

# Seven Cs of Assessment in the Cisco Networking Academy Program

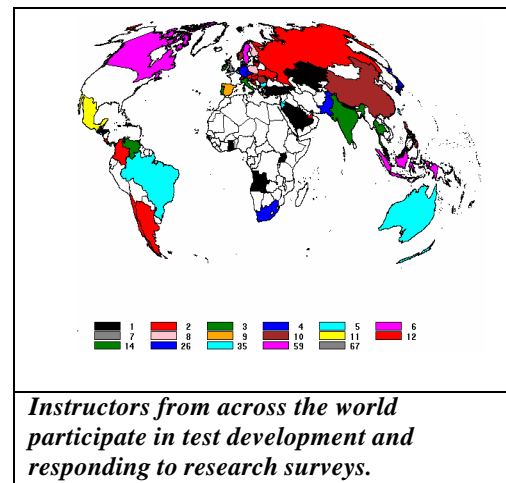
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The Cisco Networking Academy® Program works to support schools and instructors who are teaching students Information Technology (IT) related concepts and skills. There are many notable aspects of the program including on-line curriculum designed for high interactivity, comprehensive instructor training through partnering educational institutions, a quality assurance program to help schools monitor and improve learning, and on-line and in-class assessments.

Cisco's Assessment, Research and Evaluation team worked with instructors from around the world to build a comprehensive assessment program that helps students, instructors, and administrators collect and manage information about student knowledge and skills. In the spring of 2003, instructors across 150 countries administered an average of 43,000 exams each day using this free on-line assessment and curricular delivery system. This paper discusses some of the highlights of the Networking Academy assessment program by covering 7 "Cs" that drive the assessment activity.

## **1 and 2: Claims and Curriculum**

One of the most frequently neglected aspects of assessment development is detailed design that is instructionally motivated and psychologically appropriate. The assessment teams in the Networking Academy program use a process called Evidence Centered Design to help ensure integration and coordination between broad desired outcomes for the student (claims), and specific objectives that have been taught to reach that goal (curriculum). The assessment and curriculum teams work hand-in-hand to ensure that what is included in the assessments covers important parts of the curriculum, and what the instructors teach is appropriately tested.



## **3. Collaboration**

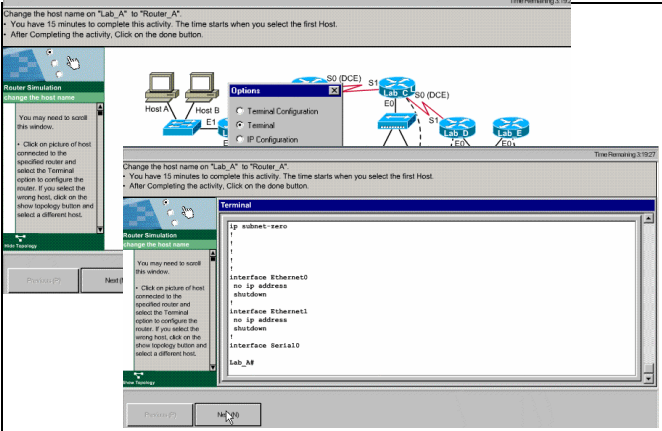
From the very start of the program, Cisco's Worldwide Education group created and developed the Networking Academy Program as a collaborative activity between Cisco Systems, Inc., and the educators in the partnering educational institutions. In the assessment arena, this is done at several levels. First, the content development for assessments is done primarily through individuals that are active Academy instructors working at universities, colleges and high schools around the world. These teams of instructors are trained and organized to design, create and manage large amounts of assessment content. Some of the instructors involved in developing Academy assessment activities are involved in writing assessment activities for Cisco

certification exams as well. Instructors working as part time consultants, create assessment activities through a World Wide Web-based application designed specifically for Academies to use. This web-based tool allows instructors to participate regardless of their geographical location. Because the assessments delivered through the Academy program occur in 9 languages, the authoring tool stores text in these languages as well. This is part of what makes the Networking Academy program a truly global activity.

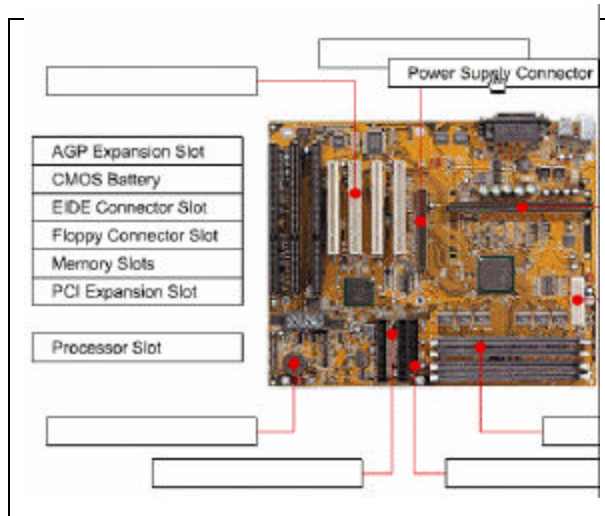
Second, assessments are typically reviewed prior to public use in the field by a number of additional instructors. Third, feedback mechanisms are available to let the Cisco staff know about concerns or possible improvements for assessment content.

#### 4. Complexity

The world has changed dramatically because of computers and computer networks. For example, the presentation and collection of complex information can occur in remote and under-resourced locations as well as in thriving population centers. By using advanced server technologies as well as presentation and scoring approaches, the Networking Academy program is providing state-of-the-art e-learning to students around the world. Assessments in the program are composed of tasks that can be as simple as asking a multiple-choice or fill-in the blank question, or they can consist of complex simulations or other question formats. Network simulations can be scored in multiple ways to give the student partial credit for different portions of their solution as well as allowing students to accomplish a desired outcome through their own individual approach. Because the applications are Web-based, the computer requirements for



*Complex performance tasks for network configuration and troubleshoot are scored for multiple features and given scores for partially correct answers.*



*Drag-and-drop questions for identifying physical and conceptual aspects of the material studied are available in quizzes and exams.*

taking the assessments are relatively low, keeping the lab costs down for the educational institution.

While scoring and data collection can be a problem for some paper-based situations, the Academy assessments are computer-scored so the results are available immediately. Because the program has a policy of considering the instructor central to the instruction and learning of the student, additional hands-on and in-class assessments are recommended and supported as well.

#### 5. Computation

The quality of the program has led to increased adoption and continued widespread use. To keep

track of the quality and value of different assessment tasks, a comprehensive statistical process is used to analyze data collected from partnering schools. Tasks are analyzed using the latest statistical technologies and the results are output to the web so the consulting assessment developers can have access to this information. By working in unified teams of psychologists, measurement experts and consulting instructors, the Networking Academy staff leverage several disciplines to understand the data, the analysis, and its implications for the classroom.

## **6. Communication**

While the collection and analysis of information regarding student performance is important, its value is determined by its use to inform relevant stakeholders. In the Networking Academy program this means making sure there are reporting and interpretation aids for students, instructors and administrators. For students, there are assessment-level reports as well as specific item answers for practice tests and quizzes. For instructors, there is a comprehensive grade book with detailed scoring and performance information on each of their students. For administrators, there are on-line reports that summarize student comments and feedback about class activities along with group and class summaries. By combining all of these different types of assessment activities, the program supports immediate instructional goals and the more global policy and accountability needs of an educational institution.

## **7. Co-ordination**

Like all educational activities, assessment is embedded in a larger context. In the context of the Networking Academies, the capstone certification exams provide a valuable goal for the student. The widely recognized industry certifications are obtained independently from the assessment system of the Networking Academy program. However, for certification exams administered by Cisco Systems, Inc, it opens the possibility of a comprehensive assessment ecosystem. In these cases (CCNA and CCNP exams) the in-class exams are linked conceptually, developmentally and statistically with the content of the certification exams. This helps ensure comprehensive alignment of the curricula and assessment activities. The goal of this approach is to make sure the in-class assessments are aligned with the external capstone assessments. By working across all stages of assessment we aim to avoid disconnects between classroom and capstone activities.

## **Summary**

The Networking Academy program helps to promote instruction by supporting students and instructors with an advanced learning environment. The seven Cs help guide direction and clarity of vision, while the World Wide Web and related Internetworking technologies provide a platform to make the vision a reality in classrooms around the world.