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II. Education and Training

949 **Introduction**

950 Actuarial professional education and examinations are two cornerstones of the actuarial
951 profession. As in other professions, the content of actuarial education is designed to meet
952 the needs of the profession's stakeholders, who include investors, managers, regulators,
953 and consumers. In the past, the actuarial organizations responsible for examinations have
954 successfully met the needs of these stakeholders. Demand for actuaries has been strong.
955 The actuarial reputation remains good.

956

957 **Forces Driving Actuarial Services**

958 Today, actuaries are in high demand. In the United States, regulatory requirements, such
959 as the role of the appointed actuary, drive this demand. The actuarial organizations have
960 been successful in preparing increasing numbers of actuaries to meet regulatory demands.

961

962 The regulatory supply/demand balance is not equal across all actuarial functions.
963 Technology advances continue to make actuaries more efficient, with fewer actuaries
964 needed to achieve the same productivity levels. Globalization is also beginning to expand
965 the supply of actuarial services beyond the geographical boundaries of the United States.
966 Economic principles of free trade will lead to more outsourcing of actuarial services, and
967 the public's need for actuarial services is expanding. Leadership of the actuarial
968 organizations is beginning to look for new markets for actuarial services in the areas of
969 corporate finance, investments, predictive modeling, operational risk, and customer
970 relationship management. New services, however, do not come without risk, and they
971 require changes in the actuary's core knowledge.

972

973 **Forces Driving Professional Competition**

974 Actuaries are increasingly in competition with other financial professionals, particularly
975 in areas where regulations do not require actuaries. Financial engineering, behavioral
976 economics, and enterprise risk management are fast-growing fields in which actuaries can
977 provide insight and technical knowledge. Competition will come from non-actuarial
978 credentialed professionals (MBAs, PhDs, DBAs, PRMs, CPAs, financial engineers,
979 modelers, financial risk managers, and chartered financial analysts). While these
980 positions do not require actuarial credentials, actuarial skills are helpful in meeting the
981 demands of these roles.

982

983 **Forces Driving Actuarial Education**

984 Basic education for actuaries is mentally strenuous and intellectually demanding. The
985 examinations are written by current actuaries for future actuaries. Formal classroom
986 attendance is not required, only attendance at the examination center. This opens the
987 profession to many more students. It is a path of self-study from which the actuary
988 acquires several defined values, including independence, dedication, persistence, and

989 motivation. This process develops strong self-education skills that enable actuaries to
990 move into new areas of training and to acquire needed knowledge.

991
992 The education dilemma for actuaries is that current market demands for actuarial services
993 are known, but the demands for future actuarial services remain unknown. Many
994 members of our profession believe that actuaries should be trained to meet market
995 demands for known technical services, as the current market demands are great. Other
996 members think we also need to educate actuaries for the demands of the future, such as
997 financial economics. The CRUSAP Task Force agrees that greater emphasis should be
998 placed on the latter view, while acknowledging the need to adequately serve the former.
999

1000 One danger to the actuarial profession is to be enticed by an expectation of stability in the
1001 current market and the actuaries' current knowledge base. Narrow views among members
1002 contribute to actuarial organizations' inability to react and change to a dynamic
1003 environment. The potential for professional entropy in a knowledge-based environment is
1004 real. As one colleague recently quipped, "Actuaries are moving toward knowing more
1005 and more about less and less, until one day soon they will know everything about
1006 nothing."

1007
1008 It is also necessary to be cautious in thinking that the current examination process is an
1009 effective and efficient educational system because of the current employability of
1010 actuaries. There is no guarantee that the current educational structure is teaching the right
1011 things for tomorrow's actuaries, nor is it certain that the actuarial organizations are
1012 efficient in the delivery of that education.

1013
1014 Organizations must challenge, restate, and rekindle their value propositions if they want
1015 to grow and prosper. The U.S. actuarial organizations are no different. The key issues
1016 surrounding actuarial education are the skill sets, technical tools, and education required
1017 for actuaries so that they can provide valued services to the users of those services and
1018 thus meet their needs. This is the value proposition for actuaries. Challenges to the status
1019 quo are not detrimental to actuaries. Recurring questions regarding educational
1020 requirements are designed to address the potential needs in new markets and the scope of
1021 services actuaries may provide in those markets.

1022
1023 We have split our analysis into two sections: basic education and ongoing education. The
1024 demands for each will vary with the recognition and design of the future market economy
1025 and the competitive forces within the insurance industry.

1026 1027 **Analysis**

1028 **Basic Education**

1029 Primary responsibility for the basic education of actuaries rests with the Society of
1030 Actuaries (SOA) and the Casualty Actuarial Society (CAS). Basic competency is
1031 demonstrated through the examination process. The professional development process
1032 generally consists of two approaches: education and training. Education is the building of
1033 knowledge from theory to a solution; training builds knowledge from practical, hands-on
1034 experience to a solution. Training is the most efficient way to obtain the skills needed to

1035 respond to specific problems. Education may be less efficient and more individualized,
1036 but it's more effective in building a set of skills that can respond to more generalized
1037 issues or problems.

1038

1039 Training is both an efficient and effective mode of improving skill levels in a static
1040 environment but is less efficient in dynamic environments. Education may be more
1041 efficient in a dynamic environment where issues are more prevalent and a particular
1042 solution is just one of many options.

1043

1044 ***1. Knowledge acquisition frameworks.*** The amount of training vs. education depends on
1045 whether the environment is static or dynamic.

1046

1047 In a static environment, training often dominates over education. The characteristics of a
1048 static environment include: 1) long periods of stability; 2) a strong, centralized scientific
1049 core knowledge base; 3) a constant or at least predictable future; 4) well-defined
1050 problems and solution sets; and 5) rules (bright lines). Under this environment, "if...then"
1051 statements dominate the solution patterns. This is most often the worldview of a
1052 technician. Examination provides proof of competency.

1053

1054 Before the late 1970s or early 1980s, it is arguable that actuaries functioned primarily in a
1055 static environment. Since that time, however, the environment has become more
1056 dynamic, as evidenced by the evolution in capital markets and risk financing, greater
1057 volatility in financial markets, increased complexity in product design, and the movement
1058 to principles-based supervision. When the environment is dynamic, education dominates
1059 over training. The characteristics of a dynamic environment include: 1) periods of
1060 extensive, rapid innovation; 2) market-driven, economic/behavioral analysis central to the
1061 core knowledge base; 3) uncertain future; 4) uncertain questions and fuzzy solutions; and
1062 5) principles-based regulations. Under a dynamic environment, regime recognition
1063 dominates the response patterns. A regime represents all the operational, economic,
1064 political, and social characteristics of a time period. This is the worldview of experienced
1065 managers and business leaders. In business schools, it is a core concept for the MBA
1066 curriculum and often represents the central idea behind books on business theory and
1067 strategy. Results provide proof of competency.

1068

1069 Currently, the actuaries' basic examination process tends to develop technicians. The
1070 current examination system provides detailed training exercises. Core knowledge skills
1071 are outlined in learning outcome statements, and success results in the appropriate
1072 problem recognition and use of learned solution sets. This approach quickly provides the
1073 actuary with the greatest detail regarding procedures, information, facts, correlations,
1074 relationships, model designs, and practical skills. It is very applicable to operational
1075 processes where solution sets are specific to the data set and a series of primary
1076 questions.

1077

1078 The perceived value of this examination approach among actuaries is apparent from the
1079 CRUSAP survey results. In question 15 of the CRUSAP survey for actuaries (see
1080 Appendix E), 65 percent of the respondents thought that basic actuarial education was

1081 “good” (45 percent) or “excellent” (20 percent), with an additional 18 percent rating the
1082 process as “adequate.” Only 14 percent of the survey respondents thought the
1083 examinations “fair” (11 percent) or “poor” (3 percent).

1084
1085 To retain the high level of actuarial skills expected for Fellowship, more and more
1086 material is being added to the syllabus, but little is removed. The expansion of core
1087 actuarial knowledge would naturally lead to the downside of increased travel time
1088 required for attaining Fellowship. In general, the complaints against the current
1089 examination process were that travel time is too long, examinations need greater
1090 emphasis on practical considerations, too much memorization is required, the syllabus
1091 changes too frequently; stability is preferred. However, as summarized by one
1092 respondent: “Despite some criticism, I think the system is working well.”

1093
1094 **2. *The future actuary.*** The primary debate regarding examinations concerns the actuarial
1095 skill sets required of future actuaries. Actuaries who can address traditional actuarial
1096 responsibilities are still in demand. Employers want actuaries who know how to develop
1097 rates, perform reserve analysis, and provide actuarial statements of opinion.

1098
1099 Based on current known demand, many actuaries think it is unnecessary to develop the
1100 skill sets required for investment management, customer relationship management, and
1101 enterprise risk management. These skills are simply not needed in today’s actuarial
1102 environment. In addition, how does one build comprehensive examinations for an
1103 unspecified set of skills in roles with unknown demands? The thought is that actuarial
1104 organizations must focus their efforts on developing qualified actuaries to fill current
1105 positions now. The actuarial examinations and their content will evolve based on the
1106 actual demands and needs of future employers. In other words, the future will take care of
1107 itself.

1108
1109 We know that over the long term, the syllabus must change to avoid professional
1110 obsolescence. The issue is: How fast must the actuarial profession innovate? The
1111 profession needs an education system that can more rapidly respond to change and
1112 innovation. Once a paradigm shift in practice emerges, the basic education system must
1113 be able to quickly respond. For example, despite the recent additions of basic financial
1114 economics, in all our interviews with university faculty specializing in insurance issues,
1115 they consistently noted that the actuarial educational process is significantly behind in its
1116 inclusion of financial economics, which is critical to the implementation of “fair value”
1117 accounting for insurance company liabilities.

1118
1119 Much of the debate in the Morris Review regarding actuarial education centers on the
1120 balance between a static core knowledge base and actuarial innovation. Actuarial core
1121 knowledge was developed around regulatory risk metrics that 1) emphasize downside
1122 risks and 2) favor conservatism in actuarial solutions. Regulation created a static
1123 environment for the insurance industry and actuaries. Innovation occurs, but only over
1124 time. Unfortunately, such conservative approaches have also introduced a lack of
1125 transparency, maybe even lack of relevance, into actuarial work. This has become a

1126 handicap for actuaries in today's financial markets and has created opportunities for
1127 others to lead efforts aimed at innovation.

1128

1129 **3. *Narrow vs. broad scope of services.*** Can the actuarial profession afford to remain
1130 narrow in its scope of services? Should it combine its current base knowledge in
1131 modeling downside risks with models of financial risks that also contain the upside to a
1132 transaction? The trend toward principles-based regulation of insurance requires
1133 integration among actuarial, economic, and financial theories, and frameworks and
1134 principles as they relate to the strategic direction of financial institutions.

1135

1136 Many current financial and economic concepts, such as modern financial theory,
1137 economic capital, value at risk, and derivatives, have significantly changed the financial
1138 markets. The insurance industry, which has been slow to follow, is now playing catch-up.
1139 To compete in this dynamic environment, actuarial examinations should place more
1140 emphasis on education, diversifying the actuarial knowledge base, and expanding training
1141 in basic modeling techniques. Consideration should also be given to offering specialized
1142 certificates for training in specific areas, such as derivatives.

1143

1144 **4. *Fellowship skill sets.*** What does the Fellowship designation really mean? What
1145 educational basis and skills should it indicate? According to multiple surveys and
1146 discussions with individual actuaries, no one wants a decline in the quality of the
1147 Fellowship designation.

1148

1149 Actuaries too often equate the difficulty of the actuarial examinations with the quality of
1150 the Fellowship designation. A long and arduous examination process exists, but it may be
1151 excessively concerned with actuarial self-image and inadequately concerned with the
1152 quality of actuarial work. Leadership of the actuarial profession must define the meaning
1153 of Fellowship at two levels: specialist vs. generalist, and basic skills vs. skilled expert.

1154

1155 *a. Specialist vs. generalist*

1156 An educational process directed more toward training than education has led to tighter
1157 and tighter boundaries regarding acceptable approaches to core actuarial problems. As a
1158 result, differentiation between any two actuaries in their approaches to a problem may, at
1159 times, be minimal (leading from Actuarial Standards of Practice). However limiting in
1160 purpose and scope, the technical skills of the specialist have been invaluable to the
1161 historical growth and reputation of the profession. According to the CRUSAP survey,
1162 specialists tend to like the traditional system of exams, the more difficult the better.

1163

1164 While grounded in the core knowledge base, generalists' skills are often honed with
1165 experience, allowing them to differentiate among a broader set of potential business
1166 solutions at the expense of an in-depth technical response. Generalist responses in the
1167 survey tended to emphasize well-roundedness, flexibility, and the ability to think, rather
1168 than just manipulate formulas.

1169

1170 The mix of specialist and generalist within a professional organization determines the
1171 direction of the organization's examination process and content. If the demand

1172 environment shifts from one skill set to the other, will the organization membership
1173 recognize it? For example, presume a scenario where the demand is assumed to be
1174 toward specialists but future demand is actually shifting toward generalists. Students
1175 entering the profession may have specialist skills by temperament, personality type,
1176 interest, etc. Specialists will dominate the leadership and see no reason to change,
1177 regardless of the new shift to generalist skill demands. As one respondent stated: “The
1178 profession, by its testing rigor, generally attracts people who are not very good
1179 communicators and are not good advocates. So unless the educational system can reward
1180 those who do not have the deeply technical knowledge of others, it will be difficult to
1181 change the profession.”

1182
1183 The two primary actuarial examination bodies of the United States (the SOA and the
1184 CAS) have taken different approaches to this issue. The SOA’s educational system
1185 incorporates and acknowledges a wider skill diversification in its track approach in the
1186 Fellowship examinations. The CAS, on the other hand, holds to a single-track approach
1187 — skill consolidation.

1188
1189 The actuarial organizations in the United States are in the initial stages of a dilemma. It is
1190 the primary issue in the education and training of future actuaries. If an actuary’s main
1191 areas of specialization remain narrowly defined to pricing and reserving roles within the
1192 insurance and retirement industries, the current examination approach works extremely
1193 well. However, as discussed earlier, the environment in which actuaries operate is
1194 becoming more dynamic. It is increasingly important that actuaries be given the
1195 necessary skills to respond to new, emerging problems.

1196
1197 *b. Basic skills vs. skilled expert*

1198 Does being an actuary mean an end of one’s education (expert) or simply the beginning
1199 of a lifetime of learning (basic skills)? Said one survey participant: “One standard for an
1200 actuary. Anything else might look and smell like an actuary, but he/she would not be an
1201 actuary! In other words, no ‘para-actuaries.’” However, another respondent countered:
1202 “We are too caught up in wanting to test for everything an actuary might do. The goal
1203 should be a strong core education with recognition of the professional expectations to
1204 learn more on your own.”

1205
1206 Leadership of the actuarial organizations must address this issue and communicate the
1207 goals and directions of actuarial education to all stakeholders — current actuaries,
1208 students, regulators, employers, and the public. Each examining organization should
1209 clarify its education position regarding not only the skill level at Fellowship (expert vs.
1210 basic) but also the core knowledge based on today’s vs. tomorrow’s skills, academic vs.
1211 practical mix, and expected travel time.

1212
1213 *c. Efficacy and efficiency of examination process*

1214 The current examination process assumes that successful individuals demonstrate the
1215 required level of knowledge, self-education ability, self-motivation, and high intelligence.
1216 It also assumes that all individuals respond the same way to the stimuli of an examination
1217 process. Successful exam takers sometimes share common personality characteristics,

1218 which may limit diversification within the actuarial profession. In order to retain a
1219 constant flow of viable candidates, social and demographic changes might require other
1220 delivery systems to support a different generation of students. Quite simply, the old-
1221 fashioned examination process of using pencil and paper, including the newer ventures
1222 into computerized testing, no longer meets the requirements of actuarial syllabus content,
1223 nor the nature of the students sitting for the examination. For example, in testing for
1224 model simulation skills, examination constraints allow only the most superficial of
1225 questions. Other delivery mechanisms, such as seminars, as being designed by the CAS,
1226 must continue to be advanced to address technological advances and where new
1227 approaches to skill verification must be implemented.

1228
1229 There are a number of different delivery structures that can complement the educational
1230 process. These include examinations, web-based modules and/or presentations, seminars,
1231 academic papers or theses, and on-line universities. We note that both the SOA and the
1232 CAS have begun to move toward several of these delivery structures, and this Task Force
1233 agrees with this direction.

1234
1235 The attitude toward travel time depends on whether one believes Fellows need to be
1236 experts, or whether the profession needs candidates who are able to compete with other
1237 quantitative professions, such as mergers and acquisition specialists, financial engineers,
1238 chartered financial analysts, and enterprise risk management specialists.

1239
1240 **5. Globalization of actuarial skills and accreditation of actuaries.** Another of the current
1241 issues is global actuarial qualification and reciprocity. Can an actuary qualified in
1242 Australia practice in the United States? To meet this goal of mutual recognition, the
1243 profession needs a global definition of actuarial skills.

1244
1245 The International Actuarial Association (IAA) has been developing a global definition of
1246 actuarial skills. In addition, it has implemented educational guidelines that member
1247 organizations (in the United States, these organization include the Academy, ASPPA,
1248 CAS, CCA, SOA) were to have met by 2005 in order to be accredited. The two U.S.
1249 educational organizations have initiated content changes in their examination systems to
1250 meet these compliance standards.

1251
1252 The IAA accreditation process requires that an actuarial organization provide training
1253 (education) in 10 areas of study: financial mathematics, probability and mathematical
1254 statistics, economics, accounting, modeling, statistical methods, actuarial mathematics,
1255 investment and asset management, principles of actuarial management, and
1256 professionalism.

1257
1258 **6. Value proposition of Fellowship.** Too many actuaries seem to believe that the value of
1259 Fellowship centers on the singular achievement arising from success in the basic
1260 examinations. Others, however, are adamant that an actuary's intelligence and creativity
1261 generate the value. Still others realize that regulation, through statements of actuarial
1262 opinion, creates value for actuaries. Unfortunately, these definitions all derive from
1263 actuaries' self-analysis. How do employers, legislators, regulators, and the general public

1264 value actuaries? A definitive statement from the actuarial leadership is needed to develop,
1265 promote, and define the value clients place on actuarial Fellowship. The clarity of this
1266 value statement will set the educational needs for future Fellows.

1267

1268 **Conclusions**

1269

- 1270 • Regulation of the financial industry (including the insurance industry) is quickly
1271 moving from being a rules-based to a principles-based environment.
- 1272 • The static environment in which actuarial services were traditionally performed is
1273 becoming dynamic.
- 1274 • The actuarial examination process as currently structured is a training process, not
1275 an educational process.
- 1276 • Training is both efficient and effective for the transfer of a specific set of skills; it
1277 works best in a static environment with well-defined problem sets.
- 1278 • Education is less efficient, but effective for the transfer of a diversified set of
1279 skills; it works best in a dynamic environment with fuzzy problem sets.
- 1280 • While technical training remains primary, it is only a portion of the skills an
1281 actuary needs: business acumen, communication, and human relationship skills
1282 are major factors in a successful actuarial career.
- 1283 • There is increased market competition from other professions that can and do
1284 provide certain actuarial services: CPAs, MBAs, PhDs, chartered financial
1285 analysts, financial engineers, and risk managers (GARP, PRMIA).
- 1286 • There are substitutes for actuarial services arising from globalization, technical
1287 innovations, and management's attitude toward greater use of non-credentialed
1288 actuaries.
- 1289 • Examination processes produce substantial homogeneity in actuarial membership;
1290 homogeneity can impede innovation.
- 1291 • Actuarial core knowledge should be expanded to introduce new skills.

1292

1293 Boards of directors for examination organizations should:

- 1294 1. Define the value proposition to the public of Fellowship in light of more
1295 dynamic markets with respect to:
 - 1296 a. Expertise vs. experience
 - 1297 b. Competition in professional services markets
 - 1298 c. Travel time expectations
- 1299 2. Define the purpose and scope of actuarial skills that include:
 - 1300 a. Education vs. training
 - 1301 b. Education content
 - 1302 c. Consideration of IAA educational criteria
- 1303 3. Expand education system to include a combination of delivery formats:
 - 1304 a. Examinations
 - 1305 b. Seminars
 - 1306 c. Academic/papers/theses
 - 1307 d. Web-based modules/presentations
 - 1308 e. On-line education

- 1309 4. Increase the use of professional education services:
1310 a. Increased use of and improvement to learning outcome statements
1311 b. Selection of appropriate delivery format based on content design
1312
1313

1314 **Continuing Professional Education**

1315 Actuaries sell knowledge, and as a result, most display a professional commitment to stay
1316 current, maintain a position as “thought leaders” in the industry of financial risk, and
1317 expand into new future roles.
1318

1319 The survey results also highlighted how actuaries assess the current state of professional
1320 education. In question 16 of the CRUSAP survey, only 39 percent of the respondents
1321 thought that continuing actuarial education was “good” (33 percent) or “excellent” (6
1322 percent). Approximately 30 percent rated the process as “adequate,” and 28 percent of the
1323 survey respondents thought the continuing education process only “fair” (21 percent) or
1324 even “poor” (7 percent). In general, the complaints against the current continuing
1325 education process were:
1326

- 1327 • Voluntary approach to professional development credits
- 1328 • Minimal continuing education requirements
- 1329 • Inadequate delivery vehicles
- 1330 • Failure to emphasize new developments and ideas
- 1331 • Too general
1332

1333 From the survey results, the difference in attitude between basic and professional
1334 education is significant. As one respondent stated: “The continuing education doesn’t
1335 come close to the basic education...”
1336

1337 ***1. Professional development requirements.*** “Continuing education (CE) is what one
1338 makes of it,” said one survey respondent. “Some skate by, simply attending meetings
1339 without intending to walk away with much new knowledge; others learn considerably by
1340 attending to learn, or leading such a meeting.” While this comment may touch on
1341 professional ethics, most actuaries take professional development seriously and see it as
1342 an opportunity to increase their knowledge and skills. Actuaries believe that maintaining
1343 their professional competencies is critical for their individual and professional success.
1344

1345 Another survey respondent stated: “Change the focus from reviewing old topics and
1346 methods to a broader understanding of today’s fast-moving changes.” With an increased
1347 demand for professional development that arises from dynamic environments, the
1348 question arises as to the opportunity for and requirements of actuarial development after
1349 Fellowship.
1350

1351 ***a. Formal vs. informal professional development requirements***

1352 Many of the respondents think that more stringent, monitored professional development
1353 criteria must be established. This may include re-certification of actuaries for certain key
1354 actuarial services, i.e., specialists’ statements of actuarial opinions. This group of

1355 respondents believes that many do not rigorously maintain their skills or education. To
1356 ensure the reputation and status of the actuarial designation, a more formal professional
1357 development system must be designed.

1358
1359 Inadequate and informal professional development criteria lead to a lack of participation
1360 in professional development offerings. This, in turn, leads to inadequate funding for such
1361 offerings due to poor attendance and/or participation, lack of development of in-depth
1362 professional development opportunities, and deterioration of professional skills over
1363 time.

1364
1365 *b. Verification*

1366 Survey results show that future actuarial professional educational requirements need to
1367 include two components: 1) an increase in the minimum number of hours, and 2) formal
1368 verification. This would place the actuarial professional development criteria more on a
1369 par with those of other professional groups such as accountants, physicians, and lawyers.

1370
1371 *c. Right to use designation*

1372 The carrot and stick of such a formal verifiable system is the use of the professional
1373 designation. Non-compliance results in the forfeiture of the right to the designation. A
1374 typical comment on professional development was: “CE should be mandatory to retain
1375 the actuarial designation.”

1376
1377 **2. Updating of professional skills.** The primary purpose of professional education is to
1378 update skills. This includes the cross-fertilization of financial methodologies,
1379 technologies, and theories. This also includes educational presentations from outside the
1380 actuarial profession.

1381
1382 The SOA, as one example, took a substantial lead in the development of professional
1383 education when it created interest sections. Section membership adds professional
1384 strength to actuaries practicing in areas of special interest: finance, risk management, etc.
1385 It provides educational opportunities at a grass-roots level, enhancing actuarial
1386 knowledge and skill development. While led by actuaries, several of these sections have
1387 begun to reach out to other professional association groups, thereby introducing greater
1388 diversity of ideas and practice into the section. Said one survey participant: “...exposure
1389 to other disciplines would help give actuaries a better perspective on how their work fits
1390 into the larger picture.”

1391
1392 *a. Maintenance and expansion of skill sets*

1393 In a dynamic environment, the development and maintenance of technical skills are
1394 critical. A survey respondent asks for “comprehensive ‘how to’ seminars for some of the
1395 more technical areas.”

1396
1397 Beyond technical skills, professional education must fill in observed holes in the primary
1398 educational system. A typical survey respondent stated, “I’d add more non-actuarial
1399 course work to expand our areas of expertise and spur creative thought.” As actuaries
1400 advance through their careers, other proficiencies must be introduced, including ethical

1401 considerations, professional ASOPs and Precepts, management responsibilities, strategic
1402 directions, and leadership skills.

1403

1404 *b. Research and development*

1405 Professional education is not simply one way. It also entails expansion of core knowledge
1406 by creating new ideas, theories, and techniques, through research and development.

1407 Greater emphasis must be placed on new topics, such as innovations in financial market
1408 concepts or operational risk management; leadership skills including change
1409 management; communication skills; practical business issues and in-depth topical
1410 research; and discussions in such areas as stochastic modeling, internal models, etc. This
1411 can be accomplished through academic research and thought leadership in change
1412 management, operational research, risk theory and frameworks, methodologies,
1413 techniques, markets, etc.

1414

1415 Education, in the broadest sense, is inherent in most actuarial organizations' activities.
1416 For example, a critical component of the research and development activities resides with
1417 many committees, task forces, and working groups. From these activities comes an
1418 expectation of practical and theoretical advancement, actuarial service enhancements, and
1419 thought leadership. The reports from these groups should receive broad distribution and
1420 discussion. Too often they are written, accepted, and buried.

1421

1422 **3. Professional development delivery.** The SOA and CAS are only beginning to
1423 understand that not all actuaries learn in the same way. They need to fulfill members'
1424 professional education needs by providing more varied and innovative approaches. Many
1425 of the survey respondents like the traditional self-study, or even advocate additional
1426 examinations, but most respondents want more content combined with convenient,
1427 effective, and efficient delivery.

1428

1429 Survey results reveal a great desire for relevant, cutting-edge, advanced, hands-on, in-
1430 depth learning experiences offered through a series of low-cost, time-sensitive, and
1431 efficient channels.

1432

1433 The Academy, ASPPA, CAS, CCA, and SOA must all continue to assume an expanded
1434 role in the delivery of educational topics, including web-based platforms; academic
1435 sponsorship of papers, symposiums, and classes; "on-line university" education; as well
1436 as the traditional seminars and programs at annual meetings. With the ever-decreasing
1437 time allocations combined with increasing costs of travel, there is greater demand for
1438 distance-learning approaches.

1439

1440 **4. Value proposition.** To maintain and increase the value the public places on actuarial
1441 services, the intelligence, creativity, ethics, and professionalism of all actuaries must be
1442 evident throughout their careers. The number of credentialed actuaries continues to
1443 increase. Demands for actuarial skills continue to expand. With a growing membership,
1444 the profession must design a complete educational system sufficient to meet the growing
1445 demands of the post-examination professional. To accomplish these goals, adequate

1446 budgets must be established for the implementation and monitoring of professional
1447 development among actuaries.

1448

1449 **Conclusions**

- 1450 • Credentialed actuaries have significant educational needs that are not currently
1451 being met.
- 1452 • Actuarial core knowledge is expanding; professional development is required to
1453 remain current.
- 1454 • To assure actuarial competency in a dynamic environment, actuaries need to
1455 spend an adequate number of hours on professional development.
- 1456 • Professional education processes must emphasize building new skills in meeting
1457 membership needs; these processes must be timely in content, effective in
1458 delivery, convenient, and efficient.
- 1459 • Professional development will produce greater heterogeneity in skills with more
1460 diverse specialized skills among actuarial membership.
- 1461 • Continuing professional education is both a technical training process and an
1462 educational process.
- 1463 • Training must be detailed, timely, and transfer a specific skill set.
- 1464 • Education must be time efficient and effective in knowledge dissemination.
- 1465 • Competition from other professions will increase in areas where actuaries can and
1466 do provide services; competing professionals including CPAs, MBAs, PhDs,
1467 chartered financial analysts (CFAs), financial engineers (members of the
1468 International Association of Financial Engineers — IAFE), and risk managers
1469 (members of the Global Association of Risk Professionals — GARP — and the
1470 Public Risk Management Association — PRMIA).
- 1471 • There are actuarial alternatives arising from globalization of actuarial services,
1472 technical innovations, and management’s attitude toward greater use of non-
1473 credentialed actuaries.

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1475 Boards of directors for examination organizations should:

- 1476 1. Define the value proposition of Fellowship in light of:
 - 1477 a. Actuarial strengths and weaknesses
 - 1478 b. Competition in the professional services market
- 1479 2. Define the purpose and scope of professional development that include:
 - 1480 a. Enhancing the value the public places on actuaries; this is the value
1481 proposition for actuarial services
 - 1482 b. Minimum professional development credits
 - 1483 c. Education, training, and technology content
- 1484 3. Draw up budgets for professional development
 - 1485 a. Increase in budget for development and implementation of a professional
1486 development agenda
 - 1487 b. Develop joint professional training and educational activities among the
1488 actuarial organizations — minimum 50 hours annually

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- 1490 c. Develop joint professional training, and develop joint educational
- 1491 activities with universities and other professional associations (IAFE,
- 1492 GARP, PRMIA, CFA Institute)
- 1493 4. Expand education system to include a combination of delivery formats:
- 1494 a. Seminars
- 1495 b. Special interest sections
- 1496 c. Examinations
- 1497 d. Academic/papers/theses
- 1498 e. Web-based modules/presentations
- 1499 f. On-line education
- 1500 5. Increase the use of professional education services:
- 1501 a. Increased use of and improvements to learning outcome statements
- 1502 b. Selection of appropriate delivery format based on content design
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