Best Practices in Corporate Universities

Maryland State Highway Administration

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This research was funded by:
Federal Highway Administration
Transportation Education Development Pilot Program

Grant #DTFH61-089G-00017

December 2009

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Grant #DTFH61-089G-00017

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Executive Summary

Training is critical to workforce development, contributes toward employee retention, and provides new skills that are required when agency missions expand. Nevertheless, few transportation agencies have addressed future workforce needs. In 2002, the National Transportation Workforce Summit, sponsored by the U.S. Department of Transportation, found that training expenditures in transportation agencies are insufficient and recommended annual investments of 2 percent of salaries. In recent years, the Maryland State Highway Administration (MSHA) has invested 1.5 percent of salaries toward education and training. Through the Transportation Education Development Pilot Program (TEDPP) grant, this best practices report in corporate universities examines the delivery mechanisms of training (e-learning, blended, and academy formats) and the efficacy of training delivery mechanisms for corporate universities within various private and public sector organizations and selected state highway administrations.

Instructional design and training models have a rich past resulting in several variations. Most of the variations have idiosyncrasies, but the majority of models recommend similar steps for development. These steps include: 1) assessing training needs; 2) designing, developing, and implementing training; and 3) evaluating training efforts.

The training needs assessment can occur at the individual, group, or organizational level. Sources of information typically include: formal records within the human resources department, employee interviews, focus groups, observations, surveys, and tests. The level of needs assessment and systems has varied across organizations. For example, Arizona, California, Delaware, Florida, New York, and North Carolina assess needs through competency modeling. Virginia uses peer reviews to assess competencies and training needs. Pennsylvania uses position analysis questionnaires.

Technological advances in recent years have served as a catalyst for the proliferation of e-learning initiatives and the establishment of corporate universities within organizations. The advantages of cost-effectiveness and flexibility situate e-learning as a strategic tool toward long-term human capital development. Nevertheless, the efficacy of training delivery mechanisms is contingent on numerous factors, including learner autonomy, technical capability (of equipment and end-user), and specific job functions for which training is being provided.

A variety of delivery options are available for distance learning initiatives. The sophistication of the technology used depends on the learning management systems (LMS) software, the ability and willingness of the instructor to integrate technological tools into a web-based course, the quality of the end user's computer, and the cognitive ability and initiative of the end user. The use of technology for distance learning consists of a variety of options, including videoconferencing, web-based courses, and knowledge-sharing networks. Within the academic community, Blackboard and Web-CT are LMS software widely used to deliver online courses.

Many large companies within the private sector have established successful corporate universities (e.g., Land Rover, Motorola, Sears, Walt Disney, and Xerox). The types of training delivered by organizations within the transportation industry have been diverse. The Federal Highway Administration promotes knowledge development opportunities by increasing employees' awareness of what is available, promoting knowledge sharing, and offering several avenues for learning. They currently offer over 100 e-learning courses free of charge. In comparison, state initiatives have varied. Virginia was one of the first states to use a warehouse of human capital management data across state agencies to identify training needs and facilitate succession planning and workforce development (Selden, 2009). The Louisiana Transportation Research Center uses a curriculum with specific work-related training applicable to each level of employment.

The evaluation of training typically includes four to five levels: reaction, learning, transfer, results, and (less frequently) return on investment (ROI). A National Cooperative Highway Research Program (Giber, 1997) survey of transportation agencies found that among the 37 respondents, 35 measured reaction to training. In contrast, 18 measured learning, 17 measured behavior, and 12 measured results. Not surprisingly, few organizations evaluate training using ROI. Those organizations that do attempt to link training and results use a variety of measures, including turnover, absenteeism, production, costs, and reduced errors.

Results from the Online Survey of State Highway Administrations

An online survey was developed and administered to officials representing state highway administrations throughout the United States. Twenty-five responses were received from representatives of 25 state highway agencies. The states include California, Colorado, Florida,

Georgia, Kansas, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New York, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Virginia, Washington, Wyoming, and two unidentified states. Key results from the survey include the following overall comparisons:

- The majority of respondents report that legally mandated training is centralized.
- Most state transportation agencies send trainers out to regional facilities or field offices to provide on-site training to remote locations. Many organizations are also using videoconferencing as a tool.
- Software used to deliver online training varied. Software systems included: Articulate, Breeze, Captivate, Flash, GeoLearning, Meridian KSI, Pathlore, and Training Partner Online.
- The majority of respondents indicate that their state agency identifies training needs using the following tools: certification requirements for the position (76 percent), performance appraisals (68 percent), professional development plans (68 percent), and agency workforce plans (60 percent).
- The distribution of learning hours from highest to lowest is as follows: traditional classroom settings, on-the-job training (OJT), a blended format, and e-learning.
- A combination of classroom settings and OJT is preferred for key processes of contract administration. In contrast, organizations appeared to vary in their training delivery preferences for procurement and budget and finance (figures 2 and 3).
- The majority of respondents provided either classroom settings or a combination of classroom settings and OJT to deliver training for most field maintenance functions. Very few organizations utilized e-learning or a combination of e-learning with other delivery mechanisms. In comparison, classroom settings only appear to be the prevalent training delivery mechanisms for real estate functions, although OJT and a combination of classroom settings and OJT are also utilized. When it comes to training, delivery mechanisms for finance organizations are often split between classroom settings only, OJT only, or a combination of the two.
- Nearly every respondent stated that they expect to see an increase in the number of blended and online training courses offered by their organization.

States that reported training delivery to remote sites through all three mechanisms of regional facilities or field offices, videoconferencing, and online training included: Florida,

Minnesota, New York, Oregon, Pennsylvania, Texas, and Virginia. Comparisons are provided below:

- Performance appraisals, professional development plans, and certification requirements were most often used to identify training needs.
- Four of the seven states used agency workforce plans to identify training needs.
- Two of the seven states reported the use of career development programs to assess training needs.
- The distribution of learning hours was much higher for traditional classroom instruction and OJT. Most of the seven states reported less than 20 percent of instruction though e-learning or a blended model of classroom instruction and e-learning (table 9).
- Florida and Virginia reported 21 percent to 40 percent of instruction through e-learning (table 9).
- States reported a higher use of industry partners and private vendors to outsource training. The use of University Transportation Centers (UTCs), Transportation Technology Transfer Centers (T2Cs), and colleges and universities varied (table 10).
- Classroom instruction, OJT, and a combination of both were the most frequently reported training mechanisms for field maintenance positions. A few states reported the use of e-learning or a combination of e-learning and classroom instruction for functions such as emergency communications, CPR and first aid, construction math, concrete, and (as expected) the Federal Emergency Management Agency's National Incident Management System (NIMS) (table 11).
- Classroom instruction was also the most common training delivery mechanism for real estate functions. There was some use of OJT.
- Classroom instruction and OJT were also common for training for various functions in finance positions. Nevertheless, a few of the selected states reported the use of a combination of classroom instruction, OJT, and e-learning for the functions of contract management and procurement (table 13).

Overall, it is recommended that conditions similar to those below be used for the development of a successful corporate university and to sustain the MSHA University:

- Support from executive leadership (financial and strategic);
- Mission and learning goals that are aligned with the strategy of the organization;

- Career development programs (institutional majors) to establish and reinforce career paths);
- Internal marketing to encourage employee participation;
- Online modules available 24/7 and traditional classroom instruction for topics that are not conducive to the online format; and
- A comprehensive assessment process of training needs and learning outcomes.

Abbreviations and Acronyms

ADL	Advanced Distributed Learning
AT&L	Acquisition, Technology, and Logistics
CBT	Computer-Based Training
DAU	Defense Acquisition University
DOD	Department of Defense
DOT	Department of Transportation
FHWA	Federal Highway Administration
IPMA-HR	International Public Management Association-Human Resources
LMS	Learning Management Systems
LTAP	Local Technical Assistance Program
MSHA	Maryland State Highway Administration
NHI	National Highway Institute
NIMS	National Incident Management System
OJT	On-the-Job Training
ROI	Return on Investment
SDOTs	State Departments of Transportation
SHRM	Society for Human Resource Management
T2Cs	Transportation Technology Transfer Centers
TEDPP	Transportation Education Development Pilot Program
TRB	Transportation Research Board
UTCs	University Transportation Centers

Introduction

The University of Baltimore research team and its Maryland State Highway Administration (MSHA) partner team met in November 2008 to outline the scope of the analysis for best practices in corporate universities. Areas of focus include the following: assessment of training needs; delivery mechanisms; how programs are administered and by whom; efficacy of delivery mechanisms; and how organizations close the loop between what is needed and what is provided. Comparison organizations include other state departments of transportation (SDOTs), state governments, the Federal Emergency Management Agency, military organizations, and corporations with in-house training programs.

The overall purpose of best practices in corporate universities is to examine how training programs are administered in other organizations. Specifically, the delivery mechanisms of training (e-learning, blended, and academy formats) and the efficacy of training delivery mechanisms are considered. This includes learning about management software, developing curriculum, identifying training needs, and understanding how organizations close the loop between what is needed and what is delivered. This study utilizes a best practices approach and an online survey to examine organizational training. The best practices approach also is used to study corporate universities within various private and public sector organizations and selected state highway administrations. An online survey was developed and administered to officials representing state highway administrations throughout the United States.

Funding for Training within Transportation Agencies

There are several components of federal funding for workforce training within transportation agencies. According to the Transportation Research Board (TRB, 2003), the largest source of funding is administered through the Surface Transportation Program. This program allows states to use up to 0.5 percent of those funds ($38 million in 2003) for education and training purposes.

Funding for existing federal programs that directly support education and training include: University Transportation Centers (UTCs), the Federal Highway Administration's (FHWA) National Highway Institute (NHI), and the Local Technical Assistance Program (LTAP). According to the TRB (2003), NHI received $8 million in 2002 and offered 550 courses

to 15,500 participants—the majority (70 percent) representing SDOTs. They also started to implement web-based training. In comparison, 58 LTAP centers provided training and technical assistance primarily to local transportation agencies (although SDOTs are also included) through state universities and technical colleges. LTAPs are financed through federal funds, SDOTs, universities, local agencies, and the Bureau of Indian Affairs ("help wanted"). Similarly, UTCs are managed by the Research and Special Programs Administration in the U.S. Department of Transportation (DOT) to support graduate student education and research. Under the Transportation Equity Act for the 21st Century ("help wanted"), 13 new UTCs were established; in addition, 14 existing UTCs and six university research institutes were reauthorized. Funding for UTCs are authorized through TEA-21. From 1998 to 2003, TEA-21 authorized $158 million in funding to 33 UTCs (TRB, 2003). It is also worth noting that the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU, Sec. 5204 9(e)) supports 100 percent (no state matching funds required) of training-related activities in the following core program areas: the Surface Transportation Program, the National Highway System, the Bridge Program, the Interstate Maintenance Program, and the Congestion Mitigation and Air Quality Program (U.S. DOT, 2009).

In 2002, the U.S. DOT sponsored the National Transportation Workforce Summit. The TRB Committee on Future Surface Transportation Agency Human Resource Needs: Strategies for Recruiting, Training, and Retaining Personnel was formed to study and identify strategies and issued the final report. Despite the federal funding available for education and training, TRB (2003) contends that training expenditures in transportation agencies are insufficient and recommends an investment of 2 percent of salaries, equivalent to 40 hours of annual training for each employee.

Importance of Training

According to the Office of Professional and Corporate Development within the FHWA (U.S. DOT, 2009), nearly half of the transportation workforce will be eligible to retire over the next decade. Simultaneously, as staffing levels have decreased, there is stiff competition for skilled workers, fewer people are entering the field of transportation, and programs have grown within state transportation agencies. Some of the factors that can affect a transportation agency's

ability to fill gaps in staffing levels are a slower growing workforce and shortages of qualified applicants to replace technical positions.

Training is critical to workforce development, contributes toward employee retention, and provides new skills that are required when agency missions expand. Nevertheless, few transportation agencies have addressed future workforce needs. This is due, in part, to the complexities of workforce issues, which must take into consideration political, economic, social, and technological factors that impact the internal and external environment of the agency. In addition, the great variation among agencies and national data sources makes it difficult to examine workforce issues that are "too aggregated to provide accurate predictions for individual job categories in SDOTS and TAs [transportation agencies]" (TRB, 2003, p. 19).

Employee perceptions of opportunities for learning and growth within the organization are ensured through strategic training and development. The perception of training within the organization and environmental supports and constraints are necessary to assess the educational climate of the organization. The first step toward establishing a learning organization is to assess organizational support for learning within the current work environment. Obstacles to a supportive learning environment include: working conditions, such as limited time or opportunity to learn or apply new skills; lack of support from peers, who may perceive training as a waste of time; and lack of support from management, who may not provide the opportunities or encourage employees to attend and utilize training (Raelin, 2008).

Training Models

Although numerous authors and consultants have developed various acronyms (e.g., ADDIE for Analysis, Design, Development, Implementation, and Evaluation) and models of instructional design, a typical model for training (regardless of acronym) includes the following steps:

1. Assess training needs
2. Design, develop, and implement training
3. Evaluate training efforts

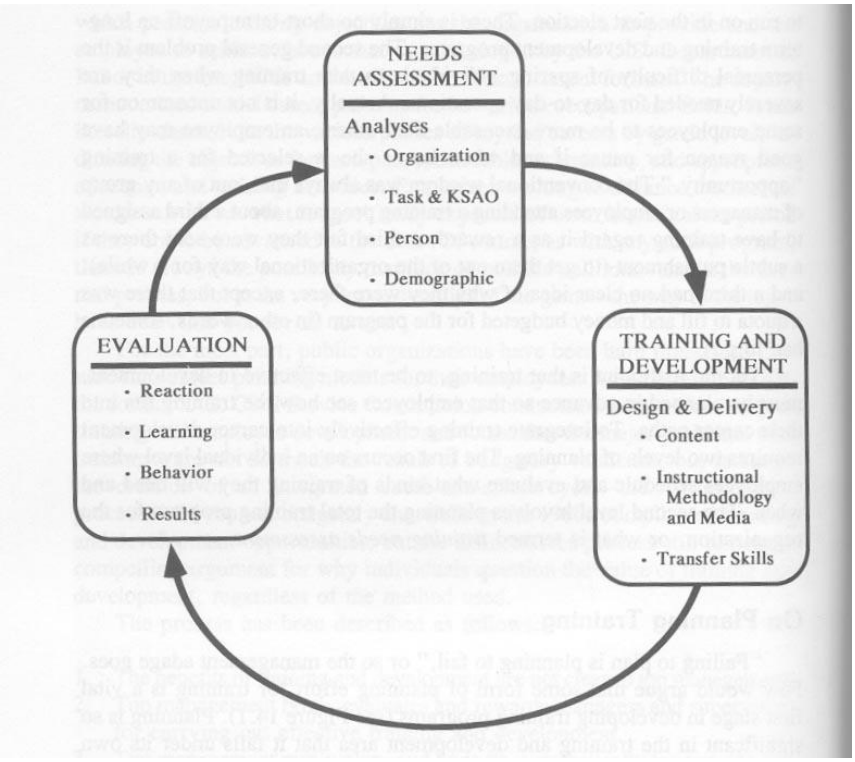

Figure 1 A Systems Approach to Training and Development
Source: Ban, Faerman, & Riccucci, 1991

Assessing Training Needs

A needs assessment helps to determine the appropriate intervention necessary to narrow the gap between existing performance and desired performance. Training needs assessment is typically framed around three levels—the organization, the job, and the individual. Sources of information used to assess training needs often include: formal records within the human resources department (e.g., performance appraisals, safety reports, grievances, etc.), employee interviews, focus groups, observations, surveys, and tests.

The Organization

Organizational analysis assesses the appropriateness of training in meeting the needs of the organization. Strategic planning and identification of the knowledge, skills, and abilities necessary for future effective organizational performance are critical elements of organizational analysis (IPMA-HR, 2001).

Potential data sources:

- Equipment records
- Exit interviews
- Grievances
- Supervisory and training observations
- Safety reports
- Training records

The Job

In comparison, assessing training needs for specific job categories often begins with an analysis of job tasks.

Potential data sources:

- Job certification criteria
- Job descriptions
- Job evaluation records
- Job performance standards
- Knowledge, skills, and abilities
- Questionnaires

The Individual

Individual training needs, as a third level of assessment, often occur through performance evaluations and performance development plans.

Potential data sources:

- Certification records
- Employee surveys
- Performance appraisals
- Personnel records
- Position questionnaires

Individual competency assessments can be used to assess all three levels, ranging from a short assessment with few items to assessments with over 100 items. The competency assessment typically is undertaken by a division, department, or the entire organization. The advantages include more precise measures of individual strengths and weaknesses, peer comparisons, and indications of the organizational value placed on these competencies (Kirkpatrick & Rezvani, 2008).

The extent to which organizations assess training needs varies. The International Public Management Association-Human Resources (IPMA-HR, 2001) conducted a training needs assessment survey representing 149 public sector employees from federal, state, and local

jurisdictions. Forty-two percent of their respondents reported that "only to a small extent" does the strategic plan of their organization address the training necessary to reach strategic goals. Similarly, 42 percent reported that managers support learning initiatives "only to a moderate extent." Half of the respondents noted an absence of formal training models within their organizations.

Organizational Snapshots: Needs Assessment

The following SDOTs use competency modeling to assess training needs: Arizona, California, Delaware, Florida, New York, and North Carolina (Giber, 1997).

New Jersey
Employees at the New Jersey DOT identify their training needs through a questionnaire. Once training needs are identified, they are prioritized, and goals and objectives are established. The organization then develops and establishes a training program to address these needs. They have established five training goals to serve as a foundation for curriculum development (Selden, 2009).

Pennsylvania
In 1998, the Pennsylvania DOT established five teams to close gaps in employee development, particularly in the areas of "[m]eaningful cross-training experiences," "[c]areer development and promotion opportunities," and "[t]raining and development tied to the Department's strategic direction" (PennDOT, 2005, p. 1). The Internal Customer Service Team developed several strategies to address employee development issues that were identified. In the area of cross-training, emphasis was placed on opportunities for career development and promotion, as well as linking training and development to the strategic direction of the organization. Position analysis workbooks provided self-assessment tools to assist in planning training and development activities. Learning opportunities for the specific position were also outlined in each workbook. In addition, the position analysis workbooks were used to develop cross-training opportunities.

Virginia
In 1995, the Virginia DOT began using an employee survey to assess training needs. Employees rate each other on their demonstration of key competencies. The results are used to target training (Giber, 1997).

Hennepin County, Minnesota
Hennepin County uses competency modeling to assess the training needs of the organization. Necessary competencies to achieve the strategic plan are identified by examining current and future challenges facing the county. Training opportunities are then identified and linked to specific competencies. Employees have access to a list of courses relevant to each competency.

Training needs are also assessed through annual department meetings on the strategic plan. Training solutions are developed after a review of the strategies. Feedback from training partners, course evaluations, and performance appraisals is also used. In addition, data are collected from human resources staff regarding the training needs of supervisors and managers (IPMA-HR, 2001).

Training Delivery Mechanisms

Corporate Universities

While *corporate university* is a term used to designate formal learning and knowledge-sharing activities within organizations, Allen (2007) contends that true corporate universities are mission-driven and linked to strategy. He defines a corporate university as an "educational entity that is a strategic tool designed to assist its parent organization in achieving its mission by conducting activities that cultivate individual and organizational learning, knowledge, and wisdom" (p. 4). While many organizations contain traditional training departments, fewer have corporate universities that meet the criteria of linking training to the organization's strategic plan.

The terms *corporate university* and *e-learning* are often used interchangeably. However, it is possible to have one without the other. For example, Disney and General Electric have corporate universities that date back over half a century. E-learning can also occur in the absence of a corporate university model. E-learning has been formally defined as "instructional content or learning experiences delivered or enabled by electronic technology" (Weatherly, 2005a, np). Types of e-learning include synchronous and asynchronous web-based training, online lecture support, and blended learning.

In recent years, technological advances have contributed to the proliferation of web-based corporate universities. Interviews among managers at various Global 2500 companies revealed that 39 of the 40 managers responding had online training initiatives within their organizations (Strother, 2002). In 2003, an estimated $11 billion in corporate training funds were dedicated to e-learning (Weatherly, 2005a). The 2006 Society for Human Resource Management (SHRM) Workplace Forecast found that e-learning was a top trend as organizations increased the development and use of online training. Some estimate that there are over 2,000 corporate universities in the U.S. (Scanlan, 2007), and approximately 1,000 corporate universities are established each year (Raelin, 2008). If the trend continues, corporate universities will outnumber traditional universities over the next decade.

Many organizations view the online corporate university model as a flexible and cost-efficient way to establish virtual learning organizations by expanding offerings to more employees, particularly in geographically dispersed areas, while reducing time away from work.

E-learning is cheaper and can reduce training costs up to 60 percent (Zeidner, 2007). Cost savings are often recognized through the reduced time employees spend away from their jobs to attend training. In some cases, training time is cut in half.

Furthermore, corporate universities may be used strategically for long-term human capital development. According to Meister (1998), corporate universities promote the three Cs: corporate citizenship, contextual framework, and core competencies. Corporate universities can reinforce the vision of the organization and enhance employee understanding by sharing information on organizational strategy and direction, including how employees can contribute toward the success of the organization. In contrast, traditional training initiatives emphasized skills training without context of the value of the position or the person within the organization. The three Cs help to clarify the link between the individual, the position, and the organization in moving toward strategic goals.

One framework used to analyze corporate universities is Taylor and Paton's (2002) model (see figure 2), which addresses corporate universities along the dimensions of spatial organization and a learning continuum. Spatial organization defines the location (traditional or virtual); the learning continuum ranges from narrow training (e.g., how to operate X) to broader professional development (e.g., leadership training). Spatial organization is on the vertical axis with web-based learning at the top and traditional courses at the bottom. The learning continuum

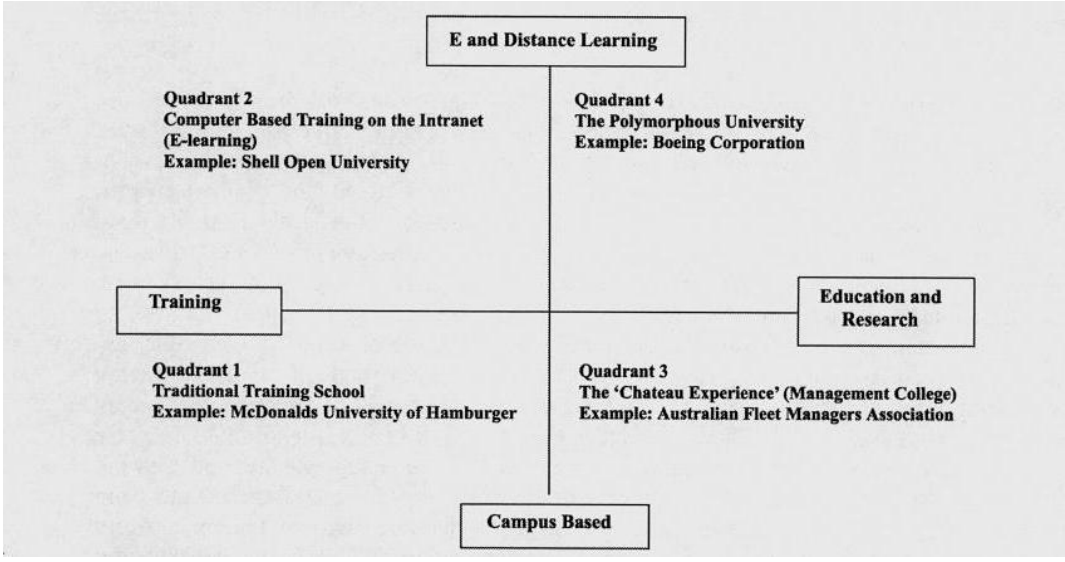

Figure 2 Taylor & Paton's Model of Corporate Universities

is on the horizontal axis, with training on the left and education and research on the right. The first quadrant represents traditional training schools. The second quadrant represents computer-based training. The third quadrant is described as the "chateau experience" and represents traditional courses often offered through universities. The fourth quadrant is described as the "polymorphous university" that combines in-house training with university courses.

Others have noted that corporate universities often consist of various tracks. Prochaska (2001) indicates that components of corporate universities may be categorized along the tracks of business education, professional education, professional development, and technical instruction. Table 1 is a visual display adapted from these components. One advantage to tracks is that employees can take courses from a combination of the four tracks to meet individual and organizational needs. The items listed within each quadrant are only examples, not an exhaustive list. For example, certification and on-the-job training (OJT) could be tied to each track. Certification may also be internal or external.

Table 1 Corporate University Tracks

Professional Education	**Technical Instruction**
Career development	Certification
Certification	Job specific skills training
Supervisory and leadership training	Equipment training
Personal Development	**Organization Education**
Employee health and well-being	Training specific to the organization
Time management	Orientation
Stress management	Organizational policies
Personal finance	Strategic plan

-Adapted from corporate university components outlined by Prochaska (2001)

Distance Learning Delivery Options

The IPMA-HR survey (2001) of individuals representing federal, state, and local jurisdictions found that half of the respondents did not offer any computer-based training and only 19 percent of the organizations offered computer-based training to 75 percent to 100 percent of their employees. Similarly, the majority of organizations (73 percent) reported that less than 10 percent of the training consisted of electronic technology. The timeframe in which the survey

was administered (2000) provides a partial explanation for the findings, as does jurisdictional size. Forty-one percent of respondents represented jurisdictions with population sizes less than 100,000. Rapid technological advances have contributed to the increased use of online training initiatives.

A variety of delivery options are available for distance learning initiatives. The sophistication of the technology used depends on the learning management systems (LMS) software, the ability and willingness of the instructor to integrate technological tools into a web-based course, the quality of the end user's computer, and the cognitive ability and initiative of the end user. The technology used for distance learning consists of a variety of options, including videoconferencing, web-based courses, and knowledge-sharing networks. Within the academic community, Blackboard and Web-CT are the LMS software most widely used to deliver online courses. The benefits of the software include the ability to combine asynchronous discussion boards and assignments with synchronous chat rooms and videoconferencing. The integration of synchronous discussions through audio and visual media challenges prior assertions that the human element is missing in online courses. For example, synchronous "real-time" conversations can occur via the chat function offered in most online platforms; face-to-face interaction via webcams is also possible (Wyatt-Nichol & Dunning, 2008).

Learning portals are websites that serve as information portals and knowledge networks, often tailored to the needs of an organization. A few examples of learning portals include: Fatbrain, Learn.com, ThinQ, ScheduleEarth, Click2Learn, and SkillSoft. In comparison, LMS are software applications that manage the development, storage, and use of learning content. Typical functions of LMS (Rosenberg, 2001) include:

- Developing course catalogs
- Maintaining registrations and records of employee training
- Creating a competency assessment tool
- Administering individual learning assessments
- Distributing learning materials
- Enhancing collaboration
- Integrating systems and knowledge management tools

Efficacy of Training Delivery Mechanisms

The efficacy of training delivery mechanisms is contingent on numerous factors, including learner autonomy, technical capability (of equipment and end-user), and specific job functions for which training is being provided. Learner autonomy exists at varying levels and is influenced by four factors: desire, resourcefulness, initiative, and persistence (Confessore, 1992). Within the context of learning, Lindley (1986) maintains that autonomy is two-dimensional. First, there is a sense of self in which one's actions are attributed to one's goals and purposes. Second is free will and the ability to act in pursuit of self-selected goals. Self-efficacy, defined as "beliefs in one's capabilities to organize and execute the courses of action required for managing prospective situations" (Bandura, 1997, p. 2), serves as the foundation for the construct of learner autonomy. According to social learning theory, self-efficacy is essential for effective learning. The tendency to exhibit self-efficacy is one of the characteristics of typical adult learners (Knowles, 1980). E-learning provides student control over the learning process and incorporates the dynamic of independent study, both of which are characteristics of the autonomous learner. On the other hand, receptiveness to online training is a reflection of learning style preferences. For example, senior managers at Lockheed Martin preferred traditional classroom training over online training (Merriman, 2006). This also could be a reflection of age and generational differences, as the senior managers were all over 40 years of age.

Given the simultaneous demands of providing training to meet the needs of employees with different learning preferences, for numerous jobs reflecting a variety of skill levels, it should come as no surprise that blended learning is a favored training delivery mechanism to balance those demands. IBM realized the cost savings of blended universities, saving $200 million in 1999 by integrating online instruction (80 percent) with traditional classroom instruction (20 percent) (Strother, 2002). Sixty-five percent of respondents to a survey sponsored by the American Society for Training and Development and Balance Learning Limited rated blended learning as efficient and very efficient (Blended learning works best, 2005).

Organizational Snapshots: Training Delivery in Private Sector Organizations

Most large private sector companies have their own corporate universities (even McDonald's). Organizations that have been recognized for their renowned training programs include Land Rover, Motorola, Sears, Walt Disney, and Xerox (Gerbman, 2000; Prochaska, 2001).

ADC Telecommunications

A broadband communications equipment company with over 16,000 employees worldwide, ADC Telecommunications uses the learning portal Click2Learn to deliver training programs online. Click2Learn establishes online portals for the organization to provide courses and track enrollment. Managers at ADC have provided positive feedback, noting that e-learning through the Click2Learn portal was user friendly and easily accessible for employees. In addition, the option was cost effective because it was based on a pay-as-you-go model (Dressler, 2002).

CEM
A U.S. multinational corporation, CEM selected an LMS to link multiple functions within the organization, deliver and track training modules, and keep a record of individual training. The LMS also provided competency mapping and career development paths. Due to the heavy time commitment required for individual competency modeling, CEM focused on positions (Weatherly, 2005b).

Sears
At Sears, educational development activities are administered through Sears University. For example, the curriculum for middle managers emphasizes enhancing the abilities of managers through various courses such as team building and finance. However, technical training courses (e.g., appliance repair) are provided outside of the university. Media sources such as CDs and videotapes are available at the stores and through the university library (Gerbman, 2000).

Organizational Snapshots: Training Delivery in Transportation Organizations

Federal Highway Administration
Within the Office of Professional and Corporate Development, FHWA established a Knowledge Application Team to promote a learning organization by implementing principles of knowledge management through a variety of practices, including knowledge sharing through communities of practice and distance learning. The application of such practices enables the organization to establish networks, orient and train new employees, share expertise, provide professional development, and improve service. To promote retention and enhance program effectiveness, FHWA has established a framework for workforce development that emphasizes recruitment, development, and career opportunities. E-learning initiatives, particularly web conferencing, continue to expand at FHWA with over 100 sites free of charge to FHWA offices. As part of the Office of Professional Development at FHWA, the NHI offered "more than 550 courses to 16,000 individuals" in 2007.

Louisiana Transportation Research Center
The Department of Transportation and Development Structured Training Program provides a curriculum with specific work-related training targeted to each level of employment. Training includes professional development, continuing education, hands-on training, and OJT. The training program covers five areas: construction and materials, maintenance, management development, headquarters program manager, district liaison and training implementation specialist, and district training offices (http://www.ltrc.lsu.edu/).

Organizational Snapshots: Training Delivery in Transportation Organizations (continued)

Minnesota
The Circuit Training and Assistance Program provides training for maintenance positions at the local and state level. A van is equipped to provide on-site training to demonstrate new equipment and techniques. Among the training courses are asphalt pavement maintenance, culvert installation and maintenance, dust control on unpaved roads, gravel road maintenance, roadside vegetation management, and erosion control (http://www.cts.umn.edu/T2/workshops/CTAPwkshop.htm).

Virginia
Through the Virginia Department of Human Resources Management, Virginia was one of the first states to use a data warehouse of human capital management data across state agencies to facilitate succession planning and workforce development (Selden, 2009). In addition, the Virginia DOT offers a Maintenance Training Academy (http://www.virginiadot.org/jobs/mainttrainacademy.asp).

Washington
Training is linked with the strategic plan. "[E]ach behavioral or learning objective in that training program and the strategic objectives of the department are specified. This specification ensures that training is aligned with the strategic imperatives of the organization" (Giber, 1997, p. 22). An Automated Training Management System is used to identify employees for specific training and to schedule and track courses. Curriculum for personal development is also generated for individual employees.

SDOTS
Some SDOTs have established uniform programs for training and certification under the Transportation Curriculum Coordinating Council. Examples of training and certification efforts include: Georgia DOT's Project Engineer Academy and Worksite Erosion Control Certification, Indiana DOT's Technician Certification Program, and PennDOT's Transportation University (TRB, 2003).

Arizona
Through pooled training resources among state agencies in Arizona, the Arizona Government University has provided over 100 courses for state employees. Many of the courses are offered through competency-based formats, including the Advanced Supervisor Certificate Program, and employees are also able to track their progress online (Selden, 2009).

Organizational Snapshots: Training Delivery Department of Defense Initiatives

The Department of Defense (DOD) has invested significant amounts of resources into improving the ability to engage and train soldiers in the military branches. In the last three decades, the Pentagon has developed an extensive satellite network that connects nearly all military installations and mobile entities such as submarines and aircraft. The DOD is currently engaged in the procurement of educational services in the form of a singular organization to coordinate and proffer multiple-agency hosted online educational courses (Interview with General Aaron Lilley, U.S. Army, Retired: in Carlson, Wyatt, & Davis, 2003).

Defense Acquisition University (DAU)
The DAU offers detailed information on certification standards and course schedules for acquisition, technology, and logistics (AT&L) personnel. A detailed list of certification standards for contracting (Levels I-III) are provided in Appendix 3. A full list of certifications is available at http://icatalog.dau.mil/onlinecatalog/CareerLvl.aspx?lvl=3&cfld=16 (http://www.dau.mil/).

Organizational Snapshots: Training Delivery Department of Defense Initiatives (continued)

Defense Acquisition Portal
The Defense Acquisition Portal was launched by the DAU on July 20, 2009. The portal serves as a knowledge-sharing system to assist contracts/acquisition personnel within DOD and replaces the former AT&L Knowledge Sharing System (AKSS). Information on formal course enrollment, certification, career planning and development, and leadership training are provided (https://dap.dau.mil).

DOD Advanced Distributed Learning (ADL) Initiative

ADL represents the collaborative efforts of over 1,600 colleges and universities and over 150 corporations to promote standards for content design and delivery. The Sharable Content Object Reference Model is used as a standard to enable sharable and reusable content (http://www.adlnet.org).

National Defense University
The National Defense University has physical locations in Washington, DC, and Norfolk, VA. Web courses are also available. Numerous certifications are available, including Government Strategic Leader and Chief Financial Officer (http://www.ndu.edu/irmc/pcs/prog_crs_svcs1.html).

Evaluation of Training

While there are numerous models to evaluate training, most are adaptations of Kirkpatrick's (1979) classic model, which posits that training can be evaluated at four levels: reaction, learning, transfer, and results. Reaction typically reflects student satisfaction with course delivery, including the instructor and content. Learning is often assessed through testing. Transfer is the change in behavior and application of new skills on the job after completion of a training program. According to the cognitive theory of transfer, application of new knowledge and skills depends on the capability of the trainee; nevertheless, the likelihood of transfer is increased when training assignments simulate work (Raelin, 2008). As the fourth level to evaluate training, results measure outcomes that occur due to training. Strategies to influence training outcomes include acknowledging positive performance that results from training through (1) written documentation such as performance appraisals and organization newsletters and (2) performance measurements linking training to future opportunities. Not surprisingly, an IPMA-HR survey (2001) found that 92 percent of respondents representing public sector organizations evaluated training at the first level through course evaluation surveys. Similarly, focus groups were used by all respondents, but the approach was used less than 10 percent of the time. Although the majority of respondents attempted to evaluate learning at the fourth level, only 6 percent used such measures more than 75 percent of the time.

Others have promoted a fifth level to evaluate training—return on investment (ROI). Cost-benefit ratios are developed by converting data on reaction, learning, transfer, and results into monetary values to be compared with the cost of training. Phillips' (2003) model to assess the ROI for the four evaluation levels of training is provided below:

Level 1: Reaction ROI

Ask participants to:

- Identify any improvement in knowledge and skills

- Identify planned actions to utilize their new knowledge and skills
- Describe how improved knowledge and skills will impact work
- Estimate the dollar impact of change; provide the basis of estimates and level of confidence

Level 2: Learning ROI

- Develop tests to measure the objectives and job relevance of training modules or courses
- Establish a relationship between test scores and individual performance
- Establish a monetary value for performance data by estimating the dollar value associated with each level of increase in performance
- Compare training costs of the program to performance data

Level 3: Transfer ROI

- Develop job competencies
- Determine monetary value of the job competencies (salary surveys and market value may be used)
- Calculate the value of each participant's skill level prior to training and after training using pre- and post-test scores
- Subtract post-test scores from pre-test scores to determine added value of training with respect to changes in competence
- Compare total costs and benefits

Level 4: Results ROI

- Conduct ROI calculations for levels 1 to 3
- Establish measures relevant to the organization to determine whether training produced desired results
- Determine what increases in productivity or decreases in costs were achieved
- Determine to what extent organizational goals were advanced

A National Cooperative Highway Research Program (Giber, 1997) survey of transportation agencies found that among the 37 respondents, 35 measured reaction to training. In contrast, 18 measured learning, 17 measured behavior, and 12 measured results. Not surprisingly, few organizations evaluate training using ROI. According to one American Society for Training and Development study in 2000, only 3 percent of respondents in one survey measured the business results of training (Strother, 2002). Those organizations that do attempt to link training and results use a variety of measures, including turnover, absenteeism, production, costs, and reduced errors.

Software Applications for Workforce Planning/ROI

Human capital software applications have been developed to track workforce development and ROI. For example, ProCourse ROI is a software application developed by Capital Analytics, Inc. to assess workforce development initiatives (Selden, 2009). When Excel is combined with Business Objects Crystal Xcelsius, it can be used to run "what if" analyses. Similarly, some organizations have used the statistical software packages SAS and SPSS to track workforce development and estimate future trends. For example, the state of North Carolina worked with the SAS Institute to develop a software package, Workforce Outlook and Retirement Knowledge System (NC WORKS). NC WORKS is a data warehouse that provides detailed information on workforce shortages and surpluses to arrive at better workforce planning decisions (Selden, 2009, p. 170). Other applications include PeopleSoft's Enterprise Performance Management, SAP's NetWeaver, and Oracle's Daily Business Intelligence.

Organizational Snapshots: Evaluation of Training

Oklahoma
The OK Office of Personnel employs the Kirkpatrick model to evaluate training using a variety of measures. Typical course evaluations are used to assess reactions to training. Learning is sometimes evaluated through pre/post tests. To assess behavioral changes, participants are asked about specific changes that may have occurred as a result of training. Since 1991, overall results have been evaluated through "Quality Oklahoma," which documents cost savings representing an ROI of $30 for every $1 invested in training, and, since 1986, through the "Certified Public Manager Program," which uses cost savings generated from final projects at $20 ROI for every $1 invested in the program (http://www.ipma-hr.org/content.cfm?pageid=314).

Phoenix, AZ
Learning and behavioral changes are assessed through focus groups of employees and their supervisors. Employees are asked about the application of training to their position, what they considered the best part of training, and suggestions for improvement. Supervisors are asked about observable changes in the employee since training, knowledge or skills that are still lacking, and suggestions to improve training.

Organizational Snapshots: Evaluation of Training (continued)

Phoenix, AZ (continued)
The city also examines citizen and employee satisfaction. Employee attitude surveys have been measured on a regular basis since 1980 and citizen satisfaction has been measured since 1985. The city interprets training efforts and satisfaction levels cautiously (noting that direct causation cannot be proven) yet simultaneously (http://www.ipma-hr.org/content.cfm?pageid=315).

Hennepin, MN
Training evaluations are conducted at levels I-III of the Kirkpatrick model—typical course evaluation for level I and self-assessment for level II. Transfer of learning for new supervisors is assessed through action plans and peer coaching circles. Participants must develop action plans that focus on behavioral changes prior to completion of training. During the peer coaching circles, participants discuss any supervisory issues that may have arisen in their new roles. Peers offer advice and strategies on how to address the issue (IPMA-HR, 2001; IPMA Best Practices, http://www.ipma-hr.org/files/2002_01_bp_final.pdf).

Scanlan (2007) contends that, overall, the following conditions are necessary for corporate universities to be successful:

- Support from executive leadership (financial and strategic)
- A mission and learning goals that are aligned with the strategy of the organization
- Internal marketing to encourage employee participation
- Online modules available 24/7 and traditional classroom instruction for topics that are not conducive to the online format
- An assessment process

Online Survey of State Highway Administrations

An online survey was developed in May 2009 to gather data from state highway administrations throughout the United States. Questions included on the survey were based on prior meetings between representatives from the University of Baltimore and the MSHA. On May 21, 2009, team members from the University of Baltimore and the MSHA met to review the survey. The survey was then modified and prepared for submission to the university's institutional review board. The board approved the survey in mid-June. Email addresses were then gathered for state DOT officials, and the survey was sent out on June 24th. A follow-up reminder was emailed on July 15th. Twenty-five respondents representing 25 state highway agencies responded to the survey. A copy of the email invitation letter and online survey are included in the appendices.

States Represented in the Survey Results		
California	Nebraska	South Dakota
Colorado	Nevada	Tennessee
Florida	New York	Texas
Georgia	North Carolina	Vermont
Kansas	Ohio	Virginia
Minnesota	Oregon	Washington
Mississippi	Pennsylvania	Wyoming
Missouri	South Carolina	*X1 and X2

** Two respondents chose not to identify their states. They are identified in the results as X1 and X2.*

Results

Structure and Administration of Training

The majority of respondents (68 percent) report that legally mandated training is centralized. In comparison, 48 percent (n=12) indicate that non-mandated, skills-specific training is centralized, and 52 percent (n=13) report that such training is decentralized. The majority of respondents (92 percent) also report that training programs are developed and delivered by both the organization and through external organizations or consultants. Table 2 provides the percentage of training outsourced to various external organizations.

Table 2 Percentage of Outsourced Training

Percentage of training outsourced to:	0-20%	21-40%	41-60%	61-80%	81-100%	No response
UTCs	56% (14)	8% (2)	--	--	--	36% (9)
T2Cs	52% (13)	16% (4)	--	4% (1)	--	28% (7)
Local 4-yr. colleges & universities	64% (16)	16% (4)	--	--	--	20% (5)
Community colleges	60% (15)	4% (1)	--	--	--	36% (9)

Table 2 Percentage of Outsourced Training

Percentage of training outsourced to:	0-20%	21-40%	41-60%	61-80%	81-100%	No response
Industry partners	44% (11)	12% (3)	--	--	4% (1)	40% (10)
Other state agencies	48% (12)	12% (3)	--	--	--	40% (10)
FHWA	56% (14)	16% (4)	--	8% (2)	--	20% (5)
Private vendors	48% (12)	28% (7)	--	--	4% (1)	20% (5)

Training Delivery to Remote Sites

One of the open-ended questions on the survey asked respondents how their organization delivers training to remote sites. Twenty-two respondents provided written comments to this question. Table 3 provides a visual summary of the comments. As expected, most state transportation agencies send trainers out to regional facilities or field offices to provide on-site training to these remote locations. Many organizations are also using videoconferencing as a tool. For example, Texas indicates videoconferencing is provided across 60-plus points throughout the state. Other states, such as Georgia, are only beginning to venture into web-based conferencing. Several states also report using online training as a delivery tool for remote locations. While the extent of online training is not measured in the open-ended responses (see section on the distribution of learning hours for more information), the presence of online training mechanisms does not necessarily equate to an increase in online training offered. For example, Nevada reports that while online training exists within their organization, it is probably used less than 5 percent of the time to deliver training to remote locations.

Table 3 Training Delivery to Remote Sites

	Regional facilities or field offices	Videoconferencing	Online training
CO	X	X	
FL	X	X	X
GA	X	X	
MN	X	X	X
MO	X		
NC	X		
NE	X		
NV	X		X
NY	X	X	X
OH	X		
OR	X	X	X
PA	X		X
SC	X	X	
SD	X		
TN	X		
TX	X	X	X
VA	X	X	X
VT	X		
WA	X		X
WY	X	X	
X1	X		
X2	X	X	X

Software Used to Deliver Online Training

An open-ended question was also provided for respondents to list the software system they use to deliver training. Colorado indicates the use of "*SecureMeeting* for webinars; *RWD infopak* for SAP training; some are hosted by a vendor." Minnesota internally develops e-learning, delivers with Flash, and uses Pathlore as an LMS to host e-learning. Missouri also uses Pathlore. New York reports that they "internally developed using *flash*, html, *captivate*, launched through our own servers." Oregon also reports the use of Captivate, in addition to Articulate and Breeze. Pennsylvania uses Training Partner Online. Virginia and Texas report the use of

Meridian KSI to deliver online training. The state of Washington uses GeoLearning as an LMS through the Department of Personnel.

Training Needs Assessment

The majority of respondents indicate that their state agency identifies training needs using the following tools: certification requirements for the position (76 percent), performance appraisals (68 percent), professional development plans (68 percent), and agency workforce plans (60 percent). Respondents are almost evenly divided on the use of career development plans. Fifty-two percent (n=13) use career development programs to identify training needs, while 48 percent (n=12) do not. Similarly, 56 percent (n=14) of respondents report that their agencies link training with succession planning compared to 44 percent (n=11) of agencies that do not.

An open-ended question was also presented asking respondents to identify areas where training needs have not been met within their organization. Of the 25 survey respondents, 15 provided typewritten comments. Six respondents indicated that professional development opportunities are limited, particularly in the areas of leadership and supervisory skills. One respondent stated that the, "Primary focus is on mandated and business critical, leaving individual development for career advancement lacking." Another respondent stated that training needs had not been met in "succession planning general supervisory training—field forces performance management for supervisors."

Another theme that emerged from the comments was that of getting training to employees. One respondent stated that the "challenge is to ensure that all affected employees receive the necessary training in a timely manner. This encompasses all facets of operations." Another pointed out that the quantity and frequency of training needs have not been met. One respondent stated that, "There are some supervisors that don't believe in training. So they will not request or send people to it." In addition, two respondents directly stated that training demands often exceed funding. One respondent asserted that they were, "Funded at 62 percent level of actual needs…. Skill gaps continue to increase yearly due to budget constraints."

Respondents were also asked about specific gaps in training content. Among the 25 respondents, 14 provided written comments. Three respondents were uncertain of specific

training gaps. Five noted that training gaps did exist but did not elaborate on specific areas. A few other comments are provided below:

- Training content is continually under review to identify gaps and update this content. Gaps are likely in certain areas mostly due to lack of resources to focus on updating requirements.
- Training presentations need to be tailored to employees' 63 different garages.
- Gaps have been identified in soft skills training over technical training.
- Broadest coverage in engineering and maintenance, while less coverage applies to real estate, accounting contract, and audit functions.

In addition to assessing training needs, respondents were asked how training was evaluated. All respondents reported the use of employee evaluation of training as one method to assess training. In contrast, respondents were divided on the use of performance appraisals, with 52 percent (n=13) using appraisals to assess training compared to 48 percent (n=12) who did not. Only 36 percent assessed training through an annual review of performance development plans.

Through an open-ended question, respondents were also asked what training is needed within the next five years to ensure that MSHA personnel will have the required skills to meet the future demands of the organization. Twenty of the 25 respondents provided typewritten comments that included one or more key words used to identify common themes. A few themes that emerged were training for technological advances, contract and project management, leadership skills, generational differences, and in all skills due to the percentage of the workforce eligible for retirement. Ten comments included the importance of training for technological advances—a few provided specific references to engineering practices, data management systems, and equipment. Six comments emphasized the importance of developing contract and project management skills among employees. Five comments included statements on the need for leadership training. Five comments noted the importance of training across all skill levels. Two comments cited the need to develop training approaches and knowledge transfer in a way that appeals to younger generations. One respondent noted the need to develop training for working across generations. Another respondent suggested training on organizational change and development. A few specific comments are provided below:

- IT-related training for data management systems. Training in all skills since up to 50 percent of workforce is now eligible for retirement.
- More training is needed on contract and project management for all disciplines, not just in engineering.
- Training in project management, comprehensive development agreement oversight and management, and leadership and advanced management.
- Training in transportation project management; training that focuses on new technologies related to design, construction, and maintenance.
- Training in knowledge management, working with different generations, and people skills to cut down on turnover.
- Skills to develop organizational and individual trust, manage organizational change, and learn systems method of problem solving.

Distribution of Learning Hours

Respondents were asked to identify the distribution of learning hours through traditional classroom training, e-learning/computer-based training (CBT), blended format, and OJT (check all that apply). Table 4 illustrates that the highest distribution of learning hours remains in traditional classroom settings, with OJT representing the second highest, followed by the blended format. E-learning represents the lowest distribution of learning hours.

Table 4 Distribution of Learning Hours

Distribution of Learning Hours	0-20%	21-40%	41-60%	61-80%	81-100%	No response
Classroom	--	20% (5)	28% (7)	40% (10)	12% (3)	--
E-learning/CBT	72% (18)	20% (5)	--	--	--	8% (2)
Blended format	52% (13)	24% (6)	4% (1)	--	--	20% (5)
OJT	24% (6)	32% (8)	36% (9)	8% (2)	--	--

Training Delivery Mechanisms for Key Processes

Prior to questions related to the specific functions of maintenance, real estate, and finance, respondents were asked to identify training delivery mechanisms for key processes overall. Figure 3 illustrates that a combination of classroom instruction and OJT are preferred for key processes of contract administration. In contrast, organizations appeared to vary in their training delivery preferences for procurement and budget and finance (figures 4 and 5).

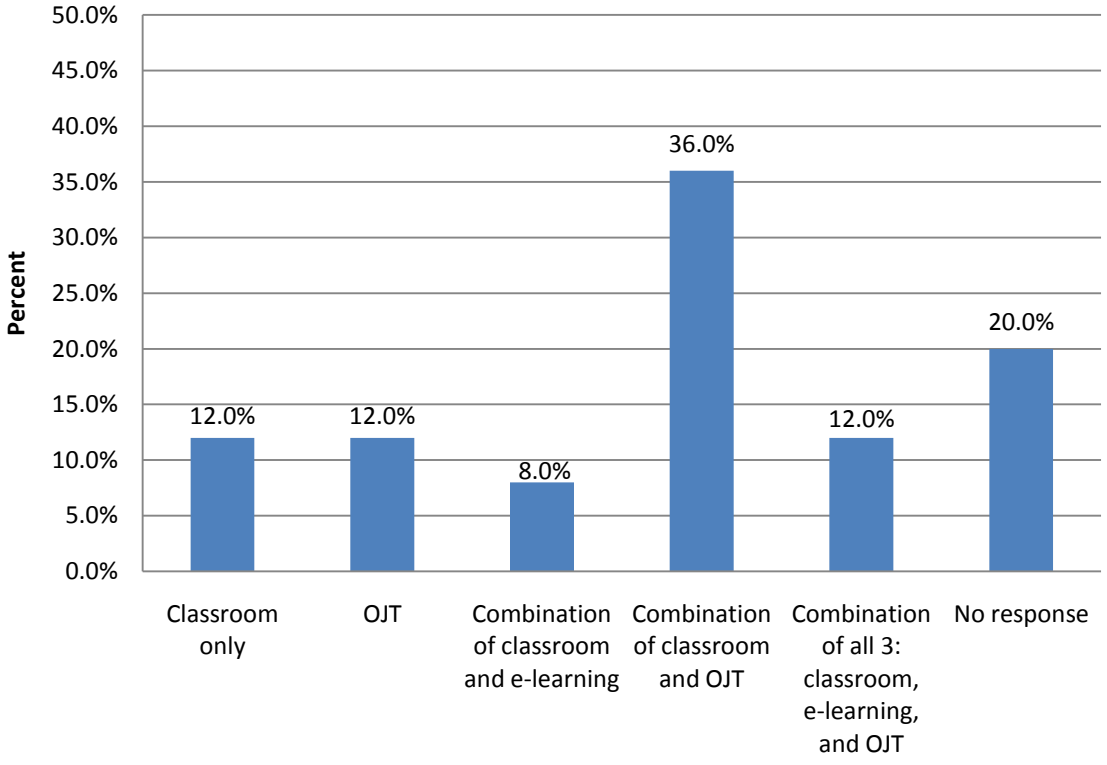

Figure 3 Training Delivery Mechanisms for Key Processes of Contract Administration

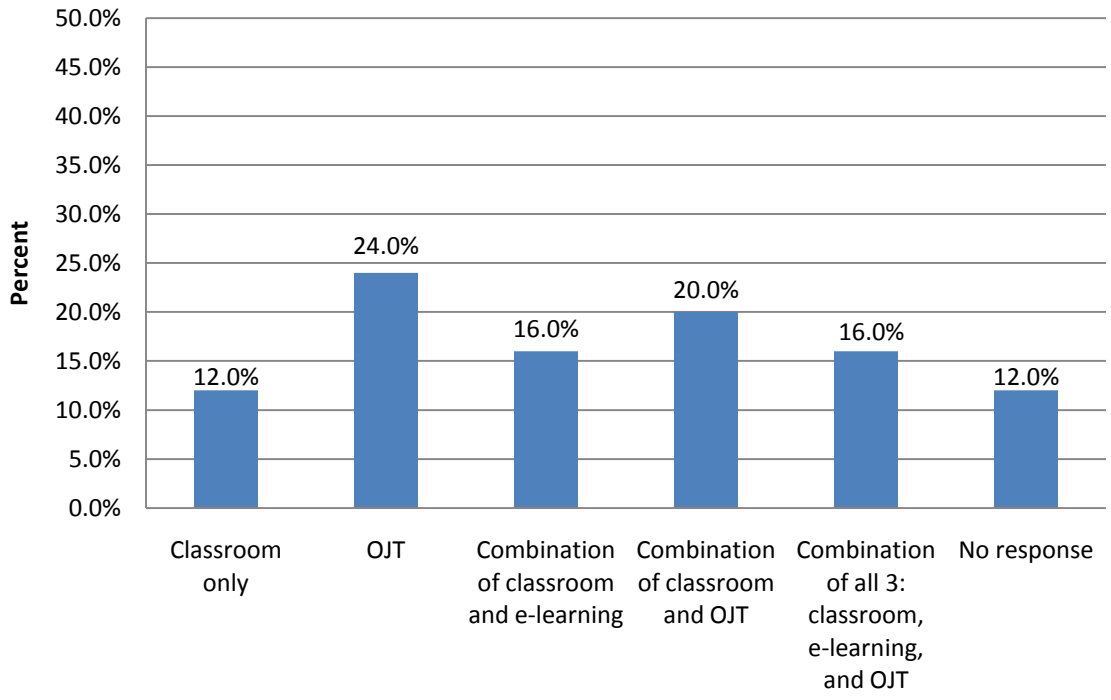

Figure 4 Training Delivery Mechanisms for Key Processes of Procurement

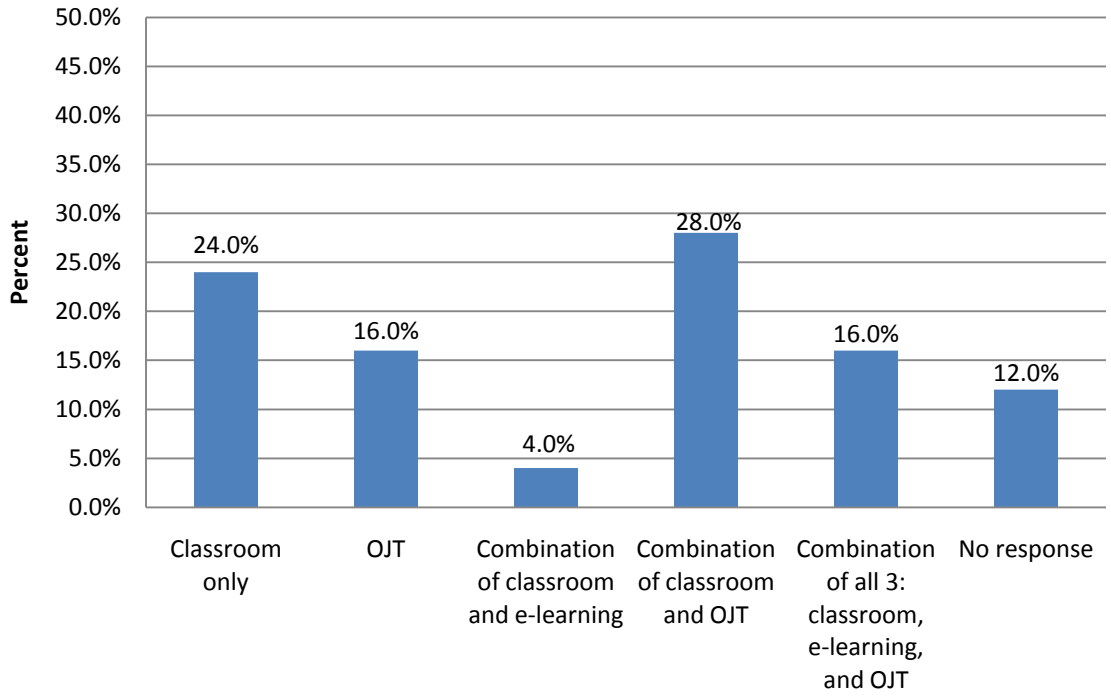

Figure 5 Training Delivery Mechanisms for Key Processes of Budget and Finance

Training Delivery Mechanisms for Specific Functions within Positions

Tables 5 to 7 reflect training delivery mechanisms for specific functions within the positions of maintenance, finance, and real estate. Table 5 demonstrates that the majority of respondents provided either classroom instruction or a combination of classroom instruction and OJT to deliver training for most field maintenance functions. Very few organizations utilized e-learning or a combination of e-learning with other delivery mechanisms. In comparison, the use of classroom-only instruction appears to be the prevalent training delivery mechanism for real estate functions, although OJT and a combination of classroom instruction and OJT are also utilized (table 6). When it comes to training delivery mechanisms for finance organizations, these are often split between classroom-only instruction, OJT only, or a combination of the two (table 7). It is surprising to note that among the positions, field maintenance was the only one where "e-learning only" was used by at least one organization to deliver training for a few specific functions (emergency communications, construction math, pesticide applicator, and [as it should be] the National Incident Management System [NIMS]). A few respondents also indicated a combination of all three training delivery mechanisms (classroom, e-learning, and OJT) for field maintenance and finance positions.

Table 5 Training Delivery Mechanisms for Field Maintenance Position Functions

Field Maintenance	**Classroom only**	**E-learning only**	**OJT only**	**Combination classroom & e-learning**	**Combination classroom & OJT**	**Combination e-learning & OJT**	**Combination classroom, e-learning, & OJT**	**No response**
Registered Flagger	53% (13)	--	--	--	32% (8)	4% (1)	4% (1)	8% (2)
Emergency Communications	28% (7)	4% (1)	8% (2)	--	28% (7)	4% (1)	8% (2)	20% (5)
Chain Saw Safety	28% (7)	--	8% (2)	4% (1)	36% (9)	4% (1)	--	20% (5)
CPR & First Aid	72% (18)	--	--	4% (1)	20% (5)	--	--	4% (1)
Heavy Equipment	8% (2)	--	8% (2)	--	68% (17)	--	8% (2)	8% (2)
Traffic Control	36% (9)	--	--	--	48% (12)	--	8% (2)	8% (2)

Table 5 Training Delivery Mechanisms for Field Maintenance Position Functions

Field Maintenance	Classroom only	E-learning only	OJT only	Combination classroom & e-learning	Combination classroom & OJT	Combination e-learning & OJT	Combination classroom, e-learning, & OJT	No response
Construction Math	32% (8)	12% (3)	12% (3)	8% (2)	8% (2)	4% (1)	4% (1)	20% (5)
Pesticide Applicator	36% (9)	4% (1)	4% (1)	4% (1)	28% (7)	4% (1)	--	20% (5)
Roadside Tree Care	36% (9)	--	8% (2)	--	12% (3)	--	--	25% (11)
Soils & Aggregate Compaction	36% (9)	--	4% (1)	8% (2)	32% (8)	--	--	20% (5)
Concrete	40% (10)	--	4% (1)	8% (2)	32% (8)	--	--	16% (4)
Hot Mix Asphalt	36% (9)	--	4% (1)	8% (2)	40% (10)	--	--	12% (3)
Pavement Marking	36% (9)	--	8% (2)	4% (1)	28% (7)	4% (1)	--	20% (5)
NIMS	40% (10)	4% (1)	4% (1)	24% (6)	4% (1)	--	8% (2)	16% (4)
Contract Management	36% (9)	--	12% (3)	--	28% (7)	--	12% (3)	12% (3)
Procurement	24% (6)	--	24% (6)	8% (2)	20% (5)	--	8% (2)	16% (4)

Table 6 Training Delivery Mechanisms for Real Estate Position Functions

Real Estate	Classroom only	E-learning only	OJT only	Combination classroom & e-learning	Combination classroom & OJT	Combination e-learning & OJT	Combination classroom, e-learning, & OJT	No response
Procurement	44% (11)	--	16% (4)	--	12% (3)	--	--	28% (7)
Skills of Expert Testimony	32% (8)	--	12% (3)	4% (1)	16% (4)	--	--	36% (9)
Principles of Appraisal	48%	--	8% (2)	--	20% (5)	--	--	24% (6)
Principles of Law	48%	--	8% (2)	4% (1)	16% (4)	--	--	24% (6)
Relocation Assistance	44%	--	12% (3)	--	20% (5)	--	--	24% (6)
Legal Aspects of Easements	48% (12)	--	12% (3)	--	16% (4)	--	--	24% (6)
Eminent Domain Law	48%	--	4% (1)	--	24% (6)	--	--	24% (6)
Easement Valuation	48%	--	16% (4)	--	8% (2)	--	--	28% (7)
Appraisal of Partial Acquisitions	52%	--	12% (3)	--	8% (2)	--	--	28% (7)
Title VIII	60%	--	8% (2)	--	8% (2)	--	--	24% (6)
Basic Plat Reading	36%	--	16% (4)	4% (1)	12% (3)	--	--	32% (8)
Principles of Land Acquisitions	44% (11)	--	8% (2)	--	20% (5)	--	--	28% (7)
Investment Analysis	40%	--	20% (5)	--	4% (1)	--	--	36% (9)
Industrial Valuation	36%	--	20% (5)	--	8% (2)	--	--	36% (9)
Lease and Leasehold Valuation	40% (10)	--	20% (5)	--	4% (1)	--	--	36% (9)

Table 7 Training Delivery Mechanisms for Finance Position Functions

Finance	Classroom only	E-learning only	OJT only	Combination classroom & e-learning	Combination classroom & OJT	Combination e-learning & OJT	Combination classroom, e-learning, & OJT	No response
Financial Reporting	32% (8)	--	28% (7)	--	16% (4)	4% (1)	--	20% (5)
Intro. to FMIS*	36% (9)	--	24% (6)	--	16% (4)	--	4% (1)	20% (5)
Budget & Fiscal Management	32% (8)	--	20% (5)	--	28% (7)	--	--	20% (5)
Contract Management	28% (7)	--	24% (6)	4% (1)	16% (4)	--	8% (2)	20% (5)
Procurement	32% (8)	--	16% (4)	4% (1)	20% (5)	--	12% (3)	16% (4)

*Financial Management Information System

Anticipated Changes in Course Content and Delivery

Seventeen respondents provided typewritten comments on anticipated changes in training content over the next five years. Although many respondents stated that technology is an area where training needs have not been met within the organization, several respondents anticipated changes in course content as a result of technological changes. A few respondents also referred to an increased use of in-house experts and changes in content resulting from expanding responsibilities. A few comments are provided below:

- Content of technical training changes as technology changes in the industry. Non-technical ("soft") skills will become even more important as baby-boomer supervisors hit retirement.
- Content will reflect changes within industry priorities and strategies. Skills and knowledge indicative of broader scope of responsibilities.
- More financial management/resource accountability training at all levels. Preventative maintenance.
- As resource constraints continue, we anticipate the need to use in-house experts for content and to harness informal learning for increased knowledge transfer.

- Make more use of gaming and other learning tools and techniques that are more conducive to bringing in new talent.
- Content will continue to be driven by technology, new equipment and new methods, materials and procedures, as well as political, social, and economic influences.

Twenty-two respondents provided typewritten comments on anticipated changes in training delivery over the next five years. Nearly every respondent (21 out of 22) stated that they expect to see an increase in the number of blended and online training courses offered by their organization. In addition, one respondent provided comments on the need to establish criteria: "Setting standards [on] when to use videoconferencing, classroom, webinars, or other forms of technology-based learning."

Barriers to Training

As expected (see figure 6), the majority of respondents (68 percent) indicated that funding is a "significant" and "very significant" barrier to meeting training needs. The majority of respondents (60 percent) also reported that the reluctance of managers to allow employees to attend training is only a slight barrier to meeting training needs. In comparison, employee resistance to training is reported as a significant barrier (12 percent), neither (20 percent), a slight barrier (48 percent), and not at all a barrier (20 percent).

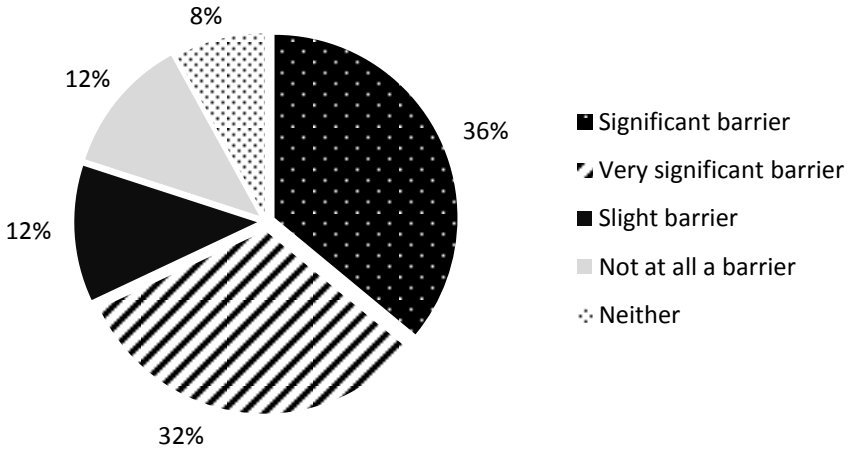

Figure 6 Funding Barriers to Training Needs

Selected State Comparisons

States that reported training delivery to remote sites through the three mechanisms of visiting regional facilities or field offices, videoconferencing, and providing online training included: Florida, Minnesota, New York, Oregon, Pennsylvania, Texas, and Virginia (see table 3). As a result, these states were selected for further cross comparisons. Table 8 illustrates that most of the selected states use performance appraisals, professional development plans, and certification requirements to identify training needs. Four of the seven states selected for comparison also use agency workforce plans; however, only two states reported the use of career development programs to assess training needs.

Table 8 Selected State Comparisons of Training Needs Assessment

Training needs identified through:	Agency workforce plans	Career development programs	Certification requirements for position	Performance appraisals	Professional development plans
FL			X	X	X
MN			X	X	X
NY			X	X	X
OR	X		X	X	X
PA	X		X	X	
TX	X	X		X	X
VA	X	X	X	X	X

Although the states were selected for comparison because they utilized a variety of training delivery mechanisms, the distribution of learning hours is much higher for traditional classroom instruction and OJT, with New York and Oregon reporting the highest percentages. Most of the states reported less than 20 percent of instruction though e-learning or a blended model of classroom instruction and e-learning. In comparison, Florida and Virginia reported 21 percent to 40 percent of instruction through e-learning (table 9).

An examination of outsourcing of training reveals that Minnesota reported the highest use of UTCs (21 percent to 40 percent). Four states reported that up to 20 percent of their training was outsourced to Transportation Technology Transfer Centers (T2Cs). A comparison of colleges and universities reveals that three states reported up to 20 percent of their training outsourced to four-year colleges and universities, while Florida and Minnesota reported up to 40 percent of their training outsourced to universities. Similarly, most states reported up to 20

percent of training outsourced to community colleges, with only Florida reporting 21 percent to 40 percent of outsourcing via community colleges. States reported a higher use of industry partners and private vendors (table 10).

Table 9 Selected State Comparisons of Training Delivery Mechanisms

Distribution of learning hours:	0-20%	21-40%	41-60%	61-80%	81-100%	No response
Classroom						
FL			X			
MN		X				
NY				X		
OR				X		
PA		X				
TX			X			
VA			X			
E-learning/CBT						
FL		X				
MN	X					
NY	X					
OR	X					
PA	X					
TX	X					
VA		X				
Blended format						
FL						X
MN	X					
NY	X					
OR	X					
PA		X				
TX	X					
VA	X					
OJT training						
FL			X			
MN						
NY				X		
OR				X		
PA		X				
TX	X					
VA	X					

Table 10 Selected State Comparisons of Outsourcing of Training

Percentage of training outsourced to:	0-20%	21-40%	41-60%	61-80%	81-100%	No response
UTCs						
FL						X
MN		X				
NY						
OR						X
PA						X
TX	X					
VA	X					
T2Cs						
FL	X					
MN	X					
NY	X					
OR						X
PA						X
TX						X
VA	X					
Local 4-year colleges & universities						
FL		X				
MN		X				
NY	X					
OR						X
PA						X
TX	X					
VA	X					
Community colleges						
FL		X				
MN	X					
NY	X					
OR						X
PA						X
TX	X					
VA	X					
Industry partners						
FL						X
MN		X				
NY		X				
OR						X
PA		X				
TX	X					
VA	X					

Table 10 Selected State Comparisons of Outsourcing of Training

Percentage of training outsourced to:	0-20%	21-40%	41-60%	61-80%	81-100%	No response
Other state agencies						
FL						X
MN	X					
NY	X					
OR						X
PA	X					
TX						X
VA	X					
FHWA						
FL	X					
MN	X					
NY				X		
OR						X
PA		X				
TX	X					
VA	X					
Private vendors						
FL		X				
MN	X					
NY						X
OR		X				
PA		X				
TX	X					
VA	X					

Tables 11 to 13 illustrate training delivery mechanisms among the selected states for various functions within the positions of field maintenance, real estate, and finance. Classroom instruction, OJT, and a combination of both were most frequently reported for field maintenance positions. A few states reported the use of e-learning or a combination of e-learning and classroom instruction for functions such as emergency communications, CPR and first aid, construction math, concrete, and (as expected) NIMS (table 11). In comparison, training for the various functions of real estate was more likely to occur through traditional classroom settings. Although there was some reported use of OJT, it was far less frequent, as expected, than what is used for field maintenance positions (table 12). While training for the functions of financial management was more likely to occur through traditional forms of instruction such as classroom settings or OJT, a few of the selected states reported the use of a combination of classroom

instruction, OJT, and e-learning for the functions of contract management and procurement (table 13).

Table 11 Selected State Comparisons of Training Delivery Mechanisms for Field Maintenance Position Functions

Field Maintenance	Classroom only	E-learning only	OJT only	Combination classroom & e-learning	Combination classroom & OJT	Combination e-learning & OJT	Combination classroom, e-learning, & OJT	No response
Registered Flagger								
FL								X
MN	X							
NY	X							
OR	X							
PA							X	
TX					X			
VA	X							
Emergency Communications								
FL								X
MN					X			
NY	X							
OR		X						
PA							X	
TX							X	
VA					X			
Chainsaw Safety								
FL					X			
MN	X							
NY	X							
OR	X							
PA					X			
TX								X
VA					X			
CPR & First Aid								
FL	X							
MN	X							
NY	X							
OR	X							
PA					X			
TX				X				
VA	X							

Table 11 Selected State Comparisons of Training Delivery Mechanisms for Field Maintenance Position Functions

Field Maintenance	Classroom only	E-learning only	OJT only	Combination classroom & e-learning	Combination classroom & OJT	Combination e-learning & OJT	Combination classroom, e-learning, & OJT	No response
Heavy Equipment								
FL					X			
MN					X			
NY			X					
OR	X							
PA					X			
TX					X			
VA					X			
Traffic Control								
FL								X
MN	X							
NY	X							
OR	X							
PA							X	
TX					X			
VA					X			
Construction Math								
FL								X
MN				X				
NY	X							
OR		X						
PA					X			
TX			X					
VA	X							
Pesticide Applicator								
FL								X
MN	X							
NY	X							
OR	X							
PA					X			
TX					X			
VA	X							
Roadside Tree Care								
FL								X
MN	X							

Table 11 Selected State Comparisons of Training Delivery Mechanisms for Field Maintenance Position Functions

Field Maintenance	**Classroom only**	**E-learning only**	**OJT only**	**Combination classroom & e-learning**	**Combination classroom & OJT**	**Combination e-learning & OJT**	**Combination classroom, e-learning, & OJT**	**No response**
NY	X							
OR	X							
PA	X							
TX								X
VA	X							
Soils & Aggregate Compaction								
FL	X							
MN	X							
NY	X							
OR	X							
PA	X							
TX			X					
VA			X					
Concrete								
FL	X							
MN	X							
NY	X							
OR	X							
PA	X							
TX					X			
VA				X				
Hot Mix Asphalt								
FL	X							
MN	X							
NY	X							
OR	X							
PA	X							
TX					X			
VA					X			
Pavement Marking								
FL	X							
MN	X							
NY	X							
OR								X
PA	X							

Table 11 Selected State Comparisons of Training Delivery Mechanisms for Field Maintenance Position Functions

Field Maintenance	**Classroom only**	**E-learning only**	**OJT only**	**Combination classroom & e-learning**	**Combination classroom & OJT**	**Combination e-learning & OJT**	**Combination classroom, e-learning, & OJT**	**No response**
TX					X			
VA				X				
NIMS								
FL								X
MN				X				
NY		X						
OR		X						
PA	X							
TX							X	
VA				X				
Contract Management								
FL	X						X	
MN								
NY					X			
OR					X			
PA	X							
TX							X	
VA							X	
Procurement								
FL	X							
MN	X							
NY			X					
OR	X							
PA				X				
TX							X	
VA					X			

Table 12 Selected State Comparisons of Training Delivery Mechanisms for Real Estate Position Functions

Real Estate	Classroom only	E-learning only	OJT only	Combination classroom & e-learning	Combination classroom & OJT	Combination e-learning & OJT	Combination classroom, e-learning, & OJT	No response
Procurement								
FL	X							
MN	X							
NY	X							
OR	X							
PA	X							
TX					X			
VA	X							
Skills of Expert Testimony								
FL	X							
MN	X							
NY	X							
OR	X							
PA				X				
TX								X
VA	X							
Principles of Appraisal								
FL	X							
MN	X							
NY	X							
OR	X							
PA	X							
TX					X			
VA					X			
Relocation Assistance								
FL	X							
MN	X							
NY	X							
OR	X							
PA	X							
TX					X			
VA					X			
Legal Aspects of Easements								
FL	X							
MN	X							

Table 12 Selected State Comparisons of Training Delivery Mechanisms for Real Estate Position Functions

Real Estate	**Classroom only**	**E-learning only**	**OJT only**	**Combination classroom & e-learning**	**Combination classroom & OJT**	**Combination e-learning & OJT**	**Combination classroom, e-learning, & OJT**	**No response**
NY	X							
OR	X							
PA	X							
TX					X			
VA					X			
Eminent Domain Law								
FL	X							
MN	X							
NY	X							
OR	X							
PA	X							
TX					X			
VA					X			
Easement Valuation								
FL	X							
MN	X							
NY	X							
OR	X							
PA	X							
TX								X
VA	X							
Appraisals of Partial Acquisitions								
FL	X							
MN	X							
NY	X							
OR	X							
PA	X							
TX								X
VA	X							
Title VIII								
FL	X							
MN	X							
NY	X							
OR	X							
PA	X							

Table 12 Selected State Comparisons of Training Delivery Mechanisms for Real Estate Position Functions

Real Estate	**Classroom only**	**E-learning only**	**OJT only**	**Combination classroom & e-learning**	**Combination classroom & OJT**	**Combination e-learning & OJT**	**Combination classroom, e-learning, & OJT**	**No response**
TX	X							
VA	X							
Basic Plat Reading								
FL								X
MN	X							
NY	X							
OR	X							
PA	X							
TX								X
VA	X							
Principles of Land Acquisitions								
FL	X							
MN	X							
NY	X							
OR	X							
PA	X							
TX								X
VA					X			
Investment Analysis								
FL	X							
MN	X							
NY	X							
OR	X							
PA								X
TX								X
VA	X							

Table 13 Selected State Comparisons of Training Delivery Mechanisms for Finance Position Functions

Finance	Classroom only	E-learning only	OJT only	Combination classroom & e-learning	Combination classroom & OJT	Combination e-learning & OJT	Combination classroom, e-learning, & OJT	No response
Industrial Valuation								
FL	X							
MN	X							
NY	X							
OR	X							
PA								X
TX								X
VA	X							
Lease & Leasehold Valuation								
FL	X							
MN	X							
NY	X							
OR	X							
PA								X
TX								X
VA	X							
Financial Reporting								
FL			X					
MN					X			
NY			X					
OR	X							
PA	X							
TX					X			
VA			X					
Introduction to FMIS								
FL					X			
MN	X							
NY			X					
OR	X							
PA	X							
TX					X			
VA					X			
Budget & Fiscal Management								
FL					X			
MN					X			
NY			X					

Table 13 Selected State Comparisons of Training Delivery Mechanisms for Finance Position Functions

Finance	**Classroom only**	**E-learning only**	**OJT only**	**Combination classroom & e-learning**	**Combination classroom & OJT**	**Combination e-learning & OJT**	**Combination classroom, e-learning, & OJT**	**No response**
OR	X							
PA	X							
TX					X			
VA					X			
Contract Management								
FL					X			
MN	X							
NY			X					
OR				X				
PA	X							
TX							X	
VA							X	
Procurement								
FL							X	
MN	X							
NY					X			
OR	X							
PA	X							
TX							X	
VA					X			

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Additional Recommended Readings

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Recommended Online Resources

Contract Management and Certification

Best Practices in State and Local Contract Management
http://www.ncmahq.org/files/Articles/2D3A6_CM0107_F04.pdf

National Contract Management Association
http://www.ncmahq.org/Careers/content.cfm?ItemNumber=972

National Defense University: Chief Financial Officer Leadership Certificate
http://www.ndu.edu/irmc/pcs/pcs_cfo.html

Distance Education/CU

Advanced Distributed Learning
http://spider.adlnet.gov/

Effectiveness of Web-Based Instruction (ADL)
http://www.adlnet.gov/Technologies/Evaluation/Library/Practitioner%20Guides/Effectiveness%20of%20Web-based%20Instruction.aspx

Emergency Management Institute at the Federal Emergency Management Agency
http://training.fema.gov/IS/

The Government Alliance for Training and Education by Satellite
http://gates.govdl.org/page.cfm?page=5

Sloan-C Consortium for Quality Online Education
http://www.sloan-c.org/

Synchronous E-learning Handbook
http://www.elearningguild.com/content.cfm?selection=doc.542

United States Distance Learning Association
http://www.usdla.org/

Highway Administration and Related

2006 Future Needs of Public Sector Real Estate, Publication No. FHWA-HEP-06-032
http://www.fhwa.dot.gov/realestate/fnpsrwgraph.htm#a4c

2006 Public Sector Real Estate Certification Needs Analysis, Publication No. FHWA-HEP-07-027
http://www.fhwa.dot.gov/realestate/pubsectcert.htm

Alabama
http://www.dot.state.al.us/Docs/Bureaus/Maintenance/Management+and+Training/Other+Training+Courses.htm

Catalog of Transportation Education, Training, and Workforce Development (July, 2008)
https://www.fhwa.dot.gov/transprogcat/catalog.pdf

Connecticut: Developing an In-House Approach to Leadership
http://www.nhi.fhwa.dot.gov/transworkforce/IP_CT.PDF

The Consortium for ITS Training and Education (CITE): Web-Based Transportation Courses
http://www.citeconsortium.org/

Core Competencies for Highway Safety Professionals
http://144.171.11.107/Main/Public/Blurbs/157622.aspx

Core Curriculum Matrix Development, Safety & Work Zone Competency Matrices
http://www.nhi.fhwa.dot.gov/tccc/matrix05.htm

Corporate Research and Technology
http://www.fhwa.dot.gov/crt/partnerships.cfm

Finance Asset Management Guide
http://www.fhwa.dot.gov/crt/lifecycle/asset.cfm

Florida
http://www2.dot.state.fl.us/proceduraldocuments/procedures/bin/625010010.pdf

Institute of Transportation Engineers
http://www.ite.org/

LTAP Web-Based Training Links
http://www.ltapt2.org/resources/webtraining.php#web

MDT2Center
http://www.mdt2center.umd.edu/index.php

Mid-Atlantic Region Technician Certification Program (MARTCP)
http://www.martcp.org/index.asp

Multi-Regional Training and Certification Program
http://rebar.ecn.purdue.edu/Superpave/M-TRAC/index.htm

National Cooperative Highway Research Program
http://www.trb.org/CRP/NCHRP/NCHRP.asp

New Jersey Capital Project Delivery
http://www.state.nj.us/transportation/capital/pd/training.shtm

NHI Course Catalog
http://www.nhi.fhwa.dot.gov/Training/down_catalog.aspx

Performance-Based Contracting for Maintenance
http://www.trb.org/news/blurb_detail.asp?id=10491

Texas Transportation Institute

http://tti.tamu.edu/

Transportation Research Board
http://www.trb.org/Main/Public/Home.aspx#

Transportation Workforce Development
http://www.nhi.fhwa.dot.gov/transworkforce/TWO.asp

Western Alliance for Quality Transportation Construction
http://www.waqtc.org/

Appendix 1: Online Email Invitation

Hello,

I am a faculty member at the University of Baltimore conducting research on best practices in training and development. Areas of focus include training delivery mechanisms, the administration of training programs, and what works best for various positions. This research is part of a Transportation Education and Development Pilot Program for the Maryland State Highway Administration, funded by the Federal Highway Administration, sponsored by the Schaefer Center for Public Policy at the University of Baltimore.

You were selected for this survey as part of a sample of executive managers within transportation departments and state highway administrations across the United States.

This survey should take no more than ten minutes of your time. Your response is very important, will provide valuable insight, and will increase the accuracy of the final results. I truly appreciate your time and expertise!

Your responses are confidential.

Here is a link to the survey:

http://www.surveymonkey.com/s.aspx?sm=_2f5n_2b9iTHCMEpAufJUhbIHA_3d_3d

If you have any questions about the survey, please call (410)837-6173 or email hwyatt-nichol@ubalt.edu.

Sincerely,

Heather Wyatt-Nichol, PhD
University of Baltimore
School of Public Affairs
1420 N. Charles St.
Liberal Arts & Policy Building, 4th Floor
Baltimore, MD. 21201
(410) 837-6173

Appendix 2: Online Survey

1. Default Section

1. Title of Study: Transportation Education Development

Purpose of the Study: This study explores best practices in training and development. Areas of focus include training delivery mechanisms, the administration of training programs, and what works best for various positions. This research is part of a Transportation Education and Development Pilot Program for the Maryland State Highway Administration, funded by the Federal Highway Administration.

Potential Risks/Discomforts: There are no costs or risks for participating in this study other than the time you will spend filling out the questionnaire.

Potential Benefits: While you may not receive any direct benefit from this study, the information you provide will contribute toward improving training and delivery within organizations.

Confidentiality: All responses are confidential and responses will only be reported as aggregate data to prevent personal identification. Your name or identity will not be linked in any way to the research data .The aggregate data may be presented at professional association meetings or in research reports.

Right to refuse to withdraw:Participation in this study is completely voluntary. I understand that my participation is voluntary and I may refuse to participate, or may discontinue it at any time.

Individuals to contact: If I have a question about my participation in this study, I can contact: Heather Wyatt-Nichol at (410)837-6173 or email hwyatt-nichol@ubalt.edu

◯ I have read this entire form and I understand it completely. All of my questions regarding this form or this study have been answered to complete satisfaction. I agree to participate in this research.

2. How are training programs adiministered within your organization? (Please check al that apply)

☐ Training programs are developed and delivered by the organization

☐ Training programs are developed and delivered by external organizations or consultants

Other (please specify)

3. What percentage of training course hours is outsourced by the following entities?

	0-20%	21-40%	61-80%	81-100%
University Transportation Centers	◯	◯	◯	◯
Transportation Technology Transfer Centers	◯	◯	◯	◯
Local Colleges and Universities	◯	◯	◯	◯
Community Colleges	◯	◯	◯	◯
Industry Partners	◯	◯	◯	◯
Other State Agencies	◯	◯	◯	◯
Federal Highway Administration	◯	◯	◯	◯
Private Vendors	◯	◯	◯	◯

4. Is legally mandated training within your organization primarily centralized or decentralized?

◯ Centralized

◯ Decentralized

5. Is non-mandatory skills-specific training within your organization primarily centralized or decentralized?

◯ Centralized

◯ Decentralized

6. How does your organization deliver training to remote sites?

7. How does the organization identify training needs of employees? (please check all that apply)

☐ Certification requirements for the position

☐ Performance appraisal

☐ Professional development plans

☐ Career development program

☐ Agency workforce plan

Other (please specify)

8. If your organization uses e-learning to provide training, please indicate the software system that is used to deliver training (e.g. Blackboard, Saba)

9. Please indicate which training delivery mechanisms are used for the key processes listed below (please check all that apply)

	Classroom	e-learning	On-the-job training
Budget and finance	☐	☐	☐
Procurement	☐	☐	☐
Contract administration	☐	☐	☐
Routine highway maintenance	☐	☐	☐
Emergency highway maintenance	☐	☐	☐
Safety management	☐	☐	☐
Project development	☐	☐	☐
Traffic engineering	☐	☐	☐
Traffic management	☐	☐	☐
Environmental stewardship	☐	☐	☐

10. Below are a list of courses relevant to Facilities Maintenance positions. Please indicate how training is delivered for similar courses within your organization. (Please check all that apply)

	classroom	e-learning	On-the-job training
Registered Flagger Training	☐	☐	☐
Emergency Communications	☐	☐	☐
Chain Saw Safety Training	☐	☐	☐
CPR & First Aid Training	☐	☐	☐
Heavy equipment training & certification (dump truck, tractor mower, fork lift, front end loader, back-hoe)	☐	☐	☐
Traffic Control & Management	☐	☐	☐
Construction Math	☐	☐	☐
Pesticide Applicator Registration Training	☐	☐	☐
DNR Roadside Tree Care Expert certification	☐	☐	☐
Soils & Aggregate Compaction Technician certification	☐	☐	☐
Concrete Field Technician certification	☐	☐	☐
Hot Mix Asphalt Field Technician certification	☐	☐	☐
Pavement Marking Technician certification	☐	☐	☐
National Incident Management System	☐	☐	☐
Contract Management	☐	☐	☐
Procurement	☐	☐	☐

11. Below are a list of courses relevant to Real Estate positions within State Highway Administration. Please indicate how training is delivered for similar courses within your organization. (Please check all that apply)

	Classroom	e-learning	On-the-job training
Procurement Seminar	☐	☐	☐
Skills of Expert Testimony	☐	☐	☐
Principles of Real Estate Appraisal	☐	☐	☐
principles of Real Estate Law	☐	☐	☐
Relocation Assistance	☐	☐	☐
Legal Aspects of Easements	☐	☐	☐
Eminent Domain Law	☐	☐	☐
Easement Valuation	☐	☐	☐
Appraisal of Partial Acquisitions	☐	☐	☐
TITLE VIII	☐	☐	☐
Basic Plat Reading	☐	☐	☐
Principles of Land Acquisitions	☐	☐	☐
Appraisal of Partial Acquisitions	☐	☐	☐
Investment Analysis	☐	☐	☐
Industrial Valuation	☐	☐	☐
Lease and Leasehold Valuation	☐	☐	☐

12. Below are a list of courses relevant to Finance administration positions within State Highway Administration. Please indicate how training is delivered for similar courses within your organization. (Please check all that apply)

	Classroom	e-learning	on-the-job training
Financial reporting	☐	☐	☐
Intro to Financial Management Information Systems	☐	☐	☐
Budget & Fiscal Management	☐	☐	☐
Contract Management	☐	☐	☐
Procurement	☐	☐	☐

13. Please indicate the distribution of learning hours by delivery method offered by your organization in the last 12 months.

	0-20%	21-40%	41-60%	61-80%	81-100%
Classroom, instructor led	○	○	○	○	○
e-learning, computer based training	○	○	○	○	○
Blended (combination of e-learning & lecture)	○	○	○	○	○
Field training, on-the-job	○	○	○	○	○

14. Is training linked with succession planning in your organization?

- ◯ Yes
- ◯ No

15. How does your organization determine the benefits derived from employee training and development? (please check all that apply)

- ☐ Employee evaluation of training
- ☐ Performance appraisals
- ☐ Annual reveiw of professional development plans

Other (please specify)

16. In what areas have training needs not been met within your organization?

17. Are there gaps in the training content?

18. What barriers does your organization experience in meeting training needs?

	Very significant barrier	Significant barrier	Neither	Slight barrier	Not at all a barrier
Funding	◯	◯	◯	◯	◯
Location	◯	◯	◯	◯	◯
Manpower shortage	◯	◯	◯	◯	◯
Reluctance of managers to allow employees to attend	◯	◯	◯	◯	◯
Employee resistance to training	◯	◯	◯	◯	◯
Lack of qualified trainers	◯	◯	◯	◯	◯
Other	◯	◯	◯	◯	◯

19. What training is needed within the next five years to insure that State Highway Administration personnel will have the required skills to meet future demands of the organization?

20. What changes do you anticipate in how training is delivered over the next five years?

21. What changes do you anticipate in the content of training over the next five years?

22. In which state is your organization located?

State:

The information below was retrieved from**:** http://icatalog.dau.mil/onlinecatalog/CareerLvl.aspx

CERTIFICATION STANDARDS & CORE PLUS DEVELOPMENT GUIDE CONTRACTING LEVEL 1	
Type of Assignment	**Representative Activities**
1 - Operational Contracting	● Contracting functions in support of post, camp or stations
2 - Research and Development	● Contracting functions in support of research and development
3 - Sys Acquisition	● Contracting functions in support of systems acquisition to include all ACAT programs
4 - Logistics & Sustainment	● Contracting functions performed by the Defense Logistics Agency or by other offices to sustain weapon systems
5 - Construction/ A&E	● Contracting functions in support of construction and/or architect and engineering services
6 - Contingency/ Combat Ops	● Contracting functions performed in a contingency or combat environment
7 - Contract Admin Office	● Contracting function is primarily focused on contract administration
8 - Contract Cost/Price Analyst	● Contracting function is primarily focused on advanced cost/price analysis
9 - Small Bus Specialist	● Contracting function is primarily focused on advising small businesses or on strategies for maximizing use of small businesses
10 - Other	● Contracting functions that perform a variety of assignments or are at a headquarters, secretariat, or OSD

Core Certification Standards ("R" indicates Resident Instruction.)

Acquisition Training	● None required
Functional Training	● **CON 100** Shaping Smart Business Arrangements ● **CON 110** Mission-Support Planning ● **CON 111** Mission Strategy Execution ● **CON 112** Mission-Performance Assessment ● **CON 120** Mission-Focused Contracting **(R)** ● **CLC 033** Contract Format and Structure for DoD eBusiness Environment ● Effective 1 June 2010, the following course is also required: ● **CON 090** Contracting Fundamentals **(R)**
Education	● At least 24 semester hours in accounting, law, business, finance, contracts, purchasing, economics, industrial management, marketing, quantitative methods, or organization and management ● Baccalaureate degree (Any Field of Study)
Experience	● 1 year of contracting experience.

Unique Position Training Standards	
Level 1 Contracting Personnel Assigned to support a MDAP/MAIS program	● ACQ 101 Fundamentals of Systems Acquisition Management

Core Plus Development Guide	Type of Assignment									
Training ("R" indicates Resident Instruction.)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CLC 003 Sealed Bidding	✔			✔	✔					
CLC 004 Market Research	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 005 Simplified Acquisition Procedures	✔	✔	✔	✔	✔	✔	✔		✔	✔
CLC 009 Service Disabled, Veteran-Owned Small Business Program	✔	✔	✔	✔	✔	✔	✔		✔	✔
CLC 020 Commercial Item Determination	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 024 Basic Math Tutorial	✔	✔	✔	✔	✔	✔	✔	✔		✔
CLC 028 Past Performance Information	✔	✔	✔	✔	✔	✔	✔		✔	✔

CLC 030 Essentials of Interagency Acquisitions/Fair Opportunity	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 043 Defense Priorities and Allocations System	✔	✔	✔	✔	✔	✔	✔		✔	✔
CLC 045 Partnering	✔	✔	✔	✔	✔	✔	✔			✔
CLC 046 Green Procurement	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 054 Electronic Subcontracting Reporting System (eSRS)	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 060 Time and Materials Contracts	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 105 DCMA Intern Training							✔			
CLC 113 Procedures, Guidance, and Information	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 131 Commercial Item Pricing	✔	✔	✔	✔			✔	✔		✔
CLC 132 Organizational Conflicts of Interest	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 133 Contract Payment Instructions	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLE 043 Online Representations & Certifications Application (OCRA)	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLE 044 Intra-Governmental Transactions	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLG 001 DoD Government Purchase Card	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLG 004 DoD Government Purchase Card Refresher Training	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLM 023 Javits-Wagner-O'Day (JWOD) Tutorial	✔	✔	✔	✔	✔	✔	✔		✔	✔
CON 237 Simplified Acquisition Procedures	✔	✔	✔	✔	✔	✔	✔		✔	✔
CON 243 Architect-Engineer Contracting **(R)**					✔					
CON 244 Construction Contracting **(R)**					✔					
FAC 007 Certificate of Competency Program	✔	✔	✔	✔	✔	✔	✔		✔	✔
SPS 101 Standard Procurement System and federal Procurement Data System - Next Generation User	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Education										

● None specified
Experience
● None specified

CERTIFICATION STANDARDS & CORE PLUS DEVELOPMENT GUIDE CONTRACTING LEVEL 2

http://icatalog.dau.mil/onlinecatalog/CareerLvl.aspx

Type of Assignment	Representative Activities
1 - Operational Contracting	● Contracting functions in support of post, camp or stations
2 - Res & Dev	● Contracting functions in support of research and development
3 - Sys Acq	● Contracting functions in support of systems acquisition to include all ACAT programs
4 - Log & Sustainment	● Contracting functions performed by the Defense Logistics Agency or by other offices to sustain weapon systems
5 - Construction/ A&E	● Contracting functions in support of construction and/or architect and engineering services
6 - Contingency/ Combat Ops	● Contracting functions performed in a contingency or combat environment
7 - Contract Admin Office	● Contracting function is primarily focused on contract administration
8 - Contract Cost/Price Analyst	● Contracting function is primarily focused on advanced cost/price analysis
9 - Small Bus Specialist	● Contracting function is primarily focused on advising small businesses or on strategies for maximizing use of small businesses
10 - Other	● Contracting functions that perform a variety of assignments or are at a headquarters, secretariat, or OSD

Core Certification Standards ("R" indicates Resident Instruction.)	
Acquisition Training	● **ACQ 101** Fundamentals of Systems Acquisition Management
Functional Training	● **CON 214** Business Decisions for Contracting ● **CON 215** Intermediate Contracting for Mission Support **(R)** ● **CON 216** Legal Considerations in Contracting ● **CON 217** Cost Analysis and Negotiation Techniques **(R)** ● **CON 218** Advanced Contracting for Mission Support **(R)**
Education	● At least 24 semester hours in accounting, law, business, finance, contracts, purchasing, economics, industrial management, marketing, quantitative methods, or organization and management ● Baccalaureate degree (Any Field of Study)
Experience	● 2 years of contracting experience.

Unique Position Training Standards	
Level II contracting personnel assigned to support a MDAP/MAIS program	● ACQ 201A Intermediate Systems Acquisition, Part A ● ACQ 201B Intermediate Systems Acquisition, Part B **(R)**

Core Plus Development Guide	Type of Assignment									
Training ("R" indicates Resident Instruction.)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
ACQ 265 Mission-Focused Services Acquisition **(R)**	✔	✔	✔	✔	✔	✔	✔	✔		✔
CLC 001 Defense Subcontract Management	✔	✔	✔	✔	✔	✔	✔		✔	✔
CLC 006 Contract Terminations	✔	✔	✔	✔	✔	✔	✔			✔
CLC 007 Contract Source Selection	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 008 Indirect Costs		✔	✔				✔	✔		✔
CLC 013 Performance-Based Services Acquisition	✔	✔	✔	✔	✔	✔	✔	✔		✔

CLC 018 Contractual Incentives	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 019 Leveraging DCMA for Program Success			✔				✔			✔
CLC 022 Profit Policy Revisions	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 026 Performance-Based Payments Overview	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 027 Buy American Act	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 031 Reverse Auctioning	✔			✔						
CLC 034 Provisional Award Fee	✔	✔	✔				✔			
CLC 035 Other Transaction Authority for Prototype Projects: Comprehensive Coverage		✔	✔				✔			
CLC 036 Other Transaction Authority for Prototype Projects Overview	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 037 A-76 Competitive Sourcing Overview	✔									✔
CLC 039 Contingency Contracting Simulation: Barda Bridge						✔				
CLC 040 Predictive Analysis and Scheduling			✔				✔			✔
CLC 041 Predictive Analysis and Systems Engineering		✔	✔				✔			✔
CLC 042 Predictive Analysis and Quality Assurance			✔				✔			✔
CLC 044 Alternative Dispute Resolution	✔	✔	✔	✔	✔	✔	✔			✔
CLC 047 Contract Negotiation Techniques	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 050 Contracting with Canada	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 102 Administration of Other Transactions		✔	✔				✔			
CLC 103 Facilities Capital Cost of Money	✔	✔	✔	✔	✔	✔	✔	✔		✔
CLC 104 Analyzing Profit or Fee	✔	✔	✔	✔	✔	✔	✔	✔		✔
CLC 107 OPSEC Contract Requirements	✔	✔	✔	✔	✔	✔	✔			✔
CLC 108 Strategic Sourcing Overview	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

CLC 110 Spend Analysis Strategies	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CLC 112 Contractors Accompanying the Force	✔	✔	✔	✔	✔	✔	✔			✔
CLC 114 Contingency Contracting Officer Refresher						✔				
CLC 120 Utilities Privatization Contract Administration							✔			
CLC 125 Berry Amendment	✔		✔	✔	✔	✔	✔			✔
CLM 013 Work-Breakdown Structure			✔				✔	✔		
CLM 031 Improved Statement of Work	✔	✔	✔	✔	✔	✔				
CLM 032 Evolutionary Acquisition			✔				✔			
CLM 038 Corrosion Prevention and Control Overview	✔	✔	✔	✔	✔	✔	✔			✔
CLM 040 Proper Financial Accounting Treatments for Military Equipment	✔	✔	✔	✔	✔	✔	✔	✔		✔
CLM 200 Item-Unique Identification	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
CON 232 Overhead Management of Defense Contracts **(R)**		✔	✔				✔	✔		
CON 234 Joint Contingency Contracting **(R)**						✔				
CON 235 Advanced Contract Pricing **(R)**			✔	✔				✔		✔
CON 250 Fundamentals of Cost Accounting Standards—Part I **(R)**		✔	✔				✔	✔		
CON 251 Fundamentals of Cost Accounting Standards—Part II **(R)**		✔	✔				✔	✔		
CON 260A The Small Business Program, Part A									✔	
CON 260B The Small Business Program, Part B **(R)**									✔	
GRT 201 Grants and Agreements Management **(R)**		✔					✔			
HBS 221 Negotiating	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
HBS 223 Presentation Skills	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
HBS 229 Team Leadership	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

HBS 239 Team Management	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
IND 100 Contract Property Administration and Disposition Fundamentals **(R)**		✔	✔	✔			✔			
Education										
● Graduate studies in business administration or procurement										
Experience										
● Two (2) additional of contracting experience										

CERTIFICATION STANDARDS & CORE PLUS DEVELOPMENT GUIDE CONTRACTING LEVEL3

http://icatalog.dau.mil/onlinecatalog/CareerLvl.aspx

Type of Assignment	Representative Activities
1 - Operational Contracting	● Contracting functions in support of post, camp or stations
2 - Res & Dev	● Contracting functions in support of research and development
3 - Sys Acq	● Contracting functions in support of systems acquisition, to include all ACAT programs
4 - Log & Sustainment	● Contracting functions performed by the Defense Logistics Agency or by other offices to sustain weapon systems
5 - Construction/ A&E	● Contracting functions in support of construction and/or architect and engineering services
6 - Contingency/ Combat Ops	● Contracting functions performed in a contingency or combat environment
7 - Contract Admin Office	● Contracting function is primarily focused on contract administration
8 - Contract Cost/Price Analyst	● Contracting function is primarily focused on advanced cost/price analysis
9 - Small Bus	● Contracting function is primarily focused on advising small businesses or on

Specialist	strategies for maximizing use of small businesses
10 - Other	● Contracting functions that perform a variety of assignments or are at a headquarters, secretariat, or OSD

Core Certification Standards ("R" indicates Resident Instruction.)	
Acquisition Training	● **ACQ 201A** Intermediate Systems Acquisition, Part A
Functional Training	● **CON 353** Advanced Business Solutions for Mission Support **(R)** ● 1 additional course from the Harvard Business Management Modules
Education	● At least 24 semester hours in accounting, law, business, finance, contracts, purchasing, economics, industrial management, marketing, quantitative methods, or organization and management ● Baccalaureate degree (Any Field of Study)
Experience	● 4 years of contracting experience

Unique Position Training Standards	
Level III contracting personnel assigned to or devoting at least 50% of their time in support of a MDAP/MAIS program	● ACQ 201B Intermediate Systems Acquisition, Part B **(R)**

Core Plus Development Guide	Type of Assignment									
Training ("R" indicates Resident Instruction.)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
ACQ 201B Intermediate Systems Acquisition, Part B **(R)**	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
BCF 102 Fundamentals of Earned Value Management			✔				✔			
CLB 007 Cost Analysis	✔	✔	✔	✔	✔	✔	✔	✔		✔
CLB 011 Budget Policy			✔							

CLB 016 Introduction to Earned Value Management			✔		✔		✔			
CLC 004 Market Research	✔	✔	✔	✔			✔	✔		✔
CLC 023 Commercial Item Determination Executive Overview	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
LAW 801 Acquisition Law (**R**)	✔	✔	✔	✔	✔	✔	✔			✔

Education
● Masters degree in business administration or procurement

Experience
● Four (4) additional years of contracting experience