Actuarial Education in 2002 and Beyond: A Global Perspective

by

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Abstract

This paper describes a number of recent developments in actuarial education around the world. Globalisation is a key driving force for change and the paper discusses the implications for actuarial education and describes some of the developments now in progress. Looking further ahead other possible globalisation initiatives are outlined. Finally some questions are posed for discussion.

Keywords

Education, globalisation, universities, professional national associations.

Resumen

En el presente artículo se describen algunos de los recientes desarrollos observados en la educación actuarial mundial. El proceso de globalización es uno de los principales motores del cambio por lo que el artículo discute las implicaciones que dicho proceso ha tenido sobre la educación actuarial y describe algunos de los desarrollos actualmente en progreso. Teniendo en cuenta el futuro próximo, también se señalan algunas de las posibles iniciativas en el proceso de globalización de la educación actuarial. Finalmente, se plantean algunas preguntas para su discusión.

Palabras Clave

Educación, globalización, universidades, asociaciones nacionales profesionales

1. Introduction

The aim of this paper is to discuss the issues underlying the globalisation of actuarial education, summarise recent developments, and raise for discussion some possible new initiatives.

2. Definition: stages of education

For ease of discussion in this paper, we use the following terminology for the broad levels of actuarial education:

Stage 1 = "pre-actuarial"	This refers to subjects which are required as foundations to actuarial science, and are widely studied by non-actuaries. For example, mathematics, statistics, and the basics of economics, finance, investment and accounting could be included in this stage.
Stage 2 = "technical"	This refers to subjects which provide the basic tools of actuarial science. For example, life contingencies and survival models, risk models.
Stage 3 = "basic applications"	In this Stage, students learn how the tools of Stage 2 are applied in various practice areas.
Stage 4 = "advanced applications"	In this Stage, students would probably specialise in one or two practice areas, considering in detail the practical problems which arise in those areas and detailed local knowledge.

3. Why is globalisation of actuarial education important?

3.1 Definition of the globalisation process

To determine the possible implications of globalisation, we should first look at what we understand by globalisation, even if this view is rather simplistic.

The first question that arises is whether globalisation is an exclusively economic process, or if it affects other areas of society. The answer is that it is a phenomenon primarily economic in nature, but which has an ever growing impact on other social issues.

"World" commerce has always existed, at least in the known world at that moment, making products from anywhere on the planet available to the elite. For example, in the 8th century AD there is evidence of trade between the Iberians and most of the other Mediterranean peoples, including the Egyptians, the Greeks and peoples from the Middle East. These commercial transactions permitted and encouraged cultural exchanges of all kinds.

In the era of great discoveries, conquests and colonisation by Europeans of the other continents, economies developed which were dedicated exclusively to production for worldwide trade. The division of countries into sellers and buyers, together with the economic strength of the latter and the struggle for access to a bigger piece of the pie, led to two world wars in the 20th century. Sadly, it can almost be said that the first globalisation was that of war. The end of World War II, and the agreements entered into subsequently, is

for some economists the first stage of the globalisation process as we understand it today.

The speed of globalisation's spread has gone hand in hand with the quantum leaps seen in communications, with Internet and the so-called new economy playing key roles. Communications currently allow a product or service created and commercialised in Barcelona to be acquired by individuals or companies in Sydney in a matter of not minutes, but seconds. For this process to work at a sufficiently global and daily scale, in all countries a portion of the economy (including finance) and of the society operate under the same rules, cultural references and even language. This social stratum (hereinafter Global Society Stratum, GSS) is truly global, and a single product or service may be aimed at this stratum regardless of the country in which it is located. This sector is the target market for Global Players (GP), where financial services and products have met with great success.

In summary, we have a global market with sellers, GP, and buyers, GSS, with virtually the same characteristics as local markets formerly.

3.2 Implications of the globalisation process on actuarial activities

The actuarial profession is being globalised within the context described above, as many new insurance and financial products and services are global in scope. This means that an actuary in Barcelona can offer a product or service which a GP will sell all over the world. At the same time, the actuarial profession as a whole forms part of the GSS. For example, actuarial software developed in Sydney may be purchased by an actuary in Barcelona, or financial investments made by an actuary in the course of his activities can be acquired anywhere throughout the world.

Nevertheless, the globalisation of actuarial activities is not an exclusive process. That is, our profession comprises actuaries of the following types:

global producers and consumers;
global producers but local consumers;
global consumers but local producers;
local producers and consumers.

All of which interact among themselves … and with other players, as our profession is obviously not the only one involved in this globalising process or trend.

The Venn diagram below shows a schematic image of the environment in which globalisation is being carried out. The universal space exemplifies an entire country, the items included in the three sets are elements globalised from different perspectives: regulator, supplier (or GP), and consumer (or GSS).

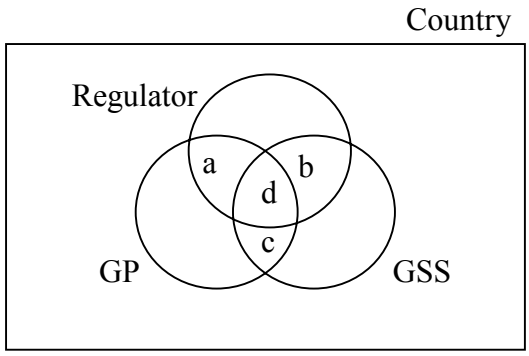

Figure 1: Globalisation process

Global markets really only exist in $GP \cap GSS = d + c$, where consumers and suppliers trade, regulated (d) or not (c) on a global scale.

A mature global market exists in area (d), in which consumers and suppliers trade under standard regulation for all countries. The current trend is for regulation to protect the weaker player in the transaction, in this case the consumer. In area (c) the market is not subject to uniform regulation and there are differences between countries, although the consumers and suppliers are global. $GSS \cap \overline{(GP \cap GSS)}$ symbolises future growth of the global market, as potential global consumers are involved. Part of this area (b) is already subject to common regulations. However, $GP \cap \overline{(GP \cap GSS)}$ represents the products or services commercialised globally, although there is no global demand to justify such transactions. Part of these products (a) could be subject to uniform global regulation.

Finally, $\overline{GP} \cap \overline{GSS}$ reflects the local market area, without considering whether or not local or global regulation exists.

At present the actuarial profession is carried out both globally and locally, although we cannot strictly talk about a division of the professional space (there are global consumers supplied by local markets), nor affirm that both sections form a fixed part of the profession (the surface of the areas is changing). Unlike in previous periods, actuaries' markets are no longer exclusively local.

Consequently, going back to the question posed initially, the main impact of globalisation on the actuarial activity is that it is now carried out in a context different from that to which we were accustomed. As globalisation is not in its final stages, we can talk about a process of growth in the relative weight of the global section as compared to local, although with peaks and valleys.

A brief summary of the difficulties encountered in the globalisation of the actuarial activity is as follows:

- Different educational processes and requirements. This is discussed further below.

- Different economic and financial environment. It is obvious that the economic and financial development of a country will have an impact on the professional advancement or maturity of its actuaries, as work is carried out to the specifications set by the society. Accordingly, in ex-Communist bloc countries the role of actuary did not exist and has only recently been created, with all the difficulties this involves.

This second point also reminds us that the size and influence of the GSS of each country can vary considerably.

In summary, for a specific country the globalisation of actuarial activities will be more advanced the greater the following:

- Stage of the general globalisation process with regard to the local market.

- Degree of convergence between the local and global markets (similarity of the products and rules).

- Actuarial education permits greater ability to adapt to new circumstances and incorporate new scientific advances.

The above is not intended to be an exhaustive list of factors, but rather is to emphasise the diversity of circumstances, as well as the possible impact of educational factors on the globalisation process.

3.3 Importance of globalisation on the education of actuaries

First, we should recognise that the actuarial profession has long had an international element. In terms of scientific developments, International Congresses have been held since 1895, the International Notation dates back to 1898, university departments of actuarial science have a long tradition of exchanging ideas and visits by staff, and ASTIN and AFIR colloquia have been held for many years. In terms of education and examination arrangements, the Institute of Actuaries (London) first offered its examinations in locations around the English-speaking world in 1892, and a number of actuarial bodies currently offer their examinations in overseas locations. For some countries without a local education and qualification system, the designations of a professional body in another country, such as Fellow of the Institute or Faculty of Actuaries, or Fellow or Associate of the Society of Actuaries, have been recognised as actuarial qualifications for the purposes of local legislation.

However, these various forms of international co-operation did not add up to true globalisation. The use of overseas education systems tended to be driven by necessity rather than any deliberate aim at globalisation. Countries which had reached a critical mass of actuarial expertise would usually look to establish their own systems of actuarial education. There was also relatively little interaction historically between the systems of education which were university-based and those which were organised by the professional bodies.

In recent years there has been much greater interest in opening lines of communication between the various systems of actuarial education around the world. There are several factors driving this shift:

(a) During the last decade, actuaries of different countries and different continents have begun to work together in the same teams. From this we have realised that there are differences between our backgrounds. We see that there are things we can learn from each other. Nevertheless, we find that we do similar work using similar skills with similar mindsets. We also have much in common.

(b) Education systems have to change more quickly, to keep up to date with the increasing rate of change in the market for actuarial skills and in the development of actuarial science and to provide a quality system to attract new entrants. Education is a larger enterprise than in the days when the syllabus remained unchanged for decades and students were willing to struggle through outdated textbooks with little assistance. It makes sense to combine efforts where possible. Thus the UK Faculty and Institute have combined their education systems, and the Society of Actuaries and Casualty Actuarial Society have combined for the earlier stages of their education. Moreover, the UK Faculty and Institute have introduced procedures to recognise university based courses through their exemption system. There could well be scope for much greater levels of co-operation and resulting economies of scale. The European Union is encouraging greater co-operation among universities.

(c) The pace of change in actuarial practice has led to a view among many of those involved in education that it is important to focus more on fundamental principles and understanding, and less on details of fact and narrow technique — a shift from "knowing what" to "knowing how to". According to this view, the country-specific detail of legislation and local practice should be left to fairly late in the education process, or even to post-qualification continuing professional development. It is argued that this will lead to actuaries who understand the big picture of actuarial skills and are adaptable to rapid change in traditional practice areas and to moving into non-traditional practice areas. While this view is not a force for internationalisation per se, it greatly facilitates development of an international, non-country-specific, system of education. However, some traditional employers tend to want the opposite, i.e. for actuarial students to be trained in the local specifics at an early stage of their education. It is a challenge for the professional associations both to enable students to gain a broad actuarial education and to provide their employers with actuarial personnel competent and knowledgeable in the skills relevant to their practices.

(d) The actuarial profession is being affected by a number of external developments at the international level. The most significant are trading agreements between blocs of nations and the emergence of international organisations.

    (i) Trading agreements. The most notable example is the European Union's requirement for mutual recognition of qualifications, including actuarial qualifications, in its member countries. This has led to the activities of the Groupe Consultatif, which are discussed further below. There are likely to be more

multilateral trade agreements in the near future, such as those under the General Agreement in Trades and Services and The North American Free Trade Agreement.

(ii) Other international organisations, e.g. international meetings of insurance regulators. The profession needs to have an international voice in dealing with international proposals on regulation, accounting standards, etc. This was one of the motives behind the re-formation of the International Actuarial Association in 1998 as an organisation of associations. The new constitution of the IAA in turn requires a definition of which actuarial bodies can be members, and thus the development of syllabus guidelines, which are discussed further below. The current discussions around the Basel II proposals (http://www.bis.org) will also have an effect.

(iii) Increasing deregulation within the financial industry (e.g. Bankassurance). As a result of deregulation, insurance companies are increasingly interested in hiring finance specialists, in some cases as a substitute for actuaries.

(e) New demand for actuaries in countries which previously did not have a significant actuarial profession. India, the People's Republic of China and Eastern Europe have all seen changes to their economic structure create a sudden demand for actuaries, and thus for actuarial education in these countries.

(f) Finally, the actuarial profession operates in a world that is increasingly globalised, as described in Section 3 above. The same pressures apply across all economies, and each country watches and learns from the experiences of other countries in regulation, deregulation, etc. The differences between countries have diminished and are likely to diminish further, so that there is less need for a unique actuarial education system for each country. A mature global market, indicated by area (d) in Figure 1 above, in which consumers and suppliers trade under standard international regulation, readily creates a demand for some level of international credential. It is worth noting that the American Institute of Certified Public Accountants is attempting to establish an international credential in business advice (see http://www.globalcredential.aicpa.org/index.htm). The AICPA are initially targeting accountants, business lawyers and MBAs, but plan to extend their market to other professions, including actuaries.

The actuarial associations have a responsibility to their members, not only to equip them with relevant competencies for their current role, but also to equip them with the broader actuarial skills that will enable them to be employable for life. This has to take account of global as well as local trends in the work which actuaries will be doing in the future.

4. What are the implications of globalisation?

We summarise below several points where we have found a diversity of focus or aspects:

- We have different education systems. For instance, since 1915 in order to became an actuary in Spain, it is required to have an specific University degree (a Master in Actuarial and Financial Science) and from 1915 to 1992 it was also required to be a

Master in Business Administration (another University degree). In other countries it is not necessary to have a university degree but to pass the actuarial association examinations. There is a third mixed experience in countries were a mathematical university degree is required to enter the actuarial association examinations. Many countries used to ask actuaries for knowledge in economics as well as mathematics, but not all, and others like Spain required business administration science or econometrics.

An implication for globalisation is that we must be tolerant of the diversity of backgrounds, whilst firm in the setting of standards for the outcomes and in the recognition internationally of the qualification of actuary.

- Cultural differences. In many countries financial institutions have been benefiting from actuarial skills for many years. Indeed, some institutions are the creation of mainly actuarial practices. On the other hand some insurance companies, for example, have grown with little actuarial support. The need for actuaries may be resisted initially by such companies but can become compelling as they generate excessive losses (or profits!) or the regulators require actuarial intervention. Globalisation will accelerate these trends.

- Diversity of university courses. Universities offering courses leading to an actuarial qualification or to exemptions from actuarial examinations have a wide diversity of approaches and cultures. In The Netherlands, the Department of Actuarial Science and Econometrics of the University of Amsterdam is part of the Faculty of Economics. At City University in London, UK, the Department of Actuarial Science and Statistics is part of the School of Mathematics. The alignment of the actuarial department within the university will affect the studies of the students outside the main actuarial subjects.

- Role of universities in education. Some associations grant qualification after appropriate university education and experience; others insist on setting their own examinations. Globalisation and distance learning will enable students to acquire the relevant competencies for their employment and to a high standard from a variety of sources. The associations have to choose how they demonstrate to themselves that such standards of competence are sufficiently high to grant their qualification.

- Specialist and wider fields. Actuaries have competencies that are valuable beyond their traditional fields. In the short term, traditional employers will attract the vast majority of qualified actuaries. But as, (for example), defined benefit pension schemes decline and life assurance profit margins are squeezed, actuaries will seek the wider fields. The choice for actuaries will expand, the need for specialist actuaries to retrain will grow. The intersection with finance is important and the growing field of integrated risk management will increasingly affect actuarial education.

- Standards. There is a diversity of standards for actuarial qualification. The diversity may not be so much in the aggregate level of academic achievement or competencies between countries. The diversity may be seen more in the make-up of the qualification. In some countries, for example, there is a greater emphasis on advanced statistics; in others, emphasis on a greater breadth of skills.

- Practical experience. In some countries actuaries are required to have practical experience in addition to theoretical knowledge as part of the qualification. In others qualified actuaries require only the university degree. The need for practical experience is part of mutual recognition agreements for actuaries moving from country to country.

- Actuarially underdeveloped nations. In such nations the organisations that need actuarial skills may globalise faster than the profession. In such circumstances overseas actuaries may fill jobs until the local actuaries generate the necessary competencies. During this transition, the visiting actuaries have a special responsibility to assist in the development of a local actuarial organisation and education processes.

- Regulation. In many countries, the actuarial profession is privileged to have monopoly rights to perform statutory functions. This is a benefit to the local actuarial organisation in bringing a stable source of work; it can also be an inhibition to acquiring the knowledge base to apply actuarial skills outside these statutory roles. The characteristics required for these roles may be relatively static and encourage introspection in the local association. A balance of statutory roles and commercial roles keeps an association healthy.

- Different economic and financial environments. It is obvious that actuaries can advance or mature professionally depending on the economic and financial development of their countries. They will focus their work as demanded by their society. These differences will be reflected in the operations employing actuaries. As these operations globalise and exchange best practices, so actuaries will need to acquire best practice actuarial skills.

5. What has happened so far?

We set out below a summary of a number of recent developments which represent a move towards globalisation of actuarial education:

5.1 Mutual Recognition Agreements (MRA)

Bilateral agreements have been signed between the following bodies: the Faculty of Actuaries, the Institute of Actuaries, the Institute of Actuaries of Australia, the Canadian Institute of Actuaries, the Society of Actuaries. In effect, a Fellow (by examination, i.e. not Honorary Fellows etc) of any of these bodies can become a Fellow of any of the other bodies, subject to fairly minimal residency requirements and work experience requirements. It is important that a Fellow by recognition abides by the Code of Conduct of the Fellow's new association. In particular the Fellow must ensure that (s)he has the relevant local knowledge before offering advice.

5.2 IAA guidelines

The International Actuarial Association was re-constituted in 1998 as an organisation of associations. For actuarial associations to be full members, they must, inter alia, commit to support the IAA minimum educational guidelines for new fully qualified actuaries who begin their studies from 2005. The IAA minimum educational guidelines can be viewed on

http://www.actuaries.org/Members/Syllabus/syllabus.cfm. The IAA is also trying to assist countries who need help in developing their education systems through its Advice and Assistance Committee, and this is mentioned further below.

5.3 Groupe Consultatif core syllabus

The Groupe Consultatif was established in 1978 as a forum for the actuarial associations in the European Union in responding to EU legislation, including the EU's requirement for mutual recognition of actuarial qualifications. It now also provides a forum for discussion amongst all actuarial associations throughout Europe, with thirty-three actuarial associations from twenty-seven European countries represented on the Groupe. As a result, associations in the fifteen EU countries, plus those in Norway, Switzerland and Iceland, have entered into a Mutual Recognition Agreement to admit as a full member any full member of any of the agreed associations who is working as an actuary in the country of the admitting association. The MRA is underpinned by a Core Syllabus which can be viewed on http://www.actuaries.org.uk/groupe_consultatif/documents/core_syll.pdf. The Core Syllabus goes further than the IAA guidelines in Stages 3 and 4 (as defined in Section 2 above). The consequences have been that many of the actuarial associations in European countries have amended their education system. For example, in the Netherlands, the method of qualifying as an actuary used to be through a university degree alone. From 1997 the association there, Het Actuarieel Genootschap, has introduced their own system of tuition and examinations to be taken by actuarial graduates as the final stages for qualification.

5.4 Cross-national education

There are a number of activities which could be categorised as cross-national education, i.e. actuarial education originating in one country which is used for training actuaries in another country.

(a) Countries which use the qualifications of an organisation based outside that country, without adaptation.

There are a number of countries with professional actuarial associations which are active, though relatively small, which have found it satisfactory to rely entirely on a qualification awarded by an overseas body. This includes countries such as New Zealand, which relies mainly on the qualification either of Fellow of the Institute of Actuaries of Australia or of Fellow of the Institute/Faculty of Actuaries (UK), and Taiwan, which relies mainly on the qualification of Fellow of the Society of Actuaries (North America).

Note that the Institute/Faculty of Actuaries (UK) allows exemptions from some of its actuarial courses, so that countries which rely on the FIA/FFA qualification may have strong local university courses covering part of the UK actuarial syllabus — for example in Singapore.

(b) Countries which use the qualifications of an organisation based outside that country, but with some adaptation to the local environment.

One example here includes the Society of Actuaries, where Fellows can qualify via either the USA or Canadian branch. In South Africa, the main qualification route is through the Institute/Faculty of Actuaries (UK) but new final stage examinations are being developed with a South African context. Another example which is near the other end of the spectrum between overseas and local is Australia, which follows the syllabus of the Institute/Faculty of Actuaries (UK) for Stages 1 and 2 (mainly studied at Australian universities) but which has its own arrangements for Stages 3 and 4.

It is also worth mentioning here that Canada has introduced a Professional Education Course (PEC) to their requirements - after Fellowship in the Society of Actuaries but before receiving a Fellow, Canadian Institute of Actuaries (FCIA) designation. This is run entirely by the CIA. The American Academy of Actuaries (AAA) has a similar course for actuaries who want to sign an "Actuarial Statement of Opinion." Both of these actions happened, in large part, because the Society of Actuaries dropped much of the "nation-specific" material from their syllabus.

(c) Special courses run in a country with the assistance of an organisation based outside that country.

Some courses have been offered in countries in Eastern Europe, taught mainly by UK actuaries with the involvement of the local professional association and leading to a diploma in actuarial science issued by the Institute/Faculty of Actuaries (UK). There is also, for example, "The Muhanna Foundation Actuarial Diploma Program" offered to participants from countries in the Middle East that involves two intensive consecutive summer sessions with distance learning in between. Other areas of cross-national education are seen in the Continuing Professional Development (CPD) programmes offered through organisations such as the Groupe Consultatif and through individual associations such as the Swiss International Summer Schools.

The Advice & Assistance Committee of the IAA has been investigating the possibility of obtaining outside financial support to make such courses more widely available to countries which are trying to establish or greatly expand their supply of actuaries. The proposal is to follow a syllabus similar to the Institute/Faculty diploma, although the issuing body for the diploma might include some other organisation in addition to the local association, for example the Society of Actuaries or the IAA itself.

5.5 International co-operation

The activities described above involve a high level of international co-operation. The IAA and the Groupe Consultatif are the most prominent examples, but throughout the various separate education systems there is much greater awareness of the international dimension than in the past. For example, the Society of Actuaries and the Institute/Faculty are both reviewing their education systems at the moment. Both groups included in their working parties representatives from other English-speaking associations. This has subsequently led to the formation of a Joint International Task Force on education with representatives from the Society of Actuaries, the Institute/Faculty, the Australian and Canadian Institutes and the Casualty Actuarial Society. This has been a very significant step forward in the level of co-operation. They have agreed a set of common principles for education described below. It is

possible that a common syllabus may be developed across two or more of these bodies for the first two or three stages of education, and that it may be possible to achieve some interchangeability of teaching and assessment at a greater level than applies today, or even to have common elements of teaching and assessment. There are however historical and environmental differences which have to be taken into account and may limit the level of commonality. Nevertheless, at the very least the Joint Task Force has led to a useful exchange of ideas. Two concepts which have gained significant support within the Joint Task Force are the QRA (Quantitative Risk Analyst) designation and the Actuarial Control Cycle. These two concepts are described below.

The international seminar on education held in Lisbon in 2001 under the auspices of both the IAA and the Groupe Consultatif is another example of co-operation across associations.

6. Current areas of development

6.1 Joint basic principles

The joint international task force of the Society of Actuaries, the Institute/Faculty, the Australian and Canadian Institutes and the Casualty Actuarial Society have agreed a set of basic principles for education given below in Figure 2. At the time of writing, these have been referred to the IAA and hence to each member organisation for consideration, with the hopes that a set of international principles supported by all actuarial bodies can be produced.

Figure 2

Number	Principle
	To preserve and enhance the public perception of the profession and to encourage and reflect the advancement of actuarial science, the actuarial education process will:
1.	Develop actuaries who are able to deliver a service of quality and high standard to meet the current and projected future needs of clients and customers.
2.	Attract the best and brightest candidates from a range of numerate backgrounds.
3.	Ensure coverage of core topics common to all disciplines, as well as speciality requirements and the emerging needs of the profession, so as to prepare members to take on a variety of different roles.
4.	Provide a balance among theoretical concepts, practical applications, business acumen and professionalism.
5.	Ensure that future actuaries demonstrate key characteristics of the profession such as attention to rigour and a long-term perspective.
6.	Emphasize quality of learning to foster deep understanding by using the best educational opportunities available and appropriate assessment methods. • It is up to individual organizations to determine their own combinations of learning and assessment.
7.	Recognize the international educational guidelines of the IAA and contribute to the globalisation of the profession.

6.2 QRA (Quantitative Risk Analyst) designation

QRA is a proposal for a new international designation to be awarded at the end of Stage 1 education. The proposal has been recommended by the Society of Actuaries Task Force, although at the time of writing it has not yet been formally considered by the Society of Actuaries. The concept has been viewed with interest by the other professional bodies in the joint international task force described above. The Institute/Faculty in their current review of education are taking account of the proposal, and seeking to be consistent with the QRA concept as far as possible when making any changes to their Stage 1. There will need to be many discussions to sort out the practicalities of universal offer of QRA.

The rationale for this new designation is that there are several disciplines, not just actuaries, which are concerned with analysing and quantifying risk — for example, demographers, quantitative economists, financial engineers. There is much greater understanding now than in the past of the need to manage all risks, including financial, environmental, medical and enterprise risks. For actuaries to be seen as the premier experts on risk, they must be able to demonstrate that they have a solid foundation in the general, non-actuarial competencies, and to be recognised for their skills outside the traditional actuarial niches, as well as within their traditional roles. It is believed that by grouping the Stage 1 elements of actuarial education and emphasising their application as a foundation for all quantitative risk disciplines, the profession will attract more good quality candidates. The QRA would also provide the profession with a concrete focus for more effective interaction with allied fields of accomplishment. The idea is that the QRA designation would be an accomplishment that many will value as their final and full designation. Others will wish to combine it with an allied designation (e.g. Chartered Financial Analyst, Financial Engineer) and many will choose to pursue further actuarial credentials.

Definition of a QRA

The Quantitative Risk Analyst has developed an understanding of the fundamental technical concepts of the analysis of risk and its quantification, and the application of mathematical models to real-world risk management issues.

Courses required for QRA designation

The following courses are proposed:

1. Probability and introductory statistics
2. Corporate finance and compound interest
3. Statistical methods
4. Economics
5. Investments and asset/liability management
6. Modeling
7. Professionalism Course

It is intended that the first four subjects, and parts of the fifth, would be covered by university courses which are already offered widely.

How the QRA fits into globalisation of actuarial education

The QRA has originated with the Society of Actuaries. However, it is not intended simply as a stepping stone towards the designations of Associate or Fellow of the Society of Actuaries. The Society sees its value as an international designation. It is envisaged that a number of actuarial bodies — or perhaps the IAA — could agree on the details of content and standards of the QRA. Candidates who met these internationally agreed standards could be awarded the QRA either by their local body or by the IAA or some other international body.

6.3 The Actuarial Control Cycle

The Actuarial Control Cycle is a model which has been used for several years in teaching Stage 3 within the Australian actuarial education system. It has attracted interest from the Institute/Faculty and Society of Actuaries, who are actively considering whether it should be incorporated in their Stage 3. As with QRA its implementation in some university based systems will need much debate.

Before the Actuarial Control Cycle (ACC) was introduced in Australia, the previous education structure required students at Stages 3 to 4 to take separate courses in each of the four main practice areas. (This is similar to, for example, the current Institute/Faculty structure where students in Stage 3 take subjects 301 to 304 in Life Insurance, General Insurance, Pensions and Investment). The idea of the ACC subject was instead to teach the general concepts and functions in actuarial work (e.g., risk analysis, pricing, reserving, solvency, monitoring of experience, etc.) in a holistic way. The various practice areas would then provide examples of the application of these concepts. The advantages were seen to be (a) that students would learn better, because they would see the relevance of the concepts, rather than feeling that they were being forced to study a practice area in which they did not work, and (b) that students would develop a broader picture of what actuarial work was, which would facilitate the movement of the profession into non-traditional areas.

So firstly, the ACC was a generalised applications subject, rather than a practice area specific subject. Secondly, the control cycle concept provided a framework to link together the separate concepts of risk analysis, pricing, etc. This framework also served to emphasise the importance of monitoring and responding to experience in most areas of actuarial work and to provide a framework for a learning organisation.

The ACC is a model of actuarial work. Like all models, it does not necessarily always accurately fit the phenomenon it portrays at all times or in all circumstances. However, like all good models, it is simple, and it does help the user to a clearer understanding of the phenomenon being modeled.

The ACC is often represented diagrammatically, as in the Figure 3 below. The central part of the model is based on a simple approach to problem solving — firstly, define the problem, then design and implement a solution, then monitor the effectiveness of the solution and revise it if necessary. The impact of the context (e.g. legislation, taxation, economic trends) is emphasized by the reference to the economic and commercial environment. The requirements of professionalism are recognised at all stages of the cycle.

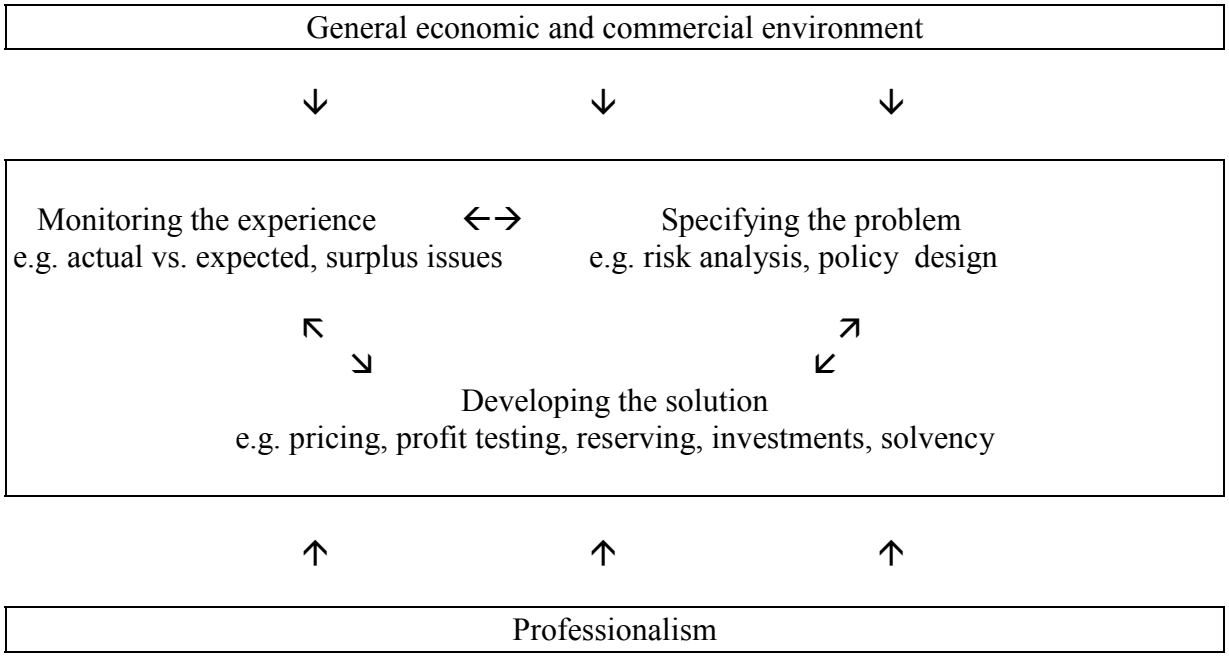

Figure 3: The Actuarial Control Cycle

The ACC is "actuarial" because, although the underlying problem solving model is completely general, the ACC embodies the basic elements common to all actuarial work:

- uncertain future events whose financial impact must be estimated
- a long-term rather than short-term horizon
- stakeholders' requirements and risk profiles to be recognized
- decisions to be made now in the light of likely future outcomes
- the use of models to represent future financial outcomes
- incorporating assumptions based on similar historical experience
- allowing for the impact of legislation, regulation, taxation, competition, etc
- interpreting the results of modeling to develop practical strategies
- monitoring and periodically analyzing emerging experience
- modifying models/strategies in the light of analysis of emerging experience

The ACC is a "control" cycle both because actuarial involvement usually includes all phases of the cycle, and because objectives or strategies or plans or standards are established, against which subsequent performance must be measured, with earlier decisions revised where appropriate.

The term "cycle", and the use of bi-directional arrows in the diagram, highlight the importance of monitoring and feedback, and the inter-relationships between elements of the cycle. In actuarial work, the feedback mechanism within the cycle is not one which results in pre-determined, unconscious, automatic adjustment, as may happen in some engineering

systems. The ACC's feedback mechanism involves the actuary in exercising personal, professional judgement.

The supporters of the Actuarial Control Cycle concept argue that it embraces the knowledge, skills and attitudes considered essential for all actuaries. It provides the flexibility that the educational program needs to adapt to a rapidly changing world. It enhances the capacity of individual future actuaries to recognize opportunities for applying their skills and equips them to market those skills to employers and clients. It strengthens the foundations on which the profession will continue to expand as a flexible, outward-looking and united body.

6.4 Groupe Consultatif new goals for 2005

The Groupe Consultatif's goal is that by 2005 an additional criterion for full and associate membership will be that member associations must comply with the minimum education requirements reflected in the Core Syllabus. The Groupe is also looking to develop a project on curriculum development with strong involvement of both universities and professional associations.

6.5 Actuarially underdeveloped nations target for 2005

All newly formed associations, most of whom are from actuarially underdeveloped nations, are confirming their commitment to support the minimum educational guidelines set out by the IAA. One of the easier methods followed is to link the local qualifications by an international examining body such as the UK Institute and Faculty of Actuaries. This could apply also in university based systems through a twinning program.

7. What other globalisation initiatives are possible?

7.1 E-education

The technology exists for delivery of actuarial courses via the Internet. This is already in use by Australia for their stage 3 course on the actuarial control cycle to help students who are studying by distance learning in different countries. Development of e-education can be expensive and there could be mutual benefit in developing courses globally based on shared syllabuses such as the IAA. The new technology might also be used for assessment as well as for course delivery. Internet technology allows for assessment on-demand which could be helpful in speeding up travel time to qualification. Again international collaboration could help make this development more possible.

7.2 Global examinations

Convergence on syllabus content and the packaging of the content into agreed modules could be followed by global examinations particularly for the early stages up to stage 3. Global examinations recognised by associations around the world might be offered under the aegis of the IAA. This would help to spread the burden of assessment among all the countries who choose to participate. Country specific assessments will always be needed in the final stages of qualifications but a common approach might be possible in early stages. The global

examinations might also be made available in a number of different languages. However there would be many administration issues to be resolved. It will also always be true that it will be up to individual organisations to determine their own combinations of learning and assessment, as stated in Joint Principle 6 (in Section 6.1 above).

7.3 IAA diploma

Another development based on common syllabuses and in particular common examinations could be the offer of an IAA Diploma. This could correspond to success in examinations equivalent to a syllabus which covers the IAA education guidelines. Systems might be introduced for the IAA diploma to be available in countries with their own education approaches as well as for students who have taken global examinations.

7.4 Methods of knowledge transfer, e.g. multilingual textbooks or course materials

Another initiative which might be possible is the development of international learning material. In Section 7.1 the possibility of Internet education was discussed. An international series of actuarial science books has been started recently by the Faculty and Institute through Cambridge University Press. The editorial panel is internationally based and it is hoped that the first book will be available in 2002.

7.5 Interaction between universities and professional associations

Universities have autonomy over their syllabuses and the curriculum they offer will reflect the research strengths of the staff as well as employment destinations of students. The development of shared views on actuarial education through the Groupe Consultatif and the IAA has led to new types of interaction between professional associations and universities. For instance the professional association might offer some additional education which fills in any areas not covered in universities. This approach is being developed in countries such as Switzerland and Belgium where there is variation in the curriculum offered by the different universities in each country. It has also been proposed that the IAA may have a role to play in bringing together universities internationally to discuss actuarial education.

8. A counter-argument

An argument against greater globalisation is that there is strength and flexibility in diversity. An international qualification will have many stakeholders with diverse, possibly conflicting, requirements. There is a risk that it may end up being a compromise. Or that once any system is in place, the need to get general agreement on any amendments may make it impossible to change quickly, so that it ends up being inflexible and unresponsive to the changing environment.

We may be better served where different national systems are free to innovate and experiment. If an educational experiment is unsuccessful, its failure will not threaten the profession globally. If it is successful, it can be copied later.

Globalisation and uniformity of actuarial education leads inherently to slower processes and the adaptation to new requirements can be lengthy. The need for flexibility is important.

9. Questions for discussion

The IAA Education Committee is keen to hear the audience views. We would like to hear the perspective from the students and from the point of view of the employer.

- Is further globalisation in actuarial education feasible? Is it desirable?

- What has been your experience of cultural differences between actuaries and actuarial systems in different countries, or between for example English-speaking and non English-speaking, or between European and Asian? Is it important to recognise and accept these differences?

- How can we best meet the needs for education of the actuarially underdeveloped nations?

- What are your views on each of the possible areas for development described in this paper? Are there other possibilities not covered in the paper?