Entry-Level Associate Degree Education in Health Information Management: Reform for the 21st Century

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Acknowledgements

The AOE wishes to acknowledge and thank the many individuals who provided valuable advice and input in the development of the ***"Health Information Technology Model Curriculum 1995"***. Special thanks are extended to the AHIMA Board of Directors for financially supporting the project, AHIMA staff support personnel, Shirley Eichenwald, past AHIMA Education Director and to the following:

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Preamble

Over the last five years the American Health Information Management Association (AHIMA) has been engaged in a number of activities related to educational reform in the profession.[1] The AHIMA recognizes that advances in information technology, the changing healthcare marketplace and the demand for practitioners who are capable of assuming additional higher-level skills, necessitates curriculum reform within the profession. Curriculum reform may mean extensive change for some academic programs. Or, it may mean programs reorganize, restructure or simply do better some of the things that they already are doing.[2]

The Board of Directors (BOD) of the AHIMA commissioned the Assembly on Education (AOE) to look at curriculum reform in the profession and to develop curriculum models for associate, baccalaureate and masters degree levels of professional education in health information management (HIM). In addition, the AOE was commissioned to develop resource products to assist in curriculum development efforts. In 1994, six workgroups were formed to begin work on the model curriculum. Products of their efforts were subsequently validated by the 1994 AOE Symposium participants and used as a basis for further curriculum development activity by the 1995 AOE Curriculum Project Workgroup. The goal of the Workgroup was to produce curriculum models that provide direction in the design of HIM curriculum. This document is the product of the Curriculum Project Workgroup's efforts in regard to associate degree education in health information technology (HIT).

Introduction

In designing the curriculum model, the Workgroup reviewed a variety of reports and studies related to educational reform,[3,4,5] the future of allied health education,[6,7,8,9] previous HIM educational initiatives,[10,11,12,] and other professional associations' curriculum projects.[13,14,15] The Workgroup reflected carefully on the key issues raised by these documents and concluded that HIM professional education must meet the needs of a continuously changing environment while requiring a rigorous course of study to prepare graduates for diversified practice in the health care industry.

The Workgroup recognized that there is an increasing desire to educate students in life skills (i.e., critical thinking, problem solving, literacy, etc.) as well as professional skills. The life and professional skills are seen as mandatory in order for graduates to assume the role of life-long learners who are capable of functioning in a technologically advanced and changing work environment. Graduates must be innovative and adaptable critical thinkers and problem solvers who are capable of using available services and technologies to support the operations, management and decision making within an enterprise.

To assist students in acquiring the skills necessary to function in this work environment, the Workgroup sought to present a curriculum model that would 1) address the evolving professional skills of associate degree students, 2) emphasize the life skills necessary to function in a changing environment, and 3) address the educational strategies necessary for educating self-directed learners. The model provides a benchmark for entry-level associate degree education in HIM. Implicit in the design of the model is its flexibility as it relates to individual programmatic goals and standards and communities of interest. The model should be used as a guide to modernize, update or revise curricula as needed. It is intended to be used in concert with the ongoing professional roles and functions studies conducted by the AHIMA and the Essentials for an

Accredited Educational Program for the Health Information Technician. The contents of the model should be viewed as a ***complement*** to these documents.

The remainder of this document discusses the curriculum model. It concludes with a discussion of the issues of core curriculum and multiskilling in allied health. The model is divided into the following sections.

- Mission of HIM Education
- HIM Practice Definition
- Occupational Title
- Task Responsibilities
- Uniqueness of Associate Degree Curriculum
- Transcurricular Content and Outcomes
- Curricular Content and Competency Levels
- Clinical Experience
- Sample Curriculum Format
- Educational Strategies and Assessment
- Staffing Levels and Faculty Qualifications
- Computer Laboratory

Curriculum Model

Mission of Health Information Management Education

A mission statement serves as a general framework within which an organization can establish certain policies, objectives and/or guidelines. The Workgroup developed a general mission statement of HIM education for faculty to use as a guide, and for society in general to understand the profession's responsibility to professional education and research. Although academic programs may formulate their own mission statements, it is understood that curricula will be structured in the spirit of the HIM educational mission with necessary adjustments made to accommodate the respective educational degree levels and communities of interest.

Health information management education is responsible for preparing confident, innovative and contributing professionals who can identify and use a variety of information resources and technologies to accomplish the objectives of diverse practice environments. It provides students with the knowledge and skills necessary to become self-directed learners who possess critical-thinking and problem-solving abilities, as well as communication and interpersonal skills. It instills a commitment to life-long learning, and important ethical values. The educational process fosters the acquisition of leadership abilities and systems thinking necessary for adapting careers within a changing health care environment. As practitioners, graduates will serve society and the profession through collaborative practice, innovative teaching, and the generation and application of new knowledge about health information management.

Health Information Management Practice Definition

Health information management represents a continuum of practice concerned with health related information and the management of systems to collect, store, process, retrieve, analyze, disseminate and communicate information related to the research, planning, provision, financing and evaluation of health care services.

Occupational Title

Graduates of associate degree educational programs are known as health information technicians. Entry-level health information technicians may be employed in a variety of settings, and they may assume a variety of job titles depending upon their education, work experience and place of employment. Common job titles held by health information technicians in today's job market include coder, medical record technician, abstractor, supervisor, transcriptionist, etc. It is anticipated that job titles will change as healthcare enterprises expand their reliance on information systems and technology. Health information technicians have, and will continue to hold, positions that support efforts toward the development of computer-based patient record systems and a national health information infrastructure. Presently, opportunities for practice are found in numerous settings such as acute care general hospitals, managed care organizations, physician office practices, long term care facilities, home healthcare agencies, corrections facilities, behavioral healthcare organizations, insurance companies, ambulatory settings, state and federal healthcare agencies, etc. Practice opportunities are unlimited.

Task Responsibilities

The tasks or functions performed by health information technicians are numerous and continually changing within the work environment. The job title and work setting will dictate the actual tasks performed by the health information technician. However, in general, these individuals perform tasks related to the use, analysis, validation, presentation, abstracting, coding, storage, security, retrieval, quality measurement and control of health care data regardless of the physical medium in which the information is maintained. Their task responsibilities may also include supervising personnel.

Uniqueness of the Associate Degree Curriculum

The uniqueness of associate degree education for health information technicians is found in the environment in which the curriculum is taught, the employment setting of its graduates and the blending of course work which comprises health information technology. The associate degree curriculum represents a synthesis of curricular content drawn from general education, principles of supervision and information technology, coupled with a unique understanding of the biomedical sciences, health data content and uses, and health data classification and reimbursement systems. It is important to note that while the associate and baccalaureate curricula share common curricular foundations, they seek to accomplish significantly different outcomes, particularly with respect to the background in information technologies, statistics, and strategic organizational information resources management. The expertise of the associate degree graduate lies in the application of information technologies to support healthcare information operations. The expertise of the baccalaureate degree graduate lies in the interpretation, analysis, and design of information systems, and management of healthcare information resources and services.

Transcurricular Content and Outcomes

Over the last ten years significant attention has been paid to the integration of liberal arts and professional education studies as a way of educating a workforce that is prepared to meet the needs of a changing, high performance work environment. The work of the University of Michigan's Professional Preparation Network Project[16] suggests that professional education programs should be educating students who can demonstrate the following competencies upon graduation:

- Conceptual Competence: Understanding the theoretical foundations of the profession.
- Technical Competence: Ability to perform skills required of the profession.
- Integrative Competence: Ability to meld theory and skills in the practice setting.
- Career Marketability: Becoming marketable due to acquired education and training.

In addition, the Network Project identified eight educational outcomes that are common with liberal arts education (see Appendix A). Based on these outcomes and the dynamic changes taking place within the profession, the Curriculum Workgroup identified specific educational outcomes that were felt to exemplify the well-educated health information technician of today and tomorrow. Faculty are encouraged to design curricula to produce graduates who are:

- Confident in professional knowledge and skills, and project that confidence in professional interactions.
- Adaptable to change and capable of reflecting on the relevant aspects of practice and the opportunities and constraints found in a variety of environments.
- Service-oriented and responsible for collaborating with other healthcare professionals to accomplish the goals or objectives of the organization.
- Capable of critical thinking and able to integrate information and knowledge to solve problems.
- Communicative and able to relate to patients, providers, customers, and other healthcare professionals.
- Self-directed in learning and committed to learning throughout life, recognizing that life-long learning is mandatory for the maintenance of professional expertise.

- Ethical and able to understand ethical implications and choose an appropriate course of action.
- Open to sharing knowledge with other healthcare professionals to influence the development of solutions to health information practice issues.

Curricular Content

The associate degree curriculum emphasizes the technical component of providing a variety of health information services. The curriculum is designed to prepare entry-level graduates with the knowledge and skills necessary to use, analyze, present, abstract, code, store and/or retrieve health care data for the support of enterprise operations, and clinical and business decision making in healthcare, or related organizations.

The curricular content was identified through a series of activities which included a review of the literature and input from practitioners, faculty, and other interested individuals through envisioning forums and workgroup meetings.[17] In 1994, six AOE workgroups identified tasks and developed knowledge clusters and units which were validated by participants at the 1994 AOE Symposium and the AHIMA Annual Convention. Data from these workgroups and subsequent validation efforts were used by the Project Workgroup to design the curricular content of the model. The model in general, along with the curricular content, has been widely disseminated and presented and discussed at numerous educational and professional meetings. The Workgroup identified and included relevant modifications to the curricular content and model based on the responses received through these activities.

The recommended curricular content is comprised of general and professional education requirements. The integration of these requirements is imperative to the development of professional attributes necessary to function in a rapidly changing environment and high performance workplace.

General Education

For the purpose of this report, general education is defined as those courses which students are required to complete outside of the professional major which foster the skills necessary to function as responsible adults and contributing members of society. Professional education is defined as those courses students are required to complete to develop specialized knowledge and skills in a chosen field.[18] Figure 1 displays the recommended general education requirements for the health information technology associate degree curriculum.

Figure 1: General Education Requirements for Health Information Technology Curriculum

Intent: To prepare practitioners who are capable of understanding society and their roles in it. General education elements should be interspersed throughout the curriculum in an effort to enhance the educational outcomes expected of program graduates. General education should include, but is not limited to the following:

- Oral and written communication skills
- Social Sciences/Behavioral Sciences
- Humanities
- General Sciences
- Mathematics
- Computer literacy
  - Hardware, software, operating systems, file structure
- Microcomputer applications
  - Word processing
  - Spreadsheets
  - Database
  - Graphics and presentation

Professional Education

The professional education requirements are comprised of 10 ***knowledge clusters*** which represent broad domains of content. The knowledge clusters are further defined by ***knowledge units*** which represent more detailed content areas within the clusters. The recommended content areas do not equate to specific courses but represent a continuum of practice with the depth and breadth of the clusters and units varying by institutional prerogative, community of interest and the marketplace for health information technicians. A schematic view of the model curriculum is found in Figure 2. The model denotes a hierarchical process that evolves from basic general education requirements to practice expectations, all of which help to build the attributes necessary to achieve the educational outcomes previously discussed.

Figure 2: Health Information Technology Model Curriculum 1995

As mentioned, the knowledge clusters have been further defined by knowledge units. For curriculum development purposes, each of the units has been assigned a suggested competency level which the Workgroup felt best indicates the extent of knowledge and expertise that should be developed in students. But each program should assign competency levels based on its own marketplace and community of interest. The scale used to define the competency levels was adapted from Longenecker, et al.[19], and is found in Figure 3. The recommended curricular content as defined by knowledge clusters and units along with the competency level assignments is found in Figure 4.

Figure 3: Competency Levels

1 = Awareness	Introductory recall and recognition
2 = Literacy	Knowledge of framework and contents
3 = Concept	Comprehension, translation, extrapolation and interpretation of meaning
4 = Detailed Understanding	Appropriate application of knowledge in a structured or controlled context
5 = Skilled Use	Application using analysis, synthesis, and evaluation in new situations

Clinical Experience

Students must be given the opportunity to practice the skills learned within the didactic curriculum. Experiential opportunities should allow students to relate the functional and theoretical components of the HIT course content and the development of critical thinking and problem solving skills to realistic practice situations. Clinical practice may be included in the curriculum as separate courses, incorporated within courses and/or developed as simulated clinical practice modules.

Sample Curriculum Format

Figure 5 provides a sample curriculum format based on a semester hour designation. The sample curriculum format is offered as an ***example*** only and should be viewed as such. When designing a curriculum, sequencing of courses should follow a logical progression of course content recognizing curricular constraints of individual institutions (i.e. general education requirements and minimum credit hours for graduation). It is advisable that Anatomy and Physiology, Medical Terminology, Pathophysiology and Pharmacology precede or be provided concurrently with coding instruction. Health Data Content and Structure should also precede advanced concepts such as Legal/Ethical Issues, Quality Assessment, and Healthcare Statistics. The total hours in a curriculum are predicated on the need to provide students with a sound program leading to achievement of entry-level competencies which takes place within two academic years.

Figure 5: Sample Curriculum for Health Information Technology

Year One		Year Two	
First Semester		**First Semester**	
3	Medical Terminology	3	Pathophysiology
4	Anatomy and Physiology	4	Clinical Classification Systems
4	Health Data Content and Structure	2	Legal/Ethical Aspects
3	Microcomputer Applications	3	Clinical Practice
3	English Composition	3	General Education
17	semester hours	15	semester hours
Second Semester		**Second Semester**	
3	Healthcare Delivery Systems	4	Reimbursement Methodologies
4	Anatomy and Physiology	2	Organization and Supervision
3	Computers in Health Care	2	Quality Assessment
2	Pharmacology	3	Clinical Practice
2	Healthcare Statistics	3	General Education
3	General Education		
15	semester hours	14	semester hours

Educational Strategies and Assessment

The Curriculum Workgroup recognized that to educate students for a future characterized by change and increased dependency on information and technology, the curriculum must enable students to learn to think rationally and creatively, solve problems, manage and retrieve information, communicate effectively and continuously learn.[20] Curricula should be structured in such a manner that students become active life-long learners who are capable of creating their own knowledge after interacting with information from a variety of resources, (i.e., printed material, electronic databases, laser videodiscs, etc.). It is important for students to become information literate and to acquire the skills necessary to solve problems. For example, the Wisconsin Educational Media Association offers a concise guide on information problem-solving skills that faculty may find helpful in designing student activities (see Appendix B).

Teachers or faculty must serve as facilitators or coaches and help direct students toward the attainment of skills that will make them self-directed learners. It is recommended that faculty move away from a reliance on lecturing and foster a more case-based or problem-based approach to curriculum design. This calls for the development and use of case studies, simulations, discussion lessons, paper writing and rewriting exercises and frequent oral presentations. Faculty should focus on concepts and strategies that enhance the students' ability to analyze situations and to form and defend opinions.

Student performance should be assessed through examinations and other assessment measures that test the student's ability to critically think and problem solve. These measures should also be used as a form of self-assessment for the student as he or she progresses through the program. When areas of improvement are identified, the student and faculty should collaboratively identify strategies for individual student mastery.

The Curriculum Workgroup believes that use of the above- mentioned educational strategies and assessment methodologies will facilitate the educating of students who are capable of achieving the educational outcomes as described in this report.

Staffing Levels and Faculty Qualifications

a. Faculty

Effective implementation and maintenance of an associate degree program requires adequate faculty and staff resource levels. The changing nature of the healthcare environment, diversity of practice settings, expanding scope of practice and demands for educating a more self-directed learner require that faculty continually adjust and revise the curriculum to meet the needs of the marketplace. Associate degree programs must be staffed with more than one full-time faculty member.

Additional faculty and staff are necessary to meet the challenges of a dynamic, rapidly changing knowledge base within the profession.

It is recommended that a minimum of one full-time program director, and the equivalent of two full-time faculty members, be assigned to the associate degree program. It is the belief of the Workgroup that one individual cannot provide the scope of expertise, stability, continuity and teaching excellence needed to adequately educate students in today's environment. This recommendation is based on the assumption that faculty are responsible for at least two to three course preparations per term and that the courses are taught once a year. It also assumes that the program director will have a lighter teaching load than faculty due to the director's administrative and leadership responsibilities as related to the program and curriculum development. In addition, faculty resources may be adjusted depending on the institution's commitment to teaching, research and community service.

Programs may wish to configure faculty resources based on a collaborative matrix design that relies on faculty from other academic units to teach within the program, based upon their area of expertise. If this activity occurs, the program director must retain overall responsibility for assuring that the course content remains relevant to the overall mission of the curriculum. The qualifications of the program director and faculty should ensure that course content is adequately covered by faculty with the appropriate teaching expertise for the content under study.

The program must have a program director who is responsible for overall administrative activities of the program including curriculum design and development. The program director's administrative responsibilities are such that it is recommended that the teaching load for this individual not exceed the equivalent of one (1) three credit course per semester. The qualifications of the program director should include the following:

1) Master's degree;
2) AHIMA certification (HIT, HIA);
3) Expertise in content area taught; and,
4) Knowledge of curriculum design and educational strategies.

Program faculty qualifications should include the following:

1) Master's degree;
2) Expertise in the content area taught; and,
3) Knowledge of curriculum design and educational strategies.

Part-time faculty should have the qualifications appropriate to their teaching assignments and their work should be evaluated systematically and in the same manner as full-time faculty. Part-time faculty must participate in faculty activities, such as advising students, planning curriculum changes and interacting with faculty from other disciplines. Caution should be exercised when using part-time faculty to cover departmental workload. Excessive reliance on part-time faculty to present a curriculum risks excessive fragmentation and lack of coordination.

b. Support Staff

Secretarial support staff equivalent to at least one full-time individual must be provided to the program. In addition, rapid advances in information technology and the use of this technology in the HIM profession may require that academic programs have a dedicated computer laboratory. A laboratory assistant is needed to maintain the integrity of the laboratory's hardware and software configuration. This individual should provide technical assistance to the program faculty and may serve as a teaching assistant to the students if appropriate.

Computer Laboratory

The purpose of the computer laboratory is to 1) provide state-of-the-art training and a technological knowledge base, 2) expose students to a variety of technology, and, 3) allow students to interact successfully in a technological environment. A laboratory is integral to the work of the students and to their achievement of the knowledge needed for practice. The laboratory must serve as a source of simulation activity for procedures related to the design, use, analysis, coding, presentation, storage and retrieval of healthcare data in manual or electronic form. A dedicated computer laboratory is recommended to provide consistent and dependable access to information technology. However, with increasing technological advances, there are many alternatives for providing sufficient and dependable computer access. The networked laboratory facilitates teaching activities, software expansion needs and access to a central data repository. The program will need to acquire a number of general and HIM related software applications (i.e., encoders, groupers, cancer databases, master patient index, etc.) that can require significant amounts of CPU and peripheral device capacity.

Laboratory exercises should provide for computer experience in HIM functional areas as well as in many basic computer applications. Exercises should be developed that emphasize the acquisition of skills related to the use of electronic tools to solve problems and make decisions. Students must learn to collect, integrate, analyze, disseminate and translate vast amounts of data into usable information for patient care, financial, legal, administrative, quality management, case management, outcomes research, planning and other purposes.

It is important that the program have a plan for the continuous development and upgrading of the laboratory in order to remain current with technology and applications necessary to educate students for today's and tomorrow's needs. A list of recommended general and HIM related software applications are found in Figures 6 and 7 respectively. Students must have access to such software in order to successfully compete in the marketplace.

Figure 6: Examples of Basic Educational Software Applications

Applications	Vendors	Example of Use
Word processing	WordPerfect	Reports, papers, etc.
	MicroSoft Word*	Forms design, transcription
Medical speller	Stedman's Medical Dictionary	
Databases	Dbase	
	Paradox	MPI and other databases
	MicroSoft Access	Abstracting
Spreadsheet	Lotus for Windows	
	QuattroPro	Budgets
	MicroSoft Excel	Statistics
Graphics	QuattroPro	
	Lotus	Quality improvement reporting
	Harvard Graphics	Statistics
		Data presentations
Flowcharts, etc.	Visio	
	AllClear	Quality improvement tools
		Flow charts, diagrams
Other applications	Department layout programs	
	Calendar/scheduling	Floor plans, work flow
	E-mail	Personal time management
	Internet	Correspond with faculty, others
	MicroSoft Visual Basic	Access information
	MicroSoft Project	Programming language
	S/Designer	Project management
	Case Tool	Data modeling

*Programming suites such as MicroSoft Office may be useful (Word, Access, Excel, PowerPoint, Visual Basic, Mail)

Figure 7: Examples of HIM Educational Software Applications

Applications *	Vendors	Example of Use
Encoder	3M Coding Software	Coding exercises
	CodeMaster	Coding from records
	Coders Bookshelf	Verification of coding exercises
	Medicus	Compare & contrast multiple systems
Coding Instruction	EduCode (MC Strategies)	Computer-aided instruction
	Coding Tutor	
Grouper	3M	
	CodeMaster	Sequencing of diagnoses
	Medicus	DRG assignment
		Optimization
		Case mix exercises
Terminology	EduCode	Computer-aided instruction
Chart Abstractor	3M	Abstract and retrieve data
		Format/generate/evaluate reports/indices
		Compile & analyze statistics
Chart Completion	SoftMed	Deficiency analysis, report generation
	3M	Physician Notification
		Analyze & evaluate process
Chart Tracking	SoftMed	Generate reports, track data
Tumor Registry	CansurNet	Abstract/retrieve/generate reports
	Oncolog	Requires $500 training course
Correspondence	SoftMed	Release of information exercises, reports
Birth Certificates	Certificate Manager	Data collection exercises

* The above applications do not have to be purchased from a vendor. They can be designed in-house using general software. Students may receive practice using software at clinical sites.

An example of the hardware and software needs for configuring a dedicated network laboratory to serve 20 students is found in Appendix C. The cost for the hardware and software represents 1995 dollars with academic discounts included. The list is provided as an indication of the potential cost for establishing a computer laboratory. Brand names are included for comparison purposes ***only***. There are many alternative products on the market. However, hardware should be purchased that can accommodate the technical requirements of software. Programs are encouraged to seek academic discounts when purchasing both hardware and software applications to help defray costs. Leasing may also be an option.

Core Curriculum and Multiskilling in Allied Health

In the last five years the Pew Health Professions Commission and the National Commission on Allied Health have engaged in a number of studies which have addressed the issue of the future of allied health manpower in healthcare delivery.[21,22] Both groups have noted the continuing explosion of medical and health information and the resulting need for improved information management to support quality care and evaluation. These groups have emphasized the need for allied health practitioners to apply research skills in outcomes assessment and to be supported by information systems. The model health information technology curriculum presented here supports the healthcare delivery systems' need for skilled practitioners in data administration and information. Additionally, components of the curriculum can be used by other disciplines to develop or enhance their students' information management skills. Health information technology faculty should be prepared to provide expertise and support to other allied health disciplines' faculties in developing requisite information technology skills.

Recently, conferences related to core curriculum development and multiskilling of allied health professionals have taken place to discuss ways of better preparing allied health professionals for the rapidly changing, more generalist-oriented healthcare environment of the future. A suggested list of core curriculum has been identified as follows:

- Medical Terminology
- Ethics
- Medical/legal Aspects
- Basic Computer Skills
- Healthcare Delivery
- Pathology
- Anatomy and Physiology

- Basic Emergency Care and Cardiopulmonary Resuscitation
- Patient Assessment and Examination
- Patient Education
- Patient Care Skills
- Diagnostics
- Universal Precautions

A comparison of the above core curriculum with the recommended curricular content for the associate degree health information technician reveals that at least the first seven of the core curriculum areas are found in the recommended curricular content. In fact this curricular content has been required in health information technician programs for over ten years.

In regard to multiskilling, the Workgroup feels that the suggested curricular content lends itself to multiskilling opportunities for health information technicians. If warranted by the program's community of interest, students could acquire additional course content in diagnostic or therapeutic skills if necessary. However, the Workgroup advocates instead that multiskilling of health information technology students focus on roles that are related to the handling or managing of information. Of most importance, faculty should follow an educational process that assists students in becoming self-directed learners who are

capable of acquiring additional job skills if necessary.

Conclusion

Rapid changes within the healthcare environment coupled with changing organizational cultures and practice applications in the HIM profession require that associate degree programs design curricula that can prepare graduates for a future of technological innovations and change. The model curriculum put forth in this document is designed to serve as a guide to existing and future academic programs that must develop, revise and/or evaluate curriculum to meet the needs of an information-intensive society. The model discusses the course content that should be offered to students, the strategies necessary to deliver the content and the resources that should be available to successfully operate an academic program of this kind. The curriculum model is dynamic and it serves to provide direction in designing curricula, revising essentials and developing certification examinations to meet the challenges of today and the 21st century in health information technology.

Glossary of Terms

Case-based learning - an educational strategy designed to emphasize problem solving and decision making skills.

Competency level - extent of abilities that should be developed in students.

Computer literacy - understanding of, and ability to use software applications as related to computer technology.

Data - factual information used as a basis for reasoning, discussion, and calculation.

Data literacy - ability to understand data and its symbolic representation, interpret or give meaning to data and take action as a result of this understanding.

Educational outcome - the behaviors, attitudes, attributes expected from students that follow as a result or consequence of the educational process.

Enterprise - unit of economic organization or activity, i.e., business organization.

Entry-level - term used to refer to students who are entering the profession after having successfully completed a course of study from either an associate degree level or baccalaureate degree level program in health information management.

General education - courses which students are required to complete outside of their professional major which foster the skills necessary to function as a responsible adult and contributing member of society

Healthcare information infrastructure - the underlying framework or foundation of information systems within healthcare.

Health information administrator - an individual who has graduated from a baccalaureate degree program in health information management and who performs tasks related to the management of health information and the systems used to collect, store, retrieve, disseminate and communicate that information regardless of the physical medium in which the information is maintained.

Health information management - A continuum of practice concerned with health related information and the management of systems to collect, store, process, retrieve, analyze, disseminate and communicate information related to research, planning, provision, and evaluation of healthcare services; also refers to professional

curriculum at the associate, baccalaureate and graduate levels.

Health information technician - an individual who has graduated from an associate degree program in health information management and who performs tasks related to the use, analysis, presentation, abstracting, coding, storage and retrieval of healthcare data in manual or electronic form.

Information - meaningful aggregation of data or knowledge which can be evaluated for a specific use or set of uses.

Information literacy - ability to recognize when information is needed and have the ability to locate, evaluate and use information effectively when appropriate.

Knowledge cluster - a broad domain of practice.

Knowledge unit - detailed content area within a cluster.

Problem-based learning - teaching-learning strategy designed to emphasize problem solving and self-directed study skills, stresses what knowledge students learn and how that knowledge is acquired. Uses group process where students are confronted with a problem, they engage in independent study by investigating various aspects of problem, then come together along with a facilitator to share and discuss with others and receive feedback, ask additional questions, etc., until problem is solved.

Professional education - courses students are required to complete to develop specialized knowledge and skills in a chosen field.

Resource-based learning - learning which results from using multiple resources.

Self-directed learning - students are in charge of own learning and move at their own pace to acquire knowledge from multiple resources.

Transcurricular content - content taught throughout the curriculum to achieve educational outcomes such as critical-thinking, problem-solving, communication skills, etc.

References

1. Brodnik, M. and McCain, M. "The Road to Educational Reform in Health Information Management," *JAHIMA* 65, No. 1 (January 1994): 22-28.

2. Purcell, J. "Challenges of Reforming Education," *T.H.E. Journal AUTODESK, Inc., Supplement* (October 1992): 2-5.

3. Stark, J. and Lowther, M. "Strengthening the Ties that Bind--Integrating Undergraduate Liberal and Professional Study," Report of the Professional Preparation Network, The University of Michigan, Ann Arbor, MI, 1988.

4. *Integrity in the College Curriculum: A Report to the Academic Community,* Association of American Colleges, 1985.

5. *National Health Care Skill Standards,* Far West Laboratory for Educational Research and Development, San Francisco, CA, 1994.

6. *Healthy America: Practitioners for 2005*, Pew Health Professions Commission, San Francisco, CA, 1991.

7. *Healthy America: Health Professions Education*, Pew Health Professions Commission, San Francisco, CA, 1993.

8. Finocchio, L. and Johnson, C. "Core Curriculum in Allied Health Education: Controversy, Consensus and the Continuing Conundrum," Pew Health Professions Commission, San Francisco, CA, January 1995.

9. Makely, S. "Overview: Multiskilling and the Allied Health Workforce," National Conference on Multiskilling and the Allied Health Workforce sponsored by Health Resources and Services Administration, Bureau of Health Professions, Washington, D.C., November/December 1994.

10. Borges, E. "Overcoming Historical and Organizational Legacies: AHIMA Poises to Lead," *Topics in Health Information Management*, 15, No. 3 (February 1995): 29-38.

11. Summary Report of the HIM Curriculum Project Workgroups, Assembly on Education, AHIMA, Chicago, IL, April 1994.

12. Brodnik, M. "Statistical Validation of Knowledge Clusters, Units, Task Statements and Professional Definition," Assembly on Education, AHIMA, Chicago, IL, October, 1994.

13. Commission to Implement Change in Pharmaceutical Education, "Entry-Level Education in Pharmacy: A Commitment to Change," American Association of Colleges of Pharmacy, Alexandria, VA, 1991.

14. Nunamaker, J., Gouger, J., Davis, G. "Information Systems Curriculum Recommendations for the 80s: Undergraduate and Graduate Programs," *Communications of the ACM*, 25, No. 11 (November, 1982): 781-805.

15. Longenecker, H. and Feinstein, D. (eds.) "IS 90: The Data Processing Management Association Model Curriculum for a Four Year Undergraduate Degree", Curriculum Task Force, Data Processing Management Association, 1990.

16. Stark, J. and Lowther, M. "Strengthening the Ties that Bind--Integrating Undergraduate Liberal and Professional Study," Report of the Professional Preparation Network, The University of Michigan, Ann Arbor, MI, 1988.

17. Brodnik, M. and McCain, M. "The Road to Educational Reform in Health Information Management," *JAHIMA* 65, No. 1 (January 1994): 22-28.

18. Arlton, D., Ernst, M., Sunderwirith, S., "General Education in the Professional Curriculum: Faculty Perceptions of Contributions," *Journal of Allied Health*, (Winter, 1990): 49-57.

19. Longenecker, H., Feinstein, D., Couger, J., Davis, G. and Gorgon, J. "Information Systems '95: A Summary of the Collaborative IS Curriculum Specification of the Joint DPMA, ACM, AIS Task Force", *Journal of Information Systems Education*, 6, No. 4, (Winter 1994-95): 174-184.

20. "Information Literacy: A Position Paper on Information Problem Solving," Wisconsin Educational Media Association, Eau Claire Wisconsin, 1993.

21. Finocchio, L. and Johnson, C. "Core Curriculum in Allied Health Education: Controversy, Consensus and the Continuing Conundrum," Pew Health Professions Commission, San Francisco, CA, January 1995.

22. "Report of the National Commission on Allied Health," U. S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Bureau of Health Professions, Division of Associated, Dental, and Public Health Professions, Rockville, MD, 1995.

Appendix A
Outcomes Considered Important by Educators in Eight Undergraduate Professional Fields

1.	**Communication Competence**	The graduate can read, write, speak and listen and use these processes effectively to acquire, develop, and convey ideas and information.
	Comment:	Reading, writing, speaking and listening are skills essential to professional practice and to continued professional growth as well as to informed citizenry and continued personal growth.
2.	**Critical Thinking**	The graduate examines issues rationally, logically and coherently.
	Comment:	Although critical thinking is a universally desired educational outcome, professionals particularly need a repertoire of thinking strategies that will enable them to acquire, evaluate and synthesize information and knowledge. Since much professional practice is problematical, students need to develop analytical skills to make decisions in both familiar and unfamiliar circumstances.
3.	**Contextual Competence**	The graduate has an understanding of the societal context (environment) in which the profession is practiced.
	Comment:	The capability to adopt multiple perspectives allows the graduate to comprehend the complex interdependence between the professional and society. An enlarged understanding of the world and the ability to make judgments in light of historical, social, economic, scientific and political realities is demanded of the professional as well as the citizen.
4.	**Aesthetic Sensibility**	The graduate will have an enhanced aesthetic awareness of arts and human behavior for both personal enrichment and application in enhancement of the profession.
	Comment:	Sensitivity to relationships among the arts, the natural environment and human concerns epitomizes aesthetic awareness. Through learning to approach life as an aesthetic experience and by viewing work as an act of aesthetic judgment, professionals can more effectively assess and understand the world and their roles within it.
5.	**Professional Identity**	The graduate acknowledges and is concerned for improving the knowledge, skills and values of the profession.
	Comment:	Professional identity both parallels and supplements the liberal education goals of developing a sense of personal identity. The sense of personal worth and self-confidence that develops from experiencing success in professional practice, often includes a contributing or altruistic relationship with clients, is an effective vehicle for gaining a sense of one's place in the world as an individual and citizen.

6.	**Professional Ethics** **Comment:**	The graduate understands and accepts the ethics of the profession as standards that guide professional behavior. Liberally educated individuals are expected to have developed value systems and ethical standards that guide their behavior. Since in every field professionals face choice and responsibility in the process of making decisions with full understanding of their consequences, the study of ethics provides a context for development of professional ethics. continuation....

7.	**Adaptive Competence**	The graduate anticipates, adapts to, and promotes changes important to the profession's societal purpose and the professional's role.
	Comment:	A liberally educated person has an enhanced capacity to adapt to and anticipate changes in society. Since professional practice is not static, adaptability can be fostered by promoting the need to detect and respond to changes and make innovations in professional practice.
8.	**Leadership Capacity**	The graduate exhibits the capacity to contribute as a productive member of the profession and to assume leadership roles as appropriate in the profession and society.
	Comment:	All education carries with it the responsibility of developing leadership capacity. This is particularly true for professional education where the problem-decision-action cycle may have broad environmental, social and individual ramifications. Not only does leadership imply both functional and status obligations, it requires the intelligent humane application of knowledge and skills.
9.	**Scholarly Concern for Improvement**	The graduate recognizes the need to increase knowledge and advance the profession through systematic, cumulative research on problems of theory and practice.
	Comment:	The heart of the intellectual process is attention to a spirit of inquiry, critical analysis or logical thinking. Although many critical analysis skills are developed as theory and practice are integrated, the professional curriculum can be specifically designed to foster among graduates an obligation to participate in inquiry, research and improvement of the profession.
10.	**Motivation Continued Learning**	The graduate continues to explore and expand personal, civic and professional knowledge and skills throughout a lifetime.
	Comment:	A truly educated person will wish to continue learning throughout life. In professional education, substantial emphasis can be placed on fostering individual responsibility for continued professional growth.

Appendix B
Guide for Developing Information Problem Solving Skills

"Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand." American Library Association Presidential Committee on Information Literacy

INTRODUCTION

The ability to access and use information is necessary for success in school, work and personal life. The following steps represent the basic elements in an information literacy curriculum.

I. DEFINING THE NEED FOR INFORMATION

The first step in the information problem solving process is to recognize that an information need exists and to define that need. The student will be able to:

A. Recognize different uses of information (i.e. occupational, intellectual, recreational)
B. Place the information needed within a frame of reference (who, what, when, where, how, why)
C. Relate the information needed to prior knowledge
D. Formulate the information problem using a variety of questioning skills (i.e. yes/no, open ended).

II. INITIATING THE SEARCH STRATEGY

Once the information problem has been formulated, the student must understand that a plan for searching has to be developed. The student will be able to:

A. Determine what information is needed, often through a series of sub-questions
B. Brainstorm ideas and recognize a variety of visual ways to organize ideas to visualize relationships among them (i.e. webbing, outlining, listing)
C. Select and use a visual organizer appropriate to subject
D. List key words, concepts, subject headings, descriptors
E. Explain the importance of using more than one source of information
F. Identify potential sources of information
G. Identify the criteria for evaluating possible sources (i.e. timeliness, format, appropriateness).

III. LOCATING THE RESOURCES

At the onset of a search a student will recognize the importance of locating information from a variety of sources and accessing specific information found within an individual resource. The student will be able to:

A. Locate print, audiovisual, and computerized resources using appropriate catalogs and other bibliographic tools
B. Locate information through on-line databases, interlibrary loan, telephone and facsimile technology
C. Identify and use community information agencies (i.e. public and academic libraries, government offices) to locate additional resources
D. Use people as sources of information through interviews, surveys and letters of inquiry
E. Consult with others to assist in identifying sources of information
F. Access specific information within resources by using internal organizers (i.e. indexes, tables of contents, cross references) and electronic search strategies (i.e. keywords, Boolean logic).

continuation.....

IV. ASSESSING AND COMPREHENDING THE INFORMATION

Once potentially useful information has been located, the student uses a screening process to determine the usefulness of the information. The student will be able to:

A. Skim and scan for major ideas and keywords to identify relevant information
B. Differentiate between primary and secondary sources
C. Determine the authoritativeness, currentness and reliability of the information
D. Differentiate among fact, opinion, propaganda, point of view, and bias
E. Recognize errors in logic
F. Recognize omissions, if any, in information
G. Classify, group or label the information
H. Recognize interrelationships among concepts
I. Differentiate between cause and effect
J. Identify points of agreement and disagreement among sources
K. Select information in formats most appropriate to the student's individual learning style
L. Revise and redefine the information problem if necessary.

V. INTERPRETING THE INFORMATION

Following an assessment of the information, the student must use the information to solve the particular information problem. The student will be able to:

A. Summarize the information in the student's own words; paraphrase or quote important facts and details when necessary for accuracy and clarity
B. Synthesize newly gathered information with previous information
C. Organize and analyze information in a new way
D. Compare information gathered with the original problem and adjust strategies, locate additional information or re-examine information when necessary
E. Draw conclusions based on the information gathered and the student's interpretation of it.

VI. COMMUNICATING THE INFORMATION

The student must be able to organize and communicate the results of the information problem-solving effort. The student will be able to:

A. Use the search information to identify the important conclusions or resolutions to the problem to be shared with others
B. Decide on a purpose (i.e. to inform, persuade, entertain) for communicating the information and identify the intended audience
C. Choose a format (i.e. written, oral, visual) appropriate for the audience and purpose
D. Create an original product (i.e. speech, research paper, videotape, drama)
E. Provide appropriate documentation (i.e. bibliography) and comply with copyright law.

VII. EVALUATING THE PRODUCT AND PROCESS

Evaluation is the ability to determine how well the final product resolved the information problem and if the steps taken to reach the desired outcome were appropriate and efficient. Students may evaluate their own work and/or be evaluated by others (i.e. professors, classmates, practitioners). The student will be able to:

A. Determine the extent to which the conclusions and project met the defined information need and/or satisfied the assignment (i.e. how well did I do?).
B. Consider if the research questions/problem, search strategy, resources, or interpretation should have been expanded, revised or otherwise modified (i.e. what could/should I have done differently?).
C. Re-assess his/her understanding of the process and identify steps which need further understanding, skill development, or practice (i.e. how can I do better in the future?).

Appendix C: Example of Health Information Management Networked Laboratory Configuration

(To accommodate 20 students per section)

HARDWARE	UNIT PRICE	TOTAL
1 Hewlett Packard NetServer 5/66LF Model 1050 (includes Pentium 66, 1.05 GB HDD, CD-ROM 16 MB Memory, DOS, Mouse and Windows)	3,909.00	3,909.00
1 H-P SureStore 5000i 4 MM DAT Tape Drive	899.00	899.00
1 Champion 16 MB Memory (2x8 MB - 72 pin)	740.00	740.00
1 H-P SVGA Monitor 14"	302.00	302.00
1 H-P EISA Ethernet 10BaseT NIC	213.00	213.00
1 American Power Smart UPS 1250 Watt	604.00	604.00
20 Hewlett Packard Vectra VL3 PC (Pentium 90, 420 MB, IDE HDD, 8 MB Memory, with H-P SVGA 14" monitor; H-P IDE CD-ROM; Champion 8 MB SIMM)	2,712.00	54,240.00
20 Roland Speakers	50.00	1,000.00
20 AST 16 bit sound boards *(for terminology)*	115.00	2,300.00
20 Radio Shack Head sets *(for terminology)*	20.00	400.00
20 Network hookups and installation *(University)*	175.00	3,500.00
1 Sharp LCD full color Computer/Video Projection Panel - IBM compatible *(for teaching from a host computer to project for classroom viewing)*	5,300.00	5,300.00
1 Hewlett Packard Laserjet 4si mx	3,696.00	3,696.00
1 Hewlett Packard JetDirect network card *(to interface with Novell)*	369.00	369.00
1 HP Scanjet 2CX Optical Scanner *(Color)*	955.00	955.00
SOFTWARE		
Novell Netware 3.12 *(unit = 25 user pack)*	2,384.00	2,384.00
Setup and Software Installation for Network	1,300.00	1,300.00
Powerchute Software (for server)	56.00	56.00
MicroSoft Office Suite (Word, Access, Excel, PowerPoint, Visual Basic, Mail, etc)	865.00	1,730.00

AllClear 3.5 (Windows) *(unit = 10 user pack)* *(flow charts, etc.)*	1,253.00	2,506.00
EduCode (coding and terminology) *(unit = single copy)*	260.00	5,200.00
License fee renewal *($ 1,515.00 per year)*		
3M CodeFinder, DRG Finder *(unit = 5 user pack)*	60.00	240.00
Medicus *(coding product) (unit = single copy)*	50.00	1,000.00
FURNITURE		
20 Computer desks	98.00	1,960.00
20 Drawer modules for desks *(single pedestal)*	123.00	2,460.00
20 chairs	90.00	1,800.00
	Total	$92.396.00