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EDU 285

Artifact 16

Search the Internet for the national and state standards for the age and subject area(s) you intend to teach. Include copies of each in your portfolio. In a brief one-page paper, compare and contrast the two.

High school level Computer Science is my intended subject area. This area is not required or standardized by the Arizona Department of Education (ADE). However, that it is taught in a select few local schools and that there are national standards or curricula for the subject attests to its importance, if it is not obvious from the abundance of software that surrounds us. The State does produce more generic Technology Education Standards and certifies teachers in "Computer." This lumps fields of Computer Science, Software Engineering, Information Technology, Management Information Systems, and others together, explaining, perhaps, why the University is not involved with computer teacher certification. The state standards strongly emphasize technology consumption and use of technology as a tool, but do little to address its production at the high school level. This may result in smart consumers, but does little to support development of technology.

Two organizations, the Computer Science Teachers Association (CSTA, under the umbrella of the Association of Computing Machinery, the ACM) and the College Board (CB, responsible for the Advanced Placement Program), address Computer Science at different levels. The CSTA published in 2003 a "Model Curriculum for K-12 Computer Science." It includes three courses at the high school level: Computer Science in the Modern World (level 2), Computer Science as Analysis and Design (level 3), and Topics in Computer Science (level 4). In 2004 a set of objectives and outlines for the level 2 course was published. Learning objectives for fourteen topics are presented along with "detailed" outlines of labs and hands-on activities. The range of topics is broad, including computer hardware, software, programming languages, ethical issues, and careers. A draft for the level 3 course was issued in 2006 and covers ten topics in much the same format emphasizing the engineering, math, and science involved in computation. According to the model curriculum, the level 4 course(s) may be organized around projects, industry certification, or advanced placement topics.

A second organization, the College Board, administers the two advanced placement (AP) Computer Science tests: A and AB. The former emphasizes object-oriented programming and the latter adds to this a more in-depth study of algorithms, data structures, design, and abstraction. They are intended to cover the contents of semester-length, college-level programming courses. In contrast to the CSTA curriculum, relatively little attention is devoted to hardware, networking, or society; and a specific programming language, Java, is prescribed. Indeed, even a specific subset of the language is specified. The course description includes complete sample tests, but only a terse list of topics lacking suggested activities. The resulting course description is light on the high end (topics), very heavy at the low end (evaluation), and void in the

middle (objectives, activities, lesson plans). It broadly explains what to cover, but not what or how to **dis**cover, and may encourage simply teaching to the test.

Arizona state technology standards are based on International Society for Technology in Education (ISTE) National Educational Technology Standards for Students (NETS-S) along with input from Information Power, Technology for All Americans, and more. NETS-S includes fourteen high-level objectives organized into six topics. A breakdown by grade level maps performance indicators to topic. Arizona standards use the same six topics. After the grade 9-12 proficiency level standards, a small number of distinction/honor items are appended. The Arizona proficiencies match ISTE performance indicators nearly word for word. However, they are fleshed out with performance objectives and references to standards in subject areas such as mathematics, social studies, and science. This suggests that a technology expert can visit a mathematics classroom to help meet an objective or that a content specialist can visit the general technology classroom to show how technology is applied in a specific subject. Workplace skills standards are cross referenced several times. State workplace skills standard 7 deals specifically with technical literacy. Technology and the workplace often intersect in Career and Technical Education (CTE) courses outlined at the state level and implemented in several Tucson Unified School District (TUSD) schools. In particular, teachers proficient in computers are needed to teach the Business Management & Administrative Services (BMAS) courses of Technology Applications for Business and Publications for Business. However, it is not my intention to teach in these non-science areas.

Files

Computer Science Teachers Association (CSTA)
- k12final1022.pdf
- Level_2_Objectives_Outline.pdf
- CSTA_Level_III_Draft.pdf

College Board (CB)
- 52435 APCompSci-Locked.pdf

International Society for Technology in Education (ISTE)
- NETSS_standards.pdf

Arizona Department of Education (ADE)
- ProfTECHNOL.pdf

Links to Web Pages and Online Documents

- Computer Science Teachers Association (CSTA)
  - Model Curriculum
    - A Model Curriculum for K-12 Computer Science
    - Level II Course: Computer Science in the Modern World
    - Level III Course: Computer Science as Analysis and Design

- CollegeBoard (CB)
  - Advanced Placement (AP)
    - Computer Science A/AB

- International Society for Technology in Education (ISTE)
  - National Educational Technology Standards (NETS)
    - NETS for Students
      - Overview
        - One version
        - Another version
        - Yet another version
      - Book chapters
        - Grades 9-12

- Arizona Department of Education (ADE)
  - Arizona State Standards
    - Technology Education Standards
      - Standards by Grade Level
    - Workplace Skills Standards
      - Workplace Skills by Grade Level
  - Career and Technical Education (CTE) Program
    - Software Development
      - Competencies and Indicators

- American Library Association (ALA)
  - American Association of School Librarians (AASL)
    - Information Power
      - Information Literacy Standards for Student Learning

- International Technology Education Association
  - Technology for All Americans Project
    - Standards for Technological Literacy

- Tucson Unified School District (TUSD)
  - Career and Technical Education (CTE)
    - Business Management & Administrative Services (BMAS)