Retrospective on Registered Apprenticeship:

A Review of Program Initiatives and Their Policy Implications

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EXECUTIVE SUMMARY

For over 70 years, the U.S. Department of Labor (USDOL) has encouraged and promoted apprenticeship in a variety of industries and occupations, under the National Apprenticeship Act. Hands-on learning from experienced workers and mentors at the work site, always key elements of apprenticeship, were buttressed by requirements for related classroom training, incremental wage increases, clearly delineated skills and knowledge areas, and written agreements between employer and apprentice, and a national system for registering programs and apprentices by state agencies and the Federal government. The national apprenticeship system is managed at the Federal level by the Office of Apprenticeship (OA) within the Employment and Training Administration of USDOL. Individual employers, groups of employers, or joint employer and union groups design and operate apprenticeship programs. The approximately 470,000 apprentices in nearly 28,000 programs in fiscal year 2007 are concentrated in construction, energy, manufacturing, transportation and communication, and public administration occupations.

Although the US economy has expanded at a healthy pace in recent decades (nearly 3 percent per year), workers in the U.S. have faced serious challenges. Less educated workers have seen their wages stagnate or decline, falling further behind college-educated workers. The increasingly competitive atmosphere facing firms is affecting the way they organize work and the level of skills required of workers. As a result, workforce quality is increasingly emphasized by successful firms and other employers. Registered apprenticeship programs already contribute to skills development for these positions and could do more. The mix of contextualized learning and academic learning that takes place in registered apprenticeship fits well with the broader skills required for many of the new positions. As the job market and broader economy have evolved, OA's initiatives have tried to keep pace with economic developments and to strengthen the US apprenticeship system. Given the largely private sector nature of the U.S. apprenticeship system, the modest amount of government outlays on apprenticeship, and the absence of major evaluations or legislative debates dealing with apprenticeship, it is not surprising that OA's initiatives have attracted limited attention.

In carrying out its legislative mission, the OA implements a range of apprenticeship activities and a number of special initiatives. The initiatives serve a number of objectives, classified in this paper as: 1) expanding apprenticeship; 2) increasing the number of

underrepresented workers; 3) raising the quality of registered apprenticeships programs, as administered by sponsors; 4) developing and strengthening linkages with other employment-related programs; and 5) using and improving data systems and other quality management tools. Over the past two decades, the OA has engaged in four types of activities to achieve these objectives: strategic planning and program monitoring; targeting industries and occupations as opportunities that serve its objectives for expansion; developing standards and selection criteria for new registered apprenticeships; and dissemination and technical assistance to train the OA staff in the field, particularly to promote apprenticeships and engage new sponsors through a variety of proactive outreach methods.

To view OA's initiatives and operations in context, it is important to bear in mind that OA's budget and staffing levels are modest. Moreover, OA's development and management of initiatives took place over a period when its budgetary and staff resources were declining rapidly. It is difficult to know what role, if any, these reductions played in the operations of the programs.

The OA expands apprenticeships partly by analyzing emerging industries and occupational trends to identify appropriate areas for targeting, by setting goals for staff that include engaging new sponsors and crafting new standards that accommodate the needs of employers and workers, and by monitoring the progress of national and state staff toward accomplishing those goals. A number of initiatives in the past 20 years have explored how to expand apprenticeships by capitalizing on opportunities, especially in high growth industries, and identifying obstacles to expansion. Although no impact analysis is available to determine the link between the initiatives and changes in apprenticeship in targeted industries, some of the descriptive data look promising. In the energy industry, for example, the number of apprentices went from 1,208 in 1995 to 2,004 in 2001 to 5,882 in 2007. Apprentices in targeted, high growth industries now account for about 30 percent of all apprentices.

Making apprenticeship more accessible to women and minorities has long been an important goal. The OA requires all sponsors that train five or more apprentices to adopt written Affirmative Action Plan and Selection Procedures. The Women in Apprenticeship and Nontraditional Occupations (WANTO) Act of 1992 aimed to address the underrepresentation of women explicitly through legislation. WANTO and other initiatives have helped increase the absolute number of women in apprenticeship, although the percentage of women apprentices has

remained at about 7 percent. In all likelihood, increasing the share of women in apprenticeships will require expanding the demand for apprentices in occupations in which women are well represented or overrepresented.

The primary goal for some of OA's initiatives is to improve the quality of programs and increase the flexibility of registered apprenticeship. In FY2007, OA conducted 1,863 assessments of program quality. The OA has explored and begun to implement a number of initiatives to increase the flexibility and quality of registered apprenticeship programs: competency- and hour-based hybrid programs, interim credentials, and program assessment.

Over the past ten years, the OA has attached a high priority to developing stronger linkages and collaborations with other workforce development programs. The OA has sponsored numerous conferences, workshops and webinars. The OA has disseminated best practice experience through formal publications and field notices and through intra- and interdepartmental guidelines on cross-program collaborations. The OA also contributed to the development and dissemination of formal guidance from the ETA for WIA funded programs.

Over the past twenty years, the Office of Apprenticeship has worked to enhance the quality and reliability of its data collection and reporting systems. Some of the key goals have been to achieve more consistent reporting and assessment across apprenticeship programs and to incorporate continuous improvement concepts into their performance management activities. The improvements in administrative data and in various tools have allowed the national office and SACs responsible for managing the programs to use a standard set of measures. However, data reporting remains limited in some state-run SACs that only to provide summary data rather than provide a file with individual level data.

The paper concludes by drawing not only on the review of initiatives undertaken by the Office of Apprenticeship, but also on the experiences of other countries who have robust apprenticeship systems. It considers ideas relating to the broader use of technology and suggestions for improved , more rigorous research. One issue has to do with the rationalization of apprenticeable occupations. Currently, countries with large systems of apprenticeship rely on far fewer occupational categories, 300 or less, than the more than 850 currently apprenticeable occupations in the U.S. By consolidating occupational areas, the system will tend to provide a broader, more portable range of skills. The broader skills will allow apprentices to advance more easily, to achieve higher productivity because of this adaptability, and to have less stake in

maintaining a narrow occupational approach as technology changes the mix of occupations required. One result of using broader occupational profiles is the ability of apprenticeship systems in some countries to penetrate successfully such new occupations such as computer analyst and data management occupations.

INTRODUCTION

An Overview of Apprenticeship in the United States

For over 70 years, the U.S. Department of Labor (DOL) has encouraged and promoted apprenticeship in a variety of industries and occupations, under the National Apprenticeship Act.

Apprenticeship had been in existence for many centuries when its modern incarnation under the 1937 legislation created new elements designed to ensure apprentices were treated fairly and employers had a pipeline of skilled workers. The 1937 Act emphasized the "furtherance of labor standards necessary to safeguard the welfare of apprentices" as well as collaboration between management and labor in the "formulation of programs of apprenticeship" (National Apprenticeship Act, 1937). Hands-on learning from experienced workers and mentors at the work site, always key elements of apprenticeship, were buttressed by requirements for related classroom training, incremental wage increases, clearly delineated skills and knowledge areas, and written agreements between employer and apprentice, and a national system for registering programs and apprentices by state agencies and the Federal government.

The national apprenticeship system is managed at the Federal level by the Office of Apprenticeship (OA) within the Employment and Training Administration of DOL. Individual employers, groups of employers, or joint employer and union groups design and operate apprenticeship programs. Sponsors choose the apprentices and determine how many apprentices to train, the scope and sequence of the training skills, and the type of partner for related technical instruction. Apprentices must be 16 years of age or older, although some hazardous occupations require apprentices to be 18 or older. Sponsors can specify additional eligibility requirements (e.g., credentials, education, work-related physical abilities, aptitude tests, screening interview, or work experience) to ensure that trainees meet employer needs.

Sponsors register their apprenticeship program(s) with a state apprenticeship agency (SAC) recognized by the OA or through the OA in the 25 states without a SAC. SACs perform technical assistance tasks that the OA would undertake in their absence. Registered apprenticeship program must meet a set of standards, including:

- fair application procedures;

- a schedule for the apprentice to receive training and work experience in the field;
- related instruction in technical subjects required for the occupation (at least 144 hours per year), which can be completed in a classroom through trade, industrial or correspondence courses of equivalent value or approved independent study;
- a progressively increasing schedule of wages;
- proper supervision of on-the-job training with adequate facilities to train apprentices; apprentice's progress, both in job performances and related instruction is evaluated periodically and appropriate records are maintained; and
- no discrimination in any phase of selection, employment, or training.

A typical program accommodates about 15 apprentices, and about four or five new participants replace apprentices that complete the program each year. Apprentices complete between 2,000 and 8,000 hours of work experience, which they complete in one to four years.

A set of content standards (known as "work process schedules") accompanies each registered apprenticeship agreement. The work process schedules specify the length of the program as well as the skills a registered apprentice should know before completing the program. The length and type of a program varies by sponsor and occupation, and the level of detail contained in each work processes can vary. For example, an accounting technician apprenticeship sponsored by Biocare Medical is estimated to last between 4,000 and 5,000 hours. The apprenticeship has a brief work process schedule (along with an outline of key knowledge areas for related instruction) that designates an approximate number of hours per set of skills. Work process schedules for certified nurse assistant careers use a combined (or hybrid) approach combining competency and hours qualifications; they also include detailed content standards for related instruction. The pharmacy and geospatial technician schedules (developed by CVS/Pharmacy and the Mississippi Enterprise Technology, respectively) are competency-based but the content standards are quite briefly stated. In contrast, there is considerable detail in the skills standards developed for the hybrid work process schedules for information technology specialist (sponsored by CompTIA) or metalworking occupations (sponsored by the National Institute of Metalworking Skills). These programs are part of OA's emphasis on expanding to include new industries and to incorporate competency-based training. Still, as of 2007, apprenticeable occupations with competency-based standards made up only 108 of OA's 2007

list of over 950 apprenticeable occupations. Another 47 incorporated some competency standards, together with hours standards.

The approximately 470,000 apprentices in nearly 28,000 programs in fiscal year 2007 are highly concentrated in construction, energy, manufacturing, transportation and communication, and public administration occupations. Data on recent trends in specific occupations cover only the 31 states participating in the Registered Apprenticeship Information System (RAIS). According to the RAIS data, the share of apprentices in construction increased from about 50 percent in 1995 to 74 percent in 2007 (Bennici et al. 2004; OA memo based on RAIS data). However, transportation and communication occupations jumped nearly fivefold between 2003 and 2007, the fastest growth in percentage terms of any occupation. While the number of apprentices increased significantly in recent years, apprentices still make up only about 0.3 percent of total work force and nearly 4 percent of a cohort's entrants to the work force.[1]

Overall, the number of apprentices is comparable to the combined number of individuals receiving training through three federally sponsored Labor Department programs: the Workforce Investment Act's Adult and Dislocated Worker programs, the Job Corps, and the Trade Adjustment Act (Mikelson and Nightingale, 2004). In 2007, the Department of Labor spent almost $3.9 billion dollars on these programs, or over 190 times more funds that was spent on the OA.

One U.S. approach—the sectoral strategy—mirrors apprenticeship's emphasis on close employer and industry linkages and job ladders tailored to occupations, foundations and USDOL have sponsored sectoral strategies (Pindus et al. 2004). This approach builds on the experience of local organizations delivering government-sponsored training programs (Lerman 2008). The sectoral programs focus on planning, recruitment, and operations around the skill requirements of employers in specific industry sectors (Blair 2002). USDOL is sponsoring the industry-focused High Growth Jobs Training Initiative for projects that also involve coalitions of employers and training organizations. These initiatives select a sector or group of sectors, create

[1] According to the website of the U.S. Bureau of Labor Statistics, the U.S. labor force stood at 153.6 million at the end of 2007. Dividing the 468,000 apprentices by the 153.6 million in the labor force equals 0.3 percent. A cohort of 22 year-olds entering the labor force is about 3.4 million. Since apprenticeships usually last about 3.5 years, the number of apprentices per single year of age is 134,000. Dividing 134,000 by 3.4 million equals 3.9 percent.

coalitions, assess the skill requirements for existing positions, project skills required to upgrade jobs, recruit and target potential trainees, develop training modules, and obtain a mix of public and private funding. The focus on industry needs and close linkages with employers are sound principles that have led to some effective programs that train workers to improve their jobs and earnings. Unlike registered apprenticeship, the programs are more *ad hoc* than systemic since they are tailored to each local case. Also unlike registered apprenticeship, the training in sectoral programs is generally short-term and rarely leads to a recognized qualification.

Registered Apprenticeship provides demand-driven, long-term training that requires little or no foregone earnings on the part of participants, and fills positions that are in demand and that may have long-term advancement opportunities. The programs teach academic and/or technical subjects in classrooms as well as applications in the context of the tasks, problem solving, and social interactions of the occupation. The learner can draw on help from experienced adults and from peers trying to succeed in the same career. The entry requirements vary, but some require only a high school diploma. Apprenticeship training takes place mainly in the context of a work environment and is effective in using contextualized learning (Resnick, 1987), involving the teaching of skills used on an everyday basis.

Apprenticeship is perhaps the most structured and lengthy forms of employer-linked training. While workers normally receive some employer training of less than 30 hours per year (Lerman, McKernan, and Cellini 2004), apprenticeship training usually demands 2,000 hours of work-based learning as well as 120 hours of classroom training. Research on the impact of apprenticeship on earnings is limited. One quantitative study in the state of Washington used a comparison group methodology. The results indicated that apprenticeship leads to statistically significant gains in earnings (about $4,000 per calendar quarter for completers), gains that exceed earnings returns to community college (Washington State Workforce Training 2004).

OA has undertaken a several initiatives in recent decades to modernize apprenticeship in order to respond to the changing labor market and to improve the quality and effectiveness of field operations and programs themselves. The main goal of this paper, developed at OA's request, is to review the most important of these initiatives and to explore some implications of these initiatives for the future of registered apprenticeship in the U.S. However, before

describing and analyzing the initiatives, it is useful to consider the economic and labor market context as well as some theoretical developments relevant to the U.S. registered apprenticeship system.

The Context of the Labor Market and Theories of Training

Although the US economy has expanded at a healthy pace in recent decades (nearly 3 percent per year), workers in the US have faced serious challenges. Less educated workers have seen their wages stagnate or decline, falling further behind college-educated workers. The share of workers covered by pensions and health insurance has declined in recent years[2] According to Richard Freeman (2007), the intensification of global competition appears to pose challenges, if not threats, to workers at all levels. He expresses concerns about immigration, outsourcing, and the expanding labor force in India, China, and other less developed countries whose workers are now a part of a world labor market (Freeman 2007). Trade and the dynamics of companies generate worker displacement, with frequent earnings losses when workers move to other jobs (Lane, Brown, and Haltiwanger 2006). The shares of U.S. workers with a high school diploma and with a college degree are no longer the highest in the developed world (OECD 2007). Some economists are concerned that even good-paying jobs for college graduates are threatened by outsourcing to lower-paid, but well-educated, workers in poor countries (NCSAW, 2007). Meanwhile, employers report difficulty in recruiting workers with adequate skills; over half of manufacturing firms reported that the shortage of available skills is affecting their ability to serve customers and 84 percent say the K-12 school system is not doing a good job preparing students for the workplace (Deloitte Consulting 2005).

The increasingly competitive atmosphere facing firms is affecting the way they organize work and the level of skills required of workers. Organizational changes are giving non-supervisory workers more responsibility for decisions and for achieving high quality services and goods (Levy and Murnane 1996; Levy and Murnane 2006). As a result, workforce quality is increasingly emphasized by successful firms and other employers. The rising demand for skill

[2] For recent trends in employer-sponsored and other health insurance coverage by age and sex, see the following table from U.S. Bureau of the Census website, http://www.census.gov/hhes/www/hlthins/historic/hihistt2.html. For trends in pensions, see *Retirement Trends in the United States Over the Past Quarter-Century*, Facts from EBRI, http://www.ebri.org/pdf/publications/facts/0607fact.pdf.

significantly widened wage differentials between college graduates and high school graduates. One reason is the shift across industries and occupations. Manufacturing jobs, which often pay good wages for less-educated workers, have plummeted, falling from 17.2 percent of all wage and salary employment in 1987 to about 10.2 percent in 2007[3]. While manufacturing output increased over this period by 51 percent, the 72 percent rise in productivity meant that manufacturing firms needed about 20 percent fewer workers.[4] In a number of occupations used in manufacturing, turnover and retirement of an older work force will create millions of job openings. For example, metal workers and plastic workers, which include machinists and welders, will generate 455,000 job openings despite an expected decline in net jobs for these occupations (Dohm and Shniper 2007). Registered apprenticeship programs already contribute to skills development for these positions and could do more.

The mix of contextualized learning and academic learning that takes place in registered apprenticeship fits well with the broader skills required for many of the new positions. The lean approach to manufacturing and other industries is one reason employers are seeking workers with technical, academic, problem-solving and other non-cognitive skills along with relevant experience (Deloitte Consulting 2005). They seek workers who can make sound decisions on their own, without many levels of supervisors. Employers in four large metropolitan areas reported that responsibility, integrity and self-management are as important as or more important than basic skills (Holzer, 1997). In the National Employer Survey, which obtained responses from over 3,300 businesses, employers ranked attitude, communication skills, previous work experience, employer recommendations, and industry-based credentials ahead of years of schooling, grades, and test scores administered as part of the interview (Zemsky, 1997). Other evidence for the important role of occupational-specific and industry–specific skills is that high wage returns to occupation-specific and industry-specific work experience (Sullivan, 2006).

Employer-led training and work experience are often used to develop these skills (Lerman, McKernan, and Riegg 2004). Some training is brief and involves introducing workers to operations, while other training works to raise basic skills and the capability of workers to

[3] Tabulations by author from data drawn from the U.S. Bureau of Labor Statistics website, http://www.bls.gov/webapps/legacy/cesbtab1.htm .

[4] Tabulations by author from data drawn from the U.S. Bureau of Economic Analysis website on Gross Domestic Product by Industry and employment and productivity data from the U.S. Bureau of Labor Statistics.

implement new technologies or organizational methods. Employer-led training is generally viewed as achieving high returns and skill development. One recent study (Frazis and Loewenstein, 2005) found that 60 hours of training increased wage rates by about 5 percent, indicating rates of return on an annualized basis of at least 40-50 percent. In addition, Sullivan (2006) finds wage gains from occupation-specific experience in many occupations, an indication that contextualized learning of the type gained through work experience has value.

Learning approaches of the type used in apprenticeship have received strong theoretical support from cognitive scientists who have studied how people learn at work (Resnick 1987). Learning in the context of real-world tasks and of applying knowledge learned in the classroom to outside activities have been found to be particularly effective, and this is precisely the kind of training provided through apprenticeship. Another detailed study of how workers learn has emphasized that skills can often be attained by observing and interacting with experienced workers in genuine work situations (Stasz 2001). The sharing of occupation-specific knowledge among practitioners has been called a "community of practice" (Stasz, 2001). Still another researcher has found that workplaces not only require formal knowledge, i.e., facts, principles, theories, math and writing skills, but also informal knowledge, embodied in work practices and decision rules, work styles, and contextualized understanding of tools and techniques (Nelsen, 1997). Registered Apprenticeship fits this model by relying extensively on applied learning in the context of the real-world tasks, problem-solving, and social interactions at the work site, while including classroom training in subjects related to core occupational competencies. The mixed approach enables workers to gain both formal and informal knowledge in a structured and systematic way.

Extensions of human capital theory suggest that registered apprenticeship might be of considerable interest to employers. The standard human capital theory implied that employers will never pay for general skills, or skills that might be used outside the firm. However, Acemoglu and Pischke (1999) developed realistic extensions demonstrating why employers will sometimes finance general training of the type delivered in Registered Apprenticeship programs. One reason is that the transaction costs in the labor market make it difficult for workers to quit and costly for employers to replace them. In addition, a number of firms realize that specific and

general skills are often complementary and that the content of the training can be tailored to their own organizations, based on companies' understanding of their workers abilities.

Empirical evidence for the view that employers often finance general training comes from the continuation and growth of apprenticeship in several advanced economies, including the U.S. In Switzerland and Germany, well over 50 percent of a cohort of young people undertakes apprenticeships (Nyhan 2008; Gonon 2008). In Denmark and Austria, the proportion is about 40 percent (Nyhan 2008). Even in countries without longstanding apprenticeship traditions, apprenticeship training is expanding rapidly. Australia has experienced a 300 percent increase in apprenticeships since the mid-1990s and they now make up about 3.5 percent of the working population (Smith 2008). Ireland and United Kingdom are also increasing substantially the share of workers who are or will be undertaking apprenticeships (Nyhan 2008). Recently, UK Prime Minister Gordon Brown announced an initiative to have at least one in five youth participate in apprenticeships.

In the U.S., the number of workers in apprenticeship training only modestly increased between the late 1970s and the late 1990s, from 289,000 in 1979 to 345,000 in 1997 (U.S. Department of Labor 1981; Bennici 2004), a rise of about 1 percent per year. In the last decade, however, apprenticeship training expanded at a healthy rate of 3.3 percent per year to nearly 470,000 in 2007 (OA web site)[5]. Increasing the number of registered apprentices required overcoming the sharp drop in manufacturing apprentices that took place alongside the reductions in manufacturing jobs. Between 1979 and 2007, the share of apprentices in manufacturing fell from 37 percent in 1979 to only 6 percent in 2007.[6]

U.S. apprenticeship training represents a far lower share of employment than in other countries, only about 4 percent of each year's cohort of entering workers.[7] Given the substantially higher penetration of apprenticeship in other advanced economies, the comparative figures indicate considerable room for growth in apprenticeship training in the U.S. Interest in registered apprenticeship remains high in a number of sectors in the US and abroad.

[5] See http://www.doleta.gov/OA/pdf/OA_Statistics_FY_2003_2007.pdf for 2007 figures.
[6] The 1979 figure represents the percentage for all states (United States Department of Labor 1981); the 2007 figure comes from the RAIS system and an unpublished OA mimeo.
[7] See page 4.

Apprenticeship may be well-suited to the occupational skill challenges and job demands that lie ahead. Nearly half of all job openings over the next 20 years will require middle level occupational skills, beyond a high school diploma but less than a four year bachelor's degree (Holzer and Lerman (2007). In other countries, apprenticeship training is used to prepare young workers for these types of jobs.

The increasing racial and ethnic diversity of the work force poses other challenges relevant to apprenticeship. Although white, native, non-Hispanic workers made up about 71 percent of the 2000 work force, this majority group will have accounted for only about 13 percent of the net growth in the workforce expected by 2020 (Aspen Institute 2003). Black, Hispanic, and immigrant workers will account for over 80 percent of labor force growth. Because of their history of excluding black workers from apprenticeships (Marshall and Briggs 1967), apprenticeship programs have been subject to strong equal opportunity reviews for decades. As of 2007, minorities made up about one-third of all apprentices[8], up from 24 percent in 1995 (Bennici et al. 2004). With this experience, the Office of Apprenticeship is poised to help employers reach out to minorities and women to undertake apprenticeship training and become the skilled workers vital to an expanding economy.

Matching workers to jobs and training opportunities is another major challenge to an evolving economy. With average job tenure declining and the millions of job transitions every month, the role of the nation's workforce system and specifically one-stop centers is increasingly important. Apprenticeship fits into a menu of alternatives that one-stop centers can suggest to workers interested in combining paid job with long-term training. The wage gains required within the apprenticeship period assure some upward trajectory in earnings and further long-term wage growth is common to those completing apprenticeships. Moreover, both the employer-linked nature of the training and the added skills generated through apprenticeships add to employment stability.

As the job market and broader economy have evolved, OA's initiatives have tried to keep pace with economic developments and to strengthen the US apprenticeship system. Given the largely private sector nature of the U.S. apprenticeship system, the modest amount of

[8] OA report based on RAIS data.

government outlays on apprenticeship[9], and the absence of major evaluations or legislative debates dealing with apprenticeship, it is not surprising that OA's initiatives have attracted limited attention. This paper presents these initiatives and examines available data on qualitative information on them in an accessible manner. In considering their implications, the paper offers reflections on their successes and limitations. The final section considers lessons for the future from these initiatives and from new trends in apprenticeship internationally.

AN INVENTORY OF MAJOR OFFICE OF APPRENTICESHIP INITIATIVES

In carrying out its legislative mission, the OA implements a range of apprenticeship activities and a number of special initiatives. The initiatives serve a number of objectives, classified in this paper as: 1) expanding apprenticeship; 2) increasing the number of underrepresented workers; 3) raising the quality of registered apprenticeships programs, as administered by sponsors; 4) developing and strengthening linkages with other employment-related programs; and 5) using and improving data systems and other quality management tools. Based on a review of the OA's programming over the past two decades, the OA engages in four general types of activities to achieve these objectives: strategic planning and program monitoring; targeting industries and occupations as opportunities that serve its objectives for expansion; developing standards and selection criteria for new registered apprenticeships; and dissemination and technical assistance to train the OA staff in the field, particularly to promote apprenticeships and engage new sponsors through a variety of proactive outreach methods.

The matrix below lists the major initiatives discussed in this paper, and identifies initiatives that directly serve one or more of the key objectives. A number of the initiatives have evolved over time as objectives while others started as formal initiatives, such as:

1. Apprenticeship 2000
2. Apprenticeship Impact Project (AIP)
3. Advancing Apprenticeship Initiative (AAI)
4. Women in Apprenticeship and Nontraditional Occupations (WANTO)
5. Continuous Improvement Initiative (CII)
6. Training and Employment Guidance Letter (TEGL)
7. Apprenticeship Information Management System (AIMS)
8. Registered Apprenticeship Information System (RAIS)

[9] In FY2007, the federal budget for the Office of Apprenticeship was about $20 million and nearly all of the budget was designated for salaries and expenses. Some states provide modest budgets to fund the administrative component of registered apprenticeship in their states.

9. Desktop Scorecard
10. Registered Apprenticeship Program Assessment (RAPA)

All the initiatives promote the expansion of registered apprenticeships. Two objectives receive less attention than the others ("expanding outreach to underrepresented workers" and "strengthening data systems and other tools for good management"). Although many initiatives serve various overlapping functions, the matrix acknowledges only the principal and substantial objectives associated with each individual initiative. In addition, the matrix cannot fully capture instances where initiatives complement (or duplicate) each other.

This section provides a description and a critical retrospective of each initiative. Given the limited data on the impacts of the initiatives, the summaries do not attempt to evaluate the extent to which they succeeded in reaching their objectives.

Expanding Registered Apprenticeships

The OA expands apprenticeships partly by analyzing emerging industries and occupational trends to identify appropriate areas for targeting, by setting goals for staff that include engaging new sponsors and crafting new standards that accommodate the needs of employers and workers, and by monitoring the progress of national and state staff toward accomplishing those goals. The OA provides guidance using a variety of dissemination activities, training and technical assistance for field staff, and working directly with employers, to ensure that new policies are implemented and new ideas for expanding apprenticeship can be realized. Success in expanding RA within and across industries interacts importantly with each of the other four objectives—reaching underrepresented workers, raising program quality and flexibility, improving linkages with other programs, and strengthening data and management tools. For example, expanding RA can assist in reaching underrepresented workers, while improving linkages with other programs can help expand RA.

Matrix of Apprenticeship Initiatives and Objectives					
Office of Apprenticeship Initiatives	**Objectives**				
	Expanding Registered Apprenticeship Across and Within Industries	Expanding Outreach to Underrepresented Workers	Raising Program Quality and Flexibility Improving	Linkages with Other Programs	Strengthening Data Systems and Other Tools for Good Management
Strategic Planning and Program Monitoring					
Apprenticeship 2000	✓	✓	✓	✓	✓
REA analysis of new and emerging industries	✓				
Desktop Scorecard/AIMS, RAIS data collection systems	✓		✓		✓
Targeting Industries and Occupations					
Advancing Apprenticeship Initiative	✓		✓	✓	
U.S. Military Apprenticeship Program (USMAP)	✓			✓	
Women in Apprenticeships and Nontraditional Occupations (WANTO)	✓	✓		✓	
Developing Standards and Selection Criteria					
New Competency-based models	✓		✓		
Interim Credentials (e.g., CNA)	✓		✓		
2007 Proposed Regulations (e.g., codifies standards, program linkages)	✓		✓	✓	✓

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Office of Apprenticeship Initiatives	**Objectives**				
	Expanding Registered Apprenticeship Across and Within Industries	Expanding Outreach to Underrepresented Workers	Raising Program Quality and Flexibility Improving	Linkages with Other Programs	Strengthening Data Systems and Other Tools for Good Management
Dissemination, Technical Assistance (TA)					
Continuous Improvement Initiative (Baldridge criteria)	✓		✓		✓
Field-Based Employer Outreach	✓		✓	✓	
Field-based TA to sponsors/potential sponsors	✓		✓	✓	
Best practices dissemination, public information, outreach, and webinars	✓		✓	✓	
Apprenticeship Impact Project (AIP)	✓		✓	✓	✓
Training Employment Guidance Letter (TEGL)	✓		✓	✓	✓

In the seven decades since the passage of the Fitzgerald Act in 1937, the OA has used several strategies to expand and enhance U.S. apprenticeship programs. They include identifying new industries and apprenticeable occupations, designing new standards and certifications, and creating partnerships among sponsors, unions, training providers, educational institutions, local governments, and others with an interest in growing a skilled workforce (Edwards, 1994). Beginning in the late 1980s, the OA initiated **Apprenticeship 2000** to reassess the state of apprenticeships and their proper role in meeting future skilled training needs. The results of that review, along with the OA's efforts to integrate its work with the Workforce Investment Act, are reflected in many of the initiatives described here. These reviews included ongoing analyses of labor market trends, particularly the increasing demand for workers in high-growth sectors. The recommendations that emerged during the Apprenticeship 2000 initiative helped refine the strategic focus of the national apprenticeship program.

Apprenticeship 2000, which began with publication in the Federal Register in December 1987 of the "Apprenticeship 2000 Issue Paper," examined how registered apprenticeships could be transferred to industries and occupations not ordinarily associated with apprenticeships. The paper solicited reviews of the apprenticeship concept, the needs of targeted populations, including dislocated workers and at-risk youth, the needs of employers in a changing economy, and appropriate mechanisms to administer a new or expanded program for apprenticeships. It posited five questions for consideration:

- Should the apprenticeship concept be expanded to all industries?
- What should be the limitations and parameters for expanding occupations?
- What is the appropriate delivery system for an expanded program; what is the role of government?
- How ought the RA system be linked with the educational system?

DOL held public hearings in three cities, produced two additional focus papers to elicit further in-depth consideration of selected issues, and sponsored short-term research projects to develop alternatives for improving and expanding the apprenticeship system, including importantly, into new industries and occupations not historically associated with apprenticeships.

The hearings produced testimony from representatives of business and labor, federal, state and local governments, the educational community and other interest groups, and an overwhelming consensus (94 percent of those who testified) supporting the apprenticeship concept and the importance of expansion to additional occupations and industries. A large percentage expressed the need for targeting, although how to target was less clear: Should OA target occupations in demand or all skilled jobs? Who should define those targets?

What also emerged from the hearings and the review was a discussion about whether alternative models for structuring apprenticeships could improve overall effectiveness and thereby attract more employers to sponsor programs. Registered apprenticeships have historically been designed around 2,000 hours of on-the-job training and 144 hours of formal instruction, although on-the-job training can vary up to approximately 8,000 hours. During the course of Apprenticeship 2000, the possibility of using competencies and milestones rather than a required number of hours to define completion of an apprenticeship gained support. Although some raised concerns about maintaining quality and not diluting the concept of apprenticeship, many recognized that incorporating competency-based apprenticeship might open up new options for credentialing and engage more and more varied participants, both workers and employers. For example, innovative ways to recognize skill achievement, such as offering credit for previously-acquired skills and continuous learning within the apprenticeship structure, might attract more workers. Tiered levels of training could create opportunities for interim credentials and encourage additional training on a ladder of skill achievement.

Nearly half the respondents addressed school-to work strategies as a way of improving linkages between OA and the educational system. School-to-work activities could help youth learn about apprenticeship and possible engage in pre-apprenticeship, internship, or youth apprenticeship programs. The ideas around targeting, competency-based standards, and school-to-work, were identified and articulated by the Apprenticeship 2000 initiative. Since then, some elements of these strategies have been incorporated into apprenticeship contracts.

With the passage of the 1997 Workforce Investment Act (WIA), the Bureau of Apprenticeship and Training (now the Office of Apprenticeship) and the National Association of State and Territorial Apprenticeship Directors (NASTAD) co-sponsored four one and a half day

forums in 1999 as part of the **Apprenticeship Impact Project (AIP)**. The AIP forums explored ways to expand and strengthen registered apprenticeships in the context of the new emerging workforce development system. Among the critical issues raised in these discussions were:

- Concern about negative images and misconceptions about apprenticeships,
- Challenges resulting from the reported shortages of skilled worker,
- Special training needs of women and minorities, who now constitute the largest number of new entrants to the labor market,
- The need for improved linkages with community-based organizations and educational institutions from elementary through post-secondary levels in order to spur outreach and recruitment, and
- Creating opportunities for effective linkages with the new One-Stop Career Center system (Coffey Communications, 2000).

The forums identified tools and strategies to address each of these issues and to strengthen linkages to the new One Stop Career system. The OA developed new marketing materials, including the dissemination of brochures describing promising practices and evaluation findings and other material produced under the Advanced Apprenticeship Initiative.

In 2001, the Government Accounting Office published a review of apprenticeship that contributed to the ongoing discussions about how apprenticeship relates to broader labor market policies. The GAO report concluded that DOL should be more active in identifying new apprenticeable occupations and enlisting new sponsors. Rather than relying mainly on employers' requests for apprentice programs, GAO recommended more use of systematic labor market analysis to identify potential apprenticeable occupations. GAO also recommended placing more emphasis on addressing employer apprehension or concerns about some structural components of apprenticeships, such as mandated incremental wage increases.

At least one other research report since 2000 addressed some of these issues and recommendations raised in the GAO report, whose recommendations gained the ETA's support. In particular, a 2002 assessment under a DOL contract offered a rigorous analysis of the fastest growing industries and occupational groups at national, regional and local levels. According to this analysis, the sectors expected to produce the greatest growth in first decade of the 21st

century are health, social services, business services, transportation, communications and utilities (Research and Evaluation Associates, 2002). Of the 30 occupations expected to grow fastest, 17 are health-related, and 10 are computer-related (Hecker, 2001 in Research and Evaluation Associates, 2002). According to the report, over half of the growth in jobs is expected to be in occupations that require only work-related training. This projection suggests substantial opportunities for expanding registered apprenticeships beyond the construction and manufacturing sectors, industries that have historically accounted for the largest shares of apprentices. The national jobs picture for the two traditional apprentice-using industries has been mixed. While manufacturing lost nearly 4 million jobs from 1998 to 2007, construction employment increased by 1 million.

The volume and profile of new registered apprenticeships in the past several years reflect these projections. The number of new apprentices jumped from 134,000 in 2003 to 212,000 in 2007. The RAIS data on most states show an absolute decline in manufacturing apprenticeships and a large increase in construction apprenticeships. At the same time, the emphasis in OA has been to become proactive in developing apprenticeships in additional fields.

Early in 2001, national staff charged with expanding into high growth industries organized monthly conference calls with state agencies and then with employers to create a forum for peer learning, sharing experiences about what had been done, and what were successful strategies for job training. They discussed with employers job training opportunities, such as those created by retiring baby boomers. The OA now share more complete information with other parts of ETA (such as the Business Relations Group) on pre-apprenticeship and apprenticeship grantee applications. Recent programs established by the OA with large nationwide employers since 2005, such as those with Werner Enterprises and UPS to train truck drivers, and with CVS to train workers for specialized pharmacy functions, including pharmacy support staff and lead pharmacy technicians, are good examples of efforts to involve large employers and growth occupations. The RAIS data show a substantial increase in the last few years in transportation and communication apprenticeships.

Beginning in 2001, the OA developed the **Advancing Apprenticeship Initiative (AAI)** to promote apprenticeship in high-growth industries, as part of the larger ETA-wide High

Growth Job Training Initiative (HGJTI). The OA commissioned research on high-growth industries that might accommodate apprenticeships. In an effort to target high demand industries that have not traditionally used apprenticeship extensively, the OA contracted with national organizations to develop skill content standards for new apprenticeship programs. Grants were made directly to groups such as industry associations, trade unions and educational institutions, with the goal of forming partnerships that would result in registered apprenticeships in six high-growth industries and the military. The OA has produced promotional brochures for these industries which describe how the grants to industry associations and others have been used to model registered apprenticeships in each of the industries.

This "seed capital" was given to five consortia in industries that had never used the apprenticeship training model (health care, high-tech manufacturing, information technology and biotechnology). Two others (maritime and a unit of the National Guard) had used apprenticeships but had only recently adopted an RA model. The OA and NASTAD staffs were trained to undertake outreach efforts in these industries. In each of the projects described, the grant represented a new partnership between training or educational institutions (e.g., university, community college, union, training provider), trade associations, employers, and the workforce investment system (e.g., WIB or local One-Stop Career Center).

The projects operated in many sites and several produced entirely new models. The Council for Adult and Experiential Learning (CAEL), for example, created a nursing career lattice to increase the number of Certified Nursing Assistants (CNAs), Licensed Practical Nurses (LPNs) and Registered Nurses (RNs). The career lattice program is operating in nine sites. CAEL, the OA and SACs worked together to educate potential partners about the structure and benefits prior to recruiting employers. Implementation focused on building local partnerships with health care providers, licensing agencies, educational institutions and One-Stops. The OA adapted the specifics of the LPN occupation and employer needs by granting an interim credential to certify skills attained through the LPN program. The interim credential provides quality assurance sufficient to meet state certification and licensing requirements in nearly all states. In addition, using the interim credential as both a certification tool and a practical route to further skills for some workers, workers can see a transparent pathway to the RN credential at some future point.

The National Institute for Metalworking Skills, Inc. (NIMS), a creation of metalworking trade associations, developed national skill standards for a competency-based RA training model. As of 2007 NIMS had developed curriculum guides for eight occupations and is being used by 36 manufacturers. Employers report the model helps recruitment and retention, as new hires are attracted by the potential for faster advancement and wage increases.

The Computing Technology Industry Association Educational Foundation, Inc. (CompTIA), another trade association, is building the National Information Technology Apprenticeship System (NITAS) for credentialing IT workers in a competency-based RA that can register, track, and manage participants in an internet-based system. As with the other grants, CompTIA works with OA, educational institutions and the workforce development system to implement the project. The OA is helping market the system throughout the country, several colleges are pilot sites, and CompTIA is preparing assessment tools for use by One-Stop centers. CompTIA's goal is to develop nearly 384,000 IT registered apprentices and 6,700 employer sponsors by the end of the fifth year.

The University of Southern Mississippi's Workplace Learning and Performance Center is pilot-testing the nation's first Geospatial Technology Apprenticeship Program to build capacity of community colleges to offer geospatial technology certificates, including course credits toward a two- or four-year degree as part of a registered apprenticeship. It includes partnerships with NASA, Lockheed Martin and regional economic development and technology organizations.

In the biomanufacturing field, the New Hampshire Community Technical College teamed with Lonza Biologics to develop an apprenticeship program, including a partial scholarship and paid on-the-job learning. Students work toward an Associate's degree in biomanufacturing.

Of the two programs with long histories using apprenticeship but new to registered apprenticeship, the Seafarers International Union and partner employers developed a registered apprenticeship that included training modules for deck, engine and steward jobs and now a cruise ship hospitality competency-based certificate. By 2007, half of the 1,700 enrollees and one-third of the 600 maritime apprentices were recruited from One-Stop.

OA has played a critical role in promoting development of other registered apprenticeship programs of demand occupations in the public sector. One example was a new registered program for Wildland Fire Fighter Specialist. The U.S. Department of Agriculture's Forest Service and National Joint Apprenticeship Committee (NJAC) sponsored this program, which NJAC developed in 1999 in cooperation with the OA to ensure it met registered apprenticeship standards. Specialized firefighters may not represent a large number of jobs relative to other occupations, but they require a high level of skill and perform a critical public service; an apprenticeship program in this field increases the changes that there will a sufficient number of competent workers to protect life and property on public and private lands.

Finally, the Indiana National Guard has partnered with the Veterans Employment and Training Service and the Indiana Department of Workforce Investment to expand registered apprenticeships in the military. The Indiana Military Apprenticeship Program (INMAP) Certificate of Completion, issued by DOL, is recognized nationwide and comparable to a bachelor's degree. Although INMAP helps with transitioning unemployed and under-employed Guard members back to civilian employment, in contrast to the larger United States Military Apprenticeship Program (USMAP), described below, which aims primarily to assist in transition to civilian employment, it is expected that INMAP will result in lower turnover for Guard members.

Another example of a registered program that serves a broad public purpose is the United States Military Apprenticeship Program (USMAP), currently operating in the Navy, Marine Corps and Coast Guard and registered with the OA. The military has a long history of providing training for over 120 occupational areas (Department of Labor and Department of Defense, 2005). The military has a sophisticated regimen for ensuring that service men and women have the knowledge and skills to perform jobs that are highly specialized and unique to its operations. About 180,000 service men and women leave the military annually, returning to civilian life with many more years in their lifetime careers. However, veterans experience a higher initial rate of unemployment than comparable non-veterans. The transition from military to civilian employment might improve with a better fit between military and civilian occupational certification. Unfortunately, skill crosswalks between military and civilian occupations are extremely difficult to implement. In addition, skill standards, licensing, and certification are

highly state-specific. By creating apprenticeships within the military, the USMAP effort is trying to align credentials used in military training modules with business standards, potentially facilitating a smoother transition from military to civilian work.

Although no impact analysis is available to determine the link between the initiatives and changes in apprenticeship in targeted industries, some of the descriptive data look promising. In the energy industry, for example, the number of apprentices went from 1,208 in 1995 to 2,004 in 2001 to 5,882 in 2007.[10] Health care showed high percentage change but from a small base, with the number of apprentices rising from 210 in 1995 to 1,092 in 2007. Growth in apprentices in the transportation industry has been impressive, rising to about 30,000 in 2007 from only about 5,000 in 2002. Homeland Security, another targeted industry, has achieved scale of almost 14,000 apprentices in 2007. Overall, recent figures suggest that the targeted high growth industries account for 30 percent of all apprentices.

Expanding Outreach to Underrepresented Workers

Making apprenticeship more accessible to women and minorities has long been an important goal (Marshall and Briggs, 1967). Apprenticeship 2000 recognized the importance of outreach to these underrepresented groups, and the OA offers technical assistance to sponsors that are required to submit an **Affirmative Action Plan**. The OA requires all sponsors that train five or more apprentices to adopt written Affirmative Action Plan and Selection Procedures, which is registered with the Registration Agency. OA routinely conducts performance reviews on EEO compliance. In FY2007, OA conducted 797 EEO compliance reviews. Data from 31 states directly participating in the Registered Apprenticeship Information System (RAIS) indicate that the minority share of apprentices increased from about 22 to 33 percent between 2003 and 2007. In 1979, the minority share for all states was only 13 percent (United States Department of Labor 1981).

The **Women in Apprenticeship and Nontraditional Occupations (WANTO)** Act of 1992 aimed to address the underrepresentation of women explicitly through legislation. In recognition of work-readiness issues that affect the ability of women to compete in the labor

[10] The 2007 figure comes from OA's Desktop Scorecard system tracking programs in RAIS states. The 1995 and 2004 data come from Bennici et. Al (2004).

market, WANTO created a pre-apprenticeship program specifically for women. Upon completion of the program, participants move into formal registered apprenticeships, through partnerships between CBOs and apprenticeship employer sponsors.

Grants were awarded competitively to community-based organizations implementing pre-apprenticeship programs to prepare women for particular occupations. The Women's Bureau administered the early rounds of WANTO grants in collaboration with the OA. However, the OA now administers the grants in order to incorporate occupational-specific features, to improve links with sponsors, and to use the pre-apprenticeship model. Since 2006, in order to strengthen women's progression into registered apprenticeships, grantees have been working under explicit performance goals, including numbers of annual placements, documented wage progression, and written evaluations by journeymen, including, as appropriate, reasons for dropping out.

WANTO and other initiatives have helped increase the absolute number of women in apprenticeship, although the percentage of women apprentices has remained at about 7 percent. One reason is that women are less likely to work in industries that use apprenticeships extensively. For example, in 2006, women made up only 2.6 percent of all full-time workers in construction and extraction occupations. Women accounted for a somewhat higher share of manufacturing occupations, but still only 6 percent of machinists and 7 percent of welders.[11] Because construction employment is highly transient, requiring frequent moves from one construction site to the next, women with children apparently find it difficult to sustain a commitment to the construction industry. Another possibility is that in recent years women have become more likely to attend postsecondary education than men and that community college training substitutes for apprenticeship.

Overall, the share of women apprentices has remained low, from 4.1 percent in 1979 to about 5 percent in 2007.[12] (United States Department of Labor 1981). Although the female percentages barely changed, suggesting little impact from the Affirmative Action and WANTO initiatives, the initiatives may have contributed to an increase in the absolute number of women

[11] These figures come from the Bureau of Labor Statistics, "Median weekly earnings of full-time wage and salary workers by detailed occupation and sex," ftp://ftp.bls.gov/pub/special.requests/lf/aat39.txt.

[12] The 1979 number covers all states and appeared in United States Department of Labor (1981). The 2007 figure covers only the RAIS states and comes from unpublished mimeos from the Office of Apprenticeship.

apprentices, thereby preventing a decline in women's share. In all likelihood, increasing the share of women in apprenticeships will require expanding the demand for apprentices in occupations in which women are already well-established, such as nursing, child care, and laboratory technicians. Thus, initiatives to expand apprenticeships can also serve the goal of increased participation in apprenticeship by women and minorities.

Raising Program Quality and Flexibility

The primary goal for some of OA's initiatives is to improve the quality of programs and increase the flexibility of registered apprenticeship. The initiatives described below complement the ongoing performance reviews of the quality of apprenticeship programs. In FY2007, OA conducted 1,863 assessments of program quality. Of course, improving quality and flexibility is likely to help achieve other objectives as well, such as expanding apprenticeship and reaching underrepresented groups of workers.

The pre-apprenticeship model was also used for reaching other hard-to-serve workers and for offering employers a viable way of creating career ladders for those them. Over the last ten years, the OA collaborated with other agencies and offices to add pre-apprenticeship training as part of the package of services available to ex-offenders (through the National Reentry Initiatives), participants in Upward Bound, and veterans. The OA also collaborated with Job Corps to develop mechanisms to place participants directly into registered apprenticeships while the Job Corps member received credit for classroom work in Job Corps.

The OA has also explored and begun to implement a number of initiatives to increase the flexibility and quality of registered apprenticeship programs: competency- and hour-based hybrid programs, interim credentials, and program assessment. In 1995, the Office released a circular with two options for promoting **competency-based** training. Apprenticeship sponsors were encouraged to develop and implement competency-based work processes (i.e., skills that apprentices can demonstrate and instructors can observe and measure), which detail the discrete knowledge and skills apprentices learn on the job. Alternatively, sponsors can develop *hybrid* apprenticeship agreements that specify a minimum number of hours and demonstration of related competencies.

The hybrid option incorporates documentation of skill attainment while retaining sponsor specification of hourly distribution per duty area (Circular 95-05). A 2007 work process for Accounting Technician follows a hybrid model and includes hourly guidelines per duty area (Bulletin 2007-14). The OA further clarified requirements for competency-based apprenticeships in 2005 and defined competency as an "observable, measurable pattern of skills, knowledge, abilities, behaviors and other characteristics that an individual needs to perform work roles or occupational functions successfully." The OA reemphasized that apprentices cannot receive a Certificate of Completion without first working under a program sponsor for a minimum of 1,000 hours (Circular 2005-03). The 2007 proposed rules, described below, would also allow apprentices in a competency-based or hybrid program the opportunity to complete the program in less time than would be required by time-based criteria (29 CFR Part 29).

Another innovation that the OA developed to expand options beyond the traditional structure of RA is the **interim credential**. As noted above, this credential has been applied through the high-growth health sector for shorter programs that embody the central features of apprenticeship, including work-based learning, wage progression, related instruction, skill content standards, and certification. In 2004, the Evangelical Lutheran Good Samaritan Society and the OA released a career lattice model for a Certified Nurse Assistant (CNA) program. The program featured two certificate programs, three additional specializations, and a post-apprenticeship credential (Bulletin 2004-11). In order to maintain the quality of the programs, revised competency-based standards were released in 2006 (Bulletin 2006-07) and Certified Medication Aide Specialty was added in 2007 (Bulletin 2007-11).

The OA's 2003 **Continuous Improvement Initiative (CII)** focused on managing and improving the quality of the registered apprenticeship system and provides technical assistance tools. CII emphasized the role of registered apprenticeship as a system. Specifically, the initiative defined an apprenticeship program as a "*system that transforms and adds value to its inputs (apprentices) to create outputs (skilled journey-level workers) that solve the problems (demand for workers with specific skills, certifications, licenses, etc.) of groups of customers (employers)*" (Coffey 2004, p6, *emphasis from the original*). CII identified key processes that comprise the registered apprenticeship system, most of which echo other reports and initiatives. For example, the report included curriculum development, instructors and supervisor training,

recordkeeping, program evaluation, and the review and revision of apprenticeship standards, curriculum, methods, facilities, and safety. CII presented two management tools novel to OA. First, the initiative recommended an accessible and flexible Continuous Improvement Plan designed for program sponsors. Second, the initiative employed the Baldridge National Quality Program, Education Criteria for Performance Excellence, to develop self-assessment tools. The principal instrument is the Registered Apprenticeship Program Assessment (RAPA) described under management tools, described below.

The 2007 **proposed regulations** continue the trend toward increasing flexibility, quality, and portability. They call for: 1) more flexible rules for on-the-job learning and related and supplemental instruction; 2) a more inclusive definition of "related technical instruction" to include classroom, occupational or industry courses, electronic media, or other instruction approved by the Registration Agency; and 3) the option for transferring between apprenticeship programs to continue training. In addition, the proposed rules include quality assurance provisions, such as improved requirements for instructor training and credentials in teaching techniques and adult learning styles (29 CFR Part 29). Another set of provisions requires expanding portability across states of certifications from approved registered apprenticeship programs.

Without clear metrics about quality and flexibility, it is hard to judge the impact of these initiatives. Evidence from a survey of apprenticeship sponsors indicates that 70 percent view improving productivity and service quality as very important benefits of their programs and 80 percent of sponsors rate the quality of related instruction in their programs as of high quality (Lerman et al. forthcoming). Other measures of quality could be: 1) the share of apprentices completing their training and reaching journeyman status as highly skilled workers, 2) the increases in productivity linked to the program; 3) the performance of apprenticeship graduates on an externally supervised examination; and 4) the share of apprentices that remain in the industry for at least 5 years. The 2007 regulations and the interim credential offer added flexibility for sponsors in setting up apprenticeship programs and more flexibility for workers to use completed program segments in subsequent programs if they move or if they continue beyond the interim credential. Although the added flexibility might dilute quality in some cases, it is plausible that the new flexibility will allow for better matches between employer training

needs and the use of apprenticeship, thereby encouraging the development of additional apprenticeships.

Improving Linkages with Other Programs

Over the past ten years, the OA has attached a high priority to developing stronger linkages and collaborations with other workforce development programs, particularly those administered in ETA. Since Apprenticeship 2000, the OA has sponsored numerous conferences, workshops and webinars, at which field staff were provided new program information as well as training and technical assistance around program interactions. The OA has also disseminated best practice experience through formal publications and field notices, such as the *Vision for 21st Century Apprenticeship* (e.g., TE Notice 17-06), and through intra- and interdepartmental guidelines on cross-program collaborations. These include USMAP with DOD and early implementation of WANTO with the Women's Bureau in DOL. A major purpose of such cross-program communications is to more directly engage stakeholders who could promote apprenticeships and/or implement apprenticeships directly.

The OA contributed to the development and dissemination of formal guidance from the ETA for WIA funded programs. Recently, ETA and the OA have attempted codifying connections between the apprenticeship and workforce investment systems, partly via ETA's guidance communications to the field about how to achieve such connections. One reason for the limited connections is that the OA was not included in the WIA legislation and is not a mandatory partner in One-Stop Career Centers.

The OA is working to help state and local apprenticeship staff make connections to the workforce investment system. One recent initiative designed to assist staff navigate the workforce system is the July 2007 **Training and Employment Guidance Letter (TEGL)**. It outlines the rationale for linking registered apprenticeships to the national workforce system, with specific references to funding sources and overlapping job training priorities. The TEGL frames apprenticeship as a proven tool for delivering rigorous job training and itemizes a number of incentives that can attract additional employers and trainees. Although WIA values versatile programs tailored to local labor needs, registered apprenticeships are an underutilized option for

increasing access to education and training, designing innovative programs, and serving at-risk youth.

The TEGL encourages SACs to connect with other workforce leaders and organizations, especially Workforce Investment Boards (WIBs) and One-Stops Career Centers. The TEGL acknowledges that such linkages are currently limited because some WIBs and One-Stops remain unaware of how to collaborate with apprenticeship staff, how WIA funding can support apprenticeships, and/or how apprenticeships and interim credentials can positively affect performance outcomes. However, the TEGL highlights the potential of improved collaboration based on proven linkage strategies in Kansas and Washington. In both states, proactive apprenticeship staff have ensured that registered apprenticeships and apprenticeship sponsors are integrated into WIA as workforce tools and training providers. The OA is currently training SAC staff on the TEGL, so that they use One-Stops to meet their goals, leverage employer involvement and funding opportunities (e.g., Pell Grants), and educate the One-Stops in integrating registered apprenticeships into their operations.

Efforts to strengthen **linkages with the educational system** have played some role in the OA initiatives. In the Apprenticeship 2000 hearings, nearly half the respondents specifically addressed school-to work strategies. Some suggested that career counseling in secondary schools might be less singularly focused on college, and rather understand the value of skilled trades and appropriate alternatives for some students. Other recommendations included designing vocational education around employer-specified standards, including structured internships to allow graduates to qualify for apprenticeships, and granting credit for achieving specified competencies. A joint effort of industry and the educational community was suggested as a way of assuring that these options were responsive to industry needs. The discussion illuminated larger issues concerning the role that apprenticeship could play in developing the skills of important groups including youth, women, and minorities. Participants noted that expanding apprenticeships would require significant support and leadership from the national office, including new promotional campaigns and targeted technical assistance to assist field staff and other state and local agencies to promote the new flexibility and competency-focus and enlist new sponsors.

In November 1989, DOL published *Work-Based Learning: Training America's Workers,* a policy report based on findings from the Apprenticeship 2000 initiative, and in particular to assist school-to-work transition for youth. A number of recommendations were incorporated into the creation of ETA's (now former) Office of Work-Based Learning in ETA, established in 1990. Registered apprenticeship still remains an important venue for school-to-work transitions and an area for continued expansion. Improved linkages with the educational system could assist women and minorities enter apprenticeships through well-structured school-to-apprenticeship and other pre-apprenticeship models.

At this point, it is early to judge the effectiveness of the TEGL and other initiatives to link apprenticeship with One-Stops or with other employment and training programs. The evidence indicates that there is room for improvement. Site visits conducted prior to the sponsors' survey found that One-Stop directors generally had little knowledge of and gave little consideration to registered apprenticeship (Lerman et al. forthcoming). Few sponsors (about 17 percent) reported using a One-Stop or Job Service to post apprenticeship openings or having applicants sent by the One-Stop or Job Service. Only 14 percent of sponsors had been contacted by the One-Stop or Job Service to post openings.

The extent of linkages with high schools remains unclear. About one-third of apprenticeship sponsors identified high schools as important recruitment sites (Lerman et al. forthcoming). On the other hand, the average age of apprentices is rising to the late 20s, indicating that few high school students enter apprenticeships soon after leaving high school. Finally, the youth apprenticeship initiatives begun in the early 1990s did not lead to systemic change or to major system change in the interactions between registered apprenticeships and high schools.

Strengthening Operations with Data Systems, Technical Assistance, and Other Tools

Over the past twenty years, the Office of Apprenticeship has worked to enhance the quality and reliability of its data collection and reporting systems. Some of the key goals have been to achieve more consistent reporting and assessment across apprenticeship programs and to incorporate continuous improvement concepts into their performance management activities. The improvements in administrative data and in various tools have allowed the national office

and SACs responsible for managing the programs to use a standard set of measures. The gradual enhancements to the data systems and measures took place over the past twenty years.

The Apprenticeship 2000 Initiative identified key areas for improving registered apprenticeship data and management in response to the inconsistent or inaccessible data on the availability and recommended that the Bureau of Apprenticeship and Training (BAT, now the OA) collect, organize, and provide a "complete data file on apprenticeships" for use by public and private purposes (Grossman and Drier, 1988). Additional recommendations focused on the need to link apprenticeship programs to educational institutions and career counselors. The emphasis on these partnerships reflected the nascent links between pre-apprenticeship programs and school-to-work programs during the early 1990s. After Apprenticeship 2000, discussions with a range of stakeholders addressed data collection, a number of recommendations emerged (DOL-ETA, 1989). Participants focused on improving a number of process and outcome measures. As a means to improve process measures, many recommended standardized curricula for each occupation, more detailed skills requirements, a minimum level of recordkeeping on key items (e.g., hours worked, instructional hours, competencies, etc.), and documenting completion rates. The challenge of implementing such requirements for new programs raised questions about whether the new measures should also be applied to existing programs. The OA had relied on the **Apprenticeship Information Management System (AIMS)** throughout the 1990s, following the Apprenticeship 2000 reports of the late 1980s. But, the AIMS database remained voluntary and became outdated.

By decade's end, the AIP initiative echoed many of the recommendations for improving data systems. AIP identified six main areas for improvement. First, the AIP forums recommended updating registered apprenticeship training standards, curricula, and facilities. Second, in order to ensure sustained performance, AIP also recommended increasing the number of quality and compliance reviews. Third, apprenticeship staff and instructors would need to demonstrate up-to-date training and training methods to promote professional and rigorous instruction. Fourth, AIP suggested streamlining application and program administration requirements. In order to promote standardized data and information, AIP encouraged improving the quality of data and the dissemination of apprenticeship information. Finally, AIP recommended awarding apprenticeship program graduates with a portable certification of

completion. Among a dozen strategies, AIP recognized the need to increase quality control and compliance across all registered apprenticeship programs and ongoing updates and access to recordkeeping and database systems (Coffey Communications, 2000).

In February of 2002, the OA implemented a new web-based **Registered Apprenticeship Information System (RAIS)** replaced AIMS. However, while federally managed states had to report data on each apprentice on a variety of items, including demographics of apprentices, their current status, occupation, and industry, state-run SACs only had to provide summary data. Inconsistent reporting was exacerbated by continued incompatibilities between the OA and SAC databases. As a result, annual reports could not disaggregate information on apprenticeships by different industries, occupations, or types of programs as documented in an OA-commissioned paper by a major statistical and research firm (Bennicci et al., 2004). In 2005, RAIS incorporated information about individual programs, apprentices, and sponsors in 31 states, including 8 SAC states (GAO, 2005). Twenty other SACs maintain their own parallel data collection systems.

The OA will implement the Apprenticeship Program Information Data System (RAPIDS) in FY 2008. In order to make information for the data system more accessible, the OA implemented an active **Desktop Scorecard** which reports RAIS/RAPIDS data on a daily basis and generates a Performance Score Card that all the OA managers can view. The Desktop Scorecard includes statistics updated daily from the active database, which includes registration data from apprenticeship programs in 32 states (including 8 SAC states). It provides aggregate data on the number of existing and new programs, number of HGJTI programs, the number of compliance reviews conducted, and other indicators, including OA's annual GRPA goals for the current fiscal year. Another goal is to validate reported data and ensure that 85 percent of the RAIS data fields are completed. The OA managers monitor these goals daily, and instruct staff at the regional and state levels to delete erroneous or out-of-date data and contact sponsors with inactive programs to maintain the accuracy of each programs' status (Bulletin 2007-04, 2006). In addition, SAC staff are required to develop an annual plan to meeting specified goals for new apprenticeships, such as enrolling 80 percent of new apprentices in high growth industries.

The **Registered Apprenticeship Program Assessment (RAPA)** instrument**,** the product of the Continuous Improvement Initiative reviewed above, provides program sponsors with a

formalized self-assessment of the major components of a registered apprenticeship program. The instrument integrates previous recommendations for managing an up-to-date and effective apprenticeship. In addition, it reinforces constructive incentives. For example, the instrument encourages program sponsors to assess apprentice skills, training strengths and needs, rather than pre-screening potential participants to filter out individuals who may need remedial training or education. CII identifies key promising practices and related goals, including a screening and selection goal to, "utilize continuous improvement to ensure that the selection and screening processes are fair and meet and/or exceed all appropriate employment laws and/or regulations; and that they are inclusive and screen in diverse candidates" (Coffey Communications 2004). RAPA is an example of efforts by OA to improve the self-management and self-assessment of apprenticeship programs, with the ultimate aim of improving their quality and effectiveness. Unfortunately, the data are lacking on the extent to which registered apprenticeship programs are using this instrument and/or improving operations as a result.

The Desktop Scorecard and RAPA systems are clear improvements in terms of making information more relevant and timely for management and research purposes. However, the fact that the federal data systems do not apply to SAC states leaves a major gap in knowledge about the operations of apprenticeship programs. A longstanding recommendation is that SAC states should record and report data comparable to the data collected in the federal programs. There remains the issue of how to implement this extension.

IMPLICATIONS OF PAST INITIATIVES

OA has adopted a number of strategies to expand the role of registered apprenticeship in the United States, to reach out to underrepresented groups in registered programs, and to improve the both the quality of programs themselves and the administration of the national system. Reviewing and learning lessons from these initiatives are challenging tasks, given the very limited quantitative data and limited nature of the evaluations of their impacts.

To view the initiatives and OA operations in context, it is important to bear in mind that OA's budget and staffing levels are modest. The federal government's appropriations for OA in FY2007, $21.5 million, fell over 40 percent from the inflation-adjusted 1977 budget of $36.4

million (both in 2007 dollars).[13] Since nearly all the budget goes for salaries and salaries rose faster than inflation, the ability to staff the agency declined faster. The 139 workers in OA staff in 2007 were only about 30 percent of number of workers in 1977. Over this period, the number of apprentices in the Registered Apprenticeship system nearly doubled. Thus, OA's development and management of initiatives took place over a period when its budgetary and staff resources were declining rapidly. It is difficult to know what role, if any, these reductions played in the operations of the programs.

Several of the initiatives focused on increasing the number of apprenticeship programs and apprentices. As noted above, the initiatives were not subject to evaluations of program effectiveness or how the initiatives affected the number of apprentices and apprenticeship programs. Data on apprenticeship trends by themselves cannot yield conclusive evidence. A rise in apprenticeships after an initiative does not prove that the initiative *caused* the increase. On the other hand, little or no increase in apprenticeships in an occupation targeted by an initiative does not prove the initiative had no impact. There may be a considerable time lag between the initiative and the diffusion of apprenticeship across the relevant industries.

Still, the evidence on apprenticeship trends is consistent with some success in expanding apprenticeship. The number of apprentices was 36 percent higher in 2007 than in 1997, while total employment went up by about 13 percent. Nearly all of the recent increase in apprenticeship came from two industries: construction and transportation/communication. Between 2002 and 2007, apprentices in construction or in transportation/communication increased by about 58,000, about the same amount as total apprentices.[14] The gains in transportation and communication are particularly notable, yielding a five-fold increase from about 6,000 in 2003 to 29,000 in 2007. Efforts and initiatives developed by OA likely played a role in this expansion, but it is difficult to draw clear conclusions without reliable data and detailed analyses.

One way OA has tried to expand apprenticeship is to work with industry associations and other groups to set up the content standards and program parameters for new apprenticeable

[13] These data come from the Office of Apprenticeship, "Histories of Positions, Appropriations, Ceilings."
[14] Although apprentices in other industries increased as well, some industries, particularly manufacturing, experienced descreases in apprenticeships.

occupations and to promote recently developed apprenticeable occupations to prospective sponsors. The grants with organizations in health care, high-tech manufacturing, information technology and biotechnology have yielded new apprenticeship models but only modest increases in the number of apprenticeships. A reasonable additional step would be to intensify the marketing of new apprenticeship models developed through the high growth initiative or through ongoing operations, especially where the potential in terms of slots is high because of rapid industry growth. The health care field is a major source of jobs and job growth and a natural place for apprenticeship. Between 2006 and 2016, employment in health care occupations will increase by 1.4 million; only 90,000 of the increase will be among physicians (Dohm and Shniper 2007). Registered nurses will experience the largest increase in employment of any occupation (over 500,000); the projection is for 1 million openings for registered nurses. The OA could build on the recently established nursing lattice to promote the diffusion of this approach for training nurses. The broad occupational area of health technologist and technicians could fit well within the apprenticeship model. These occupations are expected to generate 480,000 net new jobs and over 1 million job openings. Using apprenticeship for these fields could contribute to a substantial increase in the number of well-trained health care workers.

Another way to expand apprenticeships is for OA to work with additional industry associations to develop new occupational profiles that involve training through apprenticeship. OA and the relevant industry association should develop plans for evaluating the success of the occupational profile in training a skill worker with the adaptability and problem-solving capabilities that are nurtured through work-based learning and experience. Once evidence has been compiled, OA and the association could jointly market the approach throughout the industry. In undertaking these efforts, it is important to attract the agreement of major employers that they will try the apprenticeship model for much of their training and recruitment of skilled workers in the appreciable fields. The very small numbers of apprentices in information technology as of 2007 indicate that, in spite of the initiative with CompTIA, IT employers have not embraced the information technology apprenticeships.

Efforts to increase the number of minorities and women have met with mixed success. The share of minorities has jumped from about 13 percent in 1979 to about 33 percent in 2007. EEO reviews and Affirmative Action plans may have played a role, but changes in social

attitudes and practices may have contributed as well. In contrast to the trend among minorities, women's share of apprenticeships has remained in single digits, rising from about 4 percent in 1979 to only 5 percent in 2007. Without a detailed analysis, it is difficult to judge why women are only slightly more likely to participate in apprenticeship than 28 years ago. However, the high and rising concentration of construction in apprenticeship are no doubt among the reasons. As noted above, the best way to expand the role of women in apprenticeship may be to extend apprenticeship training to occupations and industries that are already well penetrated by women.

Efforts to promote linkages between registered apprenticeship and the One-stop system, while worthy, appear to be at a relatively early stage. More efforts will likely be needed if there are to be significant and helpful changes in the relationship between these two systems in the field. Perhaps the recent TEGL mandate will help generate closer linkages in the future. Given their enthusiastic endorsement of registered apprenticeship, current sponsors might be good ambassadors for marketing to the Workforce Investment Boards, to other employers, and to administrators of One-stop offices.

In the area of program flexibility and quality, OA should make sure employers are well aware of the new flexibility and portability built into apprenticeship as a result of past initiatives. Given the enhanced ability employers and joint programs to tailor more effectively the duration of training to the skills that have to be learned and mastered, apprenticeship programs should become much more attractive to employer sponsors. In addition, workers and employers should gain from a competency-based program that allows fast learners to complete programs more quickly without sacrificing mastery of appropriate skills. The use of interim credentials can be attractive to employers and workers as well. Workers who fear having to complete a lengthy, four-year program might be much more willing to begin with a shorter program for an interim credential, knowing that they can subsequently use the interim credential as a step toward attaining a credential requiring advanced skills that build on skills attained as part of the interim credential. In principle, these steps could generate an increase in apprenticeships. But, additional steps may be necessary, such as publicizing the new rules and providing individualized technical assistance and marketing. If given additional resources, OA could manage this effort while partnering with Chambers of Commerce, unions, workforce agencies, and schools.

Improving the quality and comprehensiveness of the data reporting systems is a necessary component of 21st century public management and will provide at least some of the basic information for monitoring program activities in general and determining if specific initiatives are successful. The absence of micro-data on apprenticeship in SAC states is unfortunate and limits our understanding of national trends across industries, of the demographics of participants, of completion rates, and of wage rates. The Department and the Congress should work together to insure that SAC states provide this information at least in tabular form. In the future, OA and SACs should incorporate data that track the earnings of apprentices over time. The technology for matching individuals with administrative earnings records from the Unemployment Insurance system is sufficiently well-developed and economical for the Department to undertake collect long-term earnings for apprentices. Tracking earnings, together with industry and demographic information, can allow for serious analyses of the functioning of the apprenticeship systems by state, industry and other factors. One additional data and analysis component that could improve our understanding of apprenticeship in the U.S. involves the collection and organization of information on unregistered forms of apprenticeship. OA may not be the appropriate organization for carrying out programs to learn about training in unregistered apprenticeships. But, it is important to learn about this sector both to improve understanding of apprenticeship in the U.S. and to examine why some apprenticeships are unregistered.

Finally, it is notable that efforts to bring together stakeholders to take a strategic look at the future of registered apprenticeship, in the Apprenticeship 2000 initiative, and in the Forums later, appear to have generated many ideas that were influential for years to come. It may be worthwhile for ETA to consider a similar conference or set of forums to explore new trends and ideas in regard to registered apprenticeship, particularly as technology, globalization and new occupations evolve.

REFLECTIONS: NEW AREAS FOR EXPLORATION

Although this paper focused primarily on the initiatives undertaken in the past by the Office of Apprenticeship, there are other avenues that could be examined for new ideas regarding registered apprenticeship in the U.S. These other areas include the experiences of

industrialized countries that have robust apprenticeship systems, broader use of technology, and new and more rigorous research.

One issue has to do with the rationalization of apprenticeable occupations. Currently, countries with large systems of apprenticeship rely on far fewer occupational categories, 300 or less, than the more than 850 currently apprenticeable occupations in the U.S. By consolidating occupational areas, the system will tend to provide a broader, more portable range of skills. The broader skills allow apprentices to advance more easily, to achieve higher productivity because of this adaptability, and to have less stake in maintaining a narrow occupational approach as technology changes the mix of occupations required. One result of using broader occupational profiles is the ability of apprenticeship systems in some countries to penetrate successfully such new occupations such as computer analyst and data management occupations.

The OA can respond appropriately to this issue by exploring the benefits and costs of rationalizing the existing structure of apprenticeships to reduce the number or occupations while broaden the skill requirements. Reducing the number of apprenticeable occupations might open the way for peer or industry review of programs mounted by individual employers. Such a strategy might improve quality, but might be resisted by some employer sponsors. Even with current occupational profiles, OA could make the content standards accessible to current and potential sponsors of apprenticeship programs by publishing them on the Internet.

Finally, research on apprenticeship is of critical importance, both as a way of improving the system and increasing the policy presence of apprenticeship. To understand the impact of registered apprenticeship, and its role within a national training system, research could assess the impacts of training on individual workers and on employers, especially the consequences for costs, benefits, and productivity. An overall cost-benefit analysis could be part of the research effort. Recent evidence from Germany and Switzerland indicates that the net cost to employers of apprenticeship training during the four-year training period is virtually zero, since the costs of training are offset by the monetary benefits resulting from the directly productive activity of an apprentice after the first year. At that point, the skills of apprentices are higher relative to regular skilled workers than are relative wages. The limited information on impacts in the U.S. suggests extremely high returns (about $16,000 per year), as found in a study in Washington State

(Washington State Workforce Training 2004). Similar studies have not been conducted in other states and no studies have used experimental or quasi-experimental methods. Research findings that document benefits from apprenticeship are potentially highly relevant to policies concerning the budget allocations to the OA and to other policy interventions. If the evidence from the Washington study are representative and accurate, then the social benefits resulting from the lifetime earnings gains for each new apprentice are approximately $200,000 if the increased benefits last for 20 years and the discount rate is 4.5 percent. By implication, an increased investment in expanding apprenticeship of $20 million would break even in social benefit terms if the investment generated only about 100 additional apprentices.

CONCLUDING THOUGHTS

Given the continuing strength of the apprenticeship approach in many advanced economies, a significant expansion of apprenticeship in the U.S. may be both desirable and feasible. Apprenticeship has the potential to provide healthy earnings for many workers, raise productivity, and leverage employer investments in human capital. A strong case can be made for building on past initiatives regarding Registered Apprenticeship and developing new ones.

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