Information Systems Analyst (ISA): A Professional Certification Based On The IS2002 Model Curriculum

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ABSTRACT

The ICCP, ICCP Education Foundation and a coalition of universities have produced an exit examination, and a new professional certification, Information Systems Analyst, based on the IS2002 Model Curriculum. The examination is also the basis for administering IS program evaluation services by a new Center for Computing Education Research.

INTRODUCTION

For nearly two decades a task force of prominent academicians has been collaborating to define the Information Systems (IS) domain for the academy by establishing an Information Systems Model Curriculum (Cougar, et.al., 1997). Multiple versions of the model curriculum have been released for consideration - the latest in 2002 (Gorgone, et.al., 2002). This work has been sponsored by the most prestigious professional societies including the Association for Computing Machinery (ACM), the Association for Information Systems (AIS) and the Association for Information Technology Professionals (AITP), and has been widely publicized and recognized as an important standard to consider in developing undergraduate bachelors level programs in the area of Information Systems (IS). While this has been a most vital contribution of seminal importance to IS education, prior to 2003 there was not an objective process in place to measure the success of an academic program in meeting the learning objectives of the model curriculum.

Predating the above - in 1962 the Data Processing Management Association (DPMA – now AITP), recognizing the need to establish industry wide standards in IS, formulated a credentialing examination and procedure for IS professionals. Other major professional societies in computer related fields recognized the need for such a professional credential, and joined the DPMA in 1973 to organize the Institute for Certification of Computing Professionals (ICCP) with a governing board consisting of representatives from the sponsoring professional associations.

Under guidance by the governing board the ICCP expanded the initial DPMA examination to an integrated set of examinations, which, in various combinations together with experience, education, and commitment to abide by a defined code of ethics, formed the basis for certifying individuals with a basic level of professional competence. The ICCP certifications have been relatively unique in the profession because they are vendor neutral, bridging a range of knowledge from specific technical skills to high level problem solving abilities. The specific examinations and certification requirements have been rigorously managed by a certification council, with periodic review and updating a necessary function to retain currency and relevance.

EXISTING ICCP EXAMINATIONS AND CERTIFICATIONS

The ICCP administers the CCP Core examination, plus eight (8) computer language examinations and sixteen (16) computer specialty examinations as of the time of writing. The exact numbers are in flux because the Institute is actively bringing new exams online to meet the needs of changing technology, and has a program for retiring exams when older technologies are no longer relevant. Existing examinations are periodically updated to keep them current.

These examinations are used in combinations together with different levels of experience and education requirements to offer several credentials for computing professionals. Examinations and certifications are explained in greater detail in (McKell, et.al., 2003). All certifications require an agreement to abide by the ICCP professional code of ethics. While the number of vendor-neutral certifications offered by the ICCP is growing, it presently includes the following:

- CCP (Certified Computing Professional) – the ICCP flagship certification requiring experience and passing 3-4 examinations at the 70% level.
- ACP (Associate Computing Professional) – an entry level certification requiring 2 examinations passed at the 50% level.
- Certified Data Management Professional (CDMP) – Practitioner and Mastery levels; Offered under sponsorship with the Data Management Association (DAMA).
- Certified Business Intelligence Professional (CBIP) – Practitioner and Mastery levels; Offered under sponsorship with The Data Warehousing Institute (TDWI).

EMERGENCE OF THE ISCORE EXAMINATION

In 2001, Lynn J. McKell organized and moderated a panel discussion at the Information Systems Educators Conference (ISECON) titled, "Individual Certification: A Complement to Program Accreditation." (McKell, 2001) Among others, included on the panel were Herbert E. Longenecker, Ph.D. (University of South Alabama) representing the IS Model Curriculum task force, and John Reynolds, Ph.D. (Grand Valley State University) representing the ICCP Certification Council. The panel addressed the issue of whether existing certification examinations could be appropriately used as a measure of student knowledge in the area of information systems and indirectly assess the efficacy of a given information systems degree program. While the panel discussion was fruitful in opening the subject for debate and discussion, its principle contribution was in stimulating a coalition of John H. Reynolds, Herbert E. Longenecker and Jeffrey P. Landry (also University of South Alabama) to study the possibility of using existing certification examinations to assess individual performance mapped against the IS Model Curriculum.

The principle object of the above study was the ICCP Core examination, required as a nucleus for all of the certifications offered by the ICCP. This study quickly identified significant gaps between the Core exam and the Model Curriculum. This was further verified in 2002 when the ICCP Certification Council mapped the ICCP Core examination against the Model Curriculum. It was concluded that rather than modify the ICCP Core, a coalition would be formed to create a new exam from scratch based on the learning units found in the IS Model Curriculum. The process for creating this examination was described in two previous papers (McKell, et. al., 2003 and Landry, et.al., 2003). Summarizing, in February 2003 a coalition of seventeen schools sent representatives to a workshop where the seminal work was accomplished for creating this exam, referred to as the ISCore exam. The workshop was co-sponsored by the ICCP and University of South Alabama College of Computing. Consistent with existing ICCP examination standards, the IS Core examination contained 110 questions: 100 graded to assess individual performance, and 10 questions under review for possible inclusion in future forms of the examination. The examination was beta tested in the spring, 2003, using students participating in the AITP National Collegiate Conference held at Purdue University and then with students at the coalition schools, primarily graduating seniors. (See ICCP, 2003). The results of this beta test were reported in a paper presented at ISECON 2003 (Reynolds, et.al., 2003).

OBJECTIVE VECTORS FOR THE ISCORE EXAMINATION

Understanding the origins of the IS 2002 Model Curriculum clarifies the importance of an assessment tool based on the related learning units. The latest version of the Model Curriculum – IS 2002 - was validated by analyzing over 3,000 employment advertisements found in a variety of printed media from various parts of the United States. Analytical methods were used to identify the skills required by students entering the work force in information systems (Landry, et.al., 2000). The Model Curriculum authors used these results to validate and/or modify learning units which would address the requirements derived from the employment data. The learning units were then mapped to a set of 38 sub-skills that were factored from this job ad research. These learning units and sub-skills then formed the basis for creating questions to populate the assessment examination.

As described above, the IS Core examination was fundamentally designed to assess student performance as measured against the learning objectives of the IS 2002 Model Curriculum. However, it is intended that the assessment examination results may be useful in addressing two related but quite different and very important objectives:

Institutional Assessment: Aggregation and analysis of multiple data points from a broad sample of students in a specific educational program permits assessment of institutional success in achieving the objectives of the Model Curriculum.

Individual Assessment: Assess individual performance to measure personal mastery of the concepts and skills espoused by the Model Curriculum.

The first of these objectives proposes aggregating and analyzing multiple data points, to (1) identify educational programmatic strengths and weaknesses, and (2) to recommend specific curricular modifications to more fully harmonize with the Model Curriculum. The second objective (1) focuses on the individual output of an educational program, (2) can naturally lead to the validation of individual capabilities, and (3) may be used as the basis for issuing an appropriate credential.

RE-THINKING THE ISCORE

In the ICCP scheme for certification exams, the examination standards specify a 100 item (question) examination. However, a careful review of the Model Curriculum reveals over 150 different Learning Units. To satisfactorily assess this many different objectives would require a test with over 600 questions! Obviously, the ISCore exam as developed in 2003 could only sample a fraction of the categories outlined by the Model Curriculum. While it is fully recognized that no exam is exhaustive, and virtually every examination is based upon sampling principles, it was concluded that the IS Core was inadequate to satisfy the objectives stated above. While the ISCore may be sufficient when used with other ICCP specialty examinations to be the basis for a high level professional certification, it was lacking in a major way the ability to address the objectives of institutional assessment. It was concluded that the ISCore would have to be expanded. To create an exit-level examination, a subset of Learning Units was selected where the level was either a 3 or 4 as defined in Appendix 4 - IS 2002 Depth of Knowledge Metrics (Gorgone, et.al., 2002). These 62 Learning Units needed to be assessed by a minimum of four questions in order to have a strong case for making recommendations to educational institutions. In addition, the 38 sub-skills that were mapped to these learning units also needed to be measured by a minimum of 4 questions. The resulting examination specification was a 258 question exam. This expansion was undertaken in the winter months of 2004 with the resulting assessment examination delivered in time for beta testing with student subjects from the coalition schools from April 1st to June 30th, 2004.

The length of the new exam presented some practical problems. Educational designers advised that college level examinees should be given at least 40 seconds to answer each question. This would require 172 minutes for the 258 question exam. Based on this formula, the new assessment exam would require a 3 hour examination time, which is twice as long as any other exam currently supported by ICCP standards. Nevertheless, the requirements imposed by

the need for comprehensive assessment to meet both objectives persuaded the governing councils to adopt the 3 hour standard for the new core examination.

A NEW CERTIFICATION: INFORMATION SYSTEMS ANALYST (ISA)

As the full ramifications for the new 258 question examination emerged, it was proposed that this examination was a sufficient assessment for credentialing an individual at an entry level certification when combined with a baccalaureate degree in a computer-related field. After careful consideration, it was unanimously concluded that this credential should not be confused by integration with some existing certification. Consequently a new certification has been developed titled, "Information Systems Analyst," (ISA). Subsequently, the 258 question core exam has been denoted as the "ISA core examination (ISACore)." To date, over 850 coalition school students at 30 institutions of higher education have taken the exam with a 46% pass rate at 50% and a 1% pass rate at 70%. Based on these initial results, the ICCP will issue the new credential with two designated certification levels: ISA Practitioner Certificate, and ISA Mastery Certificate. The primary distinction between the two levels is the candidate's performance on the ISACore exam. Those who pass at the 50% level are candidates for the ISA Practitioner Certificate; those who pass at the 70% level are candidates for the ISA Mastery Certificate. Certificate holders at the Practitioner level are encouraged to aspire to the Mastery level by re-taking and passing the ISACore examination at the 70% level. These alternatives are summarized in an ISA Certification information sheet prepared for students who took the ISACore examination in spring, 2004. (See Appendix A.)

The ISA certification is intended as an advanced entry level credential. It ranks above the ACP because of the rigorous examination and the degree requirement, but is below the CCP because there is no experience requirement, and the candidate does not need to take any specialty exams. However, as per current ICCP procedures, those who pass the ISACore examination at the Mastery level may substitute ISACore results for the ICCP Core examination when seeking the CCP certification.

RE-CERTIFICATION

All ICCP certificate holders must adhere to ICCP re-certification standards. These standards require that a minimum amount of professional development be accomplished over a three year time period. Documentation of professional development credit is periodically submitted by certificate holders to the ICCP headquarters office.

ADMINISTRATIVE STRUCTURE

The ICCP, of course, is the natural home for the ISA certification. The Institute has all mechanisms in place to administer the new ISA credential. In fact, it is already functioning in this capacity serving individuals who participated in the 2004 beta testing. However, the Institutional Assessment process is quite different. A new organizational entity, the Center for Computing Education Research (CCER) is being formed in order to deliver this service. Fortunately, industry leaders saw the need decades ago to create a complementing non-profit organization, the ICCP Education Foundation (ICCP-EF), with the specific mandate to promote educational aspects of the IS industry. The ICCP-EF will be the ideal home for the CCER and the related institutional assessment functions.

A brief example will illustrate how we envision the organizations working. Suppose State University (SU) desires to have its Information Systems (IS) program evaluated. SU would contract with the CCER which would provide ISACore examinations for SU's IS students. SU would administer the examination to end of year students at the sophomore, junior, and senior years. The CCER would process examination data and compare results with curriculum mapping data, provided by SU prior to their students taking the examination, to produce statistical reports for the institution (SU), which are helpful in reviewing the SU IS curriculum results compared with the IS 2002 Model Curriculum objectives. SU could use these reports to assist in making curriculum decisions, and perhaps in making faculty hiring decisions to strengthen areas which may need more resources. It is anticipated that CCER staff would be available to consult with member institutions (e.g. SU) and assist them to implement the changes predicated upon the CCER evaluation reports. (A further description of these services will be the subject of a different paper.) Successful students would be given an opportunity to apply for the ISA Certification immediately after the exam. The

CCER would send these applications along with summary results for all students to the ICCP who would first contact those who applied for the certification and would also market the ISA to other successful candidates who did not apply at the time of the exam. The ICCP will work with individual students to help them secure relevant certifications based upon their successful exam performance and completion of a computer related baccalaureate degree.

SUMMARY AND CONCLUSION

Though independent, a new Center for Computing Education Research and the Institute for Certification of Computing Professionals are collaborating to promote the objectives of the IS2002 Model Curriculum through a two pronged approach including (1) a package of institutional programmatic evaluation services, and (2) a new vendor-neutral certification for individuals who demonstrate competence consistent with the Model Curriculum. Both of these elements are predicated upon a new outcome assessment examination administered to students in computer related educational programs at the baccalaureate level. The programmatic evaluation services are available through institutional contract with the CCER. Students of such programs who successfully pass the assessment examination are candidates for receiving the professional level certification, "Information Systems Analyst (ISA)," administered by the ICCP. Eligible institutions and individuals are encouraged to pursue these opportunities in order to establish and promote consistent standards and greater professionalism in information systems related industries.

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APPENDIX A - ISA INFORMATION SHEET

CERTIFICATION

for the College Graduate

Information Systems Analyst(ISA)

ISA Certification Criteria

The IS Assessment exam must be passed with the following scores:

Score	Credential Earned
Pass at 50% or higher	ISA Practitioner Certificate
Pass at 70% or higher	ISA Mastery Certificate

The ISA Practitioner certification is awarded to graduates who scored above 50% on the IS Assessment exam.

The ISA Mastery certification is awarded to graduates who scored 70% or higher on the IS Assessment exam. Exams may be retaken to improve your score and go from the Practitioner to the Mastery certificate level. You may receive credit for the CCP Core exam when the IS Assessment exam is passed at the Mastery level. ISA certificate holders will be required to be in the ICCP Recertification Program.

Additional ISA Certification Criteria

The following criteria must also be met in order to obtain a ISA: The ICCP would require transcript evidence of earning a baccalaureate degree in a computing related field. There would not, however, be any requirement for professional experience, as is the case with the current CCP designator, so this would be an entry level certification, but positioned above the ACP.

MEETING THE CHALLENGE

…[Some Material Deleted]…

Through certification, you earn benefits which include:

- A practical means of assessing your skills and expertise
- Participation in the Recertification program, designed to maintain your competence in the ever-changing information technology field
- Help in your career advancement and compensation
- The satisfaction of measuring yourself against the highest industry standards
- Membership in a distinctive peer group made up of your fellow professionals
- The knowledge that you adhere to the Code of Ethics and Standard of Conduct

ICCP, founded in 1973, is dedicated to the establishment of the professional standards in the Information Processing industry. We promote this goal, along with 27 of our national and international professional computing societies, by offering the most widely recognized non-vendor-specific certification examinations in the profession.

Institute for Certification of Computing Professionals and CCER-Division of the ICCP Education Foundation

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