

REPORT OF THE CAS FUTURE EDUCATION TASK FORCE

August 18, 2003

Task Force Charge

The task force was charged with evaluating the CAS Admissions Process and recommending appropriate changes to ensure that the process, consistent with the CAS Basic Education Principles:

- Provides basic education in all areas necessary to the education of all casualty actuaries
- Ensures that candidates for admission have demonstrated mastery of the critical components of casualty actuarial practice
- Consistent with the above, minimizes the expected amount of time required to achieve membership in the Society

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Table of Contents

I. Executive Summary	page 4
II. Current Requirements	page 6
III. Proposed Requirements	page 6
IV. Level of ACAS	page 10
V. Diploma in Casualty Actuarial Techniques	page 12
VI. Efficiency of the Educational Process	page 14
VII. Travel Time	page 20
VIII. Coordination with Other Societies	page 21
IX. Other Alternatives Considered	page 22
X. Consideration of the CAS Centennial Goal	page 26
XI. Transition Process	page 26

Appendices

A. Topics on Exams	page 28
B. The New Exam A	page 33
C. Modeling Workshop	page 35
D. Skill Survey Summary	page 38
E. SOA Education Proposals	page 40
F. Background on CIA Position	page 41
G. Validation by Educational Experience	page 43
H. Actuarial Control Cycle	page 49
I. IAA Syllabus	page 50

I. Executive Summary

The Future Education Task Force (FETF) was formed in the fall of 2001 to reevaluate the CAS Admissions Process and recommend changes to the syllabus and educational procedures that will reinforce our position as the preeminent casualty actuarial organization in the world. The objective is to ensure that appropriate basic education is provided, that candidates have mastered critical components of actuarial practice, and as much as possible minimize the amount of time required to achieve membership in the Society. The FETF met a total of 19 times over the course of nearly two years, with a significant amount of research and discussion taking place.

Two proposals to change the admissions process are being presented. The primary difference between the proposals involves the use of “Validation by Educational Experience” (VBEE) rather than testing for some topics. VBEE would require a candidate to fulfill some educational requirements with a high grade from a college or university course, or a high grade from an exam by a recognized organization. No further testing on that topic would be required. The proposal to validate certain subjects by educational experience had less than majority support within the FETF.

Both proposals incorporate two new education components, Exam A and a Modeling Workshop. Exam A, *Introduction to Property and Casualty Actuarial Practice*, is new but the content is reallocated from existing exams. The purpose of this exam is to teach candidates the basics of property and casualty actuarial practice early in the exam process so they can be equipped in their entry-level jobs. A hands-on Modeling Workshop requiring a synthesis of prior educational requirements in the context of managing property and casualty risk (e.g. DFA and ERM) would be mandatory for Fellowship candidates. Because topics such as DFA/ERM are difficult to test in a traditional (pen and paper) exam environment, a workshop setting is being recommended. The majority of FETF members support the concepts of Exam A and the Modeling Workshop.

In designing the education system for the future, FETF considered a number of structural changes:

- Reducing the exam requirements for the ACAS designation
- Awarding an actuarial diploma prior to achievement of the ACAS
- Methods to improve the efficiency of the education process

The group discussed the potential consequences of reducing the exam requirements for the ACAS designation in relation to stakeholders such as the NAIC, AAA and State Regulatory Agencies. Specifically, could the ACAS designation be awarded sooner in the education process? The FETF considered the distinction between **a qualified actuary** (i.e. individuals granted rights to sign actuarial opinions) and **a practicing actuary** although this may be misunderstood by the stakeholders mentioned above. There is majority support within FETF to leave the ACAS education requirement as is.

Some candidates are discouraged by the amount of time it takes to attain ACAS status. Therefore FETF considered awarding an actuarial diploma after completion of Exams 1 to 4 and A as recognition from the CAS for their progress. This idea was accepted by the FETF with a narrow majority.

Methods to improve the efficiency of the education process include proposing internet-based exams on demand, establishing a study note writing committee, expanding the use of semi-open book exams, reducing the number of topics per exam, and other ideas. The FETF advocates incorporating these ideas wherever possible in the CAS education process.

The FETF considered the impact of the proposed changes on travel time. Although we are adding Exam A and a Modeling Workshop to the current basic education curriculum, and rearranging other exam material, we believe these changes will not increase travel time and that there is a good chance it will actually decrease. Recommendations that should reduce travel time include offering some exams more than twice a year, having relatively high pass ratios for Exam A and the Modeling Workshop, and reducing the amount of material on the exams (which makes it quicker for the candidate to master). The total hours of testing relative to our current system will not increase. Under one proposal the number of hours remains unchanged while in the other proposal coursework credit is substituted for some of the testing hours.

Either proposal makes it possible for the CAS to coordinate certain educational requirements with both the SOA and CIA. Depending on the proposal, the CAS can jointly sponsor 1 or 3 exams with the SOA. Both the CIA and SOA are planning to validate exams based on coursework so the North American societies have an opportunity to include recognition of coursework in their joint sponsorship program.

Other alternatives considered by FETF include: testing ratemaking and reserving material together, providing candidates with optional topics on Fellowship exams, incorporating educational elements from all actuarial practice areas, and covering more topics from an international perspective. Covering ratemaking and reserving material on the same exams in increasing depth would facilitate the teaching of the “Actuarial Control Cycle”. After weighing the pros and cons, we recommend testing reserving and ratemaking topics together at the basic and advanced levels, but treating the topics separately at the intermediate level.

We also considered giving candidates optional topics for their Fellowship exams (this is similar to the SOA structure) but ultimately decided against recommending that change. Some task force members favored an exam syllabus that would expose candidates to actuarial practice areas beyond property and casualty. The syllabus of the future would also benefit from including more emphasis on international topics. However, at this time we are not proposing any major changes to the nation-specific exam because we are aware that the Education Policy Committee is working on international issues with Exam 7.

Lastly, in the midst of drafting this report, the FETF was informed of the CAS Board of Directors’ decision to adopt the Centennial Goal. Due to the timing of the goal in relation to the work of this task force, we were not able to integrate the new CAS strategic direction into our recommendations. Additional work will need to be done to evaluate these recommendations in light of the Centennial Goal.

II. Current Requirements

- Exam 1 - Mathematical Foundations of Actuarial Science
- Exam 2 - Interest Theory, Economics and Finance
- Exam 3 - Actuarial Models
- Exam 4 - Actuarial Modeling
- Exam 5 - Introduction to Property and Casualty Insurance and Ratemaking
- Exam 6 - Reserving, Insurance Accounting Principles, and Reinsurance
- Exam 7 - Nation-Specific: Annual Statement, Taxation, and Regulation - Canada/U.S.
- Exam 8 - Investments and Financial Analysis
- Exam 9 - Advanced Ratemaking, Rate of Return, and Individual Risk Rating Plans
- Course on Professionalism

Exams 1-9 are each four hours. As of Fall 2003, Exams 1, 2 and 4 are jointly administered with the SOA.

III. Proposed Requirements

In developing the proposed requirements, the FETF considered experience with the current requirements, member input through the Skill Survey (see Appendix D) and proposals being considered by the Society of Actuaries and Canadian Institute of Actuaries. Ultimately, the group decided to develop two alternative proposals, differing only in regard to whether VBEE was endorsed by the CAS.

Proposal #1

Prerequisite – Calculus

New Exam 1 – (3 hours) Probability with implicit testing of Calculus

New Exam 2 – (3 hours) Economics, Interest Theory and Finance
similar to current Exam 2 but with a reduced syllabus

New Exam 3 – (4 hours) Actuarial Models and Mathematical Statistics
similar to current Exam 3 but adding back the mathematical statistics topics
(confidence intervals and hypothesis testing) from the pre-2000 Exam 2 which
were dropped in the year 2000 redesign

New Exam 4 – (4 hours) Actuarial Modeling, same as current Exam 4

New Exam A – (2 hours) Introduction to Property and Casualty Actuarial Practice

covering basic property and casualty insurance, ratemaking, reserving and reinsurance concepts currently included on Exams 5 and 6. This exam would be intended for a newly hired candidate and could be sequenced anywhere relative to exams 1-4.

- New Exam 5 – (3 hours) Intermediate Property and Casualty Ratemaking similar to current Exam 5 excluding the material moved to new Exam A. This will become a ratemaking exam since the Intro to P/C Insurance will be moved to Exam A. Also include some of the material that is currently on Exam 9.
- New Exam 6 – (4 hours) Reserving, Insurance Accounting Principles, and Reinsurance similar to current Exam 6 excluding introductory material moved to new Exam A
- New Exam 7 – (4 hours) Nation-Specific: Annual Statement, Taxation and Regulation same as current Exam 7
- New Exam 8 – (4 hours) Investments and Financial Analysis same as current Exam 8
- New Exam 9 – (4 hours) Advanced Property and Casualty Actuarial Practice will cover advanced ratemaking and reserving topics. In large part, similar to current Exam 9 with additional advanced reserving, advanced reinsurance and catastrophe modeling topics. Some material would be moved to New Exam 5.
- Modeling Workshop – (1-2 days) Hands-on workshop requiring a synthesis of prior educational requirements in the context of managing property and casualty risk.
- Professionalism Course – No change is being recommended to the method in which this course is administered or the coverage of the topics.

Proposal #2

- Prerequisite – Calculus
- Validated by – Economics, Finance, Applied Statistics
Educational
Experience
- New Exam 1 – (3 hours) Probability with implicit testing of Calculus
- New Exam 2 – (2 hours) Interest Theory

- New Exam 3 – (4 hours) Actuarial Models and Mathematical Statistics

similar to current Exam 3 but adding back the mathematical statistics topics (confidence intervals and hypothesis testing) from the pre-2000 Exam 2 which were dropped in the year 2000 redesign

New Exam 4 – (4 hours) Actuarial Modeling
similar to current Exam 4 but excluding applied statistics

Remaining – Same as Proposal #1
Requirements

The primary difference between the two proposals involves the use of “validation by educational experience” (VBEE), rather than CAS exams, for some topics. This procedure has been endorsed by both the Society of Actuaries and Canadian Institute of Actuaries for use in their educational systems but had less than majority support within the Future Education Task Force.

Validation by educational experience would require a grade of B- or better in appropriate courses (ones for which the catalog description indicates that the course essentially covers the learning objectives) from an accredited university or college. Alternative experiences such as internet-based courses or exams of other bodies (e.g. Advanced Placement exams) would have a standard set on a case-by-case basis. Under this validation process, it would be critical for the CAS to ensure that a sufficient quantity and variety of efficient options are available to candidates, including options outside the university setting. This might require the CAS to sponsor creation of appropriate non-university options.

There are a number of potential benefits to using validation by educational experience instead of exams for the topics indicated in Proposal #2:

- Such validation for Economics and Finance might reduce travel time since these courses are widely available and frequently taken by CAS candidates. A survey of recent FCAS’s showed many had taken Economics and/or Finance courses even though they weren’t required or encouraged at the time:

	<u>Economics</u>		<u>Finance</u>	
	<u>One Sem.</u>	<u>Two Sem.</u>	<u>One Sem.</u>	<u>Two Sem.</u>
Actuarial Majors	93%	85%	83%	58%
Other Majors	78%	54%	40%	15%
Total	83%	64%	54%	30%

- Validation by educational experience for Applied Statistics might provide better validation of the appropriate competencies. The ideal competency is the ability to analyze a data set and draw appropriate conclusions, not the ability to manually calculate the kind of statistics that would be produced by a standard statistical package which is what we tend to test today.

- Allowing such validation for these topics would enable the CAS to better focus its resources on rigorous self-administered validation of competencies that are most critical to casualty actuarial practice.
- This proposal would make the CAS qualification process more attractive to candidates in countries where the basic topics are typically validated through university courses.
- The SOA is likely to allow validation by educational experience for these topics. If the CAS continues to test these topics, it may be at a disadvantage in attracting candidates who have had these experiences prior to entering the actuarial field.
- This proposal would facilitate more joint educational requirements with the SOA which would increase the time available for candidates to decide to pursue the CAS educational track.

On the other hand, validation by educational experience could have some negative consequences:

- The CAS would lose control over competency standards (e.g. grade inflation, diversity of university and college courses available in North America).
- Such validation would likely lower the required competency standard compared to our current exams. If a lower standard was desired, we could achieve this within an exam-based system.
- Validation by educational experience might be a significant barrier to entry to some potential candidates who have not previously had the required courses. Employers might be less willing to hire candidates without the required coursework. If so, this could decrease the diversity of backgrounds among CAS members.
- Validation by educational experience might increase travel time for candidates without the required courses.
- In the case of Applied Statistics, there's no guarantee that a course or alternative experience would be any more effective in validating the desired competencies given the lack of control.
- The CAS Skill Survey indicated strong member opposition to granting credit based on university courses. Support for allowing university course credit was only 28% for Economics, 17% for Finance and 11% for Applied Statistics.

Appendix G further discusses the pros and cons of validation by educational experience.

Proposal 1 was favored by 60% of the FETF. But if the Society of Actuaries were to adopt validation by educational experience for their education system, Proposal 1 was favored only by 55% within the FETF.

IV. Level of ACAS

Several FETF members expressed concern that the current education level required for ACAS is too high. We discussed a proposal to award the ACAS designation after exam 6 (i.e. completion of exams 1 to 6 and A).

The group was very concerned that reducing the exam requirements would interfere with the current definition of an ACAS as someone who has the necessary education to sign statutory opinions. In considering whether it would be appropriate to lower the education requirements for ACAS, we explored the potential impact of such a decision on organizations outside the CAS. Currently, there are at least three groups that define qualification standards based on CAS membership: NAIC, AAA, and various US state regulatory agencies.

NAIC - The first definition of a "qualified actuary" in the NAIC Annual Statement Instructions (from page 6 of the December 2002 AAA Property and Casualty Practice Note) is "a member in good standing of the Casualty Actuarial Society." Alternatively, a qualified actuary is "a member in good standing of the American Academy of Actuaries who has been approved.... by the Casualty Practice Council....". Note that membership in the AAA, among other things, is contingent upon membership in the CAS or some other AAA approved organization. No other education or experience requirements are explicitly stated in the NAIC instructions to define a "qualified actuary".

AAA –The AAA version of a "qualified actuary" (for purposes of signing Prescribed Statements of Actuarial Opinion) has three components: requirements for general/basic education, experience, and continuing education. The general education requirement includes exams on actuarial math, applicable economic/regulatory/legal environment and identification/evaluation of risk to sign general statements of opinion. Additionally, exams on policy forms, underwriting, marketing, ratemaking, statutory accounting and premium/loss/expense reserves are required to sign reserve opinions. These requirements are not tied to achieving a specific designation. They would appear to require passing Exams 3-7 in our current exam system.

State Regulatory Agencies – Qualifications required to sign Statements of Actuarial Opinion vary by state. The majority of states define a qualified actuary to be either a CAS member or an AAA member approved by the Casualty Practice Council. A handful of states (e.g. AL, LA, NC and VT) explicitly require CAS membership or the opining individual must be approved by the Commissioner. A few other states (IN, NE, and TX) require only AAA membership without any mention of CAS designations. A couple of states (CO and ME) define the qualified individual to be a joint member of the AAA and the CAS. A couple of states have their own experience requirements - for example, NJ has the following minimum years of experience requirements: FCAS (3), ACAS (5), and AAA (7).

The above indicates that "ACAS" does not necessarily equal "qualification to sign opinions" (under the AAA and the states' criteria). The CAS provides education while other entities (e.g. AAA and CIA) grant qualification standards. This might naively imply that we could move the ACAS designation without much repercussion. The issue is that we have created, through considerable lobbying, a constituency in the various state insurance departments that we need to consider and

respect. If we are to entertain reducing the ACAS requirements, we need to bring the AAA, the NAIC (and possibly state regulators) into our discussions.

Advantages of reducing ACAS requirement:

- The distinction between ACAS and FCAS is more apparent.
- Recognizes that candidates without the nation-specific exam are qualified to practice in a number of areas. Not all actuaries need to sign statutory opinions.
- The structure might be more attractive for candidates outside the US/Canada for whom a US or Canada-specific exam may not be relevant.
- Highlights the fact that ACAS does not equal qualification (i.e. amplifies the difference between the CAS membership qualification and the AAA’s practice qualification.)
- We would subject people to our CAS codes of conduct earlier in their careers. Presumably many individuals who are short of the current ACAS designation are already functioning as “practicing” actuaries.

Disadvantages of reducing ACAS requirement:

- Revising our ACAS standards has implications for the AAA, NAIC and state regulatory agencies. These entities currently assign meanings to the ACAS credentials. They may need to revise their own qualification standards and this might be a substantial undertaking.
- ACAS designation will lose "meaning" or value (as it should because individuals would be held to lower education standards).
- Proposing a pre-ACAS diploma (Section V below) already addresses the concerns that the ACAS designation is earned too far along in the process.
- The perception is that “ACAS equals qualification”. That is, ACAS means you can be expected to be competent to sign reserve opinions. Though this is a misconception, many people believe that ACAS implies qualification in the US.
- If the AAA has determined that their indicator of competence is seven exams worth of material, and the CAS lowers the bar, it is likely that the regulators will revise the definition of a qualified actuary. If this widens the gap between a designated actuary and a qualified actuary, the result would be confusing for state regulators and the public, and this would not be desirable.

The task force held a vote in which we would rank the various options on a scale from 1 to 5, with 1 = strongly in favor, 5 = strongly against. The results of that vote in order of rank are as follows:

	Average
Leave ACAS as is (exams 1-7, Course on Professionalism) AND offer the Diploma	2.6

Leave ACAS as is and DO NOT offer the Diploma	3.1
Lower ACAS by one exam (1-6, Course on Professionalism) AND offer the Diploma	3.2
Lower ACAS by one exam (1-6, Course on Professionalism) and DO NOT offer the Diploma	3.2
Stop granting the ACAS designation at all AND offer the Diploma	3.5
Stop granting the ACAS designation and DO NOT offer the Diploma	4.4

Recommendation – The preferred option within the FETF was to leave the ACAS designation at the current level and offer a pre-ACAS diploma (see Section V). If the diploma proposal is rejected, the FETF was essentially neutral on whether to reduce the ACAS requirement.

V. Diploma in Casualty Actuarial Techniques

Some people think it takes too long to attain ACAS status. Candidates are often discouraged and some FETF committee members suspect that we are losing many good candidates along the way. Some candidates, who are good analysts, also give up pursuing exams prior to ACAS. Currently, these individuals do not receive any recognition from the CAS for their progress.

To help keep more candidates in the casualty actuarial field and to provide recognition to those who have successfully completed a portion of the ACAS exams, the FETF submits the following proposal:

- The CAS awards a "Diploma in Casualty Actuarial Techniques" after a candidate successfully completes new exams 1, 2, 3, 4 and A (Introduction to P/C Actuarial Practice).
- The proposed diploma would be intended to show a substantial level of knowledge, although less than the ACAS.
- Those who have earned the diploma, but are not ACAS or FCAS, would be listed in the CAS yearbook. This would offer them some recognition for their hard work.
- Once an individual receives the proposed diploma, they will not lose it because of transition programs or syllabus changes. This is consistent with the current practice for the ACAS and FCAS designations..
- Individuals awarded the diploma would not append any letters after their name, as is currently done with ACAS or FCAS. However, they could list their achievement on their resumes.

Advantages:

- The historical roles of the ACAS were:
 1. A convenient step towards Fellowship

2. A way to divide the "mathematical" from the "practical" portions of the Syllabus
3. Evidence of certain qualifications which might justify entrusting certain important practical work to the ACAS

Until the 1970's ACAS was halfway (4/8) to Fellowship. Currently ACAS is $7/9 = 78\%$ of the way to Fellowship .

The ACAS no longer divides the mathematical from practical, nor does it provide a convenient step towards Fellowship. ACAS currently serves only one of its three historical roles. It is unlikely that we would move the ACAS back anywhere close to the 50% mark. Therefore, we need another way to acknowledge the accomplishment of passing our current "mathematical exams".

- Milestones along the way make a career path or any long task more desirable. The diploma will inspire candidates to continue pursuing the CAS designations and will help attract and retain talented people.
- The diploma is a method of rewarding students and gives them something to show for their efforts.
- The Institute of Actuaries gives a "Diploma in Actuarial Techniques" at the equivalent of four exams.
- Since Exam A is required to obtain the diploma, this might justify entrusting some practical work to the person which is, in fact, what happens at many organizations. The level would be lower than an ACAS and would entail closer supervision.
- A diploma will not change the need for employers to evaluate each person's skills and background, including relevant work experience.
- The diploma is a permanent accomplishment.

Disadvantages:

- The range of capabilities exhibited by individuals who would be granted the proposed diploma can vary considerably. The diploma will not represent anything that employers would consider a reliable indicator of job skills or of future job success (passing exams in an academic setting is demonstrably different from passing them in a full-time job).
- Entry level candidates who possess a diploma lack the necessary training for the confirmation of practice rights to opine on reserves, rate level filings, or other statements of actuarial opinion. There is therefore no reason why an employer should recognize and compensate those with the proposed diploma in any special manner that differs from today's pay systems based on number of exams. If someone with the proposed diploma and a student with exams 1, 2, 3, and 5 are likely to be paid the same, what benefit accrues to the

candidate in achieving exams 1-4 and A over exams 1, 2, 3, 5, and A? In fact, some may contend that the latter combination might be more valuable in certain circumstances.

- The “bar” moves ever higher with each generation of professionals. This will render those who receive the diploma of today and who complete no additional exams to be less qualified than the diploma holder of tomorrow.
- Granting a diploma will not necessarily retain candidates that would otherwise drop out of the actuarial career. Many people who leave the profession before ACAS do so not because they do not have a designation, but because of a combination of exams and not liking the work.
- Perhaps it is wiser to leave incremental recognition to employers. The exams only demonstrate so much knowledge anyway.
- A diploma would not accomplish much for employers. The bottom line is whether a person has mastered a certain block of knowledge. Because the individual is not conferred any practice rights with their diploma, they are not qualified to do anything.

The FETF held a vote on whether a Diploma in Casualty Actuarial Techniques should be offered. Out of 19 votes, 10 were generally in favor of a Diploma, 6 were generally against and 3 were neutral. The FETF held an additional vote considering simultaneously the proposed diploma and the appropriate level of ACAS (see Section IV).

VI. Efficiency of the Educational Process

In order to attract and retain qualified candidates, the CAS should continue to improve the efficiency of our educational process. The CAS should continue to strive to maximize the amount learned and retained, while minimizing the travel time. Candidates should feel they are learning the material important to being a casualty actuary in a way that is interesting, pleasant, and rewarding. This will attract more candidates, with more candidates eventually getting their ACAS or FCAS, and produce better casualty actuaries.

This very important goal should be considered in designing our overall education process, selecting syllabus readings, constructing exams, etc.

How can we help the candidates learn more in less time, and better allow them to demonstrate what they know? The task force has identified ten options:

1. Semi-open book exams
2. Giving exams more frequently
3. Make sure that exam length is appropriate for the time allotted
4. Make sure that readings and exam questions are at the desired level of comprehension
5. Where possible, grouping exam questions by topic
6. Reducing the number of topics on each exam’s syllabus
7. Establish a Study Note Committee in order to get better reading materials

8. Make sure that the syllabus follows the concept of progression
9. Investigate the use of internet learning classes as a part of basic education
10. Investigate computer-based testing

Some of these ideas have already been implemented or are continuing to be the study of other CAS committees. The task force recommends continued improvement in these areas. Many of these ideas require continuous effort and focus over time.

1. Semi-open book exams

On a semi-open book exam, candidates are supplied with some material from the readings along with the exam itself. Examples of possible material:

- formulas
- tables
- rating plans
- charts
- annual statement blanks

Potential advantages:

- The exam can ask more analytical questions and less memorization questions. Students are tested on more appropriate competencies.
- The exam questions would more closely mirror the "real-life" work an actuary might be expected to do.

Potential disadvantages:

- Questions can take longer to answer as students hunt for the relevant material.
- If only a few questions require reference to attached material, students are aware of being ahead or behind other students during the exam sitting based on the shuffling of pages going on around them.
- The exam costs more to print.

2. Giving exams more frequently

Giving some lower level exams more than twice a year would allow candidates, particularly those in college, to take exams when they are ready. Reducing the wait until a candidate can re-take an exam, should reduce travel time.

This would be confined to exams that are all short answer and can be graded by machine. Prior to 2000, Parts 1 and 2 were given three times a year. The task force recommends that Exams 1, 2 and/or A be given three or four times a year, so that the CAS can evaluate the benefits and costs.

3. Exam length is appropriate for the time allotted

Many candidates run out of time when taking an exam, not allowing them to demonstrate what they have learned. The Exam Committee should continue to work on finding ways to construct exams of appropriate length. Better methods need to be developed to gauge the length of an exam, before it is given.

- The goal should be to allow at least two thirds of the candidates enough time to finish the entire exam.
- Among the ways exams have been and can be shortened:
 - reducing the number of questions on the exam
 - reducing the number of subparts in a question
 - limiting the amount of calculation required
 - arranging important information so it can be quickly incorporated in the solution
 - trying to avoid verbose questions
 - providing hints where appropriate

4. Syllabus readings and exam questions should be at a clearly defined and appropriate level of comprehension

The appropriate level of comprehension varies by subject and exam. The CAS should require that casualty actuaries learn some topics at a higher level of comprehension than others. The average level of comprehension to be required on lower level exams is lower than on higher level exams. Ideas central to casualty actuarial work generally should be learned at a higher level of comprehension during the basic education process leading to Fellowship.

Even for many ideas central to casualty actuarial work, when an idea is introduced on an earlier exam, usually the candidates should not be expected to grasp many details, interconnections, special cases, complications, etc. The ability to integrate different concepts requires a higher level of comprehension. The ability to apply ideas to new or unique situations usually requires a higher level of comprehension. A passing candidate should not be required to attain the level of comprehension of an experienced practitioner or a theoretician.

A reading set at too high a level of comprehension, will result in many candidates having a very difficult time learning the basic ideas they need to know. This often occurs when a reference text designed for a practitioner is used rather than a good text for the student.

Exam questions can test different levels of comprehension of the candidates. For example, questions that require the candidate to integrate more than one idea test a higher level of comprehension. For each topic on each exam, the CAS should continue to review what is the appropriate average level of comprehension to be tested and make sure the questions reflect that decision.

Consideration of the level of comprehension should be an integral part of putting together each exam and the process of reviewing new draft exams. Similarly, consideration of the level of comprehension should be an integral part of putting together an exam syllabus, selecting individual readings as well as those portions of readings to cover.

5. Where possible, group exam questions by topic

It may help candidates if the exam questions were grouped by topic, with questions spanning multiple topics in a special section at the end of the exam.

Potential advantages:

- When exam questions jump from one topic to another, candidates have to “switch gears” abruptly. The result is less of a focus on understanding the material, and more of a focus on test-taking ability.
- While working on questions all related by topic, a candidate may remember the topic better.
- Students can implement a strategy of covering all questions on a topic that they are strong on first, next strong on second, and so on.
- Questions within a topic can be grouped in ascending order of difficulty.

Potential disadvantages:

- “Switching gears” may be beneficial, especially if a candidate is stumped.
- Grouping questions by topic may signal candidates on which tools to use. For some questions, recognizing the right tool may be as important as working the problem.

6. Reducing the number of topics on each exam’s syllabus

One of the difficulties a student faces is the breadth of the topics and the number of ideas in each topic they are required to master on each exam’s syllabus. There should be continuing study of whether there are too many ideas on each exam syllabus and whether each subtopic or learning objective should remain on the syllabus. Within each learning objective, the number of techniques, examples or applications should be limited to those that are most useful at the student’s level.

7. Study Note Committee

The Task Force recommends that the CAS establish a Study Note Committee, which would work closely with the Syllabus Committee. It would be charged with two key objectives: first, to improve the quality of the readings, and second, to insure that the readings match the learning objectives as set by the Syllabus Committee.

The Study Note Committee would:

- Work with the Syllabus Committee to identify topics where new study notes would be most helpful.
- Work with the Syllabus Committee to outline what a proposed new study note would be expected to cover.
- Recruit authors.
- Work with and supervise authors.
- Edit the study note and/or ask for revisions.
- Pass on good study notes to the Syllabus Committee, which would decide whether they should be added to the syllabus, need more work, etc.

The current syllabus consists of a hodgepodge of readings, with the following problems:

- Papers are of uneven quality.
- Papers are not necessarily written with the candidate in mind.
- Papers rarely provide sufficient practice examples.
- Papers rarely show a variety of alternative methods.

Better readings and better study materials can help to:

- fill in the holes of existing papers or completely supplant existing papers
- include everything we want to require candidates to learn and exclude material we do not want to require candidates to learn
- be written at the appropriate level of comprehension
- use consistent notation
- show a variety of alternative methods used in practice
- show “best practices” used by some of the leading experts in each field

- discuss state of the art philosophy about current issues or problems in the field
- discuss areas for future research
- provide practice examples for the student to work on and think about
- keep the syllabus up to date

8. The syllabus should reflect the concept of progression

The concept of progression is that each new topic on an exam should build on topics from previous exams. The student is constantly bringing what they know to what they do not yet know. For example, we recommend that on proposed Exam A, the student be introduced to basic ratemaking, prior to intermediate ratemaking on a later exam. This would be followed by advanced ratemaking material on a Fellowship exam.

This method of education by progressive exposure is likely superior to a method that tries to cover all aspects of a topic on a single exam.

9. Internet learning classes

Candidates learn better in differing paths. For some, self-study is a better path. Yet for others, a classroom setting, with regular meetings and with homework assignments, may be a preferable path. Fortunately, the technology to create a virtual classroom exists today and is cost effective. Note that the virtual classroom allows students to ask questions of a teacher and interact with fellow students, via e-mail. Thus, for some topics, some students might greatly benefit from an internet learning class.

The CAS should, on a trial basis, offer an internet-based instructor for a specific section of an early exam. The instructor would prepare lessons and homework assignments, offer feedback to students by grading the homework, and allow students to interact with each other and the instructor via e-mail. The CAS should monitor the results of this experiment to see how and if it should be extended. Specifically the CAS should review the exam scores and satisfaction levels of students that choose to participate in the experiment.

This proposal would:

- increase retention of good students who learn better through classes than self-study
- possibly improve students understanding of the study material
- assist in attracting more students from other countries and possibly expand the CAS international presence

10. Computer-based testing

Many professional organizations are moving toward computer-based delivery of exams. This offers a number of advantages over pencil and paper exams that may lead to improved travel time.

Potential advantages:

- Greater frequency and flexibility of delivery, including the potential for on demand delivery at any secure location.
- Potential for instant knowledge of results, including areas of weakness requiring further study.
- Better ability to track performance of questions and weed out those that are too difficult, too easy, too long, or poorly worded.

Potential disadvantages:

- Would require a great amount of work to develop a sufficiently large pool of questions and keep the pool refreshed.
- Need to obtain or develop a secure international network of exam centers.
- Cannot be applied as easily to essay questions.

VII. Travel Time

While the Future Education Task Force is adding an Exam A (basic concepts) and a Modeling Workshop to the current basic education curriculum, we believe that these additional items along with our other proposed changes (under both Proposal #1 and Proposal #2) will not increase the overall current travel time. We may even decrease travel time under the proposed basic education programs. Some reasons for this belief are as follows:

- The total hours of testing under the current system is 36 hours. Under Proposal #1, the total hours of testing will be the same (assuming 50-100 hours of time for the workshop being equivalent to approximately 1 hour of exam time). Proposal #2 will have less hours of testing since some of the material will be completed through college coursework. Overall, the amount of material to learn will be the same or less.
- We expect a high percentage of students to pass Exam A and the Modeling Workshop on their first try. We foresee Exam A having a fixed passing score with material that can be easily mastered. We expect the exam will be offered several times a year. Likewise, the Modeling Workshop will be offered several times a year with a high pass ratio.
- There is significantly less material to be learned on the first two exams which should lead to greater efficiency of learning and more students mastering the material faster. Under proposal #2 (which includes validation by educational experience), we expect most students to have the necessary courses completed while in college. We also foresee offering the first two exams at least three or four times a year, allowing students to move through these two exams faster than they do today, resulting in less travel time. Under the proposed system, we anticipate that a significant portion of students will have the first two exams completed

by the time they graduate from college. This would reduce travel time from the time they start their first full time job.

- The total amount of material to learn on Exams 3-9 should be less. This is due to moving some basic material to Exam A and reducing the number of topics on each exam's syllabus (as discussed in Section VI). For example, we are proposing to reduce the new Exam 5 to 3 hours due to less material on this exam. By having less material to learn on exams 3-9, we should see faster mastery of the material and again reduce travel time.
- We foresee the students learning the ratemaking and reserving material more efficiently by having this material organized into introductory, intermediate, and advanced topics. The students will develop a progressive pattern of learning, making each subsequent level easier to master, reducing the median travel time.
- The Future Education Task Force, as discussed in Section VI, is advocating an improved efficiency of learning. With improved study materials and alternative learning methods, students will master the material faster and therefore move through the exams faster, reducing the median travel time.

VIII. Coordination with Other Societies

A. Coordination with the SOA

The CAS and SOA each appointed separate task forces to look at their respective future educational processes. The CAS provided representatives to the SOA working group and the SOA provided representatives to the FETF. While there was significant communication between the two groups, each group developed its own proposal on future education.

In comparing the FETF proposal to the SOA proposal (see Appendix E), the following opportunities for joint educational requirements appear likely:

FETF Proposal #1: Exam 1

FETF Proposal #2: Validation by Educational Experience for Economics, Finance and Applied Statistics; also Exam 1, Exam 2 and possibly Exam 4

B. Coordination with the CIA

The Canadian Institute of Actuaries (CIA) supports the concept of recognizing university courses in Canada as part of the Validation by Educational Experience component of preliminary education. A summary of the background on the CIA position is attached in Appendix F.

The CIA advocates including Mathematical Statistics in Validation by Educational Experience, not as a prerequisite or as part of an exam. This position is different from the CAS and SOA proposals.

To make it easier for the CIA to support Canadian actuaries regardless whether they qualify through the CAS or SOA, the CIA favors as much commonality between the CAS and SOA educational systems as possible.

IX. Other Alternatives Considered

A. Testing ratemaking and reserving together

The FETF considered whether ratemaking and reserving material should be covered together on the same exams covering each topic in increasing depth. Some views expressed by members of the FETF:

Advantages:

- There may be some synergy between these topics, which teaching them together would uncover.
- It would be desirable to cover these topics at a basic level on one exam; then an intermediate level on a later exam; finally an advanced level at the FCAS level.
- If we have an early exam that uses papers culled from Exams 5 and 6, then the remaining papers could be combined in a intermediate level exam, and there may be some room at the Fellowship level for advanced reserving topics which are not currently on the exam syllabus (Exam 9 currently covers advanced ratemaking topics, with no advanced reserving topics).
- There is overlap on some topics. For example, instead of teaching trend in ratemaking and again in reserving, we could teach that topic once.
- The combination of ratemaking and reserving topics would facilitate teaching the “Actuarial Control Cycle”, an educational concept that was originally developed by the Institute of Actuaries of Australia. The Society of Actuaries and the Institute/Faculty of Actuaries are currently planning to implement the Actuarial Control Cycle as part of their educational processes. Please see Appendix H for more information on the Actuarial Control Cycle.

Disadvantages:

- Since ratemaking and reserving is core material every P/C actuary should know, these topics deserve separate competitive exams.
- These topics are operationally different within insurers.
- The existing cadre of papers for the two exams are split. They are oriented to ratemaking or reserving. There is not much good material oriented to both ratemaking and reserving.

- Integrating reserving and ratemaking concepts requires a significantly higher level of comprehension. Candidates currently have sufficient difficulty separately mastering reserving techniques and ratemaking techniques .

B. Optional tracks at the Fellowship level

One proposal that the Task Force considered, but rejected, was the idea of having optional learning tracks, at the Fellowship level.

What is an optional track? It is a learning path that focuses on a specific area of actuarial practice. For example, in most colleges, there is a core group of basic classes, followed by a series of electives. The electives allow the student to tailor their education more closely to their areas of interest.

The SOA has offered optional tracks for many years. Currently, their syllabus offers the opportunity to become an FSA with any of the following optional tracks: life, health, retirement, finance, or investments. Actuarial organizations in many other countries also allow their candidates to take some options in fulfilling their requirements for a credential or degree.

The specific proposal before the FETF was for the Fellowship exams to be offered in three tracks. There would be three shorter exams (each only two to three hours), where the candidate would have to complete any two out of three to get their Fellowship. This would replace current Exams 8 & 9.

The three tracks suggested were: advanced pricing and reserving; reinsurance and advanced actuarial modeling; and finance, underwriting, & marketing.

The advanced pricing and reserving exam would cover most of the topics on the current Exam 9, plus the more complex papers from current Exams 5 and 6.

The reinsurance and advanced actuarial modeling exam would cover advanced papers on reinsurance pricing and reserving and advanced topics in actuarial modeling & simulation. Advanced techniques in loss distributions and simulation would be covered and a spreadsheet computer would be part of the CAS supplied tools for the exam.

The finance, underwriting, and marketing track would explore the interaction of actuarial considerations in regard to decisions on investments, underwriting, and marketing, and would cover asset/liability matching, rate of return, dynamic financial analysis, and securitization.

To get credit, candidates would pass any two of the three exams. This is just one example of how optional tracks could be structured.

Advantages:

- Allows candidates to tailor education more closely to their interest.
- Reflects that some students are going to be more interested in the highly technical aspects of actuarial practice while others will be more interested in the business issues.

- Reflects the fact that casualty actuarial science is growing and very few people can really be experts in every area.
- At the Fellowship level, candidates often have important job responsibilities. A shorter exam could be better suited to their time constraints than a traditional four-hour exam.
- Shorter exams tailored to candidates' interests might enable reduced travel time.

Disadvantages:

- It would be more work to create and administer optional exams than simply requiring the same set of exams for everyone.
- Shorter exams may not be sufficient to cover the necessary breadth of Fellowship material.
- There would no longer be a common knowledge basis for all CAS Fellows.
- Candidates can specialize after achieving Fellowship.
- If candidates can opt out of studying the investment material on current Exam 8, this might put the CAS out of compliance with the IAA educational requirements (see Appendix I).

C. Exposure to all actuarial practice areas

Some members of the FETF advocated an exam or seminar that provides casualty candidates with an introduction to all practice areas of actuarial science. This would include life, health, and pensions. This proposal would place the casualty concepts within the context of the larger insurance environment, and would also provide information useful for casualty practitioners when they encounter real-life problems whose solution requires some familiarity with other practice areas. These concepts, in one form or another, are common to all types of insurance. At the introductory level, it should not be that difficult to cover them from the perspective of all practice areas at once.

Advantages:

- If candidates were introduced to all practice areas early on (the SOA is already committed to this concept), each candidate would more quickly settle into the practice area that suits him or her best. The practice area within which many candidates find their first jobs is largely a matter of happenstance, and an early introduction to other practice areas would open their eyes to other opportunities. They would also then have a reasonable idea of what they would be getting into before making a switch.
- The CAS is the only credentialing actuarial organization in the world that doesn't explicitly embrace the concept of providing candidates an introduction to all practice areas. Adopting this idea would certainly help the CAS's relationship with foreign actuarial organizations,

and would clearly demonstrate CAS compliance with IAA educational standards (see Appendix I).

- If CAS members are going to branch out beyond casualty insurance and indeed beyond insurance, such as with Enterprise Risk Management, they need to have a grasp on the basics of all types of insurance.
- International employers increasingly seek actuaries with training in life, health, and pension contingencies versus property-casualty contingencies. Designations from the IA/FA or the IA Aust can indicate competency in both life and non-life contingencies. Thus it would be helpful for the CAS students of the future to at least have an exposure to life, health, and pension contingencies.
- The CAS could implement this by jointly sponsoring the SOA's proposed ASA Course which would give candidates greater ability to delay their decision on which educational program to pursue.

Disadvantages:

- There is limited syllabus space. Additional material on non-casualty practice areas beyond what is currently included in the syllabus is not sufficiently important to be part of basic education.

D. Exposure to international actuarial topics

The current CAS syllabus has two country specific exams, 7C [Canada] and 7US [United States]. Each exam covers the three topics of the annual statement, taxation, and regulation as practiced in that country.

The syllabus of the future would benefit from including an international element. Therefore, it is proposed that some portion of each exam 7 cover the same topics, but on an international basis.

For example, instead of covering only statutory and GAAP accounting, there could be a brief reading on Fair Value Accounting. As another example, instead of only discussing the tort system or health care system in the US or Canada, other countries' tort or health care systems could be mentioned.

Advantages:

- A student with some familiarity with how other countries have handled various issues would be more well-rounded and better able to "think outside the box".
- International issues are likely to be an increasingly important area of actuarial practice for CAS members.

Disadvantages:

- The syllabus for Exam 7 is already very crowded. Adding more material may be impractical.

The task force is aware that the Education Policy Committee is working on international issues with Exam 7. At this time we are not proposing any major changes to the nation-specific exam. We do encourage the Syllabus Committee to look for non-North American educational material that would give candidates more exposure to international issues (such as bonus/malus auto rating systems).

X. Consideration of the CAS Centennial Goal

In March, 2003 the CAS Board of Directors adopted the following Centennial Goal to be completed by 2014, our 100th anniversary:

“The CAS will be globally recognized as the preeminent resource in educating casualty actuaries and conducting research in casualty science. CAS members will be recognized as the leading experts in the evaluation of hazard risk and in the integration of hazard risk with strategic, financial and operational risks.”

At that time, the Future Education Task Force was nearly completed with its work and was in the middle of drafting this report. Due to the timing of the goal in relation to the work of this task force, we were not able to integrate the new CAS strategic direction into our recommendations. Additional work will need to be done to evaluate these recommendations in light of the Centennial Goal.

XI. Transition Process

Most current exams would transition to the corresponding new exams. Credit for New Exam A would be granted for those who have passed the current Exam 5. The Modeling Workshop would be required of all Fellowship candidates once it is implemented.

New Exams	Requirements for Transition Credit
New Exam 1	Current Exam 1
New Exam 2	Current Exam 2
New Exam 3	Current Exam 3
New Exam 4	Current Exam 4
New Exam A	Current Exam 5
New Exam 5	Current Exam 5
New Exam 6	Current Exam 6
New Exam 7	Current Exam 7
New Exam 8	Current Exam 8
New Exam 9	Current Exam 9

Professionalism Course	Current Professionalism Course
Modeling Workshop	(no transition credit)

Appendix A – Topics on Exams

For the majority of syllabus topics, FETF members have expressed a reasonable level of satisfaction with the status quo. However, most members would like to see change in some aspect of the educational process (i.e. how the syllabus material is taught or tested).

Basic Mathematics and Probability (current Exam 1):

Keep: 2A Bayes Theorem
 2B Discrete Distributions
 2C Continuous Univariate Distributions
 2D Multi-variate Distributions

Eliminate:/ 1A Basic Calculus of One Variable
Do not add 1B Basic Calculus of Many Variables
 1C Basic Differential Equations
 1D Linear Algebra
 1E Algebraic Manipulation of Equations

Economics, Interest Theory and Finance (current Exam 2):

Keep: 3A Supply, Demand and Market Equilibrium
 3B Comparative Advantage
 3C Consumer Behavior
 3D Behavior of Firms
 3E Types of Markets
 3F Utility Theory
 3G Game Theory
 4C Inflation, Interest Rates, Federal Reserve
 5A Present Value – Discrete
 5B Present Value – Continuous
 5C Bond Yields, Sinking Funds, Annuities
 5D Amortization & Depreciation
 6A NPV, Internal Rate of Return
 6B Risk vs. Return
 6C Capital Budgeting
 6D Efficient Markets
 6E Types of Securities
 6F Option Pricing
 6G Corporate Financing
 6H Financial Performance Ratios

Eliminate:/ 4A National Income Accounting
Do not add 4B Aggregate Supply and Demand
 4D Money Supply
 4E Keynesian Economics
 4F The Multiplier Effect

Actuarial Models (current Exam 3):

Keep:	8A	Deterministic vs. Stochastic Models
	8B	Evaluation of Various Cash Flow Principles
	8C	Life Contingencies
	8E	Frequency Distributions
	8F	Severity Distributions
	8G	Deductibles, Policy Limits, Coinsurance
	8H	Contingent Cash Flows
	8K	Aggregate Loss Distributions
	8L	Simulation
Eliminate/	8D	Pension Math
Do not add	8I	Discrete Markov Chains
	8J	Brownian Motion

Actuarial Modeling (current Exam 4):

Keep:	9A	Parameter Estimation
	9B	Censored, Truncated, Shifted Data
	9C	Goodness of Fit Measures
	9D	Regression Analysis
	9E	Time Series and Forecasting
	9F	Classical Credibility
	9G	Bayesian Credibility
	9H	Buhlmann Straub Credibility
	9I	Model Validation through Simulation
	9J	Analysis of Variance
	9K	Hypothesis Testing

Intro to P/C Insurance and Ratemaking (current Exam 5):

Keep	10A	Basic Coverages and Contract Language
All Topics:	10B	Insurance Company Operations
	10C	Insurance Data Capture
	10D	Ratemaking Techniques
	10E	Loss Development
	10F	Exposure Trending, Frequency, Severity
	10G	Trend Determination
	10H	Class and Territory Relativities
	10I	Credibility, Complement, Off-Balance
	10J	Underwriting Expenses
	10K	Profit, Contingency, Risk Load
	10L	Surplus Allocation
	10M	Deductibles, Coinsurance, Insurance to Value
	10N	Basic Ratemaking Data
	10O	Premiums and Losses On Level
	10P	Catastrophe Ratemaking Techniques
	10Q	Other Ratemaking Loads
	10R	Basic Experience and Retro Rating
	10S	Supply and Demand Issues

Loss Reserving Techniques (current Exam 6):

Keep	11A	Constituents of Reserves
All Topics:	11B	Basic Reserving Techniques
	11C	Changes in Loss Climates
	11D	Data Capture, Data Problems
	11E	Loss Triggers
	11F	Excess Loss Development
	11G	Special Situations,
	11H	Reserve Variability; Confidence Intervals
	11I	Stochastic Models for Reserves
	11J	Reserve Run-off Testing
	11K	ULAE Reserving
	11L	Reserve Definitions and Terminology
	11M	Reserve Discounting

Reinsurance (current Exam 6):

Keep	15A	Types and Uses for Reinsurance
All Topics:	15B	Reinsurance Contracts
	15C	Exposure Rating Techniques
	15D	Experience Rating Techniques
	15E	Aggregate Limits and Deductibles
	15F	Finite Reinsurance
	15G	Catastrophe Reinsurance
	15H	Reinsurance Reserving Considerations

Basic and Statutory Accounting (current Exam 7):

Keep: 12C US or Canadian Statutory Annual Statement
12D Statutory Accounting Rules and Regulations
12E Statutory vs. GAAP Accounting
12F Accident Yr vs. Underwriting Yr vs. Calendar Yr
12G Solvency Measures
12H Analysis of Expenses

Debatable: 12A - Basic Accounting - Balance Sheet; Income Statement; Cash Flow (Note - this is not the US/Canadian annual statement, etc. This covers financial statements for any business.)
12B - Basic Accounting - Basic Double-Entry Bookkeeping

Law, Taxation, and Regulation (current Exam 7):

Keep: 13A Tort Law; Determination of Liability
13B Contract Law
13C Anti-Trust Law and Insurance Industry
13D State Regulation of Rates, Rules, Forms
13E State Regulation of Solvency and Capital
13G Solvency, Guaranty Funds, Risk-Based Capital
13H Residual Markets, Insurance Availability
13I Government Reinsurance Programs
13J Federal Income Taxes
13L NAIC Statements of Actuarial Opinion
13M Regulation, Judicial Decisions, Common Law

Debatable: 13F Deregulation of Commercial Lines
13K Government Insurance Programs

Advanced Finance and Analysis of Insurance Operations (current Exam 8):

Keep: 7A Optimal Portfolio Construction
7B Security Risk
7F Models for Valuing Stocks
7G Models for Valuing Bonds
7H Types of Fixed Income Securities
7J Decision Trees
16C Asset/Liability Management
16D Valuation of Insurance Entity or Book
16E Techniques for Valuing Insurance Operations

Eliminate: 7I International Securities

Debatable: 7C Derivatives and Options
7D Asset-backed Securities
7E Hedging Strategies

Proposed Modeling Workshop:

Add: 16A Purposes and Uses of DFA

- 16B DFA Modeling
- 17A Quantify Risk
- 17B Aggregate Risk
- 17C Assess Risk
- 17D Treat Risk

Advanced Ratemaking (current Exam 9):

- Keep:
- 14A Class Relativities
 - 14B Fairness of Class Plans
 - 14C Increased Limits, Deductible Ratemaking
 - 14D Risk Loads for Class/Increased Limits Ratemaking
 - 14E Individual Risk Rating
 - 14F Retrospective Rating Plans
 - 14G Composite Rating Plans
 - 14H Catastrophe Models
 - 14I Profit Provisions
 - 14J Total Rate of Return from Insurance Operations
 - 14K Risk Load Determination
- Debatable:
- 14L Pricing New or Non-traditional Products

Appendix B – The new Exam A

The taskforce proposes a new Exam A, titled “Introduction to Property and Casualty Actuarial Practice.” Exam A would cover basic property and casualty policy forms, ratemaking, and reserving concepts currently included on Exams 5 and 6. This exam would be intended for a newly hired candidate and could be sequenced anywhere relative to exams 1-4.

Exam A would be a two hour, multiple choice exam. Exam A should be given at least three times per year. If the CAS implements exams on demand, Exam A would be a good candidate for this process.

The objective for creating Exam A is to teach the candidate the basics of property and casualty actuarial methods early in the exam process, with readings that can be immediately useful in their entry-level jobs. This exam will satisfy the new candidate’s eagerness to learn what casualty actuarial science is all about.

Specific advantages of this new Exam A are:

- This exam supports a progression in the education process on ratemaking and reserving topics.
- If the candidates are introduced to basic actuarial methods much sooner, they will appreciate the syllabus much more because they can correlate what they are doing at work with what they are studying.
- The new exam will help orient the candidate with their job and prepare them for the challenges of later exams, with more advanced readings on ratemaking and reserving.
- Later exams could cover more intermediate or advanced topics on ratemaking and reserving, or be shortened (we recommend that Exam 5 be 3 hours), or better test in 4 hours the remainder of what is currently on these exams.
- This new exam would allow college students to take a casualty specific exam while in college and thereby get an early taste of the type of work involved in the casualty actuarial career path.
- Employers could use completion of this exam to discriminate between candidates. Individuals with credit for Exam A would be perceived as more committed to the property/casualty actuarial track. In the survey on CAS Professional Skills, 77% of those who had an opinion favored an exam of this type.

The material on Exam A would come from current exams 5 and 6. The more basic readings on ratemaking and reserving (for example, some portion or all of the ratemaking and reserving chapters from *Foundations of Casualty Actuarial Science*), would be moved to Exam A. Also the section “Introduction to Property Casualty Insurance” (CPCU readings and policy forms) would be moved from Part 5 to Exam A.

Exam A would consist of material currently on the syllabus, and thus should not increase travel time. To minimize travel time we propose to offer Exam A either several times a year or on demand. Additionally, we propose that the material be tested at a basic level of comprehension. Questions should be simple and straightforward, allowing candidates to demonstrate that they have read the syllabus and understand the important ideas. We anticipate that the passing percentage for Exam A would be significantly higher than that of current exams 5 and 6.

The proposed content for Exam A is as follows (content codes refer to the Survey on CAS Professional Skills):

- 10A - Basic coverages and contract language
- 10B - Insurance Company Operations (underwriting, marketing, and claims)
- 10C - Insurance Data Capture (statistical plans)
- 10D - Basic Ratemaking Techniques (pure premium and loss ratio methods)
- 10E - Loss Development
- 10F - Trending of Exposures, Loss Frequency, Loss Severity
- 10N - Basic Ratemaking Data
- 10O - Premium on level, and Losses at Projected Ultimate
- 11A - Constituents of Reserves (case, IBNR)
- 11B - Basic Reserving Techniques (chain ladder, Bornhuetter-Ferguson, frequency & severity)
- 11D - Data Capture, Data Problems
- 11E - Loss Triggers (possibly)

Appendix C – Modeling Workshop

Certain topics, particularly DFA and ERM, were determined to be untestable in the traditional exam environment, but are nonetheless critical to the practicing actuary's knowledge base. For these topics, the FETF is recommending that the CAS introduce a hands-on workshop to be part of the basic CAS education requirement (i.e. mandatory to attain the FCAS designation).

The motivation for the workshop is two-fold:

1. The Syllabus and Examination Committees have struggled with the best way to present and test Dynamic Financial Analysis. Many believe it is difficult to test DFA on a pencil-and-paper exam. The two committees made a joint recommendation to the Education Policy Committee that DFA not be tested in its current manner. EPC subsequently decided to remove DFA from Exam 8 (keeping the DFA overview on Exam 6) with the understanding that the FETF would consider the appropriate place for DFA in the education process and the best way to teach it.
2. The CAS Board recently approved the Centennial Goal (see Section X), which states in part that "CAS members will be recognized as the leading experts in the evaluation of hazard risk and in the integration of hazard risk with strategic, financial and operational risk" by the year 2014. This workshop provides a means for teaching this integration of different types of risk to new Fellows.

Workshop Overview

Candidates will use computers to integrate the material they studied throughout their actuarial education experience and work on examples of modeling property/casualty insurance companies or similar risks. This might include simplified applications that could be characterized as part of Dynamic Financial Analysis and/or Enterprise Risk Management.

Various items would be examined under different scenarios, such as: different economic conditions, different competitive environments, different reinsurance arrangements, occurrences of catastrophes, etc. Items to be examined include: the insurer's exposure to risk, insurer's profitability, insurer's revenue growth, insurer's survival, etc.

Sample Learning Objectives (partial list):

1. Appropriate uses of reinsurance and their potential impacts
2. The potential impacts of relationships between liabilities and various mixes of types of assets
3. The potential impacts of writing different mixes of lines of business
4. The potential impacts of various strategies of pricing and volume of business written in relation to the underwriting cycle
5. The potential impacts of catastrophes and unforeseen contingencies
6. The potential impacts of an actuary's mis-estimates in ratemaking
7. The potential impacts of an actuary's mis-estimates in loss reserving
8. How to apply mathematical and modeling concepts covered on the Associateship exams

The workshop would be taken by Associates of the CAS, and would be a requirement for Fellowship. We would tell the students if there are any readings from the syllabus of the Fellowship exams that it would be helpful for them to have read prior to attending the workshop.

Workshop Process

We recommend a three-part process. The candidates would be assigned pre-readings, then attend a workshop, and then submit a project. The typical candidate would spend about 50 to 100 hours in total.

Readings

There would be about 20 hours of reading prior to the workshop (in addition to any readings on the Associate exams which the candidates are assumed to know but may want to review). The reading would include: terms and case studies for the upcoming workshop (maybe on diskette), an outline of what will be covered, and a review of recommended readings.

Workshop

Attend a workshop for 1 to 2 days, the length depending on the specific content of the final design. The candidates will review case studies consisting of a company situation and models of different proposed solutions. There could be just one sample company, and several different areas of concern could be discussed.

Project

The candidates would be given a project to submit, due in 30 days. The project should take the average candidate about 20 hours to complete. The pass ratio should be about 75%-85% (there should be an option for re-submission of a borderline project). The project would require the candidate to answer several questions with respect to a given simplified setup (perhaps they could choose from a longer list of questions). These questions need not have a single right answer. Each candidate is expected to work on his or her own.

Implementation

Instructors: We recommend that the instructors be compensated. Good instructors are essential. Therefore, lining up instructors well in advance should be a top priority. The instructors, along with others, would need to design the workshop, the case studies, and the project. It is also recommended that an instructor would participate in grading the projects.

Transition: Announce syllabus changes a year in advance.

Dress Rehearsals: There should be a minimum of 2 “dress rehearsal” workshops offered for free to a group who will come and know enough to critique. These could be scheduled in conjunction with a CAS meeting or seminar.

Logistics: There are about 300 people who take Exam 8. There are about 150 to 200 new Associates a year. Therefore, with a very high passing percentage, perhaps 80%, we expect perhaps 200 to 250 candidates taking the workshop per year. At least initially we project 4 workshops per year in different locations, possibly in February, early March, August, and early September. It is anticipated that there will be two or three instructors per workshop depending on attendance. Cost for the workshop should be projected from a Limited Attendance Workshop and a fraction of an Exam.

Time/Resource Commitment of Fellows and CAS Staff: We expect paid instructors to handle the workshop itself. However, CAS staff would have to put in as much work as for a Limited Attendance Workshop. In order to grade the projects and oversee the whole process on an ongoing basis, we anticipate a committee of at least nine Fellows, including the chair, similar to an Exam Committee. In addition, the CAS staff would have to do much of the work they have to do for an exam.

Early Exams: Preliminary mathematical material should be presented on earlier exams in a manner designed to prepare candidates to use it at the modeling workshop. Among mathematical areas to be covered: Simulation, Frequency, Severity and Aggregate Distributions, Simple Models of Insurance Companies, and Interest Rate Models. In addition candidates should be familiar with Statutory, GAAP, and economic valuation of assets and liabilities. The presentation should include simplified concrete numerical examples of the types of applications of this material that will be used in modeling an insurer. This may require the writing of study note(s).

Appendix D – Skill Survey Summary

In July 2002, the Future Education Task Force posted a Survey on Professional Skills on the CAS Web Site. All CAS members were invited to participate. The objective of the survey was to ask our members to tell us what skills or knowledge they believe are important to them as practicing actuaries. The Future Education Task Force used this feedback to help evaluate our examination and education system.

The results of the survey have been compiled and are available in a summarized format on the CAS web site at <http://www.casact.org/members/fetf.htm>. A more condensed summary of the results by topic is also available on the web site. This does not include the written comments, but it does provide a quick overview of member opinions by specific exam topic and a summary of the general questions.

Highlights of the results are as follows:

- Three hundred thirty-eight CAS members completed the survey (response rate of approximately 9.2% of membership), comprised of 69.8% Fellows and 30.2% Associates. The majority of respondents are employed by property/liability insurers (62.1%), reinsurance (11.8%), or consulting companies (12.1%).
- Overall, our exam system is teaching and testing the right things. Very few of the learning objectives on our current syllabus were considered to be "low" or "not important" to a practicing actuary.
- The majority want to keep all basic subjects (*Probability, Economics, Regression*, etc.) on the syllabus. The exception is Calculus where the response was mixed - see below for more details.
- The majority oppose granting credits for completion of non-actuarial designations, primarily due to the variation in the difficulty of the exams of the external organizations. The majority of respondents oppose giving credit for university courses, but they were split as to whether granting such credit would dilute the FCAS designation.
- Most respondents say it should take a candidate between 5-8 years from their first full-time casualty actuarial job to Fellowship.
- The most popular methods chosen to reduce travel time were reduced number of topics and reduced breadth/depth of syllabus material. However, while there were a number of written comments about the importance of reducing the length of travel time, there were also written comments objecting to the assumption implicit in the question that "travel time should be reduced." Another important set of comments were that we should be managing the value of the syllabus with respect to its length (making sure the syllabus requires the right set of skills), rather than worrying about whether it is "too long".

- Many want to see more practical business applications incorporated in the testing process for the *Probability, Microeconomics, Actuarial Modeling* and *Basic Finance* exams.
- The majority say *Basic Mathematics (Calculus, Linear Algebra, and Algebra)* is an important skill. A little under 50% said that the Basic Mathematics topics should be taught under Basic Education. One-third of the respondents are in favor of offering university credit for Calculus.
- Knowledge of *Probability, Microeconomics, Interest Theory, Basic Finance, Actuarial Models*, and *Actuarial Modeling* are considered to be important and critical. The majority want the CAS to continue testing all these topics.
- Although ranked as important, *Advanced Finance* and most objectives under *Macroeconomics* are considered to be less important relative to *Microeconomics* and *Basic Finance*. Many Finance learning objectives are not highly used by most, but are viewed as an area of growing importance.
- *Introduction to P&C Ratemaking, Loss Reserving Techniques, Basic and Statutory Accounting, Advanced Ratemaking, Law/Taxation/Regulation*, and *Reinsurance* are important/critical. There is no question that the CAS should teach and test these topics. There are mixed views on accounting principles - some want more education while others want to adhere to testing only the basics. There are mixed views on Advanced Ratemaking - some want this to be core material while others say to keep it on the Fellowship exams.
- The majority favor introducing a *Basic Ratemaking, Basic Reserving*, and *Policy Forms* exam earlier in the exam process.
- Continuing education was suggested for emerging areas of practice and specifically for creating *DFA models* and *Enterprise Risk Management*. Most of the respondents favored testing the basic purposes and uses of DFA on an exam.
- *Basic Differential Equations, Life Contingencies* and *Pension Mathematics* were three objectives that ranked as being of low importance. Most favor reducing, but not entirely eliminating, the amount of Life Contingencies currently on the syllabus.

Appendix E – SOA Education Proposals

The current proposals developed by the various SOA working groups are outlined below.

Preliminary Education

Prerequisite – Calculus, Linear Algebra, Mathematical Statistics, Introductory Accounting, Elements of Business Law

Validated by – Economics, Finance, Applied Statistics
Educational
Experience

New Exam 1 – (3 hours) Probability with implicit testing of Calculus

New Exam 2 – (2 hours) Interest Theory and Intro to Financial Economics

New Exam 3 – (4 hours) Models for Quantifying Risk
similar to current SOA Exam 3

New Exam 4 – (4 hours) Construction and Evaluation of Risk Models
similar to current Joint Exam 4 but excluding Applied Statistics and including a
small amount of material on Construction of Mortality Tables and Graduation

ASA Course

This course would consist of eight learning modules which would enable candidates to learn about the Actuarial Control Cycle methodology using examples from all practice areas, including property and casualty.

Completion of the Preliminary Education requirements, the ASA Course and a Course on Professionalism would enable candidates to achieve the ASA designation.

FSA Requirements

The SOA working group is still developing detailed FSA requirements, but the SOA Board has directed that each track consist of two exams and four learning modules.

On June 22, 2003, the SOA Board approved these proposals for their future educational process. The SOA Board directed that the entire proposal be exposed to the SOA membership for comment and that the working group begin to move forward with implementation of the Preliminary Education proposal with a target implementation date of Spring 2005.

Appendix F – Background on CIA Position

The Canadian Institute of Actuaries (CIA) supports the concept of recognizing university courses in Canada as part of the Validation by Educational Experience (VBEE) component of preliminary education. This position has been stated by the Chair of the Eligibility and Education Council (EEC) of the CIA.

The EEC is following the efforts of the SOA and CAS education working groups. The CIA has provided members to the SOA working group and a liaison to the CAS working group. In late 2002, the EEC circulated a questionnaire regarding the role of universities in actuarial education to nine leading Canadian universities that offer actuarial courses, on which many of its conclusions were based.

Validation by Educational Experience

Canadian universities will be able to offer courses that meet a predefined set of education objectives established by the SOA or CAS. The universities prefer an approach whereby they have flexibility to design their courses to meet those objectives. The universities are willing to work with the actuarial profession to facilitate this development.

The actuarial faculties typically have little leverage over the design of courses offered in other faculties so topics such as economics and finance will require more time to ensure that the education objectives of the SOA or CAS are met by those courses.

It would be possible for universities to work with the actuarial profession to define passing grades for SOA or CAS credit that are different from the passing grades for university credit. Universities typically pass over 80% of the students whereas pass rates for SOA and CAS examinations are much lower. The EEC believes a higher passing grade for SOA and CAS credit is essential to maintain the profession's high standards.

The feedback from the actuarial faculties is that the obstacles facing a common examination administered at the universities make this concept impractical.

It is important that students who attend a university that does not offer approved courses and late entrants to the profession should be able to acquire the necessary education. The EEC was encouraged by the willingness of universities to consider distance learning alternatives which offers flexibility to students in these situations. This support notwithstanding, creating such alternatives will require substantial effort, need significant lead time, and may require some financial support from the profession to meet budget challenges.

The EEC concluded that the VBEE concept can maintain, and perhaps even enhance, the profession's high education standards.

Extensions of Validation by Educational Experience/Formal Review Process

The Institute of Actuaries and Faculty of Actuaries in the UK have established a formal review process for granting exemptions to candidates who had passed appropriate university courses. The EEC understands the SOA and CAS working groups are not considering formal review for the VBEE component.

After the SOA or CAS gains some experience with the VBEE concept, VBEE should be extended to some courses in the Validation by Examination Component of preliminary education. The CIA Board encouraged the EEC to investigate expanding VBEE to two additional topics (such as probability and interest theory) for Canada. Exemptions in this category of education would require a more formal review process like that in the UK. The EEC concluded that a formal review process could be workable in Canada if exemptions were to be offered for topics currently in the Validation by Examination phase. The CIA is willing to allocate resources to serve as reviewers of Canadian university courses if the SOA or CAS wants to consider a pilot project to extend the exemption concept to additional topics such as Probability.

Summary

The CIA encourages the working groups to develop the university exemption approach within the VBEE concept. The CIA would want the opportunity to discuss this issue further with the SOA and CAS if this approach is not included in their new systems.

Appendix G – Validation by Educational Experience

One of the most contentious topics discussed by the Task Force was the proposal to require college credit, or other third-party courses, instead of competitive actuarial exams for certain topics. A summary of the issues is included in the main text of this report, but the task force felt it was worth expanding on the summary in this appendix. First we will present the arguments for, then against, validation by educational experience.

Arguments For “Validation by Educational Experience”

There is a body of knowledge spanning the fields of mathematics, probability, statistics, economics, financing and accounting that we want actuaries to know about. It is widely acknowledged that it is not practical to test all of these subjects in depth, and in fact we currently do not test all the material that we feel actuaries should know. For example, we do not test basic algebra, yet we think there is strong consensus that actuaries should know basic algebra. We also note that there has been no widespread demand to put basic algebra on the syllabus. The reason for this is clear. There is no way for a candidate to pass the examinations that are on our syllabus without knowledge of basic algebra. With this being the case, we have decided not to use our available exam space for basic algebra.

Given our acceptance of the fact that we cannot explicitly test **all** the material that we think actuaries should know, our current admissions program allows us two options.

1. Test the material with competitive actuarial exams
2. Assume that those who actually become actuaries will learn the material on their own.

As the case for basic algebra shows, the hypothesis that we make in the second option can be a good hypothesis. Also, as indicated by the CAS Job Skills survey, there is a growing consensus that we should also adopt the second option for the topic of calculus.

Over the past few decades, actuarial science has expanded beyond its mathematical and statistical roots to include much of modern financial theory. In addition, the near universal availability of computers has radically changed the way actuaries do their day to day work. Appropriately, the CAS has expanded its educational program to include these modern developments.

But including these modern developments has led to a significant increase in the material on our exams, with the result that travel time is becoming too long. Recall that the charge to the FETF asks us to propose ways to “minimize the expected amount of time required to achieve membership in the Society.”

Under the current system, reducing the material on the examination syllabus (Option 1) forces us to assume that actuaries will pick up the material on their own (Option 2). The fact that the examination syllabus has grown reflects the reluctance of many CAS members to rely on Option 2 for material that they deem essential to proper actuarial education.

Validation by educational experience adds a third option between the two extremes. While it may suffer from potential defects such as lack of uniformity, Option 2 suffers the same defects. Adding a third option will not, at least in theory, decrease the quality of our educational program. Whether it decreases the quality in practice will depend upon how we choose to implement this option, if at all, in our educational program. In other words, we should not reject this option outright. We should use it when appropriate and evaluate it on a case by case basis.

Arguments Against “Validation by Educational Experience”

The major disadvantages of validation by educational experience include loss of control/lack of uniformity, increasing the barrier to entry, (decreasing the diversity of our members), the risk of lowering educational standards, and the objection of a large portion of our current members, as indicated by the responses to the Job Skills survey. The validation by educational experience proposal involves neither a requirement of actual work experience nor a validation of knowledge. Under this proposal we would not have any detailed understanding of what any particular candidate did or learned. This proposal requires candidates to sit in a classroom, or take an internet course, or perhaps have someone else take an internet course for them, rather than demonstrate they know specific things. Opponents of validation by educational experience also believe that the advantages of coursework and the disadvantages of exams have been over-emphasized. tAlso, opponents believe that many of the purported advantages of required coursework will not be realized, or can be realized without requiring third-party coursework. Let’s now look at each of these “arguments against” in greater detail:

1. Loss of Control/Lack of Uniformity

Given the enormous number of university courses in the US and worldwide, it is not clear that we would be “validating” anything by accepting course credit. We don’t have the resources (nor do we plan) to validate whether any homework was given, whether there were any projects, the level of difficulty or sophistication of any tests, what a particular grade means, or even the details of what material was presented. If we are willing to settle for this vague level of knowledge, we should be willing to remove the subject from our basic education, and instead just recommend that candidates know the subject as background material. This is the same as we treat basic algebra today.

Note that this control/uniformity concern is **not** an issue for most actuarial organizations that currently grant course credit. The British and Australian actuarial societies work closely with a small number of universities, setting the syllabus requirements for courses, and reviewing the final exams. For a variety of reasons, the SOA and CAS proposals for validation by experience do not contemplate selecting a small number of college or university providers.

2. Shrinking Our Potential Student Body and Diversity of Membership

Requiring all of these courses will be a significant barrier to entry to the CAS for many people. We will get fewer people who were not preparing to be actuaries in college. For instance, the career changers and the immigrants with untranslatable college experience (e.g., recently, many from the

Soviet Union) will be perceived to need remedial work to catch up. This will make such people less likely to enter the profession, and less likely to land jobs if they try.

Over time, this will significantly decrease the diversity of backgrounds in the CAS, one of our greatest strengths.

3. Lowering Standards

The validation by educational experience proposal will result in less required knowledge for new members of the CAS. We will be significantly lowering our current standards on the proposed subjects. In addition to possible low standards at “brick and mortar” schools, we intend to open this route to customized “distance learning” alternatives, provided by outside vendors. Students will naturally prefer the vendor with the highest pass rate coupled with the lowest work load. There may be substantial pressure to choose the “lowest common denominator”.

4. Objection of Current Membership

The CAS Job Skills survey did not favor giving credit for university courses. For the subjects being discussed for validation by educational experience, the support for offering credit for university courses was: Economics 28%, Finance 17%, and Applied Statistics 11%. Thus the vast majority of CAS survey respondents were opposed to this concept.

5. Other Issues

The proponents of validation by educational experience believe that some topics are better taught through a course, that projects are a better way to validate experience than exams, that students will get through courses faster than they get through exams, and that students will be attracted by already having some credit in our system when they graduate college. Opponents of validation by educational experience believe that all of these advantages depend on false premises.

6. Exams Do Not preclude courses

Proponents of validation by educational experience believe that some topics are better mastered through taking a course than through self-study. This is certainly true for many people. However, there is nothing in our exam system that prevents people from taking courses to learn the subjects. Students enrolled in university actuarial science programs do very well on the early exams. There is a healthy “industry” for review courses and exam-tailored weekly courses already available at many locations and delivered electronically. Students who master the material in such settings can demonstrate their mastery on exams.

It is true that most people will learn material more efficiently from an excellent course than on their own. However, it is not fair to compare “an excellent course” to “no help at all”.

7. Travel Time

It is certainly true that the chances of passing a college course in a semester are greater than the current odds of passing an actuarial exam in the same number of months of preparation. However, the current proposal substitutes many courses for a single exam. Under the current proposal, a student would generally need to take two semesters of economics, two semesters of finance (only the second of which would “count”) and a smaller exam to replace “Exam 2”. That student would then need to take a course in applied statistics and a slightly shorter version of the modeling exam to replace the current modeling exam. Validation by educational experience greatly increases the number of “things” a candidate needs to do. Just as with partitioning, this is likely to increase travel time.

Giving credit for courses that students already took in college would seem to improve travel time. However, students who studied a topic a few years ago, while in college, should not have too much trouble passing an exam if it is at an appropriate level. The amount of time to review a topic that was once mastered is not generally huge – far fewer hours than the amount of time it takes a student with no prior background. If a student who took a course in college really needs to start from scratch to study for an exam, it calls into question what he or she learned from that course.

Some complaints about the relative ease of courses are probably better described as complaints about the level of knowledge required to pass an exam. If the CAS decides that the level of knowledge required to pass an exam is too high, we could make our exams easier (perhaps explicitly tailoring early exams to be passable by graduates of good courses) without directly giving credit for courses.

8. Verification via Courses or Projects Versus Verification via Exams

Many proponents of validation by educational experience believe that Applied Statistics is not adequately validated by our current exam 4. They state that *“The ideal competency is the ability to analyze a messy data set with a standard statistical software package and draw appropriate conclusions. This competency is best validated by completion of appropriate data analysis projects.”*

However, we would have no knowledge of what, if any, data analysis projects would be completed by someone who got credit for Applied Statistics under the validation by educational experience proposal. We would have no knowledge of what a student who would be given credit needs to submit on any such projects.

Unlike some other subjects, such as DFA, the syllabus or exam committees have not in the past complained to the Education Policy Committee or the CAS Board that Applied Statistics is not testable. There have been several CAS task forces that have looked at Course 4 over the last few years, and they did not suggest removing Applied Statistics. Further, the arguments against “verification by exam” for Applied Statistics apply at least as well to many of our upper level exams. The ideal competency in ratemaking and reserving is, similarly, to analyze messy data and draw appropriate conclusions.

However, if the CAS concludes that the current treatment of Applied Statistics (or these other topics) should be revised there are alternatives:

1. Improve our examinations to do the best job possible of addressing the concerns. This may include commissioning a study note(s), revising the topics covered, changing the emphasis, changing the level of comprehension, changing the types of questions asked (including use of essay questions), attaching formulas and other information to the exam, etc. We have already implemented many of these on the higher exams.
2. Design a required online Internet course or workshop on Regression and Time Series. We could set the syllabus, require homework, and know that the student had actually analyzed messy data. This draws on a proposal discussed earlier in this report on Internet classes.

9. Attractiveness of Exams Versus Coursework

Proponents of validation by educational experience claim that students will be attracted to the field when they discover they already have credit for some of the requirements. This assumes that students will graduate from college with credit for the required courses. While it will, of course, be true for some students, it will not be for others. Some students will be discouraged by the lengthy course requirements needed to enter the field. People who are not in college when they consider the profession will likely find course requirements more discouraging than an additional exam or two.

10. Attracting Candidates

The task force is recommending that we continue to have a joint attractor exam with the SOA. A joint attractor exam is very important for our ability to continue to attract candidates to the CAS. We will have a joint attractor exam with or without validation by educational experience.

If the SOA requires four courses in economics and finance on the one hand, and the CAS has an easy exam on microeconomics and finance on the other hand, the SOA version might be slightly more attractive overall to candidates.

However, what is required at the very beginning of a process is only one factor in making a decision by a candidate. For example, the Fall 2003 CAS Exam 3 has a significantly reduced syllabus compared to the previous joint Exam 3 (which is the same as the Fall 2003 SOA Exam 3). The SOA has done what they think is right for them without considering the relative attractiveness of their exam 3 versus the CAS exam 3.

The potential difference in approach to some of the early subjects on the syllabus between the SOA and CAS would be relatively unimportant compared to where the jobs are, the interest level of what one does on the job, etc. Employers are largely responsible for getting candidates into the casualty side of the profession, after they have taken the attractor exam.

11. If It Ain't Broke, Don't Fix It

A few years ago, the CAS saw declining numbers of students in all the earlier exams, and employers had trouble finding new entry-level candidates. At the time, many pointed to the exam system, and the lengthy travel time it entailed, as the source of the problem. One theory went around that other careers in finance were more appealing than the actuarial career, and that they

were sapping our candidate pool. Today, more students are sitting for Exam 1 than ever in the history of the SOA or CAS, and the numbers in all the lower exams (through Exams 5 or 6) are growing. The real change is that the stock market bubble burst, as did the internet boom.

Fundamental economics drive the attractiveness of the actuarial career path. While travel time matters, jobs and salary matter more. It is critical that we maintain a system in which the education gained through fulfilling our requirements is worth the money employers invest in their employees. While we need to constantly re-think and improve our exams, opponents of validation by educational experience believe that we can best maintain the value of our credentials through some combination of exams and courses or workshops overseen by the CAS.

Summary of Task Force Preferences

The Task Force considered several validation options for Economics, Finance and Applied Statistics before settling on the two final proposals. The task force voted on preferences for each option using a scale from 1 to 5, with 1=strongly in favor, 5=strongly against. The results of the vote were as follows:

Validation Option	Micro Economics	Macro Economics	Finance	Applied Statistics
Prerequisite (No Validation)	3.0	2.1	3.9	4.5
Validation by Educational Experience	2.6	3.1	3.4	3.3
CAS Minimum Competency Exam	2.2	2.6	2.5	3.6
CAS Competitive Exam	3.3	3.9	2.3	2.1
Required CAS Course	4.5	4.5	4.1	3.1
Required CAS Workshop	4.7	4.6	4.3	2.7

Appendix H – Actuarial Control Cycle

The Actuarial Control Cycle (ACC) is a concept in the education of actuarial students that was developed in the mid-1990s by the Institute of Actuaries of Australia. It uses the standard problem solving cycle (defining the problem, proposing a solution, implementing the solution and monitoring the performance) but placed in an actuarial context. A student would begin their education with the basic math and statistics that underlie actuarial practice, plus some grounding in actuarial principles that are common to all five practice areas (life, health, pensions, casualty, finance). The student would then learn about the Actuarial Control Cycle by applying the knowledge gained from their basic education to real-life problems (for example through case studies) examining not only the problem but the implications of the proposed solution on rate making, reserving, reinsurance, and investments. After completing the ACC, the student would take specialized studies in one or more of the five actuarial practice areas.

The Institute of Actuaries of Australia has now been using the ACC in their educational program for several years. The Institute/Faculty of Actuaries and the Society of Actuaries are also planning to include the ACC in their future educational systems.

The FETF discussed the Actuarial Control Cycle, but did not recommend incorporating the ACC into CAS basic education. Given the subsequent adoption of the Centennial Goal by the CAS Board of Directors, use of the ACC may need to be reconsidered along with the other educational implications of the Centennial Goal.

More detailed information about the Actuarial Control Cycle is available at <http://www.actuaries.asn.au/PublicSite/pdf/part2syllabus.pdf> and <http://www.soa.org/eande/acc.pdf>

Appendix I – International Actuarial Association Syllabus

In conducting its deliberations, the FETF considered the educational requirements which have been put forth by the International Actuarial Association for all member organizations. These requirements are summarized below. More detailed information about the IAA educational requirements is available at <http://www.actuaries.org/public/en/syllabus/guidelines.cfm> and <http://www.actuaries.org/public/en/syllabus/syllabus.cfm>.

1. FINANCIAL MATHEMATICS

Aim:

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

2. PROBABILITY AND MATHEMATICAL STATISTICS

Aim:

To provide a grounding in probability and mathematical statistics.

3. ECONOMICS

Aim:

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

4. ACCOUNTING

Aim:

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

5. MODELING

Aim:

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

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.

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.

8. INVESTMENT AND ASSET MANAGEMENT

Aim:

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

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.

10. PROFESSIONALISM

Aim:

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