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ABSTRACT

Two models of skill standards development and skill certification--the professional model and the skill components model--have been developed. Their development follows analysis of the skill standards movement and the 22 U.S. Departments of Labor and Education pilot projects developing skills standards for various industries. These two models differ along two critical dimensions--the conceptualization of skill and the role that workers play in the development and governance of the skill standards system. The skill component model is based on the limited, passive roles that workers are expected to assume in traditional hierarchical organizations. The concept of professionalism assumes that workers have the ability to apply general knowledge to a variety of nonroutine circumstances or situations. One of the crucial distinctions between skill standards as conceived under these two models is the ultimate purpose of the skill. In the skill components model, a list of skills indicates a set of specific tasks to be directed by someone other than the worker. In the professional model, a list of skills indicates a set of "enablers" that will enhance the worker's ability to carry out broader, autonomous responsibilities. An analysis of 21 pilot projects reveals a wide variation in practice. Many simply use already existing standards. Those that developed them base them on a skills component perspective. (Contains 10 references.) (YLB)

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A Conceptual Framework for Industry-Based Skill Standards

The United States has entered "the age of the standard." Although there is little empirical proof of their benefits (GAO 1993), many believe that developing a national system of standards is one key to strengthening the country's economy. Supporters contend that standards can promote flexibility and portability of workers' skills across occupations, industries, and geographic areas and improve the fit between what is learned in school and what is needed on the job (Ganzglass and Simon 1993; Commission on the Skills of the American Workforce 1990).

This paper presents two models of skill-standards development and skill certification–the professional model and the skill-components model. We have developed these models after analyzing the skill standards movement and the 22 Departments of Labor and Education pilot projects that are developing skill standards for various U.S. industries. A detailed description of the two models, the pilot projects, and the conditions that have encouraged the skill standards movement in general are provided in the National Center for Research in Vocational Education (NCRVE) report, *Making Sense of Industry-Based Skill Standards* (Bailey and Merritt 1995).

Models of Skill and Skill Certification

Reformers of mainstream education and the workplace are challenging the series of dualities that have traditionally existed between mental and physical (head and hand), theoretical and practical, and academic and vocational activities. For example, educational reform strategies emphasize the pedagogical benefits of linking structured work experience to academic or classroom work (Grubb 1995). Likewise, workplace reform, focussing on aspects of the "high performance workplace," has sought to minimize the distinction between the activities of nonprofessional and professional workers–the "doers" and the "thinkers." Production workers formerly engaged in routine tasks initiated and directed by their superiors are increasingly being given more responsibility to solve problems, make improvements in workplace procedures, and engage actively with their co-workers.

The distinction between an approach to skill standards based on traditional dualities and one based on a more integrated perspective can be illustrated by two broad models that we have developed–the *skill-components model* and the *professional model.* These two models differ along two critical dimensions, the conceptualization of skill and the role that workers play in the development and governance of the skill-standards system.

The Skill-Components Model

The skill-components model is based on the limited, passive roles that workers are expected to assume in traditional hierarchical organizations. As Rosenbaum, Kariya, Settersten, and Maier (1990) point out, "... although college graduates are hired based on their ability to be self-directed, non-college-bound youth are hired based on their rule-following behaviors: effort, deportment, attendance, and punctuality" (p. 266). Stripped of autonomy by the narrow skills that define them, employees perform a series of rote functions that have been explicitly established for them. Since workers are not expected to make complex independent decisions, the conceptual skills that could be used as a basis for making those decisions are not considered necessary.

Workers are expected to have basic academic skills–literacy and numeracy–but a sharp distinction is maintained between academic and vocational learning. Academic skills are learned prior to specific vocational skills and are useful to the extent that they help workers master the required list of tasks. But with the typical approach to teaching and the types of tasks that workers are asked to carry out, workers are not encouraged to, and do not, transfer these enabling competencies to their applications (Stasz, McArthur, Lewis, and Ramsey 1990). That is, workers are trained to perform tasks that are defined by their supervisors, but they are not expected to know when to do them, how they fit into related tasks, how they relate to a final product, or how they can be improved or applied to different situations (Bailey 1989).

The conception of skill found in the skill-components model has two important implications. First, the effectiveness of a worker can be characterized by how well the worker carries out a list of individual tasks, the principal difference between skilled and unskilled workers being the length of the list of tasks that they can perform. Second, since the skills of workers are a collection of tools at the disposal of managers, it is reasonable that the managers, not the workers, will have control over the process of developing skill standards and their certification.

The Professional Model

The concept of professionalism assumes that workers have the ability to apply general knowledge to a variety of non-routine circumstances or situations (Wolfson, Trebilcock, and Tuohy 1980). Professionals are rewarded for autonomous, proactive, non-routine behavior and are expected to make important decisions on a client's behalf.

But professionals must also be able to carry out specific tasks. Nevertheless, two professionals, equally adept at carrying out specific tasks, could differ profoundly in their effectiveness as professionals. As Hoachlander (1995) points out, a pilot's job is much more complex and nuanced than a list of pilot skills or tasks would indicate. No pilot certification system could be considered adequate if it did not require pilots to accomplish specific tasks such as landing a plane. However, Hoachlander argues, pilots who can hit the landing path consistently will crash if they use poor judgement in non-routine situations.

In the professional model, technical **and** academic skills are the foundation or enablers for more complex general functions such as problem-solving, reasoning, or using judgement. In contrast,

in the skill-components model, the broader academic skills are the foundation or enablers of specific tasks and technical skills. Thus tasks are the ultimate activity for nonprofessional workers, while, for the professional, tasks are necessary (but not sufficient) to carry out the broader core activities of the occupation.

Skill-Standards Development Under the Two Models

One of the crucial distinctions between skill standards as conceived under these two models is the ultimate purpose of the skill. In the skill-components model, a list of skills indicates a set of specific tasks to be directed by someone other than the worker. In the professional model, a list of skills indicates a set of "enablers" that will enhance the worker's ability to effectively carry out broader, autonomous responsibilities. Given this distinction, those who develop standards based on the skill-components model need merely list a set of abstract domain-free skills. But those who are developing standards following the professional model must supply more context for the work performed and describe the kinds of interactions that occur among individuals involved in the work process. Analyzing skill-standards systems, we thus focus on two dimensions: (1) the extent to which academic and vocational skills are integrated and (2) the extent to which the workplace is integrated into the standards.

Academic and vocational integration. The skill-components model fundamentally separates academic and vocational skills. Academic skills are taught in school settings for abstract or unspecified purposes. Vocational skills, in contrast, are taught for work–often at work or in work-like settings. There is little, if any, connection or application drawn between academic and vocational skills. An academic skill for a laboratory technician might be the ability to write in complete, meaningful sentences. A lab technician's vocational skill might involve placing entries into a log book. Although these two skills are interdependent, in the skill-components model they are thought of as separate.

The professional model, on the other hand, minimizes the distinction between the types of skills–academic or vocational–that workers possess and concentrates on how the skills are combined to achieve a workplace-related goal. The fact that a lab technician can write complete sentences in a paper for a science course may be of little use in the workplace; for the skill to have any value, the technician must be able to utilize, transfer, or apply this "academic" ability as written communication in a "real" setting.

Workplace integration. The workplace also plays a different role in the two models. In the skill-components model, skills (whether academic or vocational) are generic and have no solid workplace applications. It is assumed that the ability to log lab information goes no deeper than filling in a log book in some pre-determined fashion involving no judgement calls or decision making on the part of the worker. The worker is limited to a pre-established set of responses related to the most appropriate technical skills; no application of other perhaps distantly related skills or judgements are necessary.

In the professional model, however, what is critically important is the worker's ability to apply a variety of skills in the context of the workplace. For example, using a log book involves the worker's discretion about the importance of relaying information to colleagues as well as the ability to communicate the information that the organization needs now and in the future. An independently functioning lab technician (similar to a physician logging information onto a patient's chart) must be able to assess a situation, decide what information is important enough to include in a log book, and document that information in an understandable fashion.

Current Skill Standards Development–The 22 Pilot Projects

In 1992 and 1993, the U.S. Departments of Labor and Education accepted the proposals of 22 organizations to develop and pilot-test skill-standards systems in various U.S. industries. The funded projects were responsible for developing cooperative alliances among employers, unions, and educators and increasing the knowledge and understanding of how skill standards and certification are developed, implemented, recognized, accepted, and used. By early 1995, all projects had completed the development of content standards, and almost two-thirds had completed the validation of the content standards as well as the development of performance standards.

The empirical basis for the analysis in this paper is an examination of 21 of the pilot projects.[1] In the dimension of academic and vocational integration, the pilot projects can be differentiated in three groups. In the first group, there is no integration between skill types; academic and vocational skills are listed separately. In the second group, academic skills are differentiated from vocational skills but are applied to a generic workplace setting or task that illustrates their use in the workplace. In the last group, academic skills are embedded or integrated in the technical functions (vocational skills) required in the occupation.

With respect to workplace integration, there again are three kinds of groups. The largest group follows the skill-components model: skills are listed with no workplace application relevant to the specific occupation or industry. The second group provides specific workplace applications to indicate how skills may be used. The smallest group of projects follows the professional model: their list of skills includes the organizational and industry dynamics as critical aspects of the skills; that is, they indicate how workers are expected to operate in their surroundings.

[1] Standards from one of the 22 projects were not made available to us.

Combining the two dimensions, we were able to distinguish three categories of projects.[2] The accompanying chart displays the two-dimensional categorization of the standards created by the 21 projects.

We refer to the six projects that maintain a distinction between academic and vocational skills and offer no workplace context as having *compartmentalized standards*. Four projects combine academic and vocational skills and integrate the standards into critical workplace functions. We refer to these as *consolidated* standards. The eleven remaining projects, an intermediate group that we refer to as *contextualized*, use workplace tasks or vocational activities to provide examples of the usefulness of particular skills but do not integrate the workplace or the types of skills into the standards.

Compartmentalized

In the compartmentalized projects, technical and academic skills are fundamentally separated. Technical skills are for the workplace; academic skills are for the classroom, and there is little overlap between the two. The role of trainees in the workplace is distinguished from the role of learners in the classroom.

In these compartmentalized projects, all skills are narrowly defined. The technical skills are a list of explicit abilities necessary to perform industry-specific or occupational-specific tasks and duties. The academic skills are the foundation or basic competencies that an employee needs **before** gaining technical skills. So-called employability skills such as the ability to follow schedules, when included, form a third, separate listing of skills, which are usually appended to the skill framework.

Just as types of skills are disconnected from each other, they are also disconnected from any workplace context or application. This lack of skill application is especially apparent for academic skills. In the compartmentalized projects, standards do not indicate how, for example, mathematics skills such as the conversion of fractions into decimals or percentages must be used by technicians in the performance of their jobs. The required skill is simply listed, and the tasks that will utilize this skill are listed separately and generically.

For example, one project identified skills in three categories–technical, employability, and related academic–and listed them separately. "Technical Skills" include appropriate safety procedures and keeping work areas free from clutter. "Employability Skills" include following schedules and practicing self-starting techniques. "Related Academic Skills" include algebra, interpreting ratios, and solving linear equations.

Consolidated

The consolidated projects build skill standards on a framework of broad-based workplace responsibilities and interactions rather than specific worker tasks. This approach is more in line with the less structured and more autonomous professional view of work. The list of skills is more firmly grounded in the workers' purpose within the organization and not on a set of isolated tasks that they perform. The focus is on the worker's responsibility to the customer or to the overall mission of the organization rather than primarily on the narrow context in which employers define an employee's tasks and duties. The worker's role as worker is not differentiated from the worker's role as learner.

Because it does not adhere so strictly to labeling skills, use of the professional model promotes the expansion of worker roles within the organization. In this approach, identifying a list of skills is less important than understanding the underlying aspects of worker roles and responsibilities. As one project staff member commented, standards center around what the work actually looks like and its relation to the organizational or industry mission. The knowledge, skills, attributes, and task competencies required of workers are seen as "enabling" the performance of broad organizational roles.

Contextualized

While the compartmentalized projects create standards that produce an abstract list of skills, the contextualized projects use workplace examples to make the list of skills more meaningful. Skill-standards projects that take this contextual approach create a closer link between worker and learner roles than the compartmentalized projects, but academic and vocational skills are not integrated, and skills are still not defined in relation to the broader role of the worker in the organization.

Conclusion

Our analysis of the pilot projects revealed a wide variation in practice. Too many of the current projects remain rooted in past notions of skills. Many projects simply used standards that already existed. But even those that developed new standards based them on a skill-components perspective–maintaining the traditional dualities between learning and doing that education reforms have challenged. In the dimensions of academic and vocational integration and workplace integration, only a minority of the projects came close to creating standards in line with the professional model.

If skill standards are to contribute to a broad reform of schools and workplaces, employers must be convinced that their workers need new types of skills; skill-standards projects need to base their job analyses and assessments on the professional model; and schools must have the capacity to educate students up to those broader, more sophisticated standards.

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2 This categorization refers only to the content of the standards. The governance structure of the standard-setting process, which is not addressed in this CenterFocus but is addressed in detail in the longer report, is also a crucial element that distinguished the two models. None of the pilot projects included workers in the policy-setting activities; workers were involved only after project directions had been determined by traditional decision-makers.

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CATEGORIZATION OF SKILL STANDARDS

Workplace Integration

Academic and Vocational Integration	Skills are Listed Generically with No Workplace Application Relevant to the Specific Occupation and/or Industry	Workplace Applications are Provided as Examples to Indicate How Skills Are Used	Critical Aspects of the Job and Organizational and Industry Contexts Are Integrated
Academic skills are differentiated from vocational/ technical skills	***COMPARTMENTALIZED*** *6 projects*		
Academic skills are applied to a generic workplace setting but remain distinct from vocational skills	***CONTEXTUALIZED*** *5 projects*	***CONTEXTUALIZED*** *4 projects*	
Academic and vocational skills are integrated		***CONTEXTUALIZED*** *2 projects*	***CONTEXTUALIZED*** *4 projects*

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