An Update on the Progress of the CIS Curriculum Project

(In search of) A Well-Structured Approach to Curriculum Development

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CIS Curriculum Task Group

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and...
Imperial Leader - -

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Abstract

• Computing curricula have been developed since the 1950’s to support the ever advancing computing hardware by the ACM, DPMA, and EDSIG organizations.

• In this paper we present a method to develop the Computer Information Systems (CIS) model curricula based on a
  • body of knowledge,
  • exit objectives using
    • course level learning outcomes incorporating both on the body and exit objectives.

• Integration of learning outcomes into courses is presented.
Components and Relationships

• The following figure shows elements of our curriculum
• The Body of Knowledge is the basis for the curriculum
• The Exit Objectives should be developed by analysis of expected student performance in the work place
• No single computing discipline is conveyed as prominent/dominant over others.
• We ID’d themes denoting elements core to a foundational body of knowledge.
A Curriculum Development Framework
Design Philosophy:
Extensions are based upon the core foundation to focus on domains or specializations
Exit Objectives –
Motivated as response to Standish/Chaos failure statistics

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<th>Exit Objectives for IS programs</th>
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<td>1.</td>
<td>Accurate business plan developed by end users, management, and developers</td>
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<td>Translation of requirements into viable software</td>
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Body of Knowledge
Appendix 1: CIS Body of Knowledge
(Note: the appendix material is numbered sequentially. The numbers do not connote a hierarchy. The numbers start in sections from an even hundred, e.g. 300. The numbers are referred to by other appendices.) The data is based on research of The CIS Task Force of AITP-EDSIG (Longenecker, et al, 2013)

300 BK-1 Database
301 Database Components (entities, attributes, relationships, drawing, scripting)
302 Database Structuring (Create, Modeling, Quality, integrity, data types, data, and indexes)
303 Database Access (DDL, DML, Transaction Processing, Stored Procedures; blocking injection attacks)
304 Database Services (ETL, Report Services, BI, DSS, Backup, Replication, Security Management, Administration)
305 Big Data (characteristics, MapReduce, Hadoop, big data analytics, visualization, applications [government, electioneering, health care, marketing, media, Google, sales organizations])

306 BK-2 Information System Development
307 IS Development: Planning; organizational purpose; feasibility; privacy; security; alignment, security, scope minimization and management
308 IS Development: Make or Buy
309 IS Problem Definition, Optimization, Requirements Elicitation, security planning; BPR Analysis
310 IS Organization Development with New IS (IT enabling, improved IT alignment, lower resistance, raised involvement)
311 IS Design Maturity (levels within apprenticeship, design-leadership)
312 IS System Verification/Validation Planning
Exit Objectives

201 EO-1: Accurate business plan developed by end users, management, and development team

BK1-Database

301 Database Components (entities, attributes, relationships, drawings, scripting)

LO 1.01 System Theory describes a trinity of management, operations, and developers

Module

Systems and Success

Module Outline

Systems Theory, systems trinity

Learning Outcomes in Course Modules

LO 1.01

Learning Outcome Components

LO 1.01 – E203; B342,344

Exit Objective Elements

202 Identify stakeholders; ensure executive support and continuous encouragement

Exit Objectives

BK Elements in Exit Objective

E203; B342,344

Curriculum

Computer Information Systems
Appendix 2: Exit Objectives

(Note: the appendix material is numbered sequentially. The numbers do not connote a hierarchy. The numbers start in sections from an even hundred, e.g. 300. The numbers are referred to by other appendices.) These exit objectives are based on the work of the Standish Group (1995, 2001).

201. EQ-1 Accurate business plan developed by end users, management and development team
202. Identify stakeholders; ensure executive support and continuous encouragement
203. Identify and qualify business knowledgeable project manager to deliver a competitive business plan
204. Establish user—developer—management interactions to ensure involvement, and development of clear business objectives aligned to organizational goals and strategy
205. Choose a development methodology (e.g. Agile)

206. EQ-2 Exceptional requirements analysis
207. Must use a User-Centered Focus
208. Must express IT alignment with a high degree of maturity
209. Identify System Requirements including access controls, risk detection/mitigation, audit controls
210. Must be tied to a verification and validation mechanism
211. Must involve and develop excellent teams with strong personal and interpersonal skills, critical thinking ability, develop emotional intelligence, business and technology skills, agile ability, fluent programming, demonstrated security awareness and ability to use of security standards

212. EQ-3 Translation of Requirements into viable software
213. Should consider using Agile approach; deliver working software products frequently
214. Must use well established software engineering and programming practices, including reuse
215. Must have exceptional database modeling and implementation skill
216. Use appropriate reporting and data analysis
Body of Knowledge Mapped to Exit Objectives

Curriculum: Computer Information Systems

Exit Objectives:
- 201 EO-1: Accurate business plan developed by end users, management, and development team

BK Section: BK1-Database

BK Elements:
- 301 Database Components (entities, attributes, relationships, drawings, scripting)

Exit Objective Elements:
- 202: Identify stakeholders; ensure executive support and continuous encouragement

Learning Outcome:
- LO 1.01: System Theory describes a majority of management, operations, and designers

Learning Outcome Components:
- LO 1.01 – E203; B342,344
Mapping the Body of Knowledge to the Exit Objectives

• Each element of the body of knowledge in such a manner that the mapping makes sense

• All Body of knowledge must be mapped for the model to be complete

Appendix 3: CIS 2017 Model Curriculum Project: Map BK to EO

Exit Objectives – Exit objectives are a collection of behaviorally written statements, which define characteristics expected of graduates so they will be able to fit into the fabric of an industry position. This collection of objectives is inclusive of the recommendations of the Standish Group (1995, 2001) research based on studies of at least 100,000 projects, many of which failed. All of the exit objectives of appendix 2 are mapped 1:1.

Body of Knowledge – Elements of the CIS Body of Knowledge are mapped to Exit Objectives, and the results are displayed below. The meaning of this relationship is that the educational objectives were completely enabled (supported) by the body of knowledge. All of the body of knowledge elements are mapped 1:1 to the highest level Exit Objectives.

201. EO-1 Accurate business plan developed by end users, management and development team

Exit Objectives:

202. Identify stakeholders; ensure executive support and continuous encouragement

203. Identify and qualify business knowledgeable project manager to deliver an excellent competitive business plan

204. Establish user—developer—management interactions to ensure involvement, and development of clear business objectives aligned to organizational goals and strategy

205. Choose a development methodology (e.g., Agile)
Appendix 3: CIS 2017 Model Curriculum Project: Map BK to EO

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201 EO-1 Accurate business plan developed by end users, management and development team

Exit Objectives
202 Identify stakeholders; ensure executive support and continuous encouragement
203 Identify and qualify business knowledgeable project manager to deliver an excellent competitive business plan
204 Establish user—developer—management interactions to ensure involvement, and development of clear business objectives aligned to organizational goals and strategy
205 Choose a development methodology (e.g. Agile)

Body of Knowledge
342 IS Professionalism (systems thinking, organizational behaviors, encouraging, legal issues, use of standards, ethical issues, social issues, concepts of performance, practicing success habits, life-long learning)
343 Teaming (ensure team training, ensure leadership development, improve group emotional intelligence, manage disputes, and attain certifications
344 Project Meetings [pre-meeting [meeting goal setting, participants, agenda—construction with critical thinking, using known techniques, setting agenda timing], post-meeting [documentation, follow-up]
307 IS Development: Planning: organizational purpose, aligned strategy and goals; feasibility; privacy; security; alignment, security, scope minimization and management
Course Level Learning Objectives

Curriculum

Computer Information Systems

Exit Objectives

201 EO-1: Accurate business plan developed by end users, management, and development team

BK Section

BK1-Database

Learning Outcome

LO 1.01: System Theory describes a trinity of management, operations, and developers

BK Elements

301 Database Components (entities, attributes, relationships, drawings, scripting)

Exit Objective Elements

202: Identify stakeholders; ensure executive support and continuous encouragement

BK Elements in Exit Objective

LO 1.01 – E203; B342-344

Learning Outcome Components

LO 1.01 – E203; B342-344

Course

1.0 Information System Fundamentals

Module

Systems and Success

Module Outline

Systems Theory, systems trinity

Learning Outcomes in Course Modules

LO 1.01
Development of Course Level Learning Outcomes—Linking the Body of Knowledge to Exit Objectives

- In IS’90 and ‘97 these linkages were provided using the concept of learning units
- However, explicit derivation was not accomplished
- It was not possible to assess how the body of knowledge, exit objectives, as well as learning outcomes

Appendix 4 – Sample Result of Development of Local Objectives

**Exit Objectives** - Exit objectives are a collection of behaviorally written statements, which define characteristics expected of graduates so they will be able to fit into the fabric of an industry position. This collection of objectives is inclusive of the recommendations of the Standish group their research based on studies of at least 100,000 projects, many of which failed.

**Body of Knowledge** - The CIS Body of Knowledge Elements are mapped to Exit Objectives, and the result is displayed below. An M: N mapping was allowed. The meaning of this relationship is that the educational objectives were completely enabled (dependent upon) the body of knowledge.

**Outcomes** - Learner outcomes, stated behaviorally, describe behaviors expected of learners at the conclusion of a period of study for the identified collection of data. The outcomes are written in Bloom terms. The outcomes are developed by answering the question, “For a course of study, state a sequence of outcomes that describe the results of study.” Approximately 20 outcomes are described for each 3 semester.
2001 EO-1 Accurate business plan developed by end users, management and development team

Exit Objectives

2002 Identify stakeholders; ensure executive support and continuous encouragement
2003 Identify and qualify business knowledgeable project manager to deliver an excellent competitive business plan
2004 Establish user-developer-management interactions to ensure involvement, and development of clear business objectives aligned to organizational goals and strategy
2005 Choose a development methodology (e.g., Agile)

Body of Knowledge

342 IS Professionalism (systems thinking, organizational behaviors, encouraging, legal issues, use of standards, ethical issues, social issues, concepts of performance, practicing success habits, life-long learning)
343 Teaming (ensure team training, ensure leadership development, improve group emotional intelligences, manage disputes, and attain certifications)
344 Project Meetings (pre-meeting [meeting goal setting, participants, agenda—construction with critical thinking, using known techniques; setting agenda timing], post-meeting [documentation, follow-up]
307 IS Development; Planning; organizational purpose, aligned strategy and goals; feasibility; privacy; security; alignment, security, scope minimization and management

Learning Outcomes and Knowledge Network (please note, these LO’re are a partial subset)

LO1.01 — E 203: B 342,344
System theory describes a trinity of management, operations, and developers. Be able to write a 3-5 page paper describing the organization roles of each organizational component.

LO1.02 — E 204: B 342,343
To describe an excellent business plan developed through exceptional group emotional intelligence involving the systems trinity.

LO1.03 — E 203: B 343,344,307
To discuss the meeting wherein LO1.02 where in an exceptional business plan could have been developed.

LO1.03 — E 204: B 342,344
To identify, discuss, and explain the components of emotional intelligence, and to show how development of “group” emotional intelligence is essential for successful meetings.

LO1.05 — E 204: B 342,307
To describe the system theory based argument that physical activity in an organizational process
Acknowledgment

• Gene, Lani, Bill, Aimee, Marjorie, James, Felicia and Jim have contributed significantly to the rescue of and promotion for health of one of the authors, and have provided continuous encouragement to succeed.
Reality Check:

This project needs more ideas, review, input, wider EDSIG membership commitment!

Interested parties encouraged to apply!!