AN ANALYSIS OF U.S. LEARN-AND-EARN PROGRAMS

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EXECUTIVE SUMMARY

Learn-and-earn programs can play an important role in preparing students for successful careers. The optimal programs combine career-oriented academic curriculum, relevant work experience, and student financial assistance. The academic curriculum and relevant work experience reflect the “learn” component; student financial assistance, the “earn” component. The earn component is important because it allows students, who might not be able to study without financial assistance, to remain in school.

Learn and earn is important in today’s increasingly competitive and turbulent work environment, particularly for low-income or under-skilled workers who seek better jobs, a better standard of living, and a potential for career success. Additionally, employers want to recruit qualified candidates but are not finding candidates who are adequately prepared. Both these groups could benefit greatly from learn and earn.

Learn-and-earn programs provide the flexibility students need to acquire knowledge and skills and earn a living at the same time. Moreover, the programs teach students the work ethic and communications skills needed to make the transition to the workforce.

Learn-and-earn programs also give employers the edge they need to find qualified job candidates through effective screening, selection, and recruitment techniques. Given the opportunity to influence curriculum design and content, employers reduce recruitment and training costs.

The nation is falling behind in its ability to produce qualified workers. Today’s workers often lack the knowledge and skills to compete successfully in the labor market. Learn-and-earn programs can provide the greatly needed bridge that connects workers with employers.

This report contains a comprehensive analysis of learn and earn. It specifically addresses the issue from the perspective of the student and educational programs that provide learn-and-earn opportunities. Although employers and regular workers are important in the analysis of learn and earn, the literature does not appear to provide much evidence that employer-based, learn-and-earn programs have been objectively vetted. Very few companies are willing to release this kind of proprietary information to competitors. Nonetheless, this report addresses the gap in the body of knowledge and provides a foundation for enhancing the efficiency and effectiveness of learn-and-earn programs.

To manage this task, the report is divided into seven sections. The first section includes a working definition of learn and earn and a mission statement. These two elements provide the foundation for evaluating the nature and scope of learn-and-earn models. The second and third sections identify and describe general and context-specific learn-and-earn models. The remaining sections identify and describe the curriculum, certification, delivery, and facilitating models that constitute learn-and-earn programs. The paper concludes with an assessment of the guiding principles of learn and earn, research findings, and recommendations for future research. Because this paper relies heavily on original source material for its program descriptions, hyperlinks in the text and endnotes lead the reader to web sites or file downloads for more detailed investigation.

Learn and earn has the potential to become a vital part of America’s education system. The analysis identified five general learn-and-earn models that work in a variety of settings: internships, cooperative education, apprenticeships, Federal work-study, and practicum. Context-specific models can be tailored to meet the needs of both employers and workers. Two context-specific models applicable in a narrower range of conditions include: clinical rotations or clerkships and legal externships, internships, clerkships, and clinics. All these models form the nucleus of learn and earn.

Four career-oriented delivery models support the nucleus: career and technical education; science, technology, engineering and math (STEM) programs; capstone courses and professional science master’s degree programs (PSM). Each model delivers the rigorous academic work necessary for a career but may not necessarily incorporate relevant work experience or student financial assistance. The curriculum, however, is consistent with the academic component of learn and earn.

Three credential or certification models validate academic training: information technology credentials and certifications; registered dietitian certifications (representative of several healthcare education programs), and general professional credentials such as certificates.
The following statements summarize the findings:

Five distribution models are instrumental to the implementation of learn and earn: four-year public and private colleges and universities; two-year public and private community colleges; industry and university partnerships; corporate colleges and universities, and distance education. Of these, distance education is becoming a model of choice for many workers due to its flexible setting.

Two facilitating models provide administrative or financial support for learn and earn: governmental and nongovernmental agencies. Governmental agencies include the Bureau of Labor and the Department of Education. Nongovernmental agencies include employers, unions, philanthropic foundations, and sponsorship groups.

The effectiveness of any learn-and-earn program depends on its adherence to four foundational pillars: academic rigor, relevant work experience, student financial support, and stakeholder investment in learn-and-earn programs. The pillars are held in place by a commitment to ensuring accountability, giving students the opportunity for career exploration and professional development, and conferring bona fide credentials.

The descriptions and analysis suggest programs, delivery methods, and funding sources need to change so that America’s students are prepared to compete in the labor market and thrive in their chosen fields.

The following statements summarize the findings:

- The general and context-specific models are effective in contributing to successful student outcomes; however, variation exists within and among models.
- No single model was definitively more effective than another; therefore, the value of any particular model is contingent on a variety of factors.
- Learn-and-earn programs will probably be best served through the development of basic principles rather than specific activities.
- For learn and earn to be truly effective as a guiding initiative, the principles need to allow for relatively diverse and flexible governance. Undue bureaucracy will limit the ability of programs to be entrepreneurial and, ultimately, successful.
- Current learn-and-earn programs are reaching the end of their usefulness in today’s education and labor market and need to be revitalized.
- New models being developed in companies may be critical to the future of learn and earn. Companies should produce reports documenting the success of their programs so others can benefit.
- Continuing education should be investigated further to more fully understand how it might be effectively integrated into a learn-and-earn model.
- The business community and education institutions that deliver learn and earn need greater collaboration to help ensure agreement on goals and objectives.
- Education institutions need to monitor the labor market regularly, identify emerging trends and changing conditions, and respond to market needs by adjusting their programs accordingly.
- Programs will be more successful if methods are in place to ensure program accountability, attract and retain students, and provide professional development.
- Programs that offer career exploration save time and money: Students learn early on whether they are suited to a particular profession.
- Learn-and-earn programs work better when employers, education institutions, and government and nongovernment agencies work together.
- Community colleges provide one of the strong delivery channels for learn-and-earn programs because of their access and flexibility.
- Career-oriented curriculum models such as Science, Technology, Engineering, and Mathematics (STEM) provide strong evidence of academically rigorous and relevant training.
- Industry and university partnerships are not well publicized except in a few cases. Strategic alignment in this area is thus hindered by a dearth of evidence.
- Distance education is another strong delivery channel because it removes the constraints of time and distance present in other delivery channels.
- Government and nongovernment agencies provide meaningful financial support, but their goals may not always coincide with those of stakeholders.
- Government and nongovernment agencies provide guidance in the development and administration of programs, but their diverse agendas present a challenge for strategic alignment between stakeholders.
- More money is needed to attract and retain students. Current funding does not always ensure that students earn a living wage while they study.
- More research is needed to develop best practices for learn and earn. Best practices are critical to the success of both current and future programs.
WORKING DEFINITION OF LEARN AND EARN

Although numerous learn-and-earn models are in use today, this may be the first report to provide a comprehensive analysis of this type. It addresses the gap in the body of knowledge from the perspective of the student and the educational programs that provide learn-and-earn opportunities. Thus it provides a foundation for enhancing the efficiency and effectiveness of learn-and-earn programs.

Currently, there is no working definition of learn and earn, which limits its ability to present itself as a meaningful education model. Developing a definition overcomes this limitation by accomplishing two objectives. First and foremost, it provides a lexical foundation for the analysis; that is, it describes the nature of learn and earn and separates learn and earn from other models that help students make the transition from an education setting to the workplace. Second, it stipulates the context; that is, it sets out the necessary conditions for a successful learn-and-earn model.

FOUNDATIONAL PILLARS
Explicit in the development of a definition is that four pillars form the foundation for learn-and-earn models. Without the pillars, a learn-and-earn program cannot be effective.

**Academic rigor** is learning in which students demonstrate in-depth mastery of challenging concepts through thought, analysis, problem solving, evaluation, or creativity.

**Relevant work experience** refers to practical training. It permits students to apply the knowledge, concepts, and skills they have learned in the classroom to real-world situations.

**Funding** refers to money from government and nongovernment agencies, education institutions, and businesses that support learn-and-earn programs. Financial assistance is a term reserved for money given to students participating in the programs. The importance of significant funding and financial assistance cannot be overemphasized. A 2002 report from the Advisory Committee on Student Financial Assistance stated: ...financial barriers prevent 48 percent of college-qualified, low-income high school graduates from attending a four-year college, and 22 percent from attending any college at all, within two years of graduation. Their peers from moderate-income families are hardly better off — 43 percent are unable to attend a four-year college, and 16 percent attend no college at all.

** Strategic alignment** keeps the student engaged in learning and the stakeholders invested in the program and its outcomes. Abraham (2006) referred to it as the concept of “everyone rowing [the boat] in the same direction. The tighter the linkage and the better the alignment, the likelihood of flawless execution becomes stronger.”

ORGANIZING PRINCIPLES OF LEARN AND EARN
The foundational pillars cannot stand without support from essential organizing principles. The organizing principles provide the basis for good program development.

**Accountability** is the “obligation of an individual, firm, or institution to account for its activities, accept responsibility for them, and disclose the results in a transparent manner. It also includes the responsibility for money or other entrusted property.” Appropriate reporting is one method to ensure accountability and provide a way for stakeholders to measure a program’s effectiveness.

**Career exploration** refers to activities that help students identify and plan for successful careers. Before students begin work, they should systematically explore their career interests to make sure their education aligns with their desired field of work. Students who explore their options before they enter a learn-and-earn program are more likely to succeed in school and launch a sustainable career.

**Professional development** is “the continuous process of acquiring new knowledge and skills that relate to one’s profession, job responsibilities, or work envi-
Professional registrations are given to students who complete requirements to practice in a specific profession such as nursing or engineering.

Certifications are granted to students who successfully meet requirements in a particular subject area, such as an apprenticeship program targeted to a specific industry. Tan (2005) noted that a certification is “a credential that follows the individual wherever he or she goes and demonstrates a commitment to learning beyond the basic engineering, science, or technology degree.” (p. 9)

Certificates are typically conferred after a student completes a single course or a series of courses. Since the time requirements for obtaining certificates are low, they hold less value than a diploma, professional registration, or certification. The certificates may, however, have labor market value depending on the type of certificate conferred, such as one from an IT training program.

**The Foundations of Learn and Earn**

- **Career Exploration**
- **Academic Rigor**
- **Financial Investment**
- **Professional Development**
- **Relevant Work**
- **Strategic Alignment**
- **Accountability**
- **Credentials**

Ongoing professional development ensures that students have access to academically rigorous training and relevant work experience. This kind of study enables students to keep up with best practices and update skills.

**Credentials** come in several forms and are essential for any successful learn-and-earn program. Van der Meer and Wielers (1996) noted: “credentials are a good indicator of the performance to be expected, and also legitimize the selection and professional practice of the worker.”

Diplomas attest to a student’s successful completion of a level of study. Ferrer and Riddell (2002) found that possession of a high school, community college, trade school, or university diploma directly affected the wage increases a worker received.
GENERAL LEARN-AND-EARN MODELS

Five general learn-and-earn models are in use today: internships, cooperative education, apprenticeships, Federal work-study, and practicum. These models can be applied in a wide variety of situations and contexts.

INTERNSHIPS

All definitions of internships have similar characteristics. The characteristics below overlap one another but contain subtle differences that add up to a more thorough definition.

- A supervised discipline-related work experience
- A controlled experiential learning where a student receives academic credit while employed by an organization in a chosen area of interest (Stretch and Harp, 1991, p. 67)
- A quality work experience, guided and managed by an experienced supervisor, in a position with duties that the student has not previously performed, which will benefit the student in their future career goals
- An internship is a formal arrangement designed to provide opportunities for students to study and experience professional career interests in the community.
- An internship is a supervised off-campus working and learning experience, which earns academic credit. Internships give students opportunities to apply and extend the theoretical knowledge acquired in the classroom to practical experiences, while also allowing them opportunities to view and evaluate careers to which their academic interests may lead. Ideal internships establish positive contacts with prospective employers and are key to building professional networks for students.

The University of Oklahoma extends the definition by summarizing the purpose of an internship:

- Provides an opportunity to engage in on-the-job application of classroom theories and techniques
- Assists in developing added value skills in an area of interest and in the planning and organization of a related service or community activity
- Provides opportunities to undertake challenging and stimulating tasks which often entail a significant contribution to the quality of life for persons served by the organization in which one serves their internship
- Identifies strengths and weaknesses of professional behavior
- Allows him/her to enter the professional world gradually, under competent supervision and guidance
- Presents an opportunity to interact with and learn from professional practitioners in their area of expertise
- Offers a situation in which to learn and investigate human interaction
- Provides an opportunity to evaluate the field of the organization as a professional

Participants

No authoritative source validates the number of students who perform internships each year.

Model Characteristics

The internship model is consistent with the guiding principles of learn and earn. It is weakest in the areas of credentialing and financial investment. Students seldom receive special certifications for participation, although they may receive college credit. Since most institutions do not require student interns to be paid, unpaid internships are fairly common. Despite the intentions stated in internship program literature, many students find internships without assistance from faculty or advisors and complete their internships without supervision.

Loyola University of Chicago, the University of New Haven, Pennsylvania State University, and The Ohio State University are representative examples that set forth the basic guidelines of their internship programs. Their guidelines are typical of ones described in other sources.

Loyola University of Chicago sets the following guidelines for academic internships:
• Provides meaningful work experiences for the students, directly linked with the student’s major or academic program
• Is academically rigorous, resulting in a defined project or product benefiting the organization and student learning
• Provides the student with individualized attention through a mentor at the organization to enhance student learning and student development
• Provides formal and informal evaluations throughout the experience and a final assessment from both the student and organization mentor
• Supports the academic experience of the student, while rooted in the curriculum, the Jesuit mission, and the core values of Loyola University Chicago

The University of New Haven notes that internships may be part-time or full-time and paid or unpaid. The description includes important elements structured into the experience:

• An intentional experiential learning strategy
• An emphasis on professional development
• Performance assessments
• Reflection and acknowledgement

Pennsylvania State University also states the characteristics of a good internship:

• A clear position description outlining the primary responsibilities of the intern. We recommend that both you and the student sign an agreement detailing these responsibilities, the days and hours the intern will work, and the compensation (if any) provided to the intern.
• Training that familiarizes the intern with the organization’s mission and outlines the objectives of the internship
• Challenging and meaningful duties and responsibilities that are not randomly determined or purely clerical in nature. Include interns in hands-on, meaningful work which will enhance their understanding of your organization. The student may perform some clerical work, but such work should not take up more than 50 percent of the internship.
• A safe and specific workspace for the intern
• Exposure to other professional staff, clientele, etc. (as appropriate) for professional growth
• Opportunities for shadowing, if possible, and mentoring
• Feedback and discussion regarding the intern’s performance.

The Ohio State University, Department of Political Science lists similar characteristics for professional internships:

• Contributes to the student’s personal and professional development through challenging work assignments
• Is completed before the student graduates from the university although in some cases internships can be completed the summer between the student completing the undergraduate degree and before beginning a graduate degree program
• Is planned and scheduled through consultation with the department or college so as to fit into the undergraduate experience
• Involves a supervision component that is mentoring and educational
• Includes career related experiences that complement what is learned in the classroom
• Will have a reflection and evaluation process at the conclusion of the internship
• Builds upon the relationship the department/college/university has with employers
• Is most successful when the student, the department/college, and the employer all share responsibility in making it a valuable experience

Outcomes or Benefits

Internships are perhaps the most researched model of learn and earn (Coco, 2000; Devine et al., 2007; Gault et al., 2008; Hall, Stiles, Kuzma, and Elliott, 1995; Knemeyer and Murphy; 2002; Taylor, 1988; and Thiel and Hartley, 1997). From this research, Weible (2010) summarized the benefits students can expect from internships. Weible found that while they are interns, students improve their communication skills, learn job-specific skills, improve their creative thinking, and receive academic credit. They also learn how to interview for a job and develop a job network they can use to find work after graduation. As a result, students present stronger resumes to prospective employers and are better prepared to embark on a career. When they compete for jobs, students receive more job offers, are hired more quickly, and are paid higher starting salaries than others competing in the labor market. When they find a job in their chosen field, they are also more likely to experience higher job satisfaction.

Weible (2010) also summarized the benefits to employers and found that employers looking for interns get first choice of the best students. During the internship, the employer benefits from having skilled, part-time help who bring new ideas to the workplace. The interns help the employer forge a link with the education institution, which, in turn, expands the employer’s pool of qualified job candidates. Thus employers are able to make better hiring decisions.
Benchmark programs
In its branding survey of the top 280 corporations, Universum listed the most preferred internships identified by students; however, the students’ rankings did not mean the students performed internships with the companies. The students chose PricewaterhouseCoopers, GE, Walt Disney World Orlando, Google, and P&G.

Princeton Review and several news magazines ranked internship programs, but the data were self-reported or came from peer institutions. Because of these conditions, the rankings reflected the perceived quality of the ranked programs.

The benchmark programs for education institutions listed below come from the authors, who have either worked with the staff and/or know from personal experience how the schools structure their programs.

Four-year Colleges and Universities: Messiah College, Northeastern University, Wichita State University, University of New Haven, Butler University business program

Two-year Colleges and Universities: Lane Community College, Macomb Community College, and Prince George’s Community College

COOPERATIVE EDUCATION
The most current definition of cooperative education was developed in 1994 by NCES: “Cooperative Education is a structured educational strategy integrating classroom studies with learning through productive work experiences in a field related to a student’s academic or career goals. It provides progressive experiences in integrating theory and practice. Co-op is a partnership among students, education institutions and employers, with specified responsibilities for each party.

Two-year and four-year education institutions provide similar definitions. Wichita State University states:

Cooperative Education is an academic program that allows students to connect academic knowledge with the business and professional world. Co-op expands learning experiences through paid employment in a supervised, educational work setting related to the student’s major field of study or career focus.

California State University, Sacramento, clarifies a co-op program’s financial investment in its students: “a co-op position is always a paid position and students are required to enroll in an academic course for variable credit. Additionally, students must be a junior, senior or graduate student. Co-ops are high-level positions that allow students to directly apply what they have learned in their coursework.”

Model Characteristics
Three sources of information were used to identify the characteristics of cooperative education: the Pennsylvania Department of Education, the National Commission for Cooperative Education (NCCE), and the Cooperative Education Association of the American Society for Engineering Education (ASEE).

The Pennsylvania Department of Education presents guidelines for compliance with Federal and state laws and regulations:

- Job placements where students perform work related to acquired skills with the opportunity to develop additional competencies and contribute to the productivity of the business organization
- Certified cooperative education teacher-coordinators with appropriate occupational experience to provide planned, supervised instruction
- Worksite training supervisors who can share occupational expertise with students
- Accurate and realistic descriptions of the jobs to be performed by students, as well as realistic employer expectations of the skills the students bring to the job
- Individualized, written training plans correlated to the students’ school-based instruction and on-the-job training (work-based)
- Evaluations that are formal and informal assessments of the students’ progress on the job, including feedback and follow-up to assist students in improving performance
- Parents/guardians who have a full understanding of their responsibilities in the program
- Assistance with job placement in full-time positions or referrals for additional education for graduates
- Follow-up studies of graduates that are conducted in a systematic manner
- Instruction in all aspects of the industry the student is preparing to enter, which provides a broad base of knowledge of all facets of the business operation, including management, finances, health and safety
- Strong commitment by school administration for the program

The boards of NCCE, the Cooperative Education Association, and the Cooperative Education Division of ASEE approved the following characteristics that they considered essential for a cooperative-education program:

- Formal recognition by the school as an educational strategy integrating classroom learning and progressive work experiences, with a constructive academic relationship between teaching faculty and co-op faculty or administrators
• Structure for multiple work experiences in formalized sequence with study leading to degree completion of an academic program
• Work experiences, which include both an appropriate learning environment and productive work
• Work experiences related to career or academic goals
• Formal recognition of the co-op experience on student records (e.g., grades, credit hours, part of the degree requirement, notations on the transcript, etc.)
• Pre-employment preparation for students, as well as ongoing advising
• Agreement among the school, the employer, and student on:
  • Job description and new learning opportunities
  • Specified minimum work periods (equivalent in length to an academic term (quarter, semester or trimester). In alternating programs, students work approximately 40 hours/week, full-time during the term. In parallel programs, students work approximately 20 hours/week, part-time during the term.
  • Work monitored by the school and supervised by employers
  • Official school enrollment during employment
  • Recognition as a co-op employee by the employer
  • Evaluations by the student, the school, and the employer, with guided reflection by the student, and
  • Remuneration for the work performed
  • Provision for employer and school evaluation of quality and relevance of the work experience and curriculum
  • Designed to maximize outcomes for students, employers and the school

The Cooperative Education and Internship Association (CEIA) lists the common characteristics of four-year college or university cooperative-education programs:

• Alignment with the academic mission and goals of the college/university
• Academic requirements for student participation in the program, for example, GPA, number of hours or semester/quarters completed, and successful completion of prerequisite course(s) before beginning the co-op assignment
• Requisite number of alternating, back-to-back, or parallel paid work terms with one or more employers
• Work assignments are integrated into the curriculum and deemed academically enhancing in content; assignments are related to the student’s major field of study or career interest and often include some form of learning objectives.

• Student enrollment in a Cooperative Education course while on assignment, either a credit-bearing or non credit-bearing course
• Institutional and faculty endorsement of the program and criteria for awarding some form of credit hour(s) for cooperative education assignments, as applicable
• Collaborative partnerships with participating employers to ensure the quality of employer student programs and work-integrated learning assignments
• Provisions for evaluation and feedback regarding student performance, quality of employer programs and work assignments as well as the program/process in the college/university

Participants
In a 1996 phone survey of cooperative education programs, NCCE estimated the number of students enrolled each year in cooperative education to be 400,000. It is not known how many of these participants are from two-year colleges. NCCE conducted its survey shortly after Congress discontinued funding for co-op under Title VII. Since then the number of programs and participants has declined. No new estimates are available.

Outcomes or Benefits
The benefits accruing to cooperative-education students include relevant training, financial assistance for educational expenses, and marketable job skills. The financial assistance they receive provides motivation for study and program completion. While they study, students are able to practice human relations skills, self-reliance, self-confidence, and responsibility. They gain exposure to practicing role models who provide feedback through performance assessments. Weintraub (1980-1984) found that students from LaGuardia Community College who participated in a co-op had starting salaries that were consistently higher than those of other two-year college graduates.

Kerka (1989) found that employers benefit from effective screening, selection, and recruitment techniques. Given the opportunity to influence curriculum design and content, employers reduce recruitment and training costs. Moreover, they hire and retain highly motivated employees who have realistic expectations. Employers also improve their access to women and minorities.

Benchmark programs
Four-year colleges and universities: Northeastern University, Drexel University, and University of Cincinnati

Two-year colleges and universities: Lane Community College, LaGuardia Community College, and Cincinnati State College
APPRENTICESHIPS
The State of New Jersey Department of Labor and Workforce Development defines an apprenticeship as: “a relationship between an employer and an employee during which the employer, or apprentice, learns a highly skilled occupation. The programs consist of a combination of both classroom and on the job training.”

This description is consistent with ones found in general and scholarly literature. McIntosh (2005) described an apprenticeship as “a structured programme of vocational preparation, sponsored by an employer, juxtaposing part-time education with on-the-job training and work experience, leading to a recognised vocational qualification at craft or higher level (Ryan and Unwin, 2001).” Shaikin (as quoted in Reece, 2010) described an apprenticeship as “a form of on-the-job training that combines workplace experience and classroom learning.”

Apprenticeships can be registered or non-registered. Lerman, Eyster, and Chambers (2009) described registered apprenticeships as follows:

The Employment and Training Administration (ETA) of the Department of Labor oversees the registered apprenticeship system by issuing standards, monitoring state agencies, and promoting registered apprenticeship. Registered apprenticeship program sponsors are individual employers or groups of employers (sometimes in collaboration with unions) who play a critical role. Sponsors recruit, screen and hire apprentices; develop formal agreements with them identifying the length of the program, skills to be learned, the wages to be paid at different points in time, and the required classroom instruction; and work with state apprenticeship agencies (SAAs) to make sure that their registered apprenticeship programs meet state and Federal requirements.

The Washington State Department of Labor and Industries and the U.S. Department of Labor describe the difference between registered and non-registered apprenticeships:

Registered apprenticeships are approved, registered and maintained with a high level of education and workplace expectations. Registered apprentices receive a nationally recognized certificate of completion, which increase the apprentice’s opportunities for mobility and advancement. Non-registered program training and safety standards are not regulated, and the awarding source of their credential varies.

Participants
In FY 2007, the U.S. Department of Labor issued statistics revealing participation in registered apprenticeships: 212,000 individuals entered an apprentice system; 468,000 were obtaining skills; and 35,300 graduated from programs. There were 28,000 registered programs in operation and 3,253 new ones established.

Model Characteristics
Many reports document the desired characteristics of an apprenticeship program; among these are standards for registered apprenticeships. Specifically, the Office of the Secretary of Labor has established minimum standards for a good apprenticeship program.

According to the Department of Labor, an apprenticeship program must contain these provisions:

- The starting age of an apprentice to be not less than 16
- Full and fair opportunity to apply for apprenticeship
- Selection of apprentices on the basis of qualifications
- A schedule of work processes in which an apprentice is to receive training and experience on the job
- A schedule of work processes in which an apprentice is to receive training and experience on the job
- Recognition for successful completion
- Non-discrimination in all phases of apprenticeship
- Periodic evaluation of the apprentice’s progress, both on-the-job and in related instruction
- Provision for the maintenance of proper records
- Adequate provisions to train apprentices
- The development of formal agreements with state agencies (SAAs) to make sure that their registered apprenticeship programs meet state and Federal requirements

Other reports clarify the nature of apprenticeships. McIntosh (2005) noted a distinguishing characteristic of apprenticeships, compared to other forms of vocational learning, was that apprentices were “attached to an employer, and spend a significant proportion of their time in the workplace.”

Reece (2010) noted that apprentices usually worked during the day and attended classes at night. Reece also found an apprentice could be laid off if an employer’s business was slow or did not have enough work to keep the apprentice busy.

Bilginsoy (2003) examined retention rates for union and non-union apprenticeships. He found that apprentices registered in programs sponsored jointly by unions and contractors in the organized sector were more likely to complete training and less likely to drop out compared to counterparts enrolled in non-union apprenticeships.
Bilginsoy further noted that higher drop-out rates in non-union apprenticeships might simply have reflected the unorganized sector’s preferred model of skill accumulation and composition:

This route relies on a mass of low- and semi-skilled, narrowly-trained workforce and increased use of prefabricated materials, under the direction of a few highly skilled craft workers. Presenting direct evidence for this interpretation and the discussion of its implications for the long-run prospects of the U.S. construction industry and its skills gap is the subject of future research.

Daugherty and Bakia (2000) noted that more than 90 percent of community colleges provided “contract training.” (p. 197) They described this training as “multi-year apprenticeships, combining both classroom and on-the-job training, with labor unions exercising a major role.” In this respect, contract training is relatively synonymous with apprenticeships.

Outcomes or Benefits
The Washington State Department of Labor and Industries describes in detail the benefits of program participation for registered apprentices and their employers. Registered apprentices and trainees pay substantially reduced tuition to attend related instruction classes held in community colleges or technical colleges. If they are veterans, they receive VA education benefits. While the apprentices study, they are covered by state industrial insurance. If a serious problem arises during their training, they can appeal upward as far as the state’s Apprenticeship and Training Council.

Students receive wage increases based on a journey worker’s hourly wage in the apprentice’s occupation. If students demonstrate proficiency in both the classroom and the workplace, their wages will eventually reach 85 to 90 percent of the rate paid a journey worker.

Apprentices who complete a one- to five-year program receive an Apprenticeship Completion Certificate, one of the oldest, most basic, and most highly portable industry credentials in use today. In addition, some apprentices receive dual accreditation through post-secondary institutions and can apply their apprenticeship studies toward an associates degree.

A successful registered apprenticeship program benefits employers in ways similar to other learn-and-earn programs. The Medical Transcription Industry Association adds to the list of employer benefits: improvements in employee morale, community relations, and employee relations. By participating in or sponsoring registered apprenticeship programs, employers also learn to value their employees’ commitment to training.

Benchmark Programs
None identified.

FEDERAL WORK-STUDY
Federal-Work-Study.com defines work-study as:

a program designed to allow students to hold a job, while offering them financial benefits that can be applied towards their educational needs. The money is earned through a part-time employment opportunity and is mitigated by family contributions and several other factors. The amount of money paid to the student differs based on these mitigating factors, as well as the cost of living for the student and the course of study undertaken.

Federal work-study (FWS) students enrolled in undergraduate, vocational, and graduate degree programs work for their education institution, a community non-profit or governmental agency, or a private for-profit business.

Actual work experience takes many forms. FWS defines community-service employment as a job that fulfills a public interest. The work can take place in a local nonprofit, government agency, or community-based organization designed to improve the quality of life for area residents. Work-study jobs in community service could include health care, childcare, literacy training, mentoring, and national service youth corps. The key criterion is that the employment “must be in the public interest.”

Private for-profit employers may hire students under FWS as long as the student’s work is academically relevant. The education institution can reallocate up to 25 percent of its FWS money to fund this employment, and the for-profit company must pay the non-Federal share of the student’s wages. The key criterion is that the employment “must be academically relevant to educational program.”

Proprietary institutions that hire students under FWS must make sure the work-study reinforces the student’s educational or vocational goals. The key criterion is that the employment “must be supportive of vocational goals.”

Education institutions can offer jobs that support institutional operations, including food service, cleaning, grounds, and maintenance. FWS does not require education institutions to match students with jobs related to their studies.

Students may receive academic credit for Federal work-study. The work-study can include internships, practicums, research, student teaching, and other professionally designated work; but students cannot be paid for receiving instruction. For example, if a student is participating in undergraduate research with a faculty member, a lecture as part of a lab does not constitute work. Students also cannot be paid if the employer would not normally pay for the same work.
Participants and Funding
The Department of Education delivered 944,881 new work-study awards and awarded $1,417,322,000 in grants money. The average new award was $1,500.

Model Characteristics
The Guide to Federal Student Aid (2008-09) describes the basic components of Federal work-study:

- Provides part-time employment while the student is enrolled in school
- Helps pay students educational expenses
- Is available to undergraduate and graduate students
- Is available to full-time or part-time students
- Is administered by schools participating in the FWS Program
- Encourages community service work and work related to the course of study, whenever possible.

Numerous conditions and restrictions apply to students in work-study programs. On the “learn” side, students may not work more than 39 hours each week, although 20 hours are preferred; in any case, they must work at least the minimum number of hours required for the job. Students are not permitted to work during course hours or between semesters and may not begin work before the semester starts or after it ends. While they work, students must carry a minimum number of credit hours per semester, every semester, and maintain the education institution’s minimum required grade point average.

On the “earn” side, students may not receive grants larger than the Federal maximum. Both the student and the employer are responsible for tracking the balance of the FWS award. If the student does not use all the FWS money during the year, it does not roll over to the next year. The student may not work after the FWS award has been spent. If the student continues to work, the employer becomes responsible for any cost overruns, though cost overruns will usually be transferred to the student.

Outcomes or Benefits
Every education institution that offers the Federal work-study program points out the benefits of participation to students. East Carolina University notes that Federal work-study participants gain writing and communication skills; learn time management, problem-solving, and teamwork; learn to understand workplace culture and employers’ expectations; and receive constructive, professional feedback.

The University of California, Riverside, Career Center describes student benefits with more colloquial language meant to encourage participation. For example, students can “save travel time and gas money.”

The College of DuPage lists the following benefits:

- Convenience — allows the opportunity to work on campus as a student aide
- Flexibility — allows students to adjust their work schedule around their class schedule

Northern Essex Community College notes the following benefits:

- Possible Career: Students gain valuable experience and skills in their area of study depending on the availability of placements. Also, experience gained in a work-study position may lead to a future career.
- Earnings: Students earn money as part of their financial aid award. The earnings from this need-based program do not affect the student’s future financial aid eligibility.
- Scheduling flexibility: Most departments or agencies allow work-study students to work around their class schedules, leaving time for study in the evening and on weekends.
- College Credit: Students may be able to earn college credit for skills learned in a work-study position if combined with a Co-Op.

Benchmark Programs
Community Service: University of California. Riverside; Florida Memorial College; University of Texas at Dallas; University of South Alabama.

For-profit institution: No information available; most schools do not fund FWS off campus.

Internship or co-op: at selected schools for on-campus positions: Lane Community College, Eugene, Oregon; Drexel University, Philadelphia, PA.

PRACTICUM
Price (1987) stated a practicum links “theory with practice by providing regular structured and supervised opportunities for students to apply and test knowledge, skills and attitudes, developed largely in campus-based studies, to the real world…”

Ryan, Toohey, and Hughes (1996) stated the term “practicum” is an umbrella that covers a variety of professional work experiences, including cooperative education, internships, fieldwork, clerkships, and clinical practicums. Different types of practicum are also covered under this umbrella (Lynch and Cornwall, 1992).

In apprenticeship practicums, field or workplace supervisors, commonly known as preceptors, guide student work with little involvement from university faculty. The supervision is similar to internships and co-ops. In academic practicums, faculty provide primary guidance for linking theory and practice. Student teaching and clinical rotations for medical and nursing students are examples of this work.
In casework practicums, a field supervisor works closely with students developing skills and competencies in psychotherapeutic situations. Social work, counseling, and teacher guidance counseling are examples of this work. These students take practicums as part of an academic program and usually work without pay.

Articulated practicums develop the links between cognitive and experiential learning and between theory and practice. In this setting, both faculty and field supervisors work with the students. These practicums are catchalls for work in other disciplines.

**Participants**

No data were available.

**Model Characteristics**

According to Beck and Kosnik (2002), good practicums included collaboration such as feedback between participants and their training faculty; flexibility in teaching content and methods; and demonstration of sound practice and support from supervisors. All these characteristics foster respect for the student as a professional and respect from the student for the practicum.

In addition, Ryan et al. (1996) found that a close relationship between the theoretical and practical components of the practicum was also important. If this condition was met, education institutions and employers developed long-term relationships.

**Outcomes or Benefits**

Daresh (1990) identified the outcomes of practicums (as cited in Ryan et al., 1996). By applying knowledge and skills in a practical setting, practicum students developed professional competence and tested their commitment to a specific career. During their study, students gained insight into professional practice and identified personal and professional development goals.

Au Yeung et al. (1993), Edward (1985), Gibson (1985), Lloyd (1985), Mann and Schleuter (1985), and Pienaar (1985) give evidence that the practicum is successful in:

- giving students insight into the world of work and career prospects
- developing job skills and on-the-job performance
- developing interpersonal and social skills
- enhancing employment prospects for graduates
- increasing industrial contacts for college teachers
- improving attitudes toward supervision, self-confidence, job knowledge, job-seeking skills, and practical reasoning
- helping students to integrate well into the work environment
- developing greater maturity in students
- enabling students to make more positive contributions and demonstrate more positive attitudes in class

**Benchmark Programs**

None were identified.
CONTEXT-SPECIFIC LEARN-AND-EARN MODELS

Context-specific models apply to a narrower range of conditions. The two most widely used models are clinical rotations or clerkships and legal externships, internships, clerkships, and clinics.

CLINICAL ROTATIONS AND CLERKSHIPS
Clinical rotations and clerkships are commonly used in the medical professions to give students real-world experience. Students perform each rotation in one-to-four-month blocks.

Spitzer et al. (2007) reported that clinical rotations gave medical students the opportunities to apply knowledge and build skills. They stressed the need for students to take orientation before beginning a rotation.

Clinical clerkships are similar to clinical rotations: the model characteristics are roughly the same. Contributors to Wikipedia expand on this definition:

For medical students, clerkships occur after the basic science curriculum, and are supervised by medical specialists at a teaching hospital or medical school. Typically, certain clerkships are required to obtain the Doctor of Medicine degree (e.g., internal medicine, surgery, pediatrics), while others are elective (e.g., dermatology, pathology, and neurology).

The intent of the clinical clerkship is to teach the medical student the fundamentals of clinical examination, evaluation, and care provision, and to enable the student to select the course of further study. During the clinical clerkship, the medical student will interact with real patients much as a physician does, but their evaluation and recommendations will be reviewed and approved by more senior physicians.

Dolmans et al. (2002) conceded that “clinical rotations are ill-defined, complex learning situations, an environment primarily intended for patients’ care, not students’ learning.” (p. 332)

Model Characteristics
Dolmans et al. (2002) identified several important characteristics of a clinical rotation:

- The rotation provides professional experience so that the student learns to evaluate and solve problems.
- The student applies and integrates knowledge so that the knowledge is readily available for future use.
- The supervisors provide constructive and supportive feedback throughout the rotation.
- The supervisors develop a strong relationship with their students.
- The rotation provides patients who present an adequate mix of symptoms and diseases.
- The rotation contains the right number of students (i.e., too many makes instruction difficult).

Drexel University Medical School clearly states the objectives for a rotation. After satisfactory completion of the third-year clinical clerkship curriculum, the student will have attained abilities at the levels described in the respective clerkship curricula to:

- Obtain an effective clinical history of illness in all six clinical disciplines
- Correlate physical examination findings
- Design an appropriate problem list
- Recognize interdisciplinary teaching contributions to problem solving
- Interpret clinical laboratory data
- Initiate diagnostic plans
- Correlate basic sciences with clinical problems
- Apply ambulatory care principles to all six clinical disciplines
Massachusetts General Hospital’s four-week rotation for medical students in anatomic pathology and laboratory medicine is an example of context-based clinical objectives:

- The process of tissue analysis in surgical pathology, from examination of the gross specimen through slide preparation, examination and interpretation
- The advantages and limitations of exfoliative and aspiration cytology
- The current and future role of molecular diagnostics in tumor pathology and medical microbiology
- The scope of testing offered by clinical laboratories
- The principles, strengths and limitations of representative test methods in several areas of laboratory medicine
- The pre-analytic variables that may affect laboratory test results
- The benefits and limitations of point-of-care testing
- The role of informatics in improving healthcare delivery and reducing error
- How to prepare and deliver a brief, focused presentation using content that is appropriate for the intended audience
- The way in which clinical experts with prepared minds can translate bench top scientific discoveries into bedside clinical advances
- The varied and interesting career opportunities within the field of pathology

The University of Washington’s Division of Gerontology and Geriatric Medicine provides context-based clinical objectives for nursing, occupational therapy, physical therapy and other health professionals. Objectives for these professions follow.

**Nursing Objectives**

- Review of format for Tuesday Interdisciplinary Rounds
- Familiarity with established nursing protocols for 4EH (i.e., wound management, bowel programs, etc.)
- Discussion of on-call system and expectations for weekend coverage
- Explanation of structure of Nursing Service, objectives with primary nursing and nursing plan of care
- Overview of discharge planning, necessity for information sharing and expectations from nursing that assists with process

**Occupational Therapy Objectives**

- Recognize the importance of functional evaluations for geriatric patients to increase safety and decrease change of readmission
- To recognize how important home visits are in disposition planning for evaluation of safety, w/c accessibility, and more thorough assessment of cognitive function within patient’s own environment
- To recognize which cognitive skills are necessary for a patient to function at home
- Given a geriatric patient, determine if the patient has sufficient skills to function in a CCF, at home with assistance, or home alone
- To make appropriate referrals to Occupational Therapy

**Physical Therapy Objectives**

- To observe how a physical therapy evaluation is done and a treatment plan developed
- Advantages and disadvantages of different hydrotherapy treatments and pain treatments
- Review services provided (gait training, mobility training, therapeutic exercise, advanced ambulation skills, standard PT modalities, etc.)
- To understand how a PT program for a geriatric patient is developed to address the multiple deficits of aging, the physical, mental, and social changes, the effects of prolonged bed rest and of medication side-effects on mobility

**Participants**

Several healthcare institutions and associations collect and disseminate data on student participation in rotations. The National Area Health Education Center Organization tallies the number of health professional students participating in rotations. The American Medical Association database, Freida Online, provides similar information on specialty areas and residency programs.

**Outcomes or Benefits**

Laschinger, McWilliams, and Weston (1999) found that a well-planned clinical experience for nursing students builds strong confidence among young nurses in their knowledge and counseling of patients. Coffeng and Visscher (2009) found that medical students’ career preferences are shaped by the sequence of their rotations.

**Benchmark Programs**

None were identified.

<table>
<thead>
<tr>
<th>Health Professional Students in Rotations, by Delivery Site</th>
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<td>Underserved clinical locations</td>
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<td>Community-based sites</td>
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<tr>
<td>Continuing education</td>
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<tr>
<td>Community-based training sites</td>
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</tbody>
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Source: National Area Health Education Center Organization
LEGAL EXTERNSHIPS, INTERNSHIPS, CLERKSHIPS, AND CLINICS

Even though Ronayne (1969-70) opened his paper with the unsubstantiated claim that “the value of practical training in criminal law or the administration of criminal justice by means of legal intern or clinical programs has been well established,” the MacCrate Report (1992) inferred a “fundamental distrust of practitioners as educators.” (citing Givelber et al., 1995, p. 8) In fact, the MacCrate Report concluded that law students “do not engage in serious learning when working part-time in law school and during their summer breaks, although they may receive something of value during an externship if legal educators exercise appropriate control over the experience.” (Givelber, p. 1)

The American Bar Association (ABA) classifies externships, internships, clerkships, and clinics, whether paid or unpaid, as fieldwork and sets rules and standards for law schools and students who work in these settings. It prohibits law students from receiving academic credit for paid work. It requires law students to meet poverty and other requirements before a law school is permitted to grant residence credit for an externship. Moreover, it condemns law students who work more than 20 hours a week if they attend law school full-time. As a result, different definitions for fieldwork appear throughout legal literature and on law school web sites.

Exter nships give law students real-world experience in a preferred area of expertise such as environmental law. Most students do not receive pay or course credit for an externship; however, some law programs give students course credit for law clerkships.

Outcomes Or Benefits

When Givelber et al. finished their survey of recent graduates from Northeastern University School of Law, they identified the significant components of good fieldwork in settings where students were paid. Students were given work that made full use of their time. They found the work challenging but not too difficult as a first assignment. Students were given work commensurate with their abilities and were not asked to spend time copying and doing other secretarial work.

ABA Requirements for Fieldwork

- A clear statement of fieldwork goals
- Instruction and supervision from faculty willing to devote time and attention needed to supervise the fieldwork properly and mentor participants
- A method for selecting, training, evaluating, and communicating with fieldwork supervisors
- Clearly articulated evaluations of student academic performance from faculty and fieldwork supervisors
- Periodic on-site visits (or the equivalent) from faculty, especially if students receive four or more academic credits (or the equivalent) in one term
- Contemporaneous and regular tutorials seminars or other means of guided reflection where students receive four or more academic credits (or the equivalent)
Givelber et al. (1995) also identified student satisfaction with the interactions they had with faculty and fieldwork supervisors. All participants signed an honor agreement that set out mutual expectations. Supervisors were prepared for their roles and gave students both oral and written feedback, especially clarification when the students did not understand an assignment or had a conflict with their practicing supervisor.

In Garth and Martin’s study (1993) of young lawyers, which provided background material for the MacCrate report, the most important factors in skills and learning were personal experience, advice, observation of others, and part-time work during law school. Earlier, Zillman and Gregory (1986) arrived at similar conclusions. They found that 90 percent of their sample clerked while attending law school. The respondents placed high importance on their fieldwork in shaping them as lawyers, especially their research, writing, analysis, interviewing, and negotiating skills. Zillman and Gregory also examined the supervisor’s role and concluded that 75 percent of respondents felt they received adequate supervision.

The National Law Center at George Washington University has put together a legal internship program to aid low-income law students. The center uses Federal work-study monies for first-year students to fund positions with the law library during the school year and with government-agency legal staff during the summer. The center provides funds to supplement student housing and food costs during the summer placement. For second- and third-year students, the center has an agreement with a major law firm to hire disadvantaged students as interns. An intern is assigned to a team of lawyers who make and guide work assignments, provide advice, assist the intern with completing tasks, and evaluate the intern’s work (see Rothschild, 1970).

**Benchmark Programs**
National Law Center, George Washington University
J. Reuben Clark Law School, Brigham Young University
CAREER-ORIENTED DELIVERY MODELS

Learn and earn helps students follow a particular career path at undergraduate and graduate levels. Career and technical education (CTE) is fairly well documented: the literature includes performance measures that indicate its market value for workers who have completed a program compared to those with only a high school diploma. STEM education is an aggregate of academic programs offered at two- and four-year institutions. Within a particular program, the capstone course culminates the student’s study and work experience, allowing them to solidify skills before they enter the workforce. A relatively new model, the Professional Science Master’s Program, is offered at the graduate level for science professionals who wish to advance their studies in science and mathematics.

CAREER AND TECHNICAL EDUCATION

Founded in 1926, the Association for Career and Technical Education (ACTE) claims to be the largest national education association dedicated to advancing this type of education. ACTE states career and technical education (CTE):

- prepares both youth and adults for a wide range of careers. These careers may require varying levels of education – from high school and postsecondary certificates to two- and four-year college degrees. Career and technical education is offered in middle schools, high schools, community and technical colleges and other postsecondary institutions.

Others have provided similar descriptions. Scott and Sarkees-Wircenski (2004), for example, stated:

Career and technical education (CTE) instruction aims at developing foundational skills, core workplace competencies, and specific skill competencies in various occupational areas. Internships, practicums, cooperative education, school-based enterprises, dual enrollment programs, and apprenticeships are a few venues that deliver career and technical education by providing meaningful opportunities for learners to apply their academic and technical skills.

The National Center for Education Statistics (NCES) defines CTE as: “organized educational activities that provide technical skill proficiency, an industry-recognized credential, a certificate, or an associate degree.”

The Kansas State Department of Education provides a more comprehensive definition and description of CTE:

Organized educational activities that offer a sequence of courses that provides individuals with coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in current or emerging professions, provides technical skill proficiency, an industry-recognized credential, a certificate, or an associate degree, may include prerequisite courses (other than remedial courses) that meet other requirements; and include competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, occupation-specific skills, and knowledge of all aspects of an industry, including entrepreneurship of an individual.

Participants

According to the Consolidated Annual Report published by the U.S. Department of Education, about 16 million students were enrolled nationally in career and technical education during the 2006-2007 school year, compared with 9.66 million in 1999. That increase well exceeds population growth.

Model Characteristics

In a recent report from the Institute for a Competitive Workforce, the characteristics of a CTE program were summarized. Well-designed CTE programs are relevant, rigorous, and project-based. These programs focus on helping students make the transition to postsecondary education and the workforce.
ACTE notes each state may administer its CTE programs differently. As a result, ACTE produces a set of CTE state profiles to provide clarity and context. ACTE also provides a directory of promising CTE programs.

Outcomes or Benefits

Research indicates that well-designed CTE programs yield impressive results in student performance. In their study of career academies in the San Francisco Bay Area, Maxwell and Rubin (2000) found that students enrolled in career academies were measurably more successful than non-academy students attending the same schools.

The National Association of State Directors of Career Technical Education Consortium reported the return on investment (ROI) to individuals studying CTE in Oklahoma. The Oklahoma study (2008) looked at lifetime income gains for full-time students at CareerTech’s technology center and compared the income gains of CTE participants to non-participants. The study included three job-training programs and the Oklahoma Bid Assistance Network. Income for CTE participants increased as follows:

- Graduates earned an additional $2.00 per hour - nearly 20 percent more than high school graduates.
- In FY02 the average estimated wage for CTE graduates from full-time programs was $10.47 per hour — approximately 12 percent more than the hourly wage for high school graduates of similar age.
- Wage rates were higher for adult completers compared to secondary completers at $12.46 per hour and $7.58, respectively.
- Based on all income sources, CTE graduates earned nearly $4,100 more per year than high school graduates.

The Upjohn Institute (2006) released the report, Net Impact and Benefit-Cost Estimates of the Workforce Development System in Washington State, authorized by the Workforce Training and Education Coordinating Board (WTECB) of the State of Washington. The report revealed results for CTE students when compared to high school graduates:

- CTE students found more work; earned about 50 cents more per hour; worked 35.5 hours more per quarter; and earned 13 percent more.
- CTE graduates who attended postsecondary schools had better economic outcomes than high school graduates. In the short term, the average quarterly earnings for CTE students increased by about 25 percent and included increased employment impacts of 9.2 percentage points, hourly wage increases of $2.95, and increased hours per quarter of more than 70 hours.

- Over the longer term, these students earned an average of about $900 per quarter more than high school graduates due to an employment net impact of 6.7 percentage points, an hourly wage impact of $1.87, and hours of employment impact of about 40 hours.

Benchmark programs

ACTE gives awards every year to educators and employers who excel in aiding youth development. In 2009 GirlTech at Francis Tuttle Career Technology Center in Oklahoma City was recognized for its exceptional achievements. GirlTech encourages high school students to enter science, technology, engineering and mathematics (STEM) careers. The program was recognized at a briefing for U.S. Congress and the media. It was also featured in a report that highlights effective programs and practices for gender equity in career and technical education.
SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM)

While STEM is more of a pure educational initiative rather than a learn-and-earn model, some of its definitional components are consistent with the principles of learn and earn. Most important, STEM delivers rigorous academic coursework related to career development.

Lantz (2009) defined STEM education as:

An interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and the global enterprise enabling the development of STEM literacy and with it the ability to compete in the new economy (Tsipros et al., 2009).

In an NCES report, Chen and Weko (2007) noted that the National Science Foundation (NSF) defines STEM fields broadly, not only the common categories of mathematics, natural sciences, engineering, and computer and information sciences, but also such social and behavioral sciences as psychology, economics, sociology, and political science.

Model Characteristics

Suffolk County Community College describes their STEM program, which includes student financial support:

The NSF STEM scholarship program at Suffolk County Community College provides a unique, educational enrichment environment for students pursuing careers in science (e.g., biology, chemistry, physics, earth and space, geology, information technology), technology, engineering and mathematics fields. Those students accepted into the program will be provided with academic support services to enhance their college experience and increase their likelihood of success.

SCCC proposes to fund at least 30 NSF-STEM scholars annually at an average of $3,600 each.

STEM at Cleveland State University funds need-based scholarships through its University Scholars program:

The University Scholars in STEM program provides need-based scholarship support as well as on-going academic and social programming related to STEM disciplines. Eligible students will receive up to $10,000 in scholarship support and will participate in a cohort with other students in the program. Common classes, specialized advising, guest speakers, field trips, and numerous unique learning opportunities are all benefits of participation in University Scholars in STEM.

Southwest Virginia Community College also provides financial support and makes specific reference to low-income undergraduates:

The primary goal of the Science, Technology, Engineering, and Mathematics Scholarship (S-STEM) Program is to increase the number of talented, but financially disadvantaged undergraduates who achieve associate degrees in the programs listed above. The project will focus on recruitment and retention of S-STEM students to degree achievement.

Outcomes or Benefits

Chen and Weko (2009) studied the outcomes of STEM and non-STEM students six years after the students began college. The study indicated overall that STEM students had better outcomes than their non-STEM counterparts. Compared to students who never entered STEM fields or entered only non-STEM fields, STEM students had a higher rate of completing a bachelor’s degree program (35% vs. 27–29%) and a lower dropout rate (27% vs. 33–36%). More STEM students began bachelor’s degree programs than non-STEM students (48% vs. 35%), and fewer STEM students than non-STEM students attended classes exclusively part-time (8% vs. 13%).

Benchmark Programs

None identified.

CAPSTONE COURSES

The capstone course (often referred to as the senior seminar at four-year colleges) has been a part of higher education since the eighteenth century (Answers.com). The capstone course permits seniors to demonstrate that they have achieved the learning goals established by their academic institutions and major departments. Although not technically a learn-and-earn model, capstone courses reflect the pillars of learn and earn, particularly in academically rigorous coursework and career exploration.

Rhodus and Hoskins (1995) maintained that a capstone course allows students to “build on skills acquired in earlier courses and emphasize situations and challenges that exist in the world removed from campus.” They further note that these courses were developed because students were unable “to integrate and reflect on the parts of their study which constituted” their major, having often cobbled together an array of disjointed electives and required courses.
Rhodus and Hoskins’ definition of a capstone course embodies two concepts that reflect the pillars of learn and earn: “The integration of a body of relatively fragmented knowledge into a unified whole” (i.e., strategic alignment); and the distillation of an experience that links undergraduate coursework to a future professional and civil life that builds on the educational experience (i.e., professional development and career engagement).

**Participants**

No data were available.

**Model Characteristics**

Dunlap (2005) described problem-based learning (PBL) (i.e., capstone) as: “instructional approaches that use ‘real world,’ simulated, contextualized problems of practice to motivate, focus, and initiate content learning and skill development.” (p. 66) A capstone course taken during the last semester (or quarter) of study comes at a critical time. It gives students the chance to apply classroom experience and knowledge from courses to real-world situations just before they enter the workforce (Dunlap, p. 68). Students learn a systems approach to problem-solving (e.g., problem definition, problem analysis, solution design, and testing of alternatives) that they may not have learned in an earlier internship or work experience. Because this course is taught close to graduation, students reinforce workplace skills introduced during internships (e.g., teamwork, perspective, diversity, oral communication, instrumentation abilities, analysis, and data interpretation).

Cuseo (1998) and Henscheid (2000) identified a number of approaches for delivering capstone courses, which are taken from studies conducted under the auspices of the National Resource Center for the First Year Experience and Students in Transition at the University of South Carolina. Answers.com sorts the capstone experience into four delivery categories: discipline and department-based courses; interdisciplinary courses; transition courses; and career-planning courses. These courses can be synthesized into three major types: reflective, bridging, and integrative.

Reflective courses bring together the major theories, themes, and constructs of a discipline and apply them to a particular problem or frame of analysis. For example, English majors taking the capstone can focus on how different literary genres approach a contemporary problem (e.g., health care or social inequality). Other courses may be more interdisciplinary, where the academic major courses integrate with the broader academic experience (see Moore, n.d.).

Bridging courses help students integrate academic courses with professional training. A typical bridging course addresses an industry-based problem in the classroom through research and applied problem-solving. For example, engineering majors in their senior year take a design capstone that addresses a real-world problem in a team format. Only in rare cases does the bridging exercise or discussion take place off campus.

Integrative courses extend the bridging approach by involving students in problem-solving work that takes them off campus. An experience of this kind could include research, a practicum, or an internship.

Bridging and integrative capstones fit into learn and earn because they are conducted in a problem-centered learning environment. The place of delivery optimizes the integration of content knowledge with workplace and professional skills.

**Outcomes or Benefits**

Students can be assessed through a reflective essay, a class presentation, a journal, or a portfolio. A portfolio is a depository for student learning and work experience; it gives educational institutions an effective way to measure student outcomes. LaGuardia Community College (LCC) has been recognized for its e-portfolios — electronic depositories used by the college and its students for program review and self-study.

The e-portfolio marks each student’s growth and development, beginning with the introductory portfolio course taken during the first term. At regular points during their studies, students deposit evidence that they are gaining experience in the LCC’s five core competencies — critical literacy, quantitative reasoning, oral communication, research and information literacy, and technological literacy. (A required course, Urban Studies, is an example.) Students culminate their education in the capstone e-portfolio course; the e-portfolio is a graduation requirement and must include at least one assignment or project to reinforce and assess critical literacy, research, and information literacy competencies (Arcario and Wilson, 2007).

**Benchmark Programs**

Two specific clusters of capstone programs stand out from the many being taught today: one cluster at four-year colleges; the other, at two-year colleges. The Accreditation Board for Engineering and Technology’s (ABET) Criteria 3 and 4 focus on the learning objectives, assessment, and outcomes for engineers and technology students, primarily for at the four-year level. The senior capstone design courses anchor the engineering experience where most student assessments occur.

The literature discussing engineering capstones, including best practices and assessment, is voluminous (McKenzie et al., 2004; Todd et al., 1993 and 1995). These references can be drawn upon to assist in framing a capstone experience; however, the two-year capstones may be more appropriate for learn and earn.
Several community colleges excel in the assessment of students in capstone courses. Hillsborough Community College, Kapi’olani Community College, Lakeland Community College, and Terra Community College are among several that assess students through e-portfolios. LCC is recognized as a leader among community colleges in using the e-portfolio as the cornerstone of the required capstone course.

**PROFESSIONAL SCIENCE MASTER’S PROGRAMS**

The web site for the Professional Science Master’s (PSM) defines the PSM as:

an innovative, new graduate degree designed to allow students to pursue advanced training in science or mathematics, while simultaneously developing workplace skills highly valued by employers.

PSM programs consist of two years of academic training in an emerging or interdisciplinary area, along with a professional component that may include internships and ‘cross-training’ in workplace skills, such as business, communications, and regulatory affairs. All have been developed in concert with employers and are designed to dovetail into present and future professional career opportunities.

**Model Characteristics**

In response to the call for more realistic programs to serve the nation’s science needs and students’ professional goals, several universities have developed PSM programs (CGS, 2008d; Colwell, 2009; NAS, 2008; NPSMA, 2009). These programs prepare people to work as laboratory administrators or project directors in nonacademic sectors (e.g., in large government or industrial laboratories or in small start-up companies). The program disciplines include mathematics, physics, biological sciences, computational science, forensics, chemistry, and geographical information systems.

PSMs are designed for people who need advanced technical training beyond the bachelor’s degree in a science field. Prospective students include people already working as science professionals and others who feel a “strict research” approach does not appeal to them.

Many PSM programs began with startup funds from the Sloan Foundation and the Council of Graduate Schools with the understanding that the PSMs would become self-supporting as their value to industry and students’ professional aspirations became apparent. The American Recovery and Reinvestment Act of 2009 includes funds specifically for PSMs (see Joint Explanatory Statement A). PSMs are growing in number abroad, as other nations see the value of preparing a workforce trained in science and engineering (CGS 2008a; Teitelbaum and Cox 2007).

The National Professional Science Master’s Association (NPSMA) conducted a best-practices survey to determine which program features worked best to help students meet the learning objectives of professional science master’s programs. Sixty programs from 39 universities provided feedback and input for their practices. The best practices include:

- Support for the program directors responsible for all aspects of the program, including advising, recruitment, and retention. The program directors can receive support through reduced teaching loads and administrative help. Few receive extra compensation.
- A consistent source of funding

<table>
<thead>
<tr>
<th>PSM Statistics</th>
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<tbody>
<tr>
<td>PSM programs</td>
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<tr>
<td>PSM affiliated institutions</td>
</tr>
<tr>
<td>Students enrolled</td>
</tr>
<tr>
<td>Degrees awarded annually</td>
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<tr>
<td>Graduates each year</td>
</tr>
<tr>
<td>Working in industry</td>
</tr>
</tbody>
</table>

Source: ProfessionalScienceMasters.com

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<tr>
<th>PSM Graduate Survey Results, 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number in survey pool</td>
</tr>
<tr>
<td>Survey response rate</td>
</tr>
<tr>
<td>Percent working in industry</td>
</tr>
<tr>
<td>Percent working for companies with more than 1,000 employees</td>
</tr>
<tr>
<td>Salary range</td>
</tr>
<tr>
<td>Percent who earned more than $80,000 per year</td>
</tr>
<tr>
<td>Percent who worked in same job taken after graduation</td>
</tr>
<tr>
<td>Percent who received promotions</td>
</tr>
<tr>
<td>Of which attributed promotion to PSM degree</td>
</tr>
</tbody>
</table>

• A close relationship between faculty and students, that is, a best practice requiring faculty to affirm the merits of the program and be willing to provide guidance to students
• An Advisory Board from industry to help guide the PSM program and offer project support to students
• Real-world experiences provided through internships and project-based courses
• “Plus courses” designed to develop the professional skills needed in business, government, and nonprofit organizations
• Methods for tracking the outcomes of students who enter the workforce and maintain contact with alumni

Participants
NPSMA reports almost 200 PSM programs are offered in 95 institutions.

Outcomes or Benefits
PSM programs are very small. Any evidence about student outcomes is mostly anecdotal at the university level.

In its survey of PSM graduates, the National Professional Science Master’s Association found several weaknesses in PSM programs. Most programs do not offer student financial support. Some programs provide teaching assistantships, scholarships, and tuition waivers, but students who cannot find a paid internship still have to cover tuition. Career transition support to help with job search preparation and interviewing assistance is often missing, making it harder for the graduate to obtain employment.

Benchmark programs
None were identified
Credentials validate the student’s achievement in a learn-and-earn program. Credentials also help employers evaluate job candidates and narrow their selection from a pool of candidates for a specific job. Many credentials are awarded through continuing education. The student is either a working professional who needs credits to maintain licensing, such as a real estate agent, or a credentialled mechanic who is training on a new diagnostic system. Nearly every profession offers hundreds of professional credentials. An extensive list can be found at Wikipedia. Although specific requirements vary in these programs, the same underlying principles guide them all.

INFORMATION TECHNOLOGY
Competency-based certifications and credentials in information technology have proliferated during the past twenty years, since Novell introduced its first program in 1989.

Cantor (2002) defined certification as “confirmation of one’s adequate knowledge and skills in a specified occupation or occupational specialty.” (p. 2) The National Organization for Competency Assurance defines it as “The process by which a non-governmental agency or association grants recognition of competence to an individual who has met predetermined qualifications specified by that agency or association.”

The number of different certifications offered is extensive. According to Charles (2009), more than 1,600 different types of IT certification and more than 225 accreditation programs are offered. Since 2001, the fastest growth in IT certification offerings has been in security architecture and data security.

IT certifications are either vendor-specific or vendor-neutral. Vendor-specific certifications support specific technologies and software. Examples include Certified Novell Engineer, Sun Certified Java Developer, and Microsoft Certified Systems Engineer. Vendor-neutral certifications “focus on job skills by demonstrating key concepts critical to current marketplace job roles and have core objectives that are often reinforced through popular hardware and software tools.” (Prosoft, Inc., 2005 as cited by Randell and Zirkle, 2005) Examples would include A+, Server+, Network+, and CIW Associate.

Participants
No data were available.

Model Characteristics
Bellevue College’s National Workforce Center for Emerging Technologies is one of several institutions that have established best practices for IT certification programs (NWCET, 2003, also see Randell and Zirkle, 2005). Their best practices are to set common expectations for all program participants; align curriculum development with workplace requirements; ensure the employability of graduates; set workplace expectations so that students can measure their progress; teach skills that are portable between companies and careers paths; and provide a common basis for certifying achievements against competency-based standards.

Outcomes or Benefits
According to Randall and Zirkle (2005), few baseline measures were available for the effectiveness of IT certifications, especially vendor-specific ones. Enrollment numbers, retention rates, and graduation rates did not exist or were not easily extracted from vendor databases. Zang (2004) added job placement and salary data to the list of missing measurements.

Only one association collects and disseminates data on IT certification. The Computing Technology Industry Association (CompTIA) represents 20,000 companies in more than 100 countries and issues certifications to people studying IT all over the world. It has issued more than 600,000 CompTIA certifications, and 500,000 CompTIA A+ certifications (Randall and Zirkel, 2005).

Microsoft analyzed the value of its IT certificates to the workplace as follows:

- For each new team member certified, team performance increases every time.
- The level of skill that a team has is directly responsible for how an organization performs in several key IT functional areas.
- When you increase the concentration of Microsoft certified team members on a team, you directly affect team performance.
An Analysis of U.S. Learn-and-Earn Programs

Top performing teams on average are shown to have between 40 percent and 55 percent certified Microsoft team members who are trained on relevant Microsoft technologies and processes.

Seventy-five percent of managers believe that certifications are important to team performance.

Sixty-six percent of managers believe that certifications improve the level of service and support offered to IT end-users and customers.

Benchmark Programs

Novell
Microsoft

REGISTERED DIETICIAN

Several medical disciplines require students to gain professional experience in clinical practice near the end of their coursework or after graduation. Clinical practices are not, strictly speaking, learn and earn: Students, who are rarely paid, must take clinical practice as a prerequisite for board examination, not final certification. For example, diagnostic molecular scientists study for four months; clinical laboratory scientists, six to nine months; and medical technologists, nine to twelve months. The model for registered dieticians is an example of the requirements for program completion and the desired outcomes against which the program and its students are measured.

Unlike nurses, medical students, and other health professionals who work in healthcare while they study (see clinical rotations and clerkships), dieticians must complete a one-year internship after they graduate in order to become registered. The competition for internships is high: not every graduate finds one.

Lordly (2007) defined the dietetic internship as a vehicle that provides practical experience leading, in most cases, to entry-level, dietetic competence. The Michigan State University Dietetic Internship Program indicates that its graduates will become dietitians in state-of-the-art practice and work in diverse and challenging healthcare, food service, and entrepreneurial positions.

Participants

No data were available.

Model Characteristics

Johns Hopkins Bayview Medical Center (JHBMC) defined the key components of the dietetic internship in its philosophy and mission statement:

- To provide dietetic registration opportunities for qualified graduates of didactic programs in dietetics
- To provide the highest quality training in the field of nutrition and dietetics through a strong, interdisciplinary training team
- To enable students to develop skills in dietetic leadership

Goals and Outcome Measures for the Johns Hopkins Dietetic Internship Program

Goal 1: The program will provide resources of the highest caliber available to interns.

Outcome measures:

- 100% of the curriculum and reference material will be updated annually to reflect current research and practice.
- 100% of the graduates will evaluate the program with a score of “3” (agree/satisfactory) or above in the areas of intern expectations met, preparation for entry-level dietetics and resource availability.
- Based on intern feedback, physical, environmental and labor resources will be evaluated annually; changes in the dietetic internship budget will be made each fiscal year based on intern recommendations.

Goal 2: The program will prepare graduates to become skilled entry-level dietitians.

Outcome measures:

- At least 90% of students enrolled in the program will successfully complete all program requirements within 150% (17 months) of the time planned for completion (11 months).
- Over a five-year period, 80% or more of graduates who sought employment in dietetics will be employed within three months of program completion.
- Within 12 months of completing the program, 100% of the graduates who take the exam will have passed the RD exam.
- Over a five-year period, the pass rate for graduates taking the RD exam for the first time will be at least 80%.
- Within 12 months of completing the program, 90% of the graduates who take the exam will have passed the RD exam.
- At least 80% of graduates will indicate “yes” on the graduate survey when asked if they felt prepared for an entry-level dietetics position.
- At least 80% of graduates’ employers will indicate “yes” on the graduate survey when asked if the graduate was prepared for an entry-level dietetics position.

Outcomes or Benefits

The JHBMC Dietetic Internship program has maintained a 98 percent completion rate since its inception in 2001. Since 2005, 100 percent of graduates have passed the RD exam; 93 percent achieved a first-time passing score.
In a survey of registered dieticians, Barr, Walters, and Hagon (2002) found that the internship was the most valuable part of the dietician’s undergraduate training. The internship scored highest in contributing to five areas of professional development — ability, confidence, knowledge, skills, and professional competence.

Lordly (2007), however, found concerns among dietetic educators about student performance during internship. Many interns were unable to apply or demonstrate knowledge and skills. Some displayed attitudes and work habits that conflicted with program values.

**Benchmark Programs**
None were identified.

**GENERAL PROFESSIONAL CREDENTIALS**

The Institute for Credentialing Excellence in *What is Certification?* describes the purpose of professional certifications for specialized skill-sets. A professional certification:

affirms a knowledge and experience base for practitioners in a particular field, their employers, and the public at large. Certification represents a declaration of a particular individual’s professional competence. In some professions, certification is a requirement for employment or practice. Doctors, mechanics, accountants, professional secretaries, surveyors and many others are all required to go through a certification process of some kind. In all instances, certification enhances the employability and career advancement of the individual practitioner or employee.

Corporate or internal certifications are granted by a corporation or an external contracted organization where the certification is used for internal purposes. A corporation might require a one-day training course for all sales personnel, who receive a certificate for attendance. While this certificate has limited portability — to other corporations, for example — it also is the simplest to develop.

Product-specific certifications are pegged to a product across all applications. The IT industry awards these frequently to personnel certified on a particular version of software or hardware. This certification is portable to different corporations using the same software or hardware. The most general certification covers one profession; a certified public accountant certificate is a good example. A professional organization might establish a certification order to apply professional standards, increase the level of practice, and possibly protect the public (though this crosses into the domain of licensure) The certificate is portable to all workplaces. Of course, its portability increases program costs: the requirements for establishing a legally defensible assessment of an entire profession are both extensive and expensive.

**Participants**
No data were available.

**Outcomes or Benefits**

According to the Institute for Credentialing Excellence, the benefits of certification for employees and employers include:

- Higher wages for employees in the form of bonuses, education assistance or higher salary.
- A more productive and highly trained workforce for employers.
- Prestige for the individual and a competitive advantage over non-certified individuals in the same field.
- Enhanced employment opportunities.
- Assisting employers in making more informed hiring decisions.
- Assisting consumers in making informed decisions about qualified providers.
- Protection of the general public from incompetent and unfit practitioners.
- Establishment of a professional standard for individuals in a particular field.

**Outcomes or Benefits**
No public information was available.

**Benchmark Programs**
None were identified.
Four-year public and private colleges and universities; two-year public and private community colleges; industry and university partnerships; corporate colleges and universities, and distance education are the delivery models for learn and earn. Of these, distance education is becoming a model of choice for many workers who want to acquire new skills in a flexible setting.

FOUR-YEAR PUBLIC AND PRIVATE COLLEGES AND UNIVERSITIES

Four-year public and private colleges and universities represent the most traditional model of higher education. In learn and earn, these institutions have curricular objectives distinctly different from two-year community colleges. In particular, four-year institutions are less likely to align curriculum with workforce needs — a practice more common in community colleges.

Although four-year institutions have professional schools (e.g., business education, health), the curriculum requirements for the degree programs extend beyond those for vocational institutions. As such, the ability to complete a four-year degree program is, by definition, not only more time intensive, but broader in coursework.

The cost of workforce training at a four-year institution is not very efficient, but institutions often price their programs competitively with private vocational schools. Moreover, four-year public and private colleges and universities do not always deliver workforce training that is time-efficient. Nonetheless, these institutions have a long tradition of involvement with internships, cooperative education, and Federal work-study programs.

Model Characteristics

Kolesnikova and Shimek (2010) cited the advantages of community colleges over four-year institutions. (p. 29)

The advantages are consistent with the concept of an effective learn-and-earn model:

- Community colleges have an open admission policy; making it easier for students to enroll regardless of their previous academic record.
- Students attending community colleges pay lower tuition and fees.
- Most community college students live at home, allowing them to forego the cost of room and board.
- Students have greater opportunities to schedule classes during evenings and on weekends while working full time.

Outcomes or Benefits

Kolesnikova and Shimek (2010) noted that more students enrolled in “community colleges are first generation college students than are students attending four-year colleges. More than 40 percent of the
former have parents with only a high school education or less.” (p. 30) In contrast, they found only 27 percent of four-year college students have parents with a high school education or less.

Gantt (2010) identified factors associated with the three-year graduation rate of students in technical programs at an urban community college in Texas. The majority of students in her sample were first-generation college students. Students with an official degree plan increased their likelihood of graduating in three years or less (16.9% who had prepared plan graduated vs. 1.3% for those who did not). Further, students who declared a major increased their likelihood of graduating in three years or less (92.8% who declared a major graduate vs. 7.1% who did not).

Kolesnikova and Shimek (2010) noted most studies have determined that students who attended community college but did not complete a degree earn 9 to 13 percent more than those with only a high school diploma. Researchers found an increase in annual earnings of five to eight percent associated with each year of education at a community college. This finding is particularly interesting because it is similar to the return to a year of schooling in a four-year college. (p. 30)

Jacobson, LaLonde, and Sullivan (2005) investigated older, high tenured, displaced workers enrolled at community colleges. One year of community college education increased the workers’ long-term earning by about 9 percent for men and about 13 percent for women compared with earning for similar workers who did not attend community college (as reported in Kolesnikova, 2010).

Kane and Rouse (1999) calculated that about 15 percent of students enrolled in a community college receive a certificate; 16 percent complete an associate degree; and another 16 percent eventually receive a bachelor’s degree or higher. Most community college students complete one year or less, and 35 percent complete one semester or less (as reported in Kolesnikova, 2010).

Kolesnikova and Shimek (2010) noted the completion rate compares to almost 60 percent of four-year college entrants who earn at least a bachelor’s degree. Moreover, community college students who began postsecondary education at a community college suffered a “penalty:” more students dropped or “stopped” out without a degree than students who began at four-year institutions. For example, community college students were 36 percent less likely to obtain a bachelor’s degree than similar students who started at four-year colleges.” (p. 35)

INDUSTRY AND UNIVERSITY PARTNERSHIPS

Ferris (2002) noted the collaborative relationship between industry and education involves: research and knowledge transfer; collaboration to align curriculum with rapidly changing technological advancement in the workplace or collaboration to customize course offerings and address key gaps in university-based instruction; and student-learner integration into the workplace.

Few partnerships link two or three of these models of collaboration together to directly enhance the skills and competencies of undergraduates headed for the workforce. However, two programs that illustrate this collaboration stand out: Florida Power and Light’s collaboration with Florida community colleges; and Company Anonymous (ANON) (privacy requested). FPL links customized curriculum development and student workplace preparation; Company ANON, research and student workplace preparation. Both programs use internships as the vehicle for students to gain workplace experience.

Energy Power Technology: Utilities Industry

Faced with critical manpower shortages, Florida Power and Light (FPL) developed the Power Plant Institute. Before the institute began, no single school offered a curriculum that taught the range of knowledge and skills needed by power plant technologists. Collaborating with three Florida community college faculty, FPL designed a two-year curriculum for each technical track in its organization. Senior engineers and technicians helped prepare faculty to teach the courses by participating in teaching and mentoring students during first years of the program.

Students are introduced to the most current technologies, using FPL equipment, language, and cultural norms in their labs and classrooms. At the end of the first academic year, students enter an internship at a power plant while taking several system courses on site. Program graduates are offered but not guaranteed positions in the utilities industry throughout southeastern U.S.

The FPL and Indian River State College (IRSC) Power Plant Technology Institute states the program’s purpose, objective, and results:

Through this unique partnership with IRSC and Florida Power & Light, you will be ready for an amazing high-paying career in the rapidly growing field of energy. Gain the skills to maintain and operate power plant systems, including the sophisticated technical equipment used in the operation of today’s power plants. With an Applied Science degree from IRSC, you’ll be ready for a great career - graduates average over $50,000 per year! Through the Institute partnership with FPL, you will gain hands-on experi-
ence in a professional paid summer internship, for a limited number of candidates, at a high-wage salary level, all while earning your degree.

Objective
Learn all about the fundamentals of power plant systems, computer aided schematic design, and electronics and circuitry at the Kight Center for Emerging Technologies at the IRSC Main Campus in Fort Pierce, and benefit from the hands-on experience at the St. Lucie Nuclear Power Plant during a paid summer internship, for a limited number of candidates.

Results
This program had received the 2007 Innovation of the Year Award from the League for Innovation in the Community College. All the programs offered at the Kight Center and its impressive facilities have led to the American Association of Community Colleges naming IRSC #1 in the use of technology for three consecutive years!

Company Anonymous (ANON): Manufacturing
Company ANON (privacy requested) has initiated a program with two of its key recruiting schools to partner on research essential to the company — engineering, supply chain management, and product design. The company offers an internship program to develop the young professionals they require. The company begins working with a group of students as early as the first year and provides information events and campus corporate exchanges. During the second year students are recruited for summer internships at American locations. At the same time, ANON gives research funds to faculty who work on problems facing the company in three key areas. The company places a condition on the use of research funds: after the interns return to campus for their junior year, they will be employed as research assistants in the university’s research programs. For those who qualify, senior-year students are given another internship in the research program during their senior year.

Program Objectives
ANON’s objectives are to give students a seamless transition from college into the company’s workplace; develop young professionals’ passion for the industry; strengthen the collaboration and linkage with faculty, career services, and students; and develop company professionals by offering opportunities to work and teach on campus.

Outcomes or Benefits
The program began recently. It is too early to document success.

Benchmark Programs
The U.S. Chamber of Commerce for selected examples
The Institute for a Competitive Workforce
Corporate Voices for Working Families

CORPORATE COLLEGES AND UNIVERSITIES
According to Hawthorne, Libby, and Nash (1983), a corporate college is:

an institution offering postsecondary degrees which was initially established by an entity, profit or nonprofit, whose primary mission was something other than granting collegiate degrees. This includes business, hospital service, and manufacturing corporations, as well as professional associations and clubs formed to provide educational support for members of particular professions. (p. 2)

Thompson (2000) pointed to problems with this definition. The intent of corporate colleges is to fill gaps in the training and development of their workforce because colleges and universities do not provide the specialized training the company needs to maintain its workforce. As corporate colleges evolved, the name was changed to reflect the different types of instruction: training; training plus management and executive development; courses offered for academic credit, and courses that lead to an academic degree (Allen, 2002). After synthesizing the literature, Allen (2002, 2007) provided the most recent and now widely recognized definition of corporate universities:

A corporate university is an educational entity that is a strategic tool designed to assist its parent organization in achieving its mission by conducting activities that cultivate individual and organizational learning, knowledge, and wisdom. (p. 9)

Corporate colleges may offer work and courses that can be transferred to accredited colleges. Approval of academic credit for instructional courses and programs offered by businesses is granted by the National Program on Noncollegiate Sponsored Instruction (NPONSI), housed at New York State Department of Education (Albany, NY). The American Council on Education (ACE) operates a similar program. Thompson (2000) indicated that ACE recommended college credit for courses and experiences provided by more than 250 companies.

Model Characteristics
Eurich (1985) identified the characteristics associated with the early corporate colleges. Faculty bring relevant work experience to the classroom; most teach part-time and do not receive tenure. Courses and faculty are organized around interdisciplinary activities, making them more adaptable to changing conditions and less rigid in administration. Corporate colleges give high priority to the assessment of faculty and curriculum that make learning useful and help students develop competencies. (The literature does not mention student assessments.) Corporate college programs can be limited in scope because they respond to industry-specific needs.
In a more recent examination of corporate universities, Meister (1998) identified ten important characteristics of a successful corporate university:

- A corporate advisory board composed of top management, to articulate the company’s commitment to the program
- A vision or strategic plan setting forth the organization’s goals and learning objectives
- Sustained financial commitment and support
- Identification of the students and stakeholders who will enroll corporate-college courses
- Needs assessment of students and a plan to meet these needs
- Curriculum designed courses and activities that are consistent with the corporate college’s mission
- Selection of qualified faculty
- Appropriate technology to deliver and sustain instruction
- Measurement systems for individual performance and outcomes
- Measurement systems for corporate and organizational benchmarks
- A communication strategy that promotes and increases awareness of the opportunities available at the corporate college

Mike Morrison (2002) learned from his efforts at the failed University of Toyota that a corporate university must focus on these elements:

**Operational efficiency**

- Effective communication
- Appropriate technologies
- Self-directed learning environments
- Continuous project management

**Client focus**

- Know the audience and its needs
- Implement a clear performance plan
- Align course offerings with desired result
- Measure outcomes

**Personal development**

- Improve performance
- Develop skills

**Outcomes or Benefits**

Very little public data are available on the individual and organizational value added derived from corporate-university training and education. Phillips and Phillips (2007) argued that measurements are needed to demonstrate the success of the learning investments companies are making. The authors offered a hierarchy of value determination by which organizations can hold themselves accountable.

### Hierarchy for Accountability at Corporate Colleges

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<thead>
<tr>
<th>Level</th>
<th>Assessment Type</th>
<th>Focus</th>
<th>Best Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Input</td>
<td>Number of participants, hours, programs</td>
<td>100%</td>
</tr>
<tr>
<td>1</td>
<td>Reaction</td>
<td>Participant satisfaction</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Learning</td>
<td>Measure change in knowledge, skills, attitudes</td>
<td>60-80%</td>
</tr>
<tr>
<td>3</td>
<td>Application</td>
<td>Changes in on-the-job behavior, performance, action</td>
<td>20-30%</td>
</tr>
<tr>
<td></td>
<td>Impact</td>
<td>Measures changes in business variables such as output, quality, cost, time</td>
<td>10-25%</td>
</tr>
<tr>
<td></td>
<td>ROI</td>
<td>Compares benefits to costs</td>
<td>6-10%</td>
</tr>
</tbody>
</table>

**Source:** Phillips and Phillips (2007)

Morin and Renaud (2004) studied corporate training on job performance in Canadian organizations. They found corporate training had only a small positive effect on individual job performance (accounting for pre-job performance and personal characteristics). The number of course offerings had a positive effect on job performance. Their most significant finding was that corporate training improved pre- and post-training job performance.

A synthesis of the information available on corporate universities suggests the following:

- Corporate universities strive to align curriculum and education activities with the desired work, skill, or behavioral outcomes required by the corporation.
- Corporations pay training costs or reimburse students for training taken elsewhere but may not cover lodging, meals, and transportation.
- Instructional outcomes are assessed by performance in instructional settings.
- Measurements of individual and organizational outcomes (e.g., job performance, behavior development, and improvements in business practices) are carried out infrequently and rarely released to the public.

**Benchmark Programs**

Walt Disney College Programs
McDonald’s Hamburger University
J.P. Morgan
DISTANCE EDUCATION
AND ONLINE COURSES
Moore and Kearsley (1996) defined distance education as:
the planned learning that normally occurs in
a different place from teaching and as a result
requires special techniques of course design, special
instructional techniques, special methods of
communication by electronic and other technol-
y as well as special organization and adminis-
trative agreements. (p. 2)

The online course is emerging as a major delivery
method for distance education. McFarland and Hamil-
ton (winter 2005/2006) described it as “a course having
materials delivered online that never meets synchro-
nously, and the student learns completely independent
of a live instructor.” (p. 25) Beqiri, Chase, and Bishka
(2010) defined online courses as “those in which
materials are delivered entirely online, and students
have access to the instructor only electronically.” (p. 95)
Smith and Mitry (2008) noted that online courses are
distance education because the students are physically
separated from each other and the professor.

Model Characteristics
The Office of Instructional Technology at Michigan
State University provides a useful description of the
advantages distance education:

- Flexibility of time: Teaching and learning are not re-
  stricted to a set schedule of events. Rather, students
can choose times most convenient to them and
  their lifestyle. Lecture and course materials can be
  accessed 24 hours a day.

- Flexibility of place: Students are not required to
come to campus to attend class sessions. Teaching
  sessions and associated learning materials can be
  accessed both on- and off-campus.

- Flexibility of pedagogy: Students are provided with
  choices in the teaching resources and methods to
  best suit their particular learning needs. Knowl-
ge is can be constructed through collaborative
  processes, thereby engaging students more directly
  in their own learning.

- Flexibility of pacing: Students can progress through
  a course at their own pace in accordance with their
  academic background and personal circumstance

- Material may be viewed multiple times, and often
  there can be immediate feedback to students about
  how well they are doing.

The Distance Learning College Guide states accreditation
is important because it entitles students “to the same
rights to admissions, orientation, registration, counsel-
ing, tutoring, placement, financial aid, and other student

Advantages and Disadvantages
of Distance Education

Advantages
Students study at their own pace.

Students can schedule classes and coursework to
suit their personal schedule.

Students interact with faculty and each other in
discussions and coursework.

Students pay lower tuition than for similar course-
work offered in brick-and-mortar institutions.

Disadvantages
Students need self-discipline and time-
management skills.

Apart from coursework and class discussion, students rarely interact socially.

Students are required to write and read more
material than those in traditional settings.

Source: Degreedirectory.org

services that are available to all other college students,
regardless of the delivery method of [their] classes.”

Scheduling for distance-education programs is typi-
cally offered in two formats — synchronous and asyn-
chronous. Synchronous format requires students to
participate in courses at the same time. Asynchronous
format allows students to work at their own pace and
at times convenient for them.

Distance education has advantages and disadvantages.
Perhaps the most important advantage from a delivery
standpoint is that education institutions can reach more
students than traditional brick-and-mortar institutions
can do.

Outcomes or Benefits
Lei and Gupta (2010) made a compelling argument in
favor of distance education programs:

Students can be situated anywhere in the world
and can still access course web pages and
fully participate in online classes. Many lead-
ing academic programs and departments have
accounted for individuals with complex work
and family schedules. Since most learners rely
heavily on a steady stream of income to pay for
bills and expenses, various programs at the col-
lege level have retuned their marketing efforts
to accommodate this type of lifestyle for work-
ing adults. Even well reputed, accredited higher education institutions have recognized the demand for a more time-sensitive program and have adjusted their curriculums accordingly. If individuals have job and family obligations but wish to continue learning and developing their career skills, a distance education program may be a wonderful option for them. Higher academic degrees usually lead to higher annual income in one’s respective field. Distance education affords opportunities for continuing education and career advancements simultaneously. (pp. 623-24)

Participants
Distance education has revolutionized the delivery of higher education. Kern (2010) reported that approximately 25 percent of the 19 million students enrolled in higher education were taking at least one online course during the fall of 2008. The Sloan Consortium and Babson Survey Research Group (2009) found the numbers represent a 17 percent increase in enrollments in one year. Today, online education programs are commonplace; more than 3,300 of the roughly 4,500 U.S. colleges and universities offer at least one online course. The Babson Survey Research Group (2009) found more than 1,700 of these schools offer complete online degree programs.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>754,000</td>
</tr>
<tr>
<td>1998</td>
<td>1,600,000</td>
</tr>
<tr>
<td>2000</td>
<td>3,000,000</td>
</tr>
<tr>
<td>2007</td>
<td>3,900,000</td>
</tr>
</tbody>
</table>

Source: Lei and Gupta (2010)
FACILITATING MODELS

Learn-and-earn programs rely on government and nongovernment agencies and programs for funding and organizational assistance. Although corporations and trade associations are beginning to fund programs, current funding levels are insufficient.

GOVERNMENT AGENCIES AND PROGRAMS

Numerous government agencies and programs provide research, legislation, and funding to promote learn-and-earn programs.

Research agencies include NCES, a division of the U.S. Department of Education, Institute of Education Sciences. It provides statistics on career and technical education programs.

Legislation includes the Carl D. Perkins Vocational and Technical Education Act, an example of Federal legislation that distributes more than one billion dollars every year to fund secondary and postsecondary vocational and technical education. The funds are distributed to programs that provide academic and occupational skills and focus program delivery toward minorities, women, the disabled, and groups designated as “special populations.” The act is meant to “equip a workforce with the academic and vocational skills needed to compete in a technologically advanced society.”

Several agencies fund learn-and-earn programs. One example is the U.S. Department of Labor’s Bureau of Apprenticeship and Training (BAT).

NONGOVERNMENTAL AGENCIES AND PROGRAMS

A multitude of nongovernmental agencies and programs prepare students for the workforce. SkillsUSA is a national nonprofit serving teachers and high school and college students preparing for careers in trade, technical and skilled service occupations, including health occupations.

Many accreditation agencies support learn-and-earn programs and are listed at Guide to Career Education.com. The following are representative examples:

The Accrediting Commission of Career Schools and Colleges accredits private, postsecondary, non-degree-granting institutions and degree-granting institutions that grant associate, baccalaureate, and master’s degrees. Accreditation goes to institutions that train students for occupational, trade, and technical careers, including institutions that offer distance education.

The Accrediting Council for Continuing Education and Training accredits higher-education institutions that offer continuing education and vocational training and confer certificates or occupational associate degrees, including institutions that offer distance education.

The Accrediting Council for Independent Colleges and Schools accredits private postsecondary institutions offering certificates or diplomas, and postsecondary institutions offering associate, bachelor’s, or master’s degrees. Accreditation goes to institutions that train students for professional, technical, or occupational careers, including institutions that offer distance education.

The Council on Occupational Education provides accreditation and pre-accreditation (candidacy status) services for postsecondary occupational-education institutions offering non-degree and applied associate degree programs in career and technical education, including institutions that offer distance-education programs.

More money is needed to attract and retain students. Current funding does not always ensure that students earn a living wage while they study.
The comparative analysis examines how the models use the guiding principles of learn and earn.

**FOUNDATIONAL PILLARS**
Taxonomy 1 is a summary analysis of the pillars of learn and earn.

**Academic Rigor**
The foundation of many of these models is a strong curriculum that teaches essential concepts, problem-solving approaches, analytical methods, and the content necessary to build skills. Many students in co-ops, internships, externships, practicums, and clinicals need to learn these fundamental skills to ground their experience. The most focused models include IT certification, professional certifications, PSMs, and STEM majors.

Nearly every model addresses academic rigor except Federal work-study. Some interns may not be as well prepared for their assignments because of gaps in their educational program. This conclusion is based primarily on anecdotal evidence.

**Relevant Work Experience**
While each model features work experience, relevance is stronger in some models. In particular, cooperative education addresses relevance fairly thoroughly. Contracts specify the expectations of all parties to the agreement. Work experience contributes to the growth and development of the student’s professional skills. Similarly, legal externships or internships must follow clear ABA guidelines that set expectations for the work experience. Fieldwork and apprentice work closely align instruction with professional goals.

For clinical rotations, practicums, and university-business partnerships, course content and its application in a professional setting are typically woven together and overseen by faculty or a faculty representative in the field. By providing a variety of patients, on-the-job situations, and work assignments, these programs help participants gain confidence in their profession.

Internships comprise a high percentage of learn-and-earn programs. Here, relevance is mixed. For internships taken for academic credit or offered by companies and organizations with long-standing, visible presence on campus, the work experience is monitored,
to some extent, to make sure the intern works on meaningful assignments. In most cases, however, students perform internships without oversight from faculty or advisors. Without oversight, there is no method to verify if the intern’s work has merit. At this time, the number of students in unsupervised internships has not been fully documented and requires further investigation.

Work-study is a conundrum in terms of relevance. Federal law permits institutions that receive Federal work-study funds to pay students working for approved, for-profit companies if the work experience matches the student’s educational goals. In practice, very few institutions allow students to work off campus unless they work for nonprofit, public-interest institutions. Colleges and universities are now converting on-campus jobs to internship and co-op opportunities; however, most jobs are menial, custodial, or clerical and have little relevance to a student’s field of study.

Capstone courses typically do not build in work experience; therefore relevance is less of an issue. There are examples, however, where real-world experience is integrated into the coursework for community service or for a particular company. For example, an IT capstone course at University of San Francisco asks students to solve a problem identified by a local company. Similarly, a capstone course at LaGuardia College requires students to design and conduct a research project with a local agency on a pressing social issue of interest to the community.

FUNDING AND STUDENT FINANCIAL ASSISTANCE

Cooperative-education programs and apprenticeships require students to be paid for their work experience. Internships can be paid or unpaid. Almost 87 percent of engineering interns and co-ops, but only 19 percent of media communications interns, are paid. Richard Bottner (2010) showed a wide pay range for internships from $8.00 to over $15.00 per hour.

Federal work-study funds could be allocated more effectively if student assignments matched education and career goals. Unfortunately, very few schools are doing so.

For more context-specific models, student financial assistance is dictated by governing boards. For example, the ABA states law students cannot be paid for for-credit externships. They can, however, pursue paid externships or internships during the summer and on a restricted basis while they are enrolled full-time.

The evidence indicates that funding varies within and among models. For example, when the Federal government terminated Title VII in the early 1990s, many cooperative-education programs replaced faculty supervisors with practitioners to reduce costs or converted the program to a less expensive internship model. In his review of legal externships, Backman (2006) highlighted a problem many law schools have funding fieldwork: courses requiring faculty participation cost more. As a result, many law students work in the field in exchange for academic credit and use tuition loans or grants to defray expenses.

As stressed throughout this paper, the evidence suggests many programs simply do not offer the “earn” portion of learn and earn. This problem should be addressed so that learn-and-earn models can be successful and deliver qualified workers to the labor market.

Strategic Alignment

The analysis indicates at least two general learn-and-earn models stand out: cooperative education and university-business curriculum partnerships. Each model typically requires strategic alignment of expectations and outcomes. In addition, internship programs could show strong alignment; however, since the model allows for much greater flexibility than other models, current internship programs are not as highly aligned as they could be.

In more specific models of learn and earn (e.g., clinical placements, rotations, and practicums), faculty most often share common practice with the field supervisors and professionals. Hence, alignment tends to be relatively explicit and often highly interactive (bi-directional). A major advantage of these models is shared vocabulary: the greater the shared vocabulary (e.g., terminology, lexicon, and jargon), the more effective and efficient the communication and ability to meet common objectives. The major limitation of these models is that they are not as widely accepted as general models and require greater administrative commitment.

ORGANIZING PRINCIPLES

Taxonomy 2 summarizes the comparative analysis relative to the foundation elements.

Accountability

Appropriate reporting procedures, usually achieved with performance metrics, are intended to lead to effective accountability. Several forms of performance metrics are available. Perhaps the easiest to implement are competency-based tests taken at the completion of a program module.

Another performance metric is an evaluation by an advisor or supervisor. In clinicals, externships, practicums, and university-business partnerships, faculty often evaluate student performance because they supervise the work experience. The field supervisor can also add to the evaluation.

Evaluations have a great deal of flexibility in terms of implementation. For example, the co-op model incorporates reviews during the field experience; faculty advisors make site visits and work closely with su-
Co-op students or those receiving academic credit for work experience are often required to submit reflection papers, self-evaluations, or other performance measures when they finish their assignment.

The evaluative process is perhaps most troublesome in the context of internships because it is not ordinarily expected or has not been agreed upon beforehand. Better administrative oversight is needed for these internship programs if performance is to be evaluated properly. At a minimum, accountability measurements should include benchmark information on degree and credential completion rates, time to completion, and other measures of effectiveness and efficiency. LaGuardia Community College’s “e-portfolio program” is an excellent example of program accountability.

**Career Exploration**

Numerous education institutions help students actively plan their career. Old Dominion University stands out because it offers several courses specifically designed to teach career exploration. Each course addresses career goal that should be set at different stages of the student’s career.

Some cooperative-education and internship programs require students to attend a career-socialization course before they begin work experience. The course teaches students what to expect and how to behave in the workplace and helps them take the first steps to plan their careers. For example, Mike True at Messiah College developed a software program to guide faculty and students through this introductory course.

Some programs also have a similar mechanism in place to debrief students with regard to their work experience. Debriefings help students understand the skills they developed and further understand their accomplishments and future career options. The information can also be used to counsel incoming students.

For legal externships, the ABA requires a course, seminar, or some form of on-line instruction to accompany all fieldwork completed for credit.

LaGuardia Community College offers perhaps the most comprehensive program in career exploration. A series of courses, beginning with a student’s first semester, provide academic and career development. When students complete the series, they are given an e-portfolio.

In other programs, career exploration is offered in capstone courses and practicum, but no details are available for course content and how it relates to work experience. That is, less evidence is available for capstone courses than for other models.

**Professional Development**

Evidence of professional development is reflected in all the factors that relate to the attainment of skills and knowledge. The real challenge, however, is to determine which factors contribute most to professional development in terms of career success. The most transparent factors are coursework, work experience, and credentialing. However, the factors alone are not the critical issue; instead, it is the quality of each. Coursework that is irrelevant, non-rigorous, or mediocre has little value for career development. Likewise, irrelevant work experience or credentials that do not attest to learned knowledge and skills do not provide value to the student’s professional development. No existing model exemplifies good professional development; different models were shown to excel in one or more areas.

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**Taxonomy 2. Elements of Learn and Earn**

<table>
<thead>
<tr>
<th>Model</th>
<th>Accountability</th>
<th>Career Exploration</th>
<th>Professional Development</th>
<th>Credentials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internships</td>
<td>Low to High</td>
<td>Moderate to high</td>
<td>Moderate to high</td>
<td>Low</td>
</tr>
<tr>
<td>Cooperative Education</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Apprenticeships</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Federal Work-study</td>
<td>Low to Moderate</td>
<td>Low/Moderate</td>
<td>Low to moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Career and Technical Education</td>
<td>Moderate to high</td>
<td>Moderate to high</td>
<td>Low to moderate</td>
<td>High</td>
</tr>
<tr>
<td>Practicum</td>
<td>High</td>
<td>Moderate to high</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Clinical Rotations and Clerkships</td>
<td>High</td>
<td>Typically high</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Legal Externships and Internships</td>
<td>High</td>
<td>Typically high</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>
An Analysis of U.S. Learn-and-Earn Programs

These elements operate in synergy: the whole is greater than the sum of its parts. Thus students would benefit more from programs that fit all the elements together and coordinate them to gain optimal performance.

Credentials

The most common credential awarded by learn-and-earn programs is a diploma, although other credentials are important as well. Alternatives to diplomas are relatively uncommon; the notable exceptions are IT and apprenticeship certificates. These alternatives rate high in their ability to provide explicit evidence of proficiency. For other models, the potential for bona fide evidence of credentialing is present but not necessarily transparent. For example, cooperative-education experience may be an attestation of qualification, competence, or authority, but the attestation is based on an implicit, rather than explicit, acknowledgement.

Alternative credentialing systems are common in colleges or universities and are interim or final credentials of achievement (e.g., the dean’s honor list or the magna cum laude designation on a diploma). The challenge, therefore, is to classify the conditions for applying alternative credentialing in learn-and-earn programs. By doing so, students who meet the criteria receive more transparent and transportable evidence of accomplishment.

Old Dominion University Career Exploration

UNIV 120 - Career and Major Exploration is a systematic exploration of individual interests and skills and career resources. Emphasis is placed on defining goals and developing strategies to achieve goals. Career testing and individual conferences are included.

UNIV 400/500 - Career Engagement is designed to offer juniors, seniors, and graduate students an in-depth view of the career process. Topics will include self-exploration, tools and elements of the job search process, interview skills, and job offer evaluation. Discussions will also include post-graduation plans, including the successful transition to the world of work and graduate school. Attendance at on-campus career events will be an important component. Assignments will include the use of current career technology and its applications.

Source: Old Dominion University
CONCLUSIONS

The research suggests that the three strongest models are internships, cooperative education, and apprenticeships. Unfortunately, nuances with each model preclude them from being considered optimal in practice. For example, internships do not require financial support but are very flexible. Cooperative education provides financial support but is less flexible. Cooperative education necessitates alternating cycles of school and work, thereby extending the time it might take to complete an educational program's requirements. Finally, the apprenticeship model scores high in most of the evaluation categories, but the model is not as widely used as cooperative education and internship. As such, replacing internship or cooperative education models with the apprenticeship model would likely be difficult from an organization-change perspective. Apprenticeships are usually associated with a labor or union-related job in a specific industry and may be more difficult to scale to a more general model. Moreover, organizations may resist models that replace existing ones unless it can be demonstrably shown that the alternative model is superior. We do not, at this time, believe this case can be made.

Instead, our overall conclusion is that a new learn-and-earn model needs to be found and established, building on the pillars and elements presented in this report. Adherence to the pillars and elements provides the building blocks of an effective program. Through creative and innovative thinking, an effective learn and earn model will have a strong strategic architecture capable of addressing current needs and, at the same time, be sufficiently adaptable to different contexts of changing conditions.

In this sense, multiple models with common themes that rest on the foundational pillars and elements are envisioned. In other words, it is probably unreasonable to presume that a one-size-fits-all model will maximize benefits across a wide variety of contexts and conditions. This is consistent with the recommendation that models “row in the same direction.”

The following statements summarize the specific findings:

- New models being developed in companies may be critical to the future of learn and earn. Companies should produce reports documenting the success of their programs so that others can benefit.
- Continuing education should be investigated further to more fully understand how it might be effectively integrated into a learn-and-earn model.
- The business community and education institutions that deliver learn and earn need greater collaboration to help ensure agreement on goals and objectives.
- Education institutions need to monitor the labor market regularly, identify emerging trends and changing conditions, and respond to market needs by adjusting their programs accordingly.
- Learn and earn will be more effective as a guiding initiative if the principles allow for diverse and flexible governance. Undue bureaucracy will limit the ability of programs to be entrepreneurial and ultimately successful.
- Programs will be more successful if methods are in place to ensure program accountability, attract and retain students, and provide professional development.
- Industry and university partnerships are not well publicized except in a few cases. Strategic alignment in this area is thus hindered by a dearth of evidence.
- The business community and education institutions that deliver learn and earn need greater collaboration to help ensure agreement on goals and objectives.
- Education institutions need to monitor the labor market regularly, identify emerging trends and changing conditions, and respond to market needs by adjusting their programs accordingly.
- Community colleges provide one of the strong delivery channels for learn-and-earn programs because of their access and flexibility.
- Distance education is another strong delivery channel because it removes the constraints of time and distance present in other delivery channels.
- Government and nongovernment agencies provide meaningful financial support, but their goals may not always coincide with those of other stakeholders.
• Government and nongovernment agencies provide guidance, but their diverse agendas present a challenge for strategic alignment between other stakeholders.
• Learn-and-earn programs work better when employers, education institutions, and government and nongovernment agencies work together.
• More money is needed to attract and retain students. Current funding does not always ensure that students earn a living wage while they study.

Aside from the guidelines presented in this report, the following recommendations can be made with regard to exploring opportunities. In particular, future research should use the pillars and elements to evaluate best practices in the individual programs that best exemplify the guidelines. Some best practices have already been identified and are frameworks for model development. It is important, however, to adopt systematic approach toward model development. In this context, we recommend consideration of the concept of “backward design” (Wiggins and McTighe 1998). Wiggins and McTighe (1998) described the concept of backward design and its use for examining and redeveloping programs to “rewire” and retain a global workforce:

Backward design includes three stages: I. Identify Desired Results, II. Determine Acceptable Evidence of Learning, and III. Design Learning Experiences and Instruction.

To be successful, curricula development and backward design must be led through collaborative partnerships between higher education programs and industry. Design and development must be a fluid process of aligning curricula with industry needs so that when employment and industry shifts occur then the curricula reflects these shifts and does not remain stagnant. The results of these collaborative partnerships will better prepare students for career placement, advancement, and transition. Concurrently, these partnerships enable corporations, organizations, government agencies, and institutions to more seamlessly transition graduates into the workplace as well as to increase employee engagement and potentially long-term employee retention (Betts, 2009).

Although research has provided good evidence of the viability of the learn and earn concept, more work is needed. Stakeholders need to fully understand how new models can best be developed. They also need to identify how current models can best be adapted to meet the needs of an ever-changing population. Finally, as stakeholders identify new models, they must determine the best methods to scale the new models.

The research questions are presented to help in this regard. Many have been partially answered in this report. Nonetheless, they need to be continually re-evaluated to ensure that we have the latest information to help with decision-making.

**FOLLOWUP QUESTIONS FOR FURTHER RESEARCH**

What are the best practices of successful learn-and-earn programs? Which programs exemplify the principles of learn and earn?

Which delivery models present the most potential for further development?

What are the trade-offs of each delivery model?

How can greater strategic alignment among employers, education institutions, and governmental and nongovernmental agencies be accomplished?

How can the benefits of learn and earn be communicated to each stakeholder group?

What is the best way to assess the outcomes of learn-and-earn programs?

Are current assessment practices sufficient or do they need to be adapted to ensure greater accountability?

Can current learn-and-earn programs adapt to changing needs in the marketplace?

Will developing new programs better serve the changing needs of students and businesses?

Do traditional credentials (e.g., certification, certificates, diplomas) accurately reflect learned skills and knowledge? Does one credential produce better outcomes than another? Do credentials help employers identify qualified candidates?

What constrains model development and adaptation?

What constitutes sufficient funding for earn-and-earn programs?

How much financial assistance is needed to provide an adequate income for students?

Should financial assistance include the costs of transportation, childcare, parental care, particularly for low-income students?

How can learn-and-earn programs build in career exploration so that students do not waste valuable time and money studying for a career they will not like or doesn’t suit them?

How can learn-and-earn programs be designed and delivered so that students will view career development as a positive experience, not a hurdle to jump?

What is the best way to motivate students to develop their professional skills?

Which courses and activities during the late stages of study enforce the learn and earn experience and help students make the transition into the workplace?
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