances of quality for the public. The World Bank has identified the need for actuarial education and for strengthening the actuarial profession as key ingredients to assure the stable development of insurance and pensions in many developing countries. Some of the implications of these many different strands for the future of actuarial education are explored and discussed.

Key-words: actuarial education; continuing education; broadening the profession, professional competence, core syllabus, accreditation.

1 Introduction

Actuarial education is at the heart of the profession. It is an essential requirement for a profession that it maintains the level and quality of knowledge of its members. Part of this is the initial process of qualification, leading to accreditation and recognition as an actuary. Part is concerned with maintaining the level of knowledge and relevance throughout professional life.

The International Actuarial Association (IAA) insists on Full Member Associations having an education requirement for being recognized as a fully qualified actuary which meets the IAA Core Syllabus and Guidelines. These were originally adopted by the International Forum of Actuarial Associations in 1998 and were brought forward into the new IAA. Implementation of the Core Syllabus and Guidelines as an accreditation requirement for the IAA was scheduled for 2005 and is now in full swing. At the last meeting of the Education Committee of the IAA, in Rome in June 2005, it was recommended that around 30 associations should have their education proposals approved. Many more associations are expecting to have their education proposals approved at the next IAA meetings in November 2005.

The year 2005 is not only important for this process within the IAA but also for a number of the large international examining bodies. The Society of Actuaries (SoA) has undergone a major review of its examinations and syllabus and is implementing new arrangements from 2005. The UK Actuarial Profession (UKAP – consisting of the Faculty and Institute of Actuaries) has introduced a new structure of examinations from April 2005. The Institute of Actuaries of Australia (IAAust) has made significant changes to Part III of the examination process, also with effect

from 2005. And the European Actuarial Consultative Group (the “*Groupe Consultatif*”), which brings together all the actuarial associations in Europe, is implementing its own core syllabus requirement for fully qualified actuaries in 2005 (at a more stringent level than the IAA requirement).

These developments have not been taking place in isolation, and one of the effects will be to bring the various actuarial education and examination systems closer together. This convergence also applies to the actuarial education arrangements in many other countries around the world, as the discussions in the IAA and the Groupe Consultatif are heeded and responded to. Some particular features which will be briefly discussed in this paper are:

- strong convergence of basic actuarial technical education;
- increasing awareness of the need for actuaries to understand more about financial economics;
- the move towards teaching the application of actuarial techniques in a more generic framework, following the lead set by the IAAust with Part II of their examinations (the Actuarial Control Cycle);
- the desire to open up new areas of specialism for actuaries and not to restrict the development of the profession to the traditional practice areas;
- an increasing role for universities to play in actuarial education;
- the need for actuarial education to be fully adapted to the social and business environment and to be practically relevant rather than just theoretically sound; and
- the importance of inculcating a culture of life-long learning.

2 Routes to actuarial qualification

There are a number of different models for actuarial education and qualification. The most important numerically worldwide is that of examinations set by the professional body itself. This approach began in the UK and extended to other English-speaking countries, and then more widely, with professional examination systems operated today by at least the following associations:

- the Society of Actuaries (based in North America)
- the UK Actuarial Profession
- the Institute of Actuaries of Australia
- the Institute of Actuaries of Japan
- the Casualty Actuarial Society (based in North America)
- the Society of Actuaries of China
- the Actuarial Society of India
- the Actuarial Institute of the Republic of China
- the Actuarial Society of the Philippines
- the Society of Actuaries of Indonesia

The first three of these operate widely throughout the Asian region as well as in their home countries, as, to a lesser extent, do some of the other systems.

The other major route of actuarial education is through the universities. Historically this was the main way to become an actuary in continental Europe, with lengthy university courses, at a very strong technical level, constituting the main route to qualification as an actuary in Belgium, Denmark, France, Germany, Italy, Netherlands, Sweden, Switzerland, Spain, as well as in other parts of the world, such as in Mexico and Argentina. In Europe, partly as a result of the

Groupe Consultatif's initiative in implementing a core syllabus requirement, the scene has been changing. In some countries the actuarial profession has been able to work with the universities to update and develop the syllabus for actuarial education so as to meet the Groupe Consultatif's requirements. In others the tradition of university independence is too strong for this to be possible and different ways have had to be considered. In Germany the actuarial profession took the view that the universities would provide the basic level of education but that they could not assume that all universities would be of the same standard. So they introduced professional examinations, both to examine material that would normally be expected to be taught in actuarial courses in the universities, and to educate and examine material relating to the practical and business application of actuarial techniques that would not normally be taught by the universities.

In the Netherlands an alternative route was introduced for qualifying as an actuary, through taking courses at the Actuarial Institute, an educational institution set up by and strongly connected to the actuarial professional body. In Denmark the actuarial profession is relying on a process of work experience and strengthening the requirements for continuing professional development to build on the strong theoretical foundations provided by the university. Also, in practice, students at the university have internships with actuarial employers during the later stages of the 6 year degree course, and thereby begin to gain practical experience.

In Italy and Greece the government has introduced actuarial examinations, the passing of which is a requirement to be accredited as a licensed actuary. These are run with assistance from the actuarial professional bodies (or from individuals associated with those bodies) but the accreditation is in the hands of the government rather than the profession. This is also the case in the United States in respect of the Enrolled Actuary qualification for pensions actuaries, control of which rests with the Joint Board for Enrolment. In China the government also has a role, since the examination process of the SAC is effectively under the supervision of the China Insurance Regulatory Commission.

Increasingly, the professional bodies responsible for actuarial education systems are recognising the important role that universities can play. This is probably most advanced in Australia, where the majority of students take Part I and Part II of the actuarial examinations through participation in a recognised university course. Under the UKAP system a number of universities (not only in the UK) have been accredited by the profession to offer some or all of the Core Technical subjects (corresponding exactly to Part I of the IAAust system) and the Core Applications (Part II of the IAAust system) and some of the Specialist Technical subjects. The universities must be able to demonstrate that they are teaching the syllabus required by the profession and they must appoint an external examiner acceptable to the profession (normally a Fellow of the Institute of Actuaries or a Fellow of the Faculty of Actuaries). Candidates are considered for exemptions from the UKAP examinations on an individual and subject by subject basis. Exemptions are only offered to students who attain a high mark in the university exam, usually considered to be around distinction level.

The SoA has always refused to give any credit for university education, and the tradition has grown up in North America of university actuarial students sitting the first few SoA exams whilst at university. However, under the latest arrangements, introduced in 2005, certain subjects are no longer to be examined directly by the SoA but the actuarial student must demonstrate that these subjects have been "validated by an educational experience", which in effect means that they have been taken at a university (although other routes will be acceptable).

3 The IAA Core Syllabus and Guidelines

The IAA was re-formed with a new constitution in 1998 at the Birmingham International Congress of Actuaries. At this point the IAA became an association of associations, adopting the format and much of the content of the International Forum for Actuarial Associations (IFAA), which had been created as a section of the IAA in 1995 at the Brussels Congress. The IFAA had already developed a core syllabus, which it was intended would become one of the key criteria for determining whether an actuarial association could become a Full Member of the organization. This now became part of the IAA accreditation requirements, being interpreted as having to apply to students starting their actuarial education from 2005 onwards, so without any implication that existing actuaries would have to demonstrate that they met the requirements. Further consideration of the evolution of the IAA requirement can be found in Daykin [1]

The main objective of the core syllabus was to help the IAA to be able to demonstrate that it represented a global network of professional actuarial associations which all maintained a certain minimum level of educational requirement in admitting individuals as fully qualified actuaries. Thus the education standard would be an assurance of the technical competence of actuaries who are fully qualified in any of the Full Member associations of the IAA.

The core syllabus also offers a benchmark for the development of actuarial education systems, and is expected to help in the convergence of existing systems and in ensuring that any new associations, or new university programs, aspire to establish actuarial education on a basis consistent with the IAA core syllabus.

It may also help towards mutual recognition of actuarial qualifications, although the IAA does not have an explicit objective to bring about mutual recognition, this being left as a matter for individual actuarial associations.

The core syllabus consists of the following topics:

- financial mathematics
- probability and mathematical statistics
- economics
- accounting
- modeling
- statistical methods
- actuarial mathematics
 - life insurance
 - general insurance
 - pensions
 - health care
- investment and asset management
- principles of actuarial management
- professionalism

More details of the core syllabus are provided in Appendix A (excluding the indicative reading).

The Core Syllabus is supplemented by the “Guidelines”, which explain certain aspects of the requirement, in particular that the core syllabus is not to be read as

being totally prescriptive for associations and that it is intended to leave open the way in which this level of education is achieved, for example through exams set by the profession, through university qualifications or through some mixture. Educational systems will also vary in the depth to which particular topics are treated and the breadth and scope of the syllabus. It is acknowledged that certain actuarial associations support an education system which focuses to a large extent on a single practice area or groups of practice areas. Whereas the ideal, as envisaged by the founders of the IAA, is that actuarial education should be sufficiently broad to ensure that fully qualified actuaries have a reasonable understanding of the principles of applying actuarial ideas and techniques in all the major practice areas, it is recognized that an actuarial education with a greater degree of specialization can be as valid in some circumstances as one which aims at producing generalists. Under the code of conduct of the actuary's association, which must also meet the minimum requirements of the IAA, an actuary should, of course, only operate in areas where he or she has the necessary competence and experience.

The IAA Education Committee has been working through a thorough process to assess each association's education requirements and standards against the Core Syllabus and Guidelines. This started with a self-assessment process, each association being asked to complete a questionnaire concerning their coverage of each of the subjects in the IAA Core Syllabus. Associations were asked to consider a four points scale for the treatment of each subject:

- 0 - Not covered at all
- 1 - An introduction to the topics so the student has a basic knowledge of the subject
- 2 - The student has a good knowledge of the subject as defined in the syllabus and an understanding of how the subject is used in problem solving so that the student is able to solve well-defined problems as needed by actuaries.
- 3 - The student has a deep knowledge of the subject and is able to solve complex problems using judgement.

It will be appreciated that there is a "fifth point" of depth on the scale whereby an experienced practitioner with a specialism in the subject is able to solve ill-defined complex problems using judgement. However, this depth is unlikely to be achieved at the point when an individual initially qualifies, as this is acquired with experience.

The IAA accreditation process is looking for each of the 10 subjects to be covered at least to level 2. Some associations require many of the subjects to be covered at level 3, but that is not being taken to be part of the IAA requirement. It is appreciated that some associations are still moving towards meeting the guidelines in 2005. If there are some subjects which are not covered to the required level 2 for all newly qualified actuaries matriculating after 2005, then details are required to be given of the plans to move to at least a level 2, including the timescale for achieving this. An indication has to be provided of the percentage of newly qualified actuaries whose education has not met the guidelines.

The UKAP and the Society of Actuaries have submitted their assessments against the core syllabus based on the requirements for Associateship, since it is believed that this level meets the IAA requirement of level 2 in all the subjects (with the requirements recently introduced for Associates to take a professionalism course).

All associations will be reviewed periodically and especially when they make major changes to their education system. Each association has been asked to inform the IAA Education Committee when major changes are planned.

4 Convergence of technical syllabus content

One of the clear benefits of the IAA Core Syllabus requirement has been the impetus it has created towards convergence of syllabus content in the different actuarial education systems. A similar process has been seen in Europe over the last ten years, following the adoption by the Groupe Consultatif of their core syllabus, which is rather more detailed and extensive than that of the IAA, intended to cover up to full Fellowship level in the UK and equivalents within other European actuarial associations. Associations who recognized deficiencies in their education process in a particular area have been taking action to remedy the deficiencies in one way and another.

The large international English language professional examining bodies have also been cooperating in the development of the latest structural and syllabus changes, all of which have been introduced this year. The aptly named Joint Education Task Force 2005 included representatives of the UKAP, the SoA, the CAS and the IAAust, with observers from other countries using these systems as their main route to actuarial education, such as Canada, Ireland and South Africa. The result was unfortunately not an identical syllabus for the core technical subjects, with one-to-one correspondence of examinations. However, there has been a considerable degree of convergence and it is believed that the syllabus content is now very similar overall, although packaged somewhat differently.

The UKAP has slightly reduced the content of the first stage of the examinations, known as the Core Technical subjects, with a small amount of material being dropped and other material being pushed up into a new set of subjects called Specialist Technical, where the student has more choice of which subjects to take. The compulsory core technical subjects are:

CT1	Financial Mathematics
CT2	Finance and Financial Reporting
CT3	Probability and Mathematical Statistics
CT4	Models
CT5	Contingencies
CT6	Statistical Methods
CT7	Economics
CT8	Financial Economics

In addition the student must participate in CT9, the Business Awareness Module. The aim of the Business Awareness Module is to provide candidates with an understanding of:

- the business environment they will be working in
- how to tackle business related problems
- their professional responsibilities
- the need for life-long learning

The need for this type of education was discussed in more detail in Lyn, Palandra and Daykin [2]. In the Australian system a requirement for a business module has recently been introduced into Part III.

Part I of the IAAust examination requirements is identical to the UKAP Core Technical. Normally in Australia, however, these subjects are taken through a university bachelors degree course, with exemptions being granted into the UKAP system and recognized into the IAAust system. Students who do not get all the exemptions can sit the UKAP examinations to complete Part I of the IAAust requirements.

The SoA has introduced a new education strategy and syllabus in 2005. There are four basic core technical subjects:

P	Probability
FM	Financial Mathematics
M	Actuarial Models
C	Construction and Evaluation of Actuarial Models

In addition, a student is required to demonstrate “Validation by Educational Experience” (VEE) for the following three subjects:

- Economics
- Corporate Finance
- Applied Statistics

The underlying syllabus requirements for the combination of the four technical exams and the three VEE subjects are extremely similar to the UKAP CT1 to CT8 subjects. Arrangements are in place for students transferring from one system to the other to be granted appropriate exemptions into the receiving system.

Financial economics and corporate finance are aspects which have been markedly strengthened in this latest revision (more so perhaps for the SoA than for the UKAP, since a lot of work was done in the UK at its previous revision). This seems to be an important related discipline with which actuaries should be familiar. However, one of the problems is that it is a big discipline in its own right, and one that is rapidly developing, with many of the earlier results based on the efficient market hypothesis and Markowitz portfolio theory now being modified to take into account the emerging literature on behavioural economics. It will be difficult for the actuarial education syllabus to keep up with the front line of these developments. In a recent review of the Groupe Consultatif core syllabus, financial economics and modern financial mathematics were identified as areas which needed to be considerably strengthened. This has not yet happened at the IAA level, but it is understood that the IAA Education Committee will be embarking on a review of the content of the IAA Core Syllabus as soon as it has completed the 2005 assessment of whether Full Member associations of the IAA are meeting the education requirement.

5 The Actuarial Control Cycle

Another very important area of convergence in the syllabus requirements has been motivated by the Actuarial Control Cycle (Part II of the IAAust educational requirements). This was based around the ideas in a seminal paper to the Institute of Actuaries Students Society in 1985 by Jeremy Goford [3]. The concept is to adopt a more holistic approach to understanding model development, assumption setting, pricing, reserving, emergence of profit or surplus, monitoring and feedback, with examples being taken from a variety of traditional actuarial practice areas and also from novel areas, rather than teaching the concepts of each practice area separately. The whole process is set in a contextual understanding of the role of professionalism, risk management and the general external environment

(regulation, accounting requirements, investment markets, etc.) Particular attention is devoted to helping the student to understand the interests of different stakeholders and to have an enhanced awareness of risk, from the perspectives of the different parties involved.

The Actuarial Control Cycle concept was incorporated into the IAA Core Syllabus as “Principles of Actuarial Management” and this has necessitated some changes in many individual actuarial education systems. The UKAP has now introduced “Core Applications” as a key group of subjects to follow the Core Technical, in order to complete the Associateship. Core Applications includes a subject corresponding to the Actuarial Control Cycle, but also includes a Communications paper and a requirement to attend a hands-on actuarial modeling course.

In the SoA there is a new Part 5, entitled Application of Basic Actuarial Principles, which forms part of the Associateship requirement, although, if I understand the new SoA requirements correctly, it is possible to reach the Associateship without passing this paper, as there are some elections available and ASA candidates only have to pass two out of Part 5, Part 6 (Finance and Investment), Part 7 (Applied Actuarial Modeling) and Part 8 (Advanced Specialized Actuarial Practice), subject to certain constraints.

A text-book is now available for the IAAust Part II [4]. Core reading for the UKAP Core Application CA1 examination fulfils a similar purpose in the UK system. A fuller discussion of the thinking behind the introduction of the Core Applications subject to the UKAP examinations, along with other aspects of the recently introduced education strategy, can be found in Goford *et al* [5].

6 The Review of the Actuarial Profession in the UK

In December 2000, Equitable Life, the oldest mutual life insurance company in the world closed to new business. Equitable, established in 1762, was the first insurance company to call its mathematician an ‘actuary’. It is ironic that its eventual closure should have triggered the first ever government-established review of the actuarial profession. Equitable closed because of a judgment by the House of Lords, the UK’s Supreme Court, in July 2000, which ruled as illegal the company’s practice of awarding different terminal bonuses according to whether or not contracts had a guaranteed annuity option.

A public Inquiry was set up under Lord Penrose into the events that had led to the closure of the Equitable. The 817 page March 2004 report of this Inquiry was critical of the company management but also levelled criticism at the actuarial profession and at the regulatory structures. Penrose suggested that both the regulatory system and the profession had placed too much reliance on the role of the appointed actuary. He also accused the profession of lacking comprehensive and specific professional standards, of having reactive disciplinary arrangements, of giving insufficient technical guidance on good practice in specific areas and of not being willing to challenge fellow professionals.

In receiving the Penrose report, the government accepted that there had been some shortcomings in the regulatory system, for which, they said, previous governments had been responsible, although they argued that these shortcomings had now been largely dealt with by the new supervisory structure that had been put in place under the Financial Services Authority (FSA). However, they announced the setting up of a comprehensive review of the UK actuarial profession, under Sir

Derek Morris, an academic economist who was just completing his term of office as Chairman of the Competition Commission.

The Morris Review reported in March 2005 and covered a lot of issues about the profession that are beyond the scope of this paper. Chapter 4 of the final report [6] dealt with the topics of Education and Continuing Professional Development. Sir Derek Morris was not convinced that the current education arrangements for becoming an actuary in the UK were optimal, reflecting, many in the profession would argue, a somewhat partial understanding of the current education strategies and processes. However, Morris clearly regarded the current “work-based” model of part-time study and exams run by the profession as a constraint on the profession expanding into wider fields of practice, reinforcing the existing pattern of actuaries being largely employed in insurance and pensions, a strategy which he thought could prove dangerous to the profession if these areas of work were in future to decline in importance or in their need for actuaries.

Notwithstanding some criticism of past efforts to modernise the syllabus, the Review were impressed with the latest education strategy, which was just coming into force with the April 2005 examinations, and encouraged the profession to implement that fully. The profession’s education processes will in future come under the oversight of the expanded Professional Oversight Board for Accountants and Actuaries, within the structures of the Financial Reporting Council, but the profession was exhorted to ensure that it obtains broader input into future revisions of the syllabus and core reading. This seems to reflect a (largely incorrect) perception by the Morris team, that the profession had not received broad academic and other input into previous syllabus revisions, and that there had been excessive influence from commercial interests.

More radically, the Review recommended that the profession should consider moving towards a more university-based education system, with the actuarial education up to Associateship level provided entirely by the universities, and the profession concentrating on Fellowship level examinations and work experience requirements. Morris also envisaged the profession giving much greater freedom to the universities than at present to teach and assess the basic actuarial education in whatever way they wanted, contrasting with the close monitoring and accrediting of particular courses which characterises the present UKAP model of university exemptions.

The Review was not particularly impressed by the current Continuous Professional Development Scheme of the UKAP and recommended that the objectives of the scheme be clarified and that CPD should be kept relevant and up-to-date, taking fully into account developments in actuarial science, financial markets and other related disciplines. However, the Review liked the UK profession’s current proposals for revalidation and maintenance of professional competence, which will in effect make CPD mandatory for all working actuaries, since anyone who is an actuary and in work (whether or not in an actuarial capacity) will be required to have a renewable practising certificate and to maintain a certain level of CPD, including a mandatory level of professionalism training.

One of the main motivations for the Review’s recommendations was a recognition that the actuarial profession needs to expand beyond its traditional practice areas if it is to survive in the future as a strong and expanding profession. A more university-based education can provide a good foundation for this expansion, as has been evidenced by the experience in Australia.

In the UK and in North America there is a strong desire on the part of the profession's ruling bodies to expand the profession into new areas, but it is difficult to achieve whilst there are still shortages of actuaries in traditional areas and where most actuarial students are employed by traditional actuarial employers, so that entry into the profession is often dependent on getting a trainee position in one of these employments.

There are moves under way to expand and develop the specialisms available within the actuarial qualification process. In the SoA system it is now possible to take Enterprise Risk Management (ERM) as a subject in Part 8. The UKAP also intends to introduce an ERM specialism. The latest revision to the UKAP system has seen an expansion in the range of subjects at the Specialist Technical and Specialist Applications level to include Health and Care and separate specialisms for Investment and for Finance. Also under consideration are a specialism in Social Security and a Specialist Technical paper in Demography. A longer term objective would be to offer papers in Banking.

7 Continuing Professional Development

This brings us to the topic of Continuing Professional Development (CPD) or Continuing Education (CE) as it is sometimes known. It is obviously the case that the actuarial education and examination systems provide only the foundations for actuarial professional practice. They have been described as developing the "embryo actuary". Much learning and development is still required of the newly qualified actuary, in order to be able to apply the actuarial techniques and skills that he or she has learnt, and to be able to give high quality professional advice to clients (including, in the case of employed actuaries, their own company management and Board). They need to learn a lot about the operating environment, about legislation and regulations, about accounting standards and taxation, and they need to learn to be able to apply critical analysis and judgement to their work, to the answers they provide to clients' questions and to the solutions they develop to the problems their clients face.

It is also not acceptable, in these days of rapid and continuous change, for an actuary to remain rooted in the time-warp of the day he or she qualified. It is essential to keep up-to-date with developing actuarial techniques and with the fast-moving environment of related professional developments (such as financial economics, to which allusion has already briefly been made). There is also a clear expectation from our clients, and from the wider public who depend, directly or indirectly, on actuarial advice, that a professional such as an actuary will be fully abreast of the latest developments and will be and will always remain, at a peak level of competence in their specialist field.

With this background it is in my view essential for actuarial associations to play a full and active part in facilitating and ensuring the continuing professional competence of its members. At the most basic level this should involve encouraging each actuary to be fully responsible for their personal continuing professional development. Beyond this it should involve making available through the profession the opportunities that the individual actuary needs to further their personal professional development. And it is likely increasingly to mean that actuarial associations should take responsibility for requiring continuing professional development of their members and to enforce this through active monitoring and through the implementation of measures such as practising certificates.

The UKAP has had a Continuing Professional Development scheme for some years. It is recommended practice for all actuaries to maintain a certain level of CPD. For those who perform statutory functions (pension scheme actuary, head of the actuarial function of a life insurer, with profits actuary or reviewing actuary of a life insurer and Lloyd's syndicate actuary) it is a professional requirement to hold an annually renewable practising certificate for the particular role held. Renewal of the practising certificate is dependent on demonstrating that the required amount of CPD (including specifically relevant CPD) has been carried out in the past year).

The reference in the previous section to the Morris Review's support for the profession's latest proposals relate to the intention to introduce much more radical requirements for Revalidation of Professional Competence. These will involve a requirement on all working actuaries (even if not working directly as an actuary, e.g. in management or in an entirely non-actuarial role, such as Director of Personnel) to hold a current practising certificate. The requirements for CPD will be weaker, and more general, than the current requirement for statutory roles, but will nevertheless impose on all working actuaries a requirement to maintain CPD, including a specific requirement for this to contain a certain minimum level of "professionalism training". Attendance at a professionalism course is already a requirement for new qualifiers (both Fellows and Associates) but there will in future be a requirement for those who have been qualified for some years to attend refresher professionalism courses, or particular events on professionalism topics organized within the context of conferences, conventions and seminars in particular practice areas.

8 The Importance of Developing the Profession

In carrying out its recent first cycle of the Financial Sector Assessment Program in association with the IMF, experts at the World Bank have identified the weakness of actuarial education, and the total absence of or weak actuarial professional associations, as a key area of concern for financial stability in many low to medium income countries. In discussions with the IAA, the representatives of the World Bank have emphasized the urgent need to support the strengthening of actuarial education in many countries and the importance of helping to develop strong professional associations for actuaries in these countries. This is something with which the IAA Advice & Assistance Committee is actively engaged and where the IAA believes that it can help to achieve the World Bank's objectives, particularly if the World Bank and other international funding agencies can make available the funds to facilitate the huge amount of work that needs to be done to start new actuarial education programs and to strengthen existing ones, and to support the development of the profession in every country that has a developing insurance and pensions industry.

The Advice & Assistance Committee is considering a number of different models for delivering actuarial education programs. One such is the diploma program, which was used to good effect by the Institute of Actuaries in providing an initial level of actuarial education in many of the transition economies of central and eastern Europe in the 1990s. This program has support from the IAA Education Committee as being appropriate, subject to certain conditions, for use as an initial education program, and as part of the process of a new actuarial association becoming a Full Member of the IAA. The World Bank experts are keen to have this type of program rolled out in a large number of low to medium income countries.

Thought is also being given to the possibility of developing some regional centres of expertise for actuarial education. This would be in conjunction with developing contacts with a large number of universities, in just about every country, who might be able to provide the basic level of education in some of the more generic core technical subjects. However, this would probably not, in most cases, extend as far as the Actuarial Mathematics subject of the IAA Core Syllabus and certainly not to Principles of Actuarial Management or Professionalism. These, and possibly some other subjects, would be offered through the regional centres, using a combination of face to face tuition and developing internet based training and examinations.

Another possible challenge for the future would be to develop an IAA College of Education to offer actuarial education and examination worldwide, with global examinations. Several of the international funding agencies have asked why the actuarial profession cannot have something like the Chartered Financial Analyst (CFA) examinations, which are available in uniform fashion across the world.

There is no doubt that there are many challenges ahead of us in the field of actuarial education. This paper has only been able to touch briefly on a few of the key issues. Active involvement in the developing thinking on actuarial education and professional development should be a high priority for actuaries in every country, and particularly for the actuarial associations.

References

- [1] Daykin, C.D. (1998), Educating Actuaries, *Transactions of the 26th International Congress of Actuaries*, **1**, 111-143.
- [2] Lyn, C.D., M.T. Palandra and C.D. Daykin (2002), Actuarial Education – the business element, *Transactions of the 27th International Congress of Actuaries*, **2**, 37-64.
- [3] Goford, J. (1985), The control cycle: financial control of a life assurance company, *Journal of the Institute of Actuaries Students Society*, **28**, 99-114.
- [4] Bellis, C., J. Shepherd and R. Lyon (eds.) (2003), *Understanding Actuarial Management: the actuarial control cycle*, Institute of Actuaries of Australia, Sydney.
- [5] Goford, J., C. Bellis *et al* (2001), Principles of the future education strategy, *British Actuarial Journal*, **7**, 221-273.
- [6] Morris, Sir Derek (2005), *Morris Review of the Actuarial Profession*, H.M.Treasury, London (ISBN 1-84532-089-1; available for downloading from www.morrisreview.org.uk)

C. D. DAYKIN: Government Actuary
Government Actuary's Department, Finlaison House, 15-17 Furnival Steet, London EC4A 1AB, United Kingdom.
Phone +44 20 7211 2620/Fax: +44 20 7211 2650
E-mail: chris.daykin@gad.gov.uk

A The Core Syllabus of the IAA

1. FINANCIAL MATHEMATICS

Aim:

To provide a grounding in the techniques of financial mathematics and their applications.

Topics:

- Introduction to asset types and securities markets
- Interest, yield and other financial calculations
- Investment risk, introduction to stochastic interest and discount
- Market models - e.g. term structure of interest rates and cash flow models

2. PROBABILITY & MATHEMATICAL STATISTICS

Aim:

To provide a grounding in probability and mathematical statistics.

Topics:

- Concepts of probability
- Random variables and their characteristics
- Methods and properties of estimation
- Correlation and regression analysis
- Hypothesis testing and confidence intervals
- Data analysis

3. ECONOMICS

Aim:

To provide a grounding in the fundamental concepts of both micro and macroeconomics.

Topics:

- Microeconomics
- Macroeconomics

4. ACCOUNTING

Aim:

To provide the ability to interpret the accounts and financial statements of companies.

Topics:

- Basic principles of accounting - including the role of accounting standards
- Different types of business entity
- Basic structure of company accounts
- Interpretation and limitation of company accounts

5. MODELLING

Aim:

To provide an understanding of the principles of modelling and its applications.

Topics:

- Model structures
- Selection process
- Calibration
- Validation
- Scenario setting
- Sensitivity testing
- Limitations

6. STATISTICAL METHODS

Aims:

To provide the skills and expertise in the use of models appropriate for the understanding of risk in a range of actuarial work.

Topics:

- Statistical models, such as regression and time series
- Survival and multi-state models
- Risk models (individual and collective)
- Parametric and non parametric analysis of data
- Graduation principles and techniques
- Estimation of frequency, severity and survival distributions
- Credibility theory
- Ruin theory

7. ACTUARIAL MATHEMATICS

Aim:

To provide the skills and expertise in the mathematics that are of particular relevance to actuaries working in life insurance, pensions, health care and general insurance.

Topics:

- Actuarial mathematics as applied to life insurance, pensions, health care and general insurance
- Types of products and plans - individual, group and social insurance arrangements
- Pricing or financing methods of products and plans
- Reserving
- Reinsurance

8. INVESTMENT AND ASSET MANAGEMENT

Aim:

To develop the ability to apply actuarial principles to the valuation, appraisal, selection and management of investments.

Topics:

- The objectives of institutional and individual investors
- Types of investment (bonds, shares, property and derivatives)
- Regulation and taxation of investments
- Valuation of investments
- Portfolio selection - incorporating assessment of relative value
- Performance measurement
- Portfolio management

9. PRINCIPLES OF ACTUARIAL MANAGEMENT

Aim:

To develop the ability to apply the principles of actuarial planning and control needed for the operation of risk related programs on sound financial lines.

Topics:

- The general operating environment
- Assessment of risks
- Product design and development
- Pricing and assumptions
- Reserving and valuation of liabilities
- Asset and liability relationships
- Monitoring the experience
- Solvency of the provider
- Calculation and distribution of profit (surplus)

10. PROFESSIONALISM

Aim:

To develop awareness of professionalism issues and the importance of professionalism in the work of an actuary.

Topics:

- Characteristics and standards of a profession
- Code of conduct and practice standards
- The regulatory roles of actuaries
- The professional role of the actuary