

CURRICULUM EVALUATION



State Of California
Department Of Corrections and Rehabilitation

The California State University, Chico

October 15, 2009

The California State University, Chico

Andrew J. Dick, Ph.D.
Principal Investigator
The California State University, Chico

William Rich, Ed.D.
Senior Personnel
The California State University, Chico

Tony Waters, Ph.D.
Senior Personnel
The California State University, Chico

The California State University, Chico
Chico, CA 95929-0445
530-898-5076

ABSTRACT

This report presents the results of an extensive analysis of the planned curriculum (i.e., texts and ancillary materials) for 12 vocational education courses administered at eight prisons throughout the state of California. The 12 vocational education courses included in this study are: Auto Mechanics; Building Maintenance; Carpentry; Electrical Works; Heating, Ventilation, and Air Conditioning; Janitorial Services; Landscaping; Mill & Cabinetry; Office Services; Painting; Plumbing; and Welding. The planned curricula for these courses are evaluated using the Technical Education Curriculum Assessment rubric (Keiser, Lawrenz, & Appleton, 2004a) and Flesch-Kincaid grade level readability scale. After careful evaluation of these curricula using these measures, a range of quality of the materials was discovered. The curricula for three of the classes -- Electrical Works, Mill and Cabinetry, and Office Services -- were rated as excellent. Seven curricula were rated as good (Auto Mechanics, Building Maintenance, Carpentry, Heating, Ventilation, and Air Conditioning, Painting, Plumbing, and Welding). The curriculum for the Janitorial course was rated as adequate and the Landscaping curriculum was evaluated as weak. All curricula tied to a national accreditation agency, which serves to disseminate industry standards and offers certification of accomplishments, were rated as good or excellent. Recommendations are made for strengthening the curricula and courses evaluated.

TABLE OF CONTENTS

Abstract.....	3
Table of Contents.....	4
List of Tables.....	5
Executive Summary	6
INTRODUCTION.....	9
Expert Panel and California Logic Model	10
AB 900	11
Scope of Curriculum Evaluation.....	12
Vocational Courses Evaluated.....	12
LITERATURE REVIEW	14
Vocational Education and Recidivism	14
The Benefits of Vocational Education in Prison: Human Capital and Signaling.....	15
Quality of Curriculum	16
Technical Education Curriculum Assessment Rubric Rationale.....	18
Flesch-Kincaide Grade Level Test Rationale.....	19
Readability Scales	19
Flesch-Kincaide Grade Level Test.....	20
METHODS	22
Element 1: Content Analysis.....	22
Element 2: Instructional Strategies	23
Element 3: Organization and Purpose of Planned Curriculum	24
RESULTS AND DISCUSSION	25
Element 1: Content Analysis Discussion and Implications	25
TECA Results	25
TECA Holistic Ratings	28
TECA Overall Rating	32
TECA Discussion and Implications	34
Flesch-Kincaide Readability Scale Findings	39
Flesch-Kincaide Grade Level Discussion.....	42
Element 2: Instructional Strategies Discussion and Implications.....	43
Element 3: Organization and Purpose of Planned Curriculum Discussion and Implications.....	45
RECOMMENDATIONS AND CONCLUSIONS.....	47
Recommendations.....	47
Conclusions.....	50
References.....	52
Appendices	56
Appendix A	56
<i>TECA Rubric</i>	
Appendix B.....	61
<i>Courses, Texts and Time</i>	

LIST OF TABLES

Table 1	13
Vocational Education Programs and Prisons Included in the Evaluation	
Table 2	27
TECA Assessment for All Classes	
Table 3	28
Mean TECA Criteria Scores Across the Curricula	
Table 4	30
TECA Holistic Ratings	
Table 5	32
TECA Holistic Rubric Mean, Range, and Standard Deviation of Course Ratings for Fundamental Characteristics	
Table 6	33
Overall Rating of Curricula	
Table 7	40
Mean Flesch-Kincaid Grade Level for Vocational Education Curricula	

Executive Summary

BACKGROUND

This evaluation exclusively analyzed the planned curriculum for 12 vocational education courses administered at eight California Department of Corrections and Rehabilitation (CDCR) prisons using AB 900 funding. The evaluation assessed the appropriateness of textbooks and other materials used in the classes for both industry standards and their utility in a prison environment. Notably, this was not an evaluation of facilities, inmate assignment policies, teaching methods, or implementation. These issues will be addressed in a later report to be delivered on June 30, 2010.

AB 900 specified that educational courses in California's prisons should provide graduates with national certification which would identify parolees to employers as productive workers. The emphasis on national certification and alignment with workforce standards was central to this curriculum evaluation.

Courses Evaluated and Evaluation Criteria

Under the provision of AB 900, CDCR purchased course materials for 12 vocational courses including: Auto Mechanics; Building Maintenance; Carpentry; Electrical Works; Heating, Ventilation, and Air Conditioning; Janitorial Services; Landscaping; Mill & Cabinetry; Office Services; Painting; Plumbing; and Welding. The curriculum evaluation for these courses involved

three fundamental elements: a) a content analysis of the course texts, b) an evaluation of instructional strategies recommended for each curriculum, including how easily a teacher can use the materials to move students towards completion and certification, and c) consideration of how well the curricula correlate with the goals specified in AB 900 and those articulated by *CDCR Expert Panel on Adult Offender and Recidivism Reduction Programming* (2007).

Methods for Curriculum Evaluation

Each curriculum was assessed using two evaluative methods. The first was the Technical Education Curriculum Assessment (TECA) rubric (Keiser, Lawrenz, & Appleton, 2004a), which is used to evaluate vocational and technical education courses for quality of content and real world applications. TECA permitted us to evaluate the appropriateness of the selected curricula relative to standards established for excellent vocational and technical education programs. TECA focused our evaluation of the published curriculum around six specific criteria:

- Instructional Strategies. Does the curricula support teaching strategies that can be easily applied by the teachers and engage students?
- Problem Solving. Are problem solving and critical thinking skills taught and trade appropriate?

- Integration of General Education Content. Is general education content including writing, mathematics, and oral communication incorporated into the curricula?
- Assessment. Is student progress and knowledge acquisition regularly assessed in a continuous and constant fashion?
- Personal Qualities. Are personal qualities such as responsibility, time management, and integrity incorporated into the curriculum?
- Diversity. Does the curriculum reflect the nature of the modern diverse workforce?

The second evaluation method was the Flesch-Kincaid grade level test, which was used to evaluate the level of education needed to comprehend the textbooks used in the courses. Knowledge of how challenging the materials are is useful to CDCR for a number of reasons, including ensuring the students possess the requisite reading skills necessary to be successful in the classes.

Conclusions about Individual Curricula

The combined use of quantitative measures from TECA and Flesch-Kincaid permitted us to develop conclusions about the appropriateness of each curriculum in light of the goals of AB 900, the *Expert Panel on Adult Offender and Recidivism Reduction Programming* (2007), and CDCR for vocational education programs. Using these assessment tools, the curriculum

for each class was classified into one of four categories:

- Curricula rated as Excellent: Electrical Works, Mill and Cabinetry, and Office Services
- Curricula rated as Good: Auto Mechanics, Building Maintenance, Carpentry, Heating, Ventilation and Air Conditioning, Painting, Plumbing, and Welding
- Curricula rated as Adequate: Janitorial Services
- Curricula rated as Weak: Landscaping

Courses closely attached to national certification organizations were consistently rated highly (i.e., curricula were associated with the National Center for Construction Education and Research). These curricula included textbooks and exams that were closely aligned to national trade standards. Curricula that rated lower tended to have no nationally recognized certification program available (e.g., Janitorial Services), or only very narrow certification programs available (e.g., certification for the application of specific pesticides in Landscaping). These curricula were found to be pieced together from a variety of industry and local sources rather than an outlet that reflected national trade standards.

RECOMMENDATIONS RESULTING FROM THE CURRICULUM EVALUATION

Six recommendations were made as a result of the evaluation of the curricula for the 12 vocational education courses:

1. CDCR should continue to emphasize course standardization and articulation with established national certification standards. Curricula closely tied with organizations that offered national certifications and standards were repeatedly rated as excellent or good.
2. CDCR should adopt curricula with varying times to completion to meet the needs of a wide variety of inmates with varying lengths of time remaining on their sentences. Time to completion should be calibrated with the prison environment, which includes lockdowns, security requirements, varying times to release, and sudden transfer of inmates in mind.
3. CDCR administrators should be mindful of the difficulties in reading experienced by most inmates. Some of the materials were accessible to

inmates who could only read at a 6th grade level, but others required much more advanced reading skills. Students who are assigned to more challenging courses should possess the ability to read and comprehend the course materials.

4. Wide-ranging deficiencies noted in the evaluation need to be addressed. In particular, each curriculum should reflect a diverse workforce in terms of race, gender, and age. Moreover, personal qualities such as workplace ethics and integrity should be addressed by the selected curricula.
5. Courses judged as having weak or adequate curricula should be re-evaluated and redesigned with respect to the TECA criteria, industry standards, and so on. Such an evaluation should result in stronger courses that better articulate with AB 900, the *Expert Panel on Adult Offender and Recidivism Reduction Programming* (2007) recommendations, and CDCR goals.
6. Teacher's manuals should be made available for all courses. Well-developed curricula have good teacher's manuals; CDCR teachers should not be expected to improvise excessively in the already difficult prison environment.

Introduction

The first decade of the 21st century is challenging for corrections in California. Political and economic pressures on California's correctional system are generating greater focus on efforts to reduce recidivism through rehabilitative services offered in prison. A significant change occurred in 2005 when the California Department of Corrections was renamed the California Department of Corrections and Rehabilitation (CDCR), to highlight a new emphasis on reintegrating paroled inmates into society once released. A central component for achieving this goal is providing inmates with both basic academic and vocational educational opportunities to prepare them for life after prison. The intent of providing inmates an education is to reduce risks of re-offense by increasing the probability of gaining meaningful employment upon release.

As a result of Assembly Bill 900 (2007) (hereafter AB900), CDCR purchased vocational education curricula which it hoped would contribute to inmate success on parole by increasing the chance for gainful employment in a variety of occupations. The legislation instructed CDCR to do this by implementing a curriculum that would, among other things, use credentialed teachers, meet national accreditation standards, and train inmates for jobs needed in the economy. What this meant was that vocational education curricula were to be purchased and used to provide students entry level skills in a trade likely to improve the probability of landing a job once paroled.

Over the course of two years (2008 - 2010), a team of researchers from California State University, Chico (CSUC) are evaluating 12 vocational education programs at eight prisons throughout the state. The vocational trades included in this evaluation were: Auto Mechanics; Building Maintenance; Carpentry; Electrical Works; Heating, Ventilation, and Air Conditioning (HVAC); Janitorial; Landscaping; Mill and Cabinetry; Office Services; Painting; Plumbing; and Welding. This report evaluates the planned curriculum (i.e., textbooks and teacher's manuals) for its appropriateness in a prison environment. The goal is achieved in two ways. First, the curricula are evaluated using the Technical Education Curriculum Assessment (TECA) rubric (Keiser, Lawrenz, & Appleton, 2004a). TECA was developed specifically with the intent of evaluating vocational education curricula, including examining instructional strategies, problem solving exercises, integration of general education content, and assessment. Second, the readability of the curricula is evaluated using the Flesch-Kincaid grade level scale. The Flesch-Kincaid grade level readability scale evaluates text by assessing the grade level an individual must possess to understand what they are reading. The CSUC research team's final report will evaluate these classes more broadly, including how the planned curriculum is actually administered in these classes. The final report will be delivered June 30, 2010.

This curriculum evaluation serves multiple audiences, including vocational education instructors, CDCR's Office of Correctional Education, CDCR's Executive Administration, California Legislators, and interested citizens who all share a stake in efforts to reduce recidivism. Mindful of the broad audience, the research team has taken care to fully explain technical issues that are important to using this document.

EXPERT PANEL AND CALIFORNIA LOGIC MODEL

The CDCR Expert Panel on Adult Offender and Recidivism Reduction Programming (hereafter Expert Panel) released recommendations in a 2007 report *A Roadmap for Effective Offender Programming in California*. An important element of this report is the “California Logic Model” for corrections and rehabilitation, which spells out what precisely an ideal program of incarceration and rehabilitation might look like. The report also provided specific recommendations about how to re-emphasize CDCR’s expanded role in rehabilitation. In particular, it recommended using “new models for in-prison rehabilitation programs, risk assessment tools for analyzing parole revocation decisions, and other methods to reduce recidivism and end the perpetual overcrowding crisis” (CDCR, 2007). The report suggested that if all of the panel’s recommendations were adopted, California could significantly reduce its inmate population and the crowding that has driven up per capita incarceration costs. In short, the report emphasized that effective rehabilitation programs could in fact reduce overall imprisonment costs.

Eleven specific recommendations were made to the CDCR by the Expert Panel, including emphasizing the role of overcrowding in driving up incarceration costs and recidivism rates. The second recommendation, which is the focus of the present study, suggested that the Legislature enact legislation to “expand positive reinforcements for offenders who complete rehabilitation programs and follow the rules” (Expert Panel, 2007, vii-xvi). The other nine recommendations focused on integrating rehabilitative programming during the time inmates were incarcerated and after they were paroled back to their communities.

Perhaps the key element of the Expert Panel report was the publication of a “roadmap” that described the underlying relationship between incarceration and rehabilitation. This roadmap emphasized that each inmate was to receive rehabilitative services in a systematic fashion, based in the provision of rehabilitative programs which had proved effective in the past. Such rehabilitative programs were to be prescribed for inmates in the context of criminogenic and rehabilitative needs that were to be identified at the time of reception by CDCR, continued through the period of incarceration, and maintained into parole services. The Expert Panel also pointed out that best practices in corrections should mean that inmates participating in rehabilitative programs, including vocational education classes, should be rewarded for successful completion through the awarding of privileges and time credits on sentences. Of most importance, rehabilitative programs were to be “evidence-based” and undertaken in the context of the best models of corrections available.

The Expert Panel’s report viewed the underlying understanding of corrections as being based on an eight point model called the “California Logic Model.” This model assumed that risk needs would be assessed, behavior modification plans developed, programs delivered, and progress measured. In addition, preparation for re-entry and reintegration back into society would occur. Finally, there would be follow up. Vocational capabilities, education, and follow-through into the work force are implicit and explicit goals of this approach. Although this curriculum evaluation is narrowly focused on the curricula of the 12 vocational education programs for inmates purchased for use while they are

incarcerated, it is important to remember the 12 vocational programs constitute just one component of the broader rehabilitation program envisioned in the Expert Panel's "California Logic Model" and AB 900, which is discussed next.

AB 900

AB 900 (2007) is a wide-ranging law passed by the California Legislature in 2007. The bill directed CDCR to, among other things, construct prison beds and develop programs for the rehabilitation of prisoners. It instructs CDCR to "implement a system of incentives to increase inmate participation in, and completion of, academic and vocational education consistent with inmate's education needs" (PC Sec 6 2054.2). The legislation requires CDCR to do this in a fashion that decreases the chances for recidivism by improving the likelihood of success once inmates are released from prison. In a manner consistent with the California Logic Model, the Legislature specifically instructs CDCR to do this in the context of "Prison to Employment Plans" in the hope that "the continuity of services provided both before and after an inmate's release on parole will improve the parolee's opportunity of successful reintegration into society" (PC Sec 9.8 6270(b)). The Legislature further required that this should be undertaken by accredited teachers, using curricula which met national accreditation standards.

With the passage of AB 900, CDCR began to reinvent itself in a fashion that fulfilled this new mission focused on rehabilitation. Not only would the department correct and house offenders, but also rehabilitate them for successful integration back into local communities as family members, workers, and citizens. The Legislature assumed that vocational education would play a key role in CDCR's efforts to achieve its redefined goals. The idea was that throughout the system inmates would gain the skills, knowledge, and attitudes to support their own rehabilitation and preparation for work in California's modern labor market.

In attempts to achieve the reforms required by AB 900 and recommended by the California Logic Model, administrators within CDCR's Office of Correctional Education sought a new, broad, and clear vision. One important area by which reform can influence an educational system is achieved through curriculum selection (Weiss, Knapp, Hollweg, & Burrill, 2001). With such criteria in mind, the Office of Correctional Education purchased standardized curricula which met the criteria specified by the Legislature (i.e., that it be nationally accredited, meet industry standards, and can be used in all of California prisons). As a result, the carpentry class taught at Calipatria State Prison uses the same books and exams as used in the carpentry class at Pelican Bay State Prison.

SCOPE OF CURRICULUM EVALUATION

In the scope of work governing this study (executed in 2008), six elements were identified for assessment in this curriculum evaluation which focused on inmate skills, educational leadership, and an evaluation of the purchased curriculum itself. However, a year and a half into the study, constraints on data availability and work stoppages due to California's budget crises led to revisions of the scope of work. As a result, the team focused on the planned curriculum, broadly defined. The planned curriculum (Larson, 1996; McNeil, 1996) is represented by the texts assigned to each of the 12 courses. The curriculum evaluation is directed toward the texts, workbooks, and instructor guide for each course as provided by CDCR. Three elements initially identified in the scope of work remain and serve to focus this evaluation:

- Content analysis of course texts provided;
- Instructional strategies for each classroom, in course texts provided; and
- Organization and purpose of the planned curriculum.

Limitations

Although planned curriculum represents a key factor of the learning system provided to inmates, it is by no means the only piece in the puzzle. Not addressed in this curriculum evaluation are factors such as the teachers' capacity to deliver planned curriculum with fidelity, class cancellations, and teacher layoffs CDCR implemented during the 2009/2010 fiscal year.

VOCATIONAL COURSES EVALUATED

Table 1 identifies the 12 vocational education programs CDCR selected for this evaluation. These programs are located at eight institutions across the state. All told, 19 individual classes are included in this study.

Table 1

Vocational Education Programs and Prisons Included in the Evaluation

Vocational Education Courses	CDCR Institutions							
	ASP	CAL	CCI	CIM	COR	CRC	PBSP	SATF
Auto Mechanics						•		
Building Maintenance			•				•	
Carpentry		•				•		
Electrical Works								•
Heating, Ventilation, and Air Conditioning		•						•
Janitorial Services			•		•			
Landscaping			•			•		
Mill and Cabinetry			•					
Office Services	•							
Painting	•		•					
Plumbing				•		•		
Welding								•

ASP = Avenal State Prison
 CAL = Calipatria State Prison
 CCI = California Correctional Institution
 CIM = California Institution for Men
 COR = California State Prison, Corcoran
 CRC = California Rehabilitation Center
 PBSP = Pelican Bay State Prison
 SATF = Substance Abuse Treatment Facility

Literature Review

VOCATIONAL EDUCATION AND RECIDIVISM

Gaes (2009) conducted a meta-analysis of the relationship between prison-based education programs and post-release outcomes. His analysis is the latest assessment of if, how, and why adult-basic education, GED programs, and vocational training programs affect post-release recidivism and employment rates. Gaes' analysis revealed that inmates who participated in any type of education program while incarcerated tended to have lower recidivism rates, a connection that is postulated in the design of CDCR's education programs as described by the Expert Panel's (2007) *A Roadmap for Effective Offender Programming California*.

Along the same lines, most of the studies reviewed by Petersilia (2003) indicated that inmates who had enrolled in any type of educational program while incarcerated had lower recidivism rates than those who did not. Nevertheless, no type of education, as Petersilia points out, is a magic bullet. Participation in education while incarcerated does not mean that every prisoner so treated will not recidivate. Indeed, as Petersilia acknowledges, the reduction in recidivism "are not large" (2003, p. 177), although the financial savings from effective prison-based education programs are substantial. Indeed, as Aos, Phipps, Baroski, and Lieb (2001) note, the data indicate vocational education programs "benefits per dollar spent" are over 7 to 1. This is in large part due to a combination of the high cost of incarceration versus the costs avoided by lower recidivism rates.

Petersilia (2003) credits the best education programs with a 10-30% drop in recidivism (defined as reconviction for a new felony offense within three years). Thus, if a normal recidivism rate is 50%, and an effective education program drops that rate 20%, only 40% of the parolees who participated in education are returned to prison. While not vast, as Petersilia (2003) notes, this overall financial effect is nevertheless significant due to the fact that re-incarceration is so expensive, especially in California today.

However, the Three Judge Court (2009) went well-beyond such simple cost-benefit calculations in their assessment of the effectiveness of rehabilitative programming in California prisons for addressing overcrowding and public safety. The panel noted that public safety is also improved by rehabilitation programs,

Based on the overwhelming and uncontroverted evidence, we find that additional rehabilitative programming would result in a significant population reduction while improving public safety and reducing the burden on the criminal justice systems...such programming would enhance the likelihood that recidivism will decline as the prison population is decreased. (p. 152)

Although there is obviously clear consensus supporting the idea that rehabilitative education in prison has large net benefits for society and inmates, assessing the effectiveness of a particular program is also important. Indeed, the relative effectiveness of a program has important consequences (Petersilia, 2003). One question asked by this curriculum evaluation is: What vocational curricula work best in the correctional environment of CDCR institutions? This question is ultimately answered in the context of broader issues like inmate assignment policies, teacher quality, class size, and so forth, which will be addressed in the final report; but there are also variations in the appropriateness of any particular curriculum for California's inmate population. Of most importance, how do skills taught in prison translate into the labor market after graduates are paroled?

THE BENEFITS OF VOCATIONAL EDUCATION IN PRISON: HUMAN CAPITAL AND SIGNALING

Studies have addressed why education programs are successful for reducing recidivism rates and improving employment opportunities for parolees (Aos et al., 2001; McKenzie, 2009; Petersilia, 2003). Discussions focus on two important reasons: First, training increases the amount of human capital that a parolee can offer potential employers; and second, that earning a certificate in any field "signals" to potential employers a seriousness that compensates in part for the stigma of a criminal record (see e.g., Gaes 2009; Three Judge Court, 2009).

Human capital

Investment in "human capital" is probably the most commonly cited reason for assigning an inmate to a vocational education or basic education course. Theories about the nature of human capital emphasize that a trained skilled worker is worth more to the employer as an employee than one who is not trained or skilled. The role of education for creating human capital is explicitly addressed in the vocational educational curricula evaluated here by an insistence that a rigorous range of literacy, general education/employability skills, hands-on, and technical skills be part of the courses. This insistence is important because potential employees who have mastered particular skills are more valuable to employers, are more likely to be hired, are more likely to generate profits for companies, and are likely to generate good wages for the employee. Skilled employees bring to an employer "human capital" that people without such training do not have in terms of knowledge and skill level. Notably, such skills include basic protocols needed in a good employee, such as punctuality, cooperativeness, timeliness, and team-work.

Signaling

Licensing, certification, and criminal records are sometimes referred to in the labor market as "signals" (Gaes, 2009). Licenses, certificates, and other documents signal to potential employers that a potential employee likely has specific skills, interests, and commitment to a profession whereas others may not. This is a type of positive signaling.

But there is also negative signaling. The negative “signal” of a criminal record tells employers that they are taking a risk that a particular individual is more likely to engage in theft, drug use, and other anti-social behaviors that will cause trouble in the work place.

Positive signals within the labor market are particularly important for parolees seeking a job upon release because, by definition, they are stigmatized (Gaes, 2009). Possession of a nationally recognized certificate helps overcome the stigma of a criminal record. For this reason, formal certification as part of an education program in prisons is particularly important.

In summary, there is widespread consensus in the literature about the benefits of education in prisons for reducing recidivism and increasing post-release employment. However, there are still questions about the overall effectiveness for the vocational education curricula purchased by CDCR with AB 900 monies. Basically the question becomes, does the curriculum purchased create the greatest impact possible in terms of public safety, decrease in crime, and decreased incarceration rates? In terms of answering these questions, two particularly salient issues arise. First, does the curriculum assist teachers and inmates in developing the skills and human capital parolees need on the job market? And second is this trained capacity effectively communicated to potential employers, via a legitimated and well-known certification body? For a curriculum to do this, it needs to provide up-to-date exposure to industry standards and hands-on experience using tools and equipment. Finally, an effective curriculum trains students to earn a legitimate certificate of accomplishment signaling to potential employers that the parolee will add value to the company. If a curriculum does this well, it will be an important tool offering teachers and parolees an excellent opportunity to successfully complete parole and reduce recidivism.

QUALITY OF CURRICULUM

High quality vocational education curriculum includes effective teaching strategies, performance evaluation of skills of the trade, and paper-pencil evaluations. According to Keiser et al. (2004a), excellence in technical or vocational curriculum rests on three key factors. The first factor is represented by an assumption that future workers must possess a number of basic competencies and skills before entering the workforce. The second factor is represented by the need for outstanding pedagogy coupled with teaching strategies. The third factor focuses on the articulation of tests and hands-on performance assessment with the curriculum. In the case of vocational education, such performance assessment requires students to show what they know by using actual tools to demonstrate procedures they have learned.

The first key factor of a high quality curriculum is outlined in U. S. Secretary of Labor’s Commission on Achieving Necessary Skills (SCANS) report in 1991. SCANS identified specific competencies that individuals must acquire if they are to become successful workers. These competencies include:

- Productive use of resources. Workers should be able to efficiently allocate time, money, materials, and space.
- Using information. Employees must acquire, organize, maintain, and evaluate data effectively and can utilize technology to manipulate data and process information.
- Interpersonal skills. Skills represented here include the ability to work as a team member, to lead, to negotiate, and to work with individuals from a variety of backgrounds.
- Comprehend systems. Workers should be able to understand of social, organizational, and technical systems. They should also be skilled at monitoring, designing, and improving systems.
- Technology. Workers should have the ability to not only use appropriate technology, but to troubleshoot as well.

SCANS (1991) identified three foundational skills that people need to possess if they are to be successful employees. First, basic skills such as reading, writing, speaking, and listening. Second, thinking skills are needed in the continuously changing market and work environment. They include problem solving, decision-making, reasoning, and creativity. Third, personal qualities reflect the importance of relationship and ethics such as self-management, integrity, and sociability.

The second factor excellent vocational education curricula must contain is effective teaching methods (Keiser et al., 2004a). The classroom learning of the vocational education curriculum should reflect both school environment and the reality of the job site (Finch & Crunkilton, 1998). In other words, planned instructional strategies in the curriculum need to be relevant to the real world of work. In addition, teaching strategies should be student oriented, so that teachers can pay attention to issues such as the reading comprehension level of their students. Finally, Keiser et al. (2004a) emphasize that vocational education should reflect the reality of the job site.

The third factor of excellence in technical or vocational education is assessment (Keiser et al., 2004a). Authentic performance assessment of understanding is a foundation of learning in any curriculum (see also Wiggins, 1998). In this context, performance assessments permit students to demonstrate what they have learned, to show what kinds of (actual) tools they know how to use, and demonstrate the procedures they learned that will help them succeed in the work place. In short, instruction and assessment should reflect the curriculum aligned with industry standards. There is strong evidence that a standards-based curriculum brings improvement in learning outcomes for students (Reys, Reys, Lapan, Holliday, & Wasman, 2003).

TECHNICAL EDUCATION CURRICULUM ASSESSMENT RUBRIC RATIONALE

Standardized evaluations of vocational education curricula, like the trades themselves, are always challenging. The difficulties in teaching an ever-changing trade are magnified when the vocational education class is administered in prison – an environment that does not reflect the real world very well.

Mindful of the current job-training context, a curriculum evaluation rubric that provides useful data about the vocational courses included in this evaluation was sought. Three criteria were considered in this process, including: a focus on evaluating planned curriculum (English & Larson, 1996; McNeil, 1996); adaptability and flexibility across different courses (Appleton, Lawrenz, Craft, Cudmore, Hall, & Waintraub, 2007); and theoretical soundness (Finch & Crunkilton, 1999; Jonsson & Svingby, 2007). The Technical Education Curriculum Assessment rubric (TECA) (Keiser et al., 2004a) was selected, because it was found to meet the team's criteria and fit with the specific tasks of this curriculum evaluation.

The first criteria, a focus on planned curriculum, established a practical basis for using TECA (Keiser et al., 2004a). Traditionally, scholars defined curriculum across a broad conceptual framework. Such sweeping concepts can render evaluation a lengthy philosophical exercise rather than objective data gathering. TECA provides a narrow focus on the actual curriculum materials targeted for evaluation. According to Keiser et al. (2004a), TECA was specifically designed to evaluate the characteristics and quality of planned curricula for vocational and technical courses. This focus on the planned curriculum fits well with the goals of the larger study and is the explicit aim of this report.

The second criteria, flexibility and adaptability to various courses, is also met by TECA (Keiser et al., 2004b). Most rubrics can be used to evaluate a specific curriculum for a single trade. These tools may be effective for evaluating features of courses that reflect unique qualities in each trade, but they are limited for making comparisons of curricula quality among courses from different trades. The TECA rubric was developed to circumvent this deficiency by making the rubric applicable to any technical or vocational course, thereby making comparisons possible.

Third, TECA is theoretically sound. It was developed through collaboration between the Evaluation Center at Western Michigan University and the University of Minnesota to evaluate the Advanced Technological Education program sponsored by the National Science Foundation (Keiser et al., 2004a). In the construction of the instrument, Keiser et al. (2004) merged research on the development of effective technicians into a robust theoretical framework. The chief foci of their framework include curriculum development theory for technical and vocational education, and models of assessment. A related strength of TECA is the results point to specific deficiencies in the curriculum, which can be addressed by developing strategies to improve instruction and student learning.

However, TECA (Keiser et al., 2004b) is not designed to provide a complete (i.e., including actual instruction delivered to students in the classroom) evaluation of a

curriculum. Indeed, its narrow focus on printed materials is one source of its strength and appropriateness for this evaluation of the curricula purchased by CDCR. Combined with theoretical soundness and flexibility across multiple courses, TECA supports the unique needs of this project for the assessment of the planned curricula of these 12 courses.

FLESCH-KINCADE GRADE LEVEL TEST RATIONALE

It has been said that over 27 million American adults are either illiterate or have low literacy skills (Freda, 2005). CDCR inmates are likely to fall into one of these two groups. In fact, it is estimated that the average “highest grade completed” for the 166,848 men and women in California’s prisons (CDCR Weekly Population Report, October 7, 2009) is between the 7th and 8th grade (A. R. Hernandez, personal communication, April 28, 2009). When coupled with estimates that most Americans read several grade levels below their highest grade completed (DuBay, 2004), it follows that many, if not most, inmates are deficient readers. Thus, to supplement the TECA evaluation of the 12 curricula that comprise this evaluation, a second method of assessment was conducted to determine the readability of the texts used in these courses.

The vocational educational curricula purchased by CDCR are complex, and a number demand higher level reading skills. Knowledge of the necessary reading level skills to understand the vocational education curricula provides classification committees better information when deciding to place an inmate into one of these classes. Proper inmate assignment is critical to the success of education in California’s prisons and is one of the essential recommendations made in the Expert’s Panel report (2007). Inmates assigned to educational classes must possess the requisite reading skills if they are to be successful in vocational education classes. If an inmate is unable to read, or cannot read at the necessary level required to learn, then he is unlikely to succeed. As DuBay (2004) states, “When texts exceed the reading ability of readers, they usually stop reading” (p. 1). Thus, inappropriate inmate assignment to a vocational class is counter productive to the rehabilitative goal of CDCR.

READABILITY SCALES

Broadly, readability pertains to the ability of students to read and comprehend a written passage (Freda, 2005). Readability scales are intended to assess the ease of understanding or comprehending a particular text (DuBay, 2004). The methods used estimate the difficulty or complexity of the written material (Friedman & Hoffman-Goetz, 2006). Readability is usually assessed based on the sophistication of the vocabulary used and on sentence length. Readability scales are based on the assumption that longer words and longer sentences require higher-level reading skills to comprehend the material (Stevens, Stevens, & Stevens, 1992). Conversely, shorter words and sentences are presumed to be easier to understand. Reading ability examinations, such as the TABE test used by CDCR, also reflect such skills.

Low literacy skills, coupled with difficult technical material, create significant barriers to student learning (DuBay, 2004). The 12 curricula evaluated in this study present technical information that may not be easily understood without the necessary grade level reading skills. Consequently, inmates who are below average readers and cannot understand the texts are unlikely to be successful with the paper-pencil learning unit assessments. Students require helpful texts that provide accurate information at the appropriate reading levels (DuBay, 2004). By assessing readability scores of each curriculum, CDCR administrators have a better understanding of the difficulty of the texts and can assign inmates to courses in which they are most likely to be successful.

FLESCH-KINCADE GRADE LEVEL TEST

One of the most well-known readability scales is the Flesch-Kincaid grade level test. The Flesch-Kincaid grade level test estimates the necessary reading level required to understand a written document (Friedman & Hoffman-Goetz, 2006). An advantage of Flesch-Kincaid is that the grade level for a document is calculated by both Microsoft Word and Corel's Word Perfect. In addition, several websites can also calculate the Flesch-Kincaid grade level.

Rudolph Flesch first developed the Flesch Readability Scale in 1949 to assess the readability of various texts (Stockmeyer, 2009). The Flesch Readability Scale assesses the complexity of vocabulary and sentence length in a sample of at least 100 words (Griesinger & Klene, 1984). In the mid-1970s, Kincaid simplified the formula to convert the results to grade levels corresponding to the level of reading ability necessary to understand the text (DuBay, 2004). Written samples are assessed for the average words per sentence, and average number of syllables per word (Flesch, 2004; Mailloux, Johnson, Fisher, & Pettibone, 1995). "The Flesch-Kincaid score has the advantage of measuring the readability of a document based on the minimum education level required for a reader to understand it" (Stockmeyer, 2009, p. 46). However, as DuBay (2004) cautions, the Flesch-Kincaid grade level estimate does not necessarily correlate with the highest level of education completed. Instead, it measures the approximate level of literacy one must possess to comprehend what he or she is reading.

As with other readability tests, the Flesch-Kincaid grade level scale is not without its shortcomings. First, readability scales do not measure other variables that can contribute to making a text comprehensible, including pictures, graphics, font size, and cultural relevance (Freda, 2005; Friedman & Hoffman-Goetz, 2006). The TECA (Keiser et al., 2004a) rubric is used to evaluate some of these factors. Second, readability scales like the Flesch-Kincaid cannot measure reader interest and motivation (Friedman & Hoffman-Goetz, 2006; Stevens et al., 1992). By working hard, motivated students can overcome difficult material because of their level of interest and reason for learning (DuBay, 2004). Nevertheless, Freda (2005) notes these factors will have very little influence on the reader if he or she cannot read the material.

The utility of the Flesch-Kincaid grade level test far outweighs its shortcomings. The Flesch-Kincaid is a well-established, reliable, and valid tool to evaluate the complexity

of any document, including the curricula used in the courses that make up this evaluation. This fact is supported by decades of use and research. For instance, Stockmeyer (2009) recommends its use for assessing the readability of legal documents. Other examples include Freda's (2005) evaluation of pediatric brochures; Arney, Jones, and Blankenship's (2003) evaluation of the readability of juror education materials; Griesinger and Klene's (1984) assessment of introduction to psychology texts; and Friedman and Hoffman-Goetz's (2006) evaluation of cancer education materials.

The Flesch-Kincade grade level assigned to a document is intuitive and can be a useful tool for CDCR school administrators when assigning inmates to vocational education classes. If, for example, an inmate reads at a 5.9 grade level, it would be unreasonable to expect that he could understand a curriculum written at a 10th grade level. Instead, this is a student who is likely to become frustrated and flounder in a class he is not yet prepared for. If the course texts are beyond the capacity of many or most students, these classes are unlikely to have their students successfully complete the class. As a result, the anticipated benefit of providing vocational education to prisoners – reduced recidivism – will not be realized.

The assessment of the Flesch-Kincade grade level score is meant to complement the results of the TECA evaluation of the curricula. Taken together, the TECA evaluation and Flesch-Kincade grade level assessment gives CDCR a thorough analysis of the curricula used in these courses.

Methods

Relying on the scope of work, the researchers identified three elements of focus for this evaluation:

- Content analysis of course texts provided;
- Instructional strategies for each classroom, in course texts provided; and
- Organization and purpose of the planned curriculum.

Each of these three elements of curriculum evaluation are analyzed using both quantitative and qualitative methods. (A list of the textbooks for each of the curricula in this evaluation can be found in Appendix A.) Specifically, the following methodologies were employed to evaluate each of the elements.

Element 1: Content Analysis

The research team employed two evaluation instruments to assess the planned curriculum for the content analysis. First, the Technical Education Curriculum Assessment (TECA) rubric (Keiser et al., 2004a) is used to evaluate the curricula holistically. Second, the Flesch-Kincaid grade level formula is relied upon to assess the readability of the textbooks assigned in these courses.

The TECA rubric was applied to the content of the textbooks for each of the courses in this evaluation to assess pedagogical quality (see Appendix B). TECA was designed to support the judgment of quality of technical education curriculum for facilitating student learning. Texts for each course were evaluated by the examination of every page associated with the curriculum. The researchers then used the rubric to assign an overall score for the curriculum. Each curriculum received a rating for each criterion required by the rubric. In applying the TECA rubric to course texts, researchers assigned scores on a scale of 0-4. A score of 0 is assigned for materials that do not meet the criteria. A score of 1 indicates the materials are Weak at meeting the criteria. A score of 2 means the curriculum was Adequate at meeting the TECA criteria. A score of 3 means the materials are Good at meeting the criteria. Finally, a score of 4 indicates the materials are Excellent at meeting the criteria. Second, the Flesch-Kincaid grade level readability assessment was applied to each of the texts.

Although determining a Flesch-Kincaid grade level is easy to achieve, a number of researchers have discovered a wide variance in grade level scores between any one program and another (Friedman & Hoffman-Goetz, 2006; Mailloux et al., 1995). Because of the disparity of scores from different programs, they recommend using multiple sources to capture Flesch-Kincaid grade level scores. The recommendation is followed. This method produces more reliable estimates of the actual reading grade level necessary to comprehend the curricula by reducing the importance of a single, less dependable source.

To establish the Flesch-Kincaid grade level scores for each curriculum evaluated in this study, specific procedures were followed. First, the page range from the first page of the first module or chapter to the last page of text was identified. Once the appropriate page range was identified, 10 pages of text were randomly selected. The selected pages were inspected to ensure enough text was available to be evaluated. Following the requirements of most readability scales (DuBay, 2004; Griesinger & Klene, 1984), it was required that each page in the sample have at least 100 words of text. If the page was blank, did not have enough words, was primarily a picture or drawing, a glossary, or reference page, a replacement page was selected. This procedure was followed until 10 usable pages of text were identified.

From each selected page, the first full paragraph began the sampled text. The entire paragraph was transcribed verbatim into a Microsoft Word document. If the first paragraph did not contain at least 100 words, subsequent paragraphs were included until this desired sample size was achieved. Each sampled text was double and triple checked to ensure accuracy. In addition to capturing the text from the selected pages, the number of pictures, drawings, graphics, or side bars shown were counted. When tallying these visual aids and supplementary information, both facing pages were included.

Four programs were used to assess the Flesch-Kincaid grade level of every sample: two word processing programs (Microsoft Word and Word Perfect) and two web-based programs (AddedBytes.com and OnlineUtility.com). Using these programs, each sampled paragraph(s) was evaluated to identify its Flesch-Kincaid grade level score. For each of the 10 sampled paragraphs, the Flesch-Kincaid scores from each of the programs were averaged. Then, for each textbook in the curriculum, all of the Flesch-Kincaid scores were averaged. Finally, for each set of books that make up a curriculum, the Flesch-Kincaid grade level scores were averaged to determine the mean reading grade level required to understand the material. The averaged scores provide an accurate assessment of the Flesch-Kincaid scores for the 12 programs included in this study.

Element 2: Instructional Strategies

To analyze instructional strategies in the planned curriculum, the research team reviewed an instructor certification text for the National Center for Construction Education and Research (NCCER) curriculum provided by CDCR. Recommended strategies were identified and described. Eight of the 12 courses reviewed are developed by NCCER. Instructor manuals developed for courses not developed by NCCER were not provided or do not exist. A qualitative assessment was carried out for each.

Element 3: Organization and Purpose of Planned Curriculum

Descriptions of the organization and purpose of each of the curriculum purchased by CDCR were analyzed to reveal key aspects of each course of study. Such a framework provides a structure for understanding both purpose and organization of curriculum (Tyler, 1950). Glickman, Gordon, and Ross-Gordon (2004) note that the evaluation of curriculum should align with program goals and objectives. Also important is the need to offer information that is practical and useful (Fitz-Gibbon & Morris, 1987) with appropriate time for implementation (Marzano, 2003). From these concepts, a number of fundamental themes were identified to guide analysis of the 12 courses, including: assessment and goal alignment, practicality and usefulness, standardization, and teacher creativity.

Results and Discussion

ELEMENT 1: CONTENT ANALYSIS DISCUSSION AND IMPLICATIONS

TECA Results

The TECA rubric was completed by the authors as they reviewed the planned curriculum for the vocational education courses. Ratings applied to the rubric were assigned based on the reviewer's judgment of the congruence of the course curriculum with the descriptions of criteria provided in the rubric. Six substantive criteria were identified:

- **Instructional Strategies.** How do curricula support teaching strategies that engage students in active learning?
- **Problem Solving.** Are critical thinking skills involved in problem solving? Are the students challenged to seek answers to complex problems in creative and analytical ways? Are students challenged to seek new knowledge to solve problems?
- **Integration of General Education Content.** Do the curricula use general education skills, including writing, mathematics, and oral communication?
- **Assessment.** To what extent do assessments or required activities measure the adequacy of the student's knowledge and skills required in the workplace? Are assessments embedded in the curriculum in a way that facilitates learning?
- **Personal Qualities.** Do the curricula encourage character development consistent with what is required in the workplace? Among the desirable character traits are responsibility, time management, and integrity.
- **Diversity.** Do the curricular materials reflect a diverse workforce? To what extent are racial and ethnic minorities and women used as role models?

After reviewing the curriculum as a whole, the researchers assigned scores to the rubric reflecting how well the TECA standards were met. Table 2 (see p. 27) reflects how each of the 12 curricula were scored according to the TECA criteria. Overall, four curricula were rated 3.0 or higher, including Electrical Works, Heating, Ventilation and Air Conditioning, Mill and Cabinetry and Office Services. The Office Services curriculum was the highest rated curricula with a mean of 3.5. These curricula were routinely scored as a 3 or 4 on the TECA criteria. All but Office Services (which was scored a 4) scored a 2 on Diversity. Office Services is one of the three classes that do not offer inmate-students a certification of completion or competency when they finish the curriculum. What separates this curriculum from the other non-certificated curricula is that Microsoft Corporation has published the texts and requires that they match industry standards.

Six curricula were scored between 2.0 and 2.8. Most of the NCCER curricula are found in this middle group, with Auto Mechanics, Building Maintenance, Carpentry, Painting, Plumbing, and Welding being scored in this range. Primarily, these courses scored 3's

on Instructional Strategies, Problem Solving, General Education, and Assessment, with some 2's being scored for the Personal Qualities criterion. None of these curricula scored higher than a 2 on the Diversity criterion. Auto Mechanics (an Automotive Service Excellence certified curricula) is also found in this group, being scored 3's on Instructional Strategies, Problem Solving, General Education, and Assessment, but 0 on Personal Qualities and Diversity.

Two curricula were evaluated to be subpar with respect to the TECA criteria: Janitorial (mean = 1.8) and Landscaping (mean = 0.8). Neither of these curricula scored higher than a 2 on any TECA criteria. In some respects, this finding is not surprising as both courses are not attached to a national accreditation agency. In other words, each textbook in the curricula stands alone, without the benefit of a central repository of knowledge or general industry standards. Further, these two classes do not offer in-mate-students any form of certification of completion or competency, making positive signaling (Gaes, 2009) nearly impossible.

Table 2
Assessment for All Classes

Vocational Education Courses

TECA Criteria	Auto Mechanics	Building Maintenance	Carpentry	Electrical Works	Heating, Ventilation and Air Conditioning	Janitorial	Landscaping	Mill and Cabinetry	Office Services	Painting	Plumbing	Welding
Instructional Strategies	3	3	3	4	3	2	1	4	3	3	3	3
Problem Solving	3	3	3	4	4	2	1	4	3	3	4	3
General Education	3	3	3	3	4	2	2	3	3	3	3	3
Assessment	3	3	3	3	3	2	1	3	4	3	3	3
Personal Qualities	0	2	3	3	2	2	0	3	4	3	3	3
Diversity	0	2	2	1	2	1	0	2	4	2	1	2
Mean	2.00	2.66	2.83	3.00	3.00	1.83	0.83	3.26	3.50	2.83	2.83	2.83

Table 3 presents the mean, range, and standard deviation of how the TECA criteria were scored across all the curricula in this study. Across the board, the best represented criteria in the 12 curricula that make up this evaluation was Problem Solving, with a mean score of 3.08. This was the only criterion scoring over 3, on average. One course, Landscaping, was scored a 1 on this criterion, with every other curricula scoring either a 3 or 4.

Instructional Strategies and General Education were nearly as strong as Problem Solving with a mean rating of 2.91, with Assessment falling just a bit lower at 2.83. Moreover, the General Education criterion was the most consistently scored of the six criteria, with a standard deviation of just .515. No course scored a 0 or 1 on General Education. There was slightly more variance on the Instructional Strategies and Assessment criteria, but here too the 12 curricula appear to be strong. That Assessment received a mean rating of 2.83 indicates a close alignment between the texts provided and instruction. Personal Qualities ranked second weakest with a mean rating of 2.33 and the widest variance. Notably, this was the only criterion where no curricula scored a 4. Finally, Diversity was the weakest rated criterion, with a mean rating of 1.58 across all curricula.

Table 3

Mean TECA Criteria Scores across the Curricula

TECA Criteria	Mean	Range	SD
Instructional Strategies	2.91	1-4	0.79
Problem Solving	3.08	1-4	0.90
General Education	2.91	2-4	0.52
Assessment	2.83	1-4	0.72
Personal Qualities	2.33	0-3	1.23
Diversity	1.58	0-3	1.08

TECA Holistic Ratings

In addition to evaluating each of the curricula across the six substantive criteria discussed above, TECA provides a method to assign an “overall evaluation” of the quality of the curriculum. This holistic evaluation is developed using ratings of four

fundamentally important characteristics found in excellent curricula. These ratings are based on the reviewer's judgment of the congruence of the course curriculum with the following four fundamental characteristics (Keiser et al., 2004b).

- **Industry Standards and Practices:** Materials should clearly reflect learning objectives that are based on current business, industry, and technology standards and practices.
- **Real World Curriculum:** Materials should engage students in ways to help them and understand the reality of the vocation they seek. Instruction should be related to workplace requirements and job market needs, including hands-on experiences. Materials should use real activities that people perform while “on the job.”
- **Workplace Competencies:** Curricula should enable students to develop the high performance skills needed to succeed in the workplace. A solid foundation in basic education (reading, writing, listening, and speaking), critical thinking skills, and applying technology is desired. Curricula should also provide instruction on work and the personal qualities that make people successful employees.
- **Access to In-Depth Understanding:** The curricula should require students to synthesize, generalize, and evaluate information and to develop complex understandings of the content by exploring connections and relations. In addition, materials that allow access to in-depth understanding are also well organized, easy to follow, and contain assessments and activities that are aligned with the content.

As with the substantive criteria, these fundamental characteristics are assessed using a 0 to 4 scale. The lowest rating of 0 would indicate no alignment with rubric criteria. A score of 1 suggests the materials are found to be deficient (Weak) on the characteristic, while a 2 indicates that the curriculum is Adequate at addressing the characteristic. A score of 3 means the materials are Good at meeting the characteristic. And finally, a score of 4 indicates the materials are Excellent at presenting the characteristic.

Table 4 displays the scores each curricula was assigned based on the evaluation of these fundamental characteristics. None of the curricula evaluated in this study were assigned a 0 for any of these characteristics. Only the Landscaping curricula scored a 1 on any of the four characteristics, signifying a lack of currency and application as demonstrated in the course texts. The Janitorial curriculum was the next lowest rated course, with 2s being assigned for each fundamental characteristic. As with the assessment of the six substantive criteria, Auto Mechanics, Building Maintenance, Carpentry, and Painting were positioned in the middle range of scores. Three curricula – Carpentry, Plumbing, and Welding – were rated stronger on the fundamental characteristics than on their ratings for the substantive criteria. Each of these curricula scored 3s or 4s for the four characteristics, with mean scores ranging from 3.0 to 3.5. Finally, the curricula that were scored as excellent on the substantive criteria were also judged as excellent on these fundamental characteristics. The Electrical Works, HVAC, Mill and Cabinetry, and Office Services curricula all scored 3s and 4s for each of the characteristics, further supporting the argument that these are outstanding curricula.

Table 4
TECA Holistic Ratings

Fundamental Characteristic	Vocational Education Courses											
	Auto Mechanics	Building Maintenance	Carpentry	Electrical Works	Heating, Ventilation, and Air Conditioning	Janitorial	Landscaping	Mill and Cabinetry	Office Services	Painting	Plumbing	Welding
Industry Standards and Practices	3	3	3	3	3	2	1	3	3	2	3	3
Real World Curriculum	3	3	3	3	3	2	1	4	4	3	3	3
Workplace Competencies	2	3	3	4	3	2	1	4	4	2	3	4
In-Depth Understanding	3	2	3	4	4	2	1	4	4	3	4	4
Mean	2.75	2.75	3.00	3.50	3.25	2.00	1.00	3.75	3.75	2.50	3.25	3.50

Table 5 summarizes how all 12 curricula scored on the fundamental characteristics of an “excellent curricula.” The average score for Industry Standards and Practices, 2.7, is the lowest of the four characteristics. The range of 1-3 indicates that no course was assigned a score of Excellent. Landscaping scored 1, Weak, on this characteristic and the Janitorial and Painting curricula were scored a 2, Adequate. All other courses were assigned a score of 3, Good.

Excellent Real World Curriculum reflected features such as color photos as well as drawings of tools and shop situations, or people engaging in step-by-step procedures. The introduction of trade terms and language specific to each trade set some curricula apart. For this characteristic, the average across the 12 curricula was 2.9 ($SD = .65$). Landscaping was assigned the lowest score of 1, and Janitorial received a score of 2. A score of 3 was assigned to Auto Mechanics, Building Maintenance, Carpentry, Electrical Works, HVAC, Painting, Plumbing, and Welding for Workplace Competencies. The highest score of 4 was assigned to Office Services and Mill and Cabinet curricula.

For Workplace Competencies, the average score was also 2.9. The range of 1-4 was also the same as for Real World Curriculum, but a standard deviation of .79 indicates greater variation among the scores. Landscaping scored the lowest at 1, with Auto Mechanics, Janitorial, and Painting receiving a score of 2. Building Maintenance, Carpentry, HVAC, and Plumbing all scored 3. A score of 4 was assigned to Electrical Works, Mill and Cabinetry, Office Services, and the Welding curricula.

Access to In-Depth Understanding reflects the coherency of the curriculum based on trade and publisher standards. Objectives were aligned to standards and assessed with both paper-pencil, multiple-choice tests, and performance assessment, such as completing a specific weld or constructing a cabinet. For access to In-Depth Understanding the average score was the highest of all the courses reviewed, 3.1, but also the widest variance with a standard deviation of 1.08. Once again, Landscaping was assigned the lowest score of 1. A score of 2 was assigned Building Maintenance, Janitorial Services, and Painting. Auto Mechanics and Carpentry received scores of 3. A score of 4 was received by Electrical Works, HVAC, Mill and Cabinet, Office Services, Plumbing, and Welding.

Table 5***TECA Holistic Rubric Mean, Range, and Standard Deviation of Course Ratings for Fundamental Characteristics***

Characteristics	Mean	Range	SD
Industry Standards and Practices	2.7	1-3	0.65
Real World Curriculum	2.9	1-4	0.79
Workplace Competencies	2.9	1-4	1.00
In-Depth Understanding	3.1	1-4	1.08

TECA Overall Rating

Finally, the TECA rubric afforded researchers a chance to assign an overall rating of the curricula under review. The overall rating characterizes the evaluator's overall assessment of the effectiveness of the materials in having students learn the knowledge and skills needed to be successful in the vocational workplace. This rating is not an average of all the previous ratings, but the researcher's overall judgment of quality and likely impact of the materials.

As shown in Table 6, no curriculum was assigned an overall score of 0. This means that none of the 12 vocational education curricula involved in this evaluation were blatantly deficient for teaching inmate-students about the trade. One curriculum, Landscaping, was judged as Weak. As was been demonstrated through the previous analysis, the Landscaping curriculum was found lacking in nearly every category of evaluation, in large part because it lacks coherency and is not tied with a national accreditation agency through which industry standards are disseminated and certification of trade preparedness verified.

One curriculum was judged as Adequate (Janitorial) primarily because of the overall inconsistency found in the curricula based on the criteria and characteristics under evaluation. The Janitorial course curriculum also is not tied to a national accreditation agency. This fact helps to explain why these materials are consistently rated poorly. Overall, the disparate and uncoordinated nature of the materials accounts for the curriculum being judged as Adequate, not necessarily the quality of the content. It is likely that if placed in the hands of a gifted teacher, the deficiencies found in this curriculum could be overcome and the janitorial class could produce adequately prepared workers.

Seven curricula were judged to be Good (Auto Service, Building Maintenance, Carpentry, HVAC, Painting, Plumbing, and Welding). These curricula were generally found to be strong on the evaluated characteristics. In addition, each of these curricula provided inmate-students the opportunity to gain certification for successfully completing these courses. Consequently, it is reasonable to expect students of these classes would have a realistic expectation of gaining meaningful employment upon parole.

Finally, three curricula received a rating of Excellent (Electrical Works, Mill and Cabinetry, and Office Services). These curricula excelled in every aspect of the evaluation. Two of the curricula are tied to the NCCER, where national standards for the trade and certifications are awarded (Electrical Works, Mill and Cabinetry), but the Office Services curricula lacks a certifying agency. Nevertheless, across the board these classes were found to be strong on the six substantive criteria and on the four fundamental characteristics of an excellent curriculum. The CDCR can be confident that inmates who complete these courses are well-prepared for these trades when they are released back into society.

Table 6

Overall Rating of Curricula

Overall Rating	Description of Rating	N	Names of Courses
0	No alignment with criteria	0	None
1	Weak	1	Landscaping
2	Adequate	1	Janitorial
3	Good	7	Auto Mechanics, Building Maintenance, Carpentry, Heating, Ventilation, and Air Conditioning, Painting, Plumbing, Welding
4	Excellent	3	Electrical Works, Mill and Cabinetry, Office Services

What follows is a more thorough discussion of each of the 12 courses included in this evaluation, based on our overall rating of the curriculum and our overall TECA assessment.

TECA Discussion and Implications

Curricula Rated as Weak

Landscaping. The Landscaping curriculum was rated the weakest of the curricula reviewed. The materials for the Landscape curriculum consisted of a collection of books published in different formats addressing uncoordinated aspects of the vocation. This curriculum did not follow a set of published standards or provide widely recognized certification. A minor exception was one of the texts, which was a test preparation manual for a Nursery Professional Exam, suggesting the curriculum attempted to focus on a set of trade standards. However, this trade did not have a national certification agency to govern curricular development. The range of scores across all six substantive criteria for the curriculum indicated that much of the content was judged as Adequate, at best. In effect, the curriculum reflected primarily procedural rather than theoretical knowledge.

Curricula Rated as Adequate

Janitorial. The janitorial curriculum received slightly higher and more consistent scores than the Landscape curriculum for several reasons. Each chapter of the text series began with objectives which are assessed through chapter tests. This resulted in a score of 2 for both Instructional Strategies and Assessment. For Problem Solving a score of 2 was assigned because students are required to understand the operation of equipment such as a floor buffer. Vocabulary in the texts supported a rating of 2 for General Education content. For Personal Qualities the texts described job expectations which also resulted in a score of 2. No discussion or instruction on working with members of a diverse workforce was presented in the texts. However, despite these apparent improvements over the Landscaping curriculum, the Janitorial curriculum was only judged as being Adequate.

Curricula Rated as Good

Auto Mechanics. Auto Mechanics was rated as Good for a number of reasons. Scores of 3 were assigned to Instructional Strategies, Problem Solving, Integration of General Education Content, and Assessment. Unfortunately, Personal Qualities and Diversity were scored as 0 because these areas were missing in the texts reviewed. There were no sections on ethics or workplace behavior, and there is no discussion about working with diverse members of the current labor force.

Two substantive criteria reflect the strength of this curriculum. First, the Auto Mechanics curriculum was strong on the TECA criteria Problem Solving. Students are required to demonstrate an understanding of a wide variety of issues related to auto service. Each procedure requires students to collect information about a problem and consider a number of alternative explanations prior to making any final decisions. Each exercise required multiple steps to complete, with more advanced automotive repair concepts requiring a higher level of problem solving ability.

Second was the TECA criteria Instructional Strategies. Each chapter began with objectives which are aligned to paper-pencil assessments presented as tests at the end of chapters. The objectives were aligned with the National Institute for Automotive Service Excellence (ASE) standards. General Education content was also strong in the automotive curriculum. ASE practice tests were provided to help students prepare for industry certification. Because of these reasons, the curriculum was scored highly (i.e., 3) for the fundamental characteristics Industry Standards, Real World Curriculum, and In-Depth Understanding. All told, the auto mechanics curriculum provides well-trained and prepared workers.

Building Maintenance. Overall, the Building Maintenance curriculum received an average score of 2.6, with a narrow range of 2 - 3. For Instructional Strategies, each module begins with objectives aligned with NCCER and trade standards. Assessments were well-aligned with objectives. Performance assessments allow students to show they understand the hands-on exercises and simulate real work problems. The curriculum also supported learning in groups and in independent study. Problem Solving and Integration of General Education were also scored at 3. Each procedure required students to collect information and consider risks prior to making decisions. The same is true for the fundamental characteristics of Industry Standards, Real World Curriculum, and Workplace Competencies.

Lower scores were assigned for the Building Maintenance curriculum for the substantive criteria Personal Qualities and for Diversity. For Personal Qualities a score of 2 was assigned. Although the Core curriculum provided an effective starting point for this topic, Volume 2 appears to leave the topic untouched; an integrated approach would be more effective combining personal qualities with technical learning. For Diversity, a score of 2 was also assigned. The Core curriculum provides an excellent foundation for this topic, but once again Volume 2 appears to leave the topic untouched. Finally, for the fundamental characteristic In-Depth Understanding, the curriculum also received a 2.

Carpentry. The Carpentry curriculum was also evaluated as Good. Each module began with objectives aligned to paper-pencil assessments presented as reviews and quizzes. Supplementary sources were recommended, such as books, media, and websites. As with all NCCER curricula, the *Core* curriculum provided a focus on safety and risk assessment prior to making a decision. Activities require students to collect information and perform multiple steps prior to finding a solution, as in the case of calculating lumber quantities for jobs.

For the substantive criteria, Instructional Strategies, Problem Solving, Integration of General Education, and Assessment, the curriculum was assigned a score of 3. This was also true of all of the fundamental characteristics of an excellent curriculum that were evaluated. Students were required to locate information in tables and interpret blueprints. Trade vocabulary enhances general education knowledge. Objectives were aligned with NCCER and industry standards. Reviews and quizzes assist both students and teachers to learn how to improve teaching and learning. Performance assessment provides an authentic way for students to demonstrate their understanding. For Diversity, a score of 2 was assigned; 77% of examples were of white males, but there were a mixture of younger and more mature carpenters.

Heating, Ventilation, and Air Conditioning (HVAC). The HVAC curriculum provides entry level information about the trade, but also demands higher level thinking more characteristic of general education. For this reason, the HVAC curriculum was evaluated as being Good. Mathematics directly pertaining to the industry was covered, also resulting in a 4 for Integration of General Education content. As students progress through the curriculum, they learn to troubleshoot problems in cooling, compressors, heating, and more. Students are required to gather information and consider risks prior to making final decisions.

For Assessment, a score of 3 was assigned to the HVAC curriculum. Quizzes and self-reviews are aligned with the objectives of each module of the NCCER curriculum. Performance assessments require students to show what they know beyond paper-pencil exercises. A 3 was also assigned for the fundamental characteristic Industry Standards, with the same score being assigned for the characteristic Real World Curriculum. For the characteristic Workplace Competencies, the curriculum was also scored a 3. However, for Personal Qualities, the curriculum was assigned a score of 2. Finally, for Diversity, the curriculum was scored a 2 because of the sparse use of examples involving a diverse work force.

Painting. The Painting curriculum was also evaluated as Good. One strength of the curriculum was that it contained objectives at the beginning of each module. In addition, trade terms, assessment questions, and quizzes were all aligned to objectives. The Painting texts focus on a numerous painting procedures that become more involved as students progress through the levels. Materials were flexible enough to be used by individuals as well as by groups.

For most of the substantive criteria, the Painting curriculum was assigned scores of 3. This score was assigned largely because the curriculum did a good job on Problem Solving, Assessment, and Personal Qualities. For example, professional ethics of the painting trade are discussed. Content supports students to understand what is required in the workplace. Especially in performance assessments, students are required to manage their own behaviors and set levels of personal performance. For Diversity, it was assigned a score of 2.

The Painting curriculum scored a mean of 2.5 on the fundamental characteristics of an excellent curriculum, suggesting some minor deficiencies. The curriculum was evaluated as Good on the characteristics Real World Curriculum and In-Depth Understanding. However, for Industry Standards and Workplace Competencies, the curriculum was only judged as Adequate.

Plumbing. Another example of a Good curriculum was found in the materials for the Plumbing curriculum. Materials were self-explanatory and the curriculum recommended a great deal of instructional resources to supplement instruction. Support for the materials was provided by NCCER through its website which can be useful for teachers. The curriculum can be used effectively by individuals and in groups.

For Problem Solving a score of 4, Excellent, was assigned. All students were required to recognize different types of problems and to perform multiple step tasks to arrive at a

solution. Students are required to locate specific information in texts books and in the plumbing code. As a result, the Integration of General Education content was given a score of 3. Personal Qualities was also scored a 3.

For Assessment, a score of 3 was assigned. The structure of the curriculum integrated assessment into instruction. Chapters or modules begin with learning objectives, instruction connects to objectives, and these objectives are assessed through content reviews and trade tests. Hands-on performance assessment plays a key role in the Plumbing curriculum. Through performance assessments and trade terms, industry skills were integrated, and performance assessments use real world situations. The instructor can use the assessments to generate feedback on the course teaching. The plumbing assessments measure well the students' knowledge and skills required in the workplace.

The TECA holistic ratings also supported the conclusion that the Plumbing curriculum was Good. Scores of 3s were assigned for Industry Standards, Real World Curriculum, and Workplace Competencies. A 4 was assigned for In-Depth Understanding, indicating the curriculum was outstanding on this characteristic.

One deficiency of the Plumbing curriculum was found for the criterion Diversity, where a score of 1 was assigned. There are 21 pictures of white men and 1 picture of an African-American man. No other ethnic groups or women were represented. The *Core Curriculum* presents a different picture of the role of diverse workers but the Plumbing 1, 2, and 3 offers a view of the trade that was not diverse.

Welding. The Welding curriculum was evaluated as Good. NCCER materials suggested how to teach welding and could be used by a teacher unfamiliar with specific techniques. The curriculum was useful for individuals and groups. The Welding curriculum includes a variety of instructional strategies.

For Problem Solving, a score of 3 was assigned to the curriculum. Welding students were required to demonstrate various welding procedures such as V-Groove Welds, low alloy and stainless steel pipe welds, and gas tungsten arc welding. Each procedure requires students to collect information and consider risks prior to making decisions and before engaging in a series of complex welding steps. The curriculum was assigned 3s for all of the other TECA criteria except for Diversity where it was scored a 2.

The Welding curriculum did well on the TECA fundamental characteristic evaluation. The curriculum was found to be deserving of 4s for Workplace Competencies and In-Depth Understanding. It was judged a 3 for Industry Standards and Real World Curriculum. Overall, the Welding curriculum was one of the better scoring curricula on the TECA Holistic ratings.

Curricula Rated as Excellent

Electrical Works. The Electrical Works curriculum was one of three to be rated Excellent. The Electrical Works curriculum content is tied directly to industry standards

including the National Electrical Code. Two TECA substantive criteria were assigned scores of 4: Instructional Strategies and Problem Solving. For example, for Problem Solving, all students were required to recognize different types of problems, including professional/ethical dilemmas and collect information before arriving at a solution. "What's wrong with this picture" exercises and trouble shooting case studies lead students to higher levels of thinking. The Electrical Works curriculum was also scored 4 for the holistic characteristics of Workplace Competencies and In-Depth Understanding.

For Integration of General Education content, Assessment, and Personal Qualities, a score of 3 was assigned. The Electrical Works curriculum requires students to locate specific information in textbooks and the National Electric Code. Students also were asked to communicate technical knowledge by interpreting schematics and plans. Hands-on performance assessment requires students to show what they have learned in authentic ways. An accompanying workbook assists in self-assessment. For the fundamental characteristics Industry Standards and Real World Curriculum also received scores of 3 for Electrical Works.

For Diversity, a score of 1 was assigned. Although the *Core* curriculum offered a strong beginning in working with and respecting members of a diverse work force, the remainder of the texts did not.

Mill and Cabinetry. The Mill and Cabinetry curriculum was judged to be one of the strongest included in this evaluation. A score of 4 was assigned for the TECA criteria Instructional Strategies and Problem Solving. Students progress from beginner perspectives and ultimately complete cabinet building projects. Students must perform multiple steps before completing the projects.

For Integration of General Education Content the team assigned a score of 3 to the Mill and Cabinetry curriculum. Students were required to interpret written information, communicate technical information, and to solve math problems. For Assessment the team assigned a score of 3 to the curriculum. Hands on performance assessments allow students to show what they have learned to undertake specific tasks skillfully.

With regard to Personal Qualities the Mill and Cabinetry curriculum was assigned a score of 3. The *Core* curriculum provides workplace qualities such as ethics and respect for others. For Diversity a score of 2 was assigned because the texts primarily offer a view of the trade that focused mainly on white people.

For the holistic evaluation, the Mill and Cabinetry curricula was scored a 3 for the Industry Standards characteristic, but 4 for Real World Curriculum, Workplace Competencies, and In-Depth Understanding. Taken all together, it was evident this curriculum is excellent for preparing students for a career in this trade.

Office Services. The Office Services curriculum was, in many respects, the most robust curriculum reviewed in this evaluation. For this curriculum, a score of 3 was assigned to the TECA criteria Instructional Strategies. The materials can be used by a wide range of individuals not familiar with the field. For example, keyboarding practice was used to demonstrate proficiency in specific tasks. The curriculum suggests how to

teach the material in an effective way and was adaptable for use in groups large and small.

For the Integration of General Education content and Problem Solving criteria, a score of 3 was assigned. Sample professional documents such as job application materials and references to business forms are presented. For Assessment, the curriculum was assigned a score of 4. The curriculum provides students with a study guide and the questions at the end of each chapter, which were closely aligned with objectives stated in each text. A variety of assessments provide feedback for both student improvement and for teachers to improve their own teaching. Assessments for typing and Microsoft programs integrate specific professional skills. Real world situations were created and assessed through simulations and case studies. Because of these strengths, the curriculum was scored a 4 for Real World Curriculum and In-Depth Understanding.

For the TECA criteria Personal Qualities and Workplace Competencies, a score of 4 was assigned. Business ethics, integrity, and personal responsibility were highlighted. Managing personal behavior and levels of personal performance were required and equated with business success.

For the criteria Diversity, a score of 4 was assigned. Materials emphasize that office workers work with a diverse group of people in the business world. Diversity was approached as both practical and ethical issue within the texts, with an entire chapter devoted to the issue. Photographs representing Asian, African, and white individuals, as well as both men and women were included. Materials not only broaden students' awareness of different cultural groups, but also assert that businesses success respect and appreciate cultural differences. This is, of course, an important quality for a course undertaken in the environment of CDCR.

The greatest inadequacy to the Office Services Curriculum was that it is not tied to a certifying agency. Consequently, Industry Standards are hard to identify or follow. This is a deficiency that is magnified in a world of technology that is continuously changing at a rapid pace. For this characteristic, the curriculum was assigned a 2 because of the ties to Microsoft.

Flesch-Kincade Readability Scale Findings

The reported Flesch-Kincade grade levels presented in Table 7 for each curricula are totaled across every textbook that is used for the course, across several pages of text, and are determined by several sources. These results present an accurate measurement of the reading comprehension level necessary to learn and succeed in these vocational education courses. The NCCER *Core Curriculum* is treated as a special case and is analyzed separately from the subject curriculum because of its use across so many of the vocational education courses.

Table 7

Mean Flesch-Kincaide Grade Level for Vocational Education Curricula

Vocational Education Class	Books Evaluated	Mean Grade Level	SD
Auto Mechanics	1	8.26	1.06
Building Maintenance	1	8.77	1.49
Carpentry	2	10.37	2.13
Electrical Works	4	12.32	2.86
HVAC	4	11.13	2.22
Janitorial Services	6	8.35	1.98
Mill and Cabinetry	2	9.56	2.36
Office Services	5	10.00	1.54
Painting	4	11.26	1.94
Plumbing	4	9.87	2.06
Welding	3	10.11	2.03
NCCER Core Curriculum	1	8.47	1.26

Auto Mechanics. The mean Flesch-Kincaide grade level for the Auto Mechanics curriculum is 8.26 ($SD = 1.06$), making it the “easiest” of the curricula evaluated. The minimum Flesch-Kincaide grade level score was 6.16 with a maximum of 9.96. Typically, there were no pictures or sidebars on the pages sampled. There, however, was an average of almost five figures or diagrams on these pages.

Building Maintenance. The average Flesch-Kincaide grade level for the Building Maintenance curriculum was 8.77 ($SD = 1.49$). The range of scores was from 6.82 to 11.13. Usually, no pictures were included on the pages sampled. There was an average of 2.5 figures or diagrams on these pages, but few side bars.

Carpentry. The Carpentry curriculum requires greater than a tenth grade reading level to understand the text ($M = 10.37$, $SD = 2.14$). The lowest grade level found for a sample was almost at the 7th grade level, with a maximum grade level being 13.65.

Most of the pages did not contain pictures, but they did usually display figures or diagrams ($M = 2.75$). In addition, these pages usually contained just over one sidebar.

Electrical Works. As shown in Table 7, the Electrical Works curriculum is the most difficult of the 12 that are a part of this study. On average, the curriculum is written at the 12.32 grade level ($SD = 2.86$), with a range between 7.28 and 19.99. About half of the pages sampled contained one picture, one figure or diagram, and one sidebar.

Heating, Ventilation, and Air Conditioning (HVAC). Another challenging course was HVAC. The mean Flesch-Kincaide grade level was 11.13, with a standard deviation of 2.21. Here, the lowest grade level of the sampled text was 7.56, with the highest Flesch-Kincaide grade level being 17.43. As with the electrical works curriculum, only about half of the pages from the HVAC curriculum displayed pictures. There were almost two figures or diagrams from the selected pages, and an average of 1.73 sidebars per page.

Janitorial. The Janitorial textbooks offered one of the most easily read curriculum. The average Flesch-Kincaide grade level for this curriculum was 8.35 ($SD = 1.98$) with a range of 4.72 to 13.40. Few pictures or sidebars were provided, but about two figures or diagrams were included on the selected pages.

Landscaping. As shown in Table 7, the meaned Flesch-Kincaide grade level for the Landscaping curriculum was 10.61 ($SD = 2.66$). There was a wide range of Flesch-Kincaide scores, ranging from 5.17 to 17.17. On average there were 1.27 pictures on the pages where the text was found, but less than one diagram or figure. The curriculum also made little use of sidebars.

Mill and Cabinetry. The Mill and Cabinetry curriculum was written at a 9.56 grade level ($SD = 2.35$). The low Flesch-Kincaide score was found to be 5.10, and the high score was 13.59. About half of the pages showed pictures. There were also about three figures or diagrams on the pages and just over one sidebar presented.

Office Services. The mean Flesch-Kincaide grade level for the Office Services textbooks was 10.00 ($SD = 1.54$). For these books, the range of Flesch-Kincaide scores was 7.44 to 14.69. Pictures were regularly found on the pages containing the sampled text ($M = 1.24$), but less than one figure or diagram was included. Regular use of sidebars was also found ($M = 1.74$).

Painting. For the Painting curriculum, the mean Flesch-Kincaide score was 11.26 ($SD = 1.54$). The lowest Flesch-Kincaide score was 7.30, with the highest being 15.87. No pictures were found on any of the pages sampled; however, each of the pages usually contained one figure or diagram. Under half of the pages included a sidebar.

Plumbing. Table 7 also shows that the mean Flesch-Kincaide grade level for the Plumbing curriculum was 9.87, with a standard deviation of 2.06. Once again, a wide range in Flesch-Kincaide scores was found (5.54 to 14.96). Few of the pages sampled contained pictures. There were on average 1.75 figures and diagrams and 1.75 sidebars per page.

Welding. The Welding curriculum was found to be written at just over a 10th grade level (M 10.11, SD 2.03). The lowest Flesch-Kincaid grade level score was 7.35, and the highest score was 15.73. Fewer than half of the pages displayed pictures. However, liberal use of figures and diagrams (M = 1.93) and sidebars (M = 2.50) was observed.

NCCER Core Curriculum. The *Core Curriculum* text is the introductory text for all NCCER subject curricula evaluated in this study. This textbook covers much of the basic knowledge and skills a student needs when beginning to work in the building trades. Subjects covered include identifying tools and what they are used for, construction math, construction drawing, and safety. Students are required to complete the *Core* before beginning the first book of the subject curriculum for all of the NCCER courses. In addition to providing students the rudimentary skills necessary to be successful in a trade, completion of this book means that students can jump to the introductory book for any of the NCCER curricula. Thus, this book provides the basic foundation for any CDCR inmate involved in vocational education that uses the NCCER curriculum.

The Flesch-Kincaid grade level for the *Core Curriculum* was found to be 8.47, with a standard deviation of 1.30. The range of Flesch-Kincaid scores was 6.03 to 10.92. Exactly half of the pages sampled were found to have pictures. In addition, the pages were found to have an average of 1.40 figures or drawings and 2.00 sidebars.

Flesch-Kincaid Grade Level Discussion

Knowledge about the readability of vocational education curricula is important for prison school administrators and teachers. The Flesch-Kincaid grade level scale offers an objective measure of how easy or difficult each curriculum is to read. It can also act as a minimum qualification or level of preparedness inmates need if they are to be successful in these classes when coupled with TABE scores routinely generated for each inmate. Inmates who are not prepared to comprehend the course material should be placed in remedial Adult Basic Education classes until they can meet the minimum reading levels needed to understand the course's texts. Without these requisite skills, CDCR may be placing students in classes where they are destined to fail.

Presently, CDCR does not have a minimum TABE score for eligibility in vocational education classes (R. Churchill, personal communication, October 14, 2009). Instead, classification committees rely on a variety of criteria when placing an inmate in a class, including interest, highest grade completed, previous educational experiences, behavior while in prison, and space availability. Although reading ability is likely taken into consideration when assigning students to a class, it is probable that ill-prepared students are put into classes that are beyond their present ability. The Flesch-Kincaid grade level scores for the texts can inform classification committees about just how difficult these vocational education courses are. Operating with this understanding will help the committees make decisions that place inmates in the appropriate classes. This appropriate student placement will reduce frustration as students will be learning material that they can comprehend and learn.

The evaluation of the 12 curricula based on the Flesch-Kincaid grade level scores indicate that no course of study falls below the average literacy level for CDCR. Classes with easier to read curricula include Auto Mechanics, Building Maintenance, and Janitorial Services; but these classes all had Flesch-Kincaid grade level scores below the 9th grade. The NCCER *Core Curriculum* was also found to be written at the 8.47 grade level. These curricula are most likely to be understandable for the greatest number of California's inmates.

The Carpentry, Landscaping, Mill and Cabinetry, Office Services, Plumbing, and Welding curricula can be considered to fall into a moderately difficult group. These curricula require reading comprehension between 9.5 and 10.6 grade levels. Some material found in these texts is considerably easier than these scores suggest, but a good deal of the texts also requires higher reading ability than indicated by these means. Given the fact that most Americans read at a level two or three grades lower than the highest grade they completed (DuBay, 2004), these classes are likely to be challenging for many inmates.

Three of the curricula evaluated here can be considered difficult, with average Flesch-Kincaid grade level scores greater than the 11th grade. In fact, the Electrical Works class' average Flesch-Kincaid score was 12.32, or equivalent to a freshman in college. The HVAC and Painting curricula can also be considered challenging and should be reserved for the most prepared and advanced student-inmates.

Finally, it appears that all of the selected curricula use supplementary communication materials that can help to encourage learning, like pictures, figures and diagrams, and side bars. These visual aids can both help to illustrate an important point being made and help break up the monotony of just reading text alone. These aids can be critical in helping students learn concepts that text cannot do alone. In fact, it is said that visuals can improve readability by as much as 40% over text alone (Friedman & Hoffman-Goetz, 2006).

ELEMENT 2: INSTRUCTIONAL STRATEGIES DISCUSSION AND IMPLICATIONS

A comprehensive review of the instructional strategies for the 12 curricula addressed in this study is not possible because teachers' manuals were not available for every course. However, an evaluation was possible for those classes where teaching strategies were articulated. In particular, the team reviewed the instructor's training manuals for the eight NCCER courses included in this study. The courses that are NCCER accredited and are included in this evaluation are: Building Maintenance, Carpentry, Electrical Works, HVAC, Mill and Cabinetry, Painting, Plumbing, and Welding. The curricula that do not have instructors' manuals (and were not developed by NCCER) are: Auto Mechanics, Janitorial, Landscaping, and Office Services.

Educational scholars have focused on teaching strategies for over 50 years (Joyce & Weil, 2004). This long-term research interest reflects a desire to understand how teacher

performance affects student learning. The most powerful teaching strategies compound their positive effects by helping students learn how to learn, as well as what to learn, within the content of the course. Teaching strategies can be implemented uniformly, to a great extent, for the same course taught by different instructors in different locations. This fidelity to the planned curriculum, or standardization, is highly desirable since it permits both teachers and educational administrators to measure the learning results associated with the planned teaching strategies (Marzano, Pickering, & Pollock, 2001).

For vocational education, teaching strategies are identified in the *Craft Instructors Guide* (2007) published by the NCCER. Instructors receive explicit directions and definitions about eight teaching strategies, including, lecture, demonstration, simulation, coaching, lab exercises including feedback, field trips, peer instruction, question and answer sessions, and class discussions. Each of these teaching strategies is discussed in detail and examples are given for teachers to follow.

Lecture and demonstrations fall generally into well-established models of instruction identified as direct instruction (Joyce & Weil, 2004). Teacher control and student time on task are associated with this consistently productive strategy (Hunter & Russell, 1981). Simulations provided in the *Guide* involve using materials, machines, or interactive role-play that brings students closer to real world situations. For example, the welding class using the NCCER curriculum could use a welding simulator to approximate real world experience. Coaching falls under the more general instructional strategy of giving appropriate feedback. According to Hattie and Timperley (2007), providing students such corrective feedback is a powerful force for teaching and student learning.

Pedagogy for student populations in prison requires the adaptations of previously established teaching strategies such as those presented in the NCCER *Craft Instructors Guide* (2007). Field trips, for instance, are impossible. On the one hand, question and answer sessions may be ineffective in the prison environment due to conflicts between social groups organized around gangs and race. On the other hand, peer instruction can be seen as a strategy similar to tutoring.

The organizational structure of the NCCER student texts also contains a powerful sequence of teaching strategies. Modules (chapters) begin with clearly stated learning objectives (advance organizers) followed by learning activities that include reading and hands-on experiences. Student learning is measured by both paper-pencil and hands-on assessments followed up by corrective and timely feedback from the teacher. Also built into the structure of the planned curriculum is the important teaching strategy of recognition for accomplishments in the form of certificates from NCCER.

Teaching strategies, especially those that help students learn how to learn, are also included within the organizational structure of NCCER textbooks. Student texts in NCCER courses include time expectations listed for the completion of learning activities. This pacing of work further supports efficiency in learning while at the same time helping students learn how to approach tasks from the perspective of an employee. The texts from non-NCCER developed courses do not contain such time expectations for student completion of learning tasks.

Evaluation of the TECA substantive criteria “Instructional Strategies” confirms the advantage of having a teacher’s manual and ties to a national accreditation agency. Indeed, all of the curricula associated with the NCCER or ASC (for Auto Mechanics) scored a 3 or 4 on this criterion. Of the non-certified curricula, only Office Services scored a 3 for Instructional Strategies. Both the Janitorial and Landscaping curricula were judged merely being Adequate or Weak, respectively (see Table 6). These curricula, in particular, could benefit greatly from a teacher’s manual.

ELEMENT 3: ORGANIZATION AND PURPOSE OF PLANNED CURRICULUM DISCUSSION AND IMPLICATIONS

NCCER curricula bring a level of organization to topics that makes possible high quality learning. Students can receive community college credit and, for some trades, credit towards completing trade apprenticeships. Each text contains objectives for learning clearly spelled out in ways students can easily understand. The objectives reflect the standards of the trade. Assessment is done in a variety of ways. Students take paper-pencil tests that are multiple choice and fill in the blank. They also complete hands-on performance evaluations in which they must demonstrate skills using tools and materials they will encounter on the job. Teachers can be creative by expanding and exploring enhancements to the teaching strategies that are recommended. For specific courses, estimated time to complete modules is identified and serves as a kind of pacing guide for teachers and students.

Students receive routine feedback from assessments and recognition through certificates of accomplishment. When students complete each level of the curriculum, they also receive transcripts posted online through NCCER. Portability of achievements is built into the curricula because potential employers (anywhere) have the ability to check the knowledge levels of students on the NCCER website, permitting students to signal competencies.

However, just because curricula are not part of the NCCER system does not relegate them to low quality. In fact, the highest rated course curriculum based on the TECA assessment was Office Services. This curriculum was well structured and utilized a central text and workbook that met all the requirements for high quality. Additional materials, such as Microsoft programs, are also based on standards that are widely recognized.

The Auto Mechanics curriculum is also of high quality. These materials prepare students to pass national certification exams through Automotive Service Excellence. Moreover, the text used is the same as those used at California Community Colleges. However, there is little specific introduction for teachers about how to organize the course. Because of the lack of pedagogical direction, consistency is difficult to maintain across institutions.

The Janitorial and the Landscaping curricula rely most heavily on teacher knowledge, skill, and creativity to provide a rich educational experience. The texts consist of a collection of engaging and valuable information, but coherence around a set of national or publisher standards is missing. This structural problem affects all other aspects of the curricula. Objectives and assessment are present in some texts, but not most. System-wide development of a uniform curriculum is difficult to accomplish in the absence of identifying a national accreditation agency that regulates and disseminates trade standards. Portability, as well as its value as a signal of competency, is restricted since the curriculum is based almost completely on the skill and knowledge of each teacher. Expected time to complete units of work is also not provided. Consistent with all of our previous analyses, the Janitorial and Landscaping curricula are found to be deficient and wanting.

Recommendations and Conclusions

RECOMMENDATIONS

Central to any effort to prepare inmates for successful reintegration back into their home communities is the continued implementation of the Roadmap for Rehabilitation as suggested by the Expert Panel (2007) and the reforms mandated by AB 900 (2007) and the Three Judge Court (2009). In particular, CDCR must continue its commitment to assess the criminogenic needs of inmates, deliver programs structured to address those needs, and measure both inmate achievements and the efficacy of the programs themselves (Expert Panel, 2007). The delivery of a standardized and coherent vocational curriculum consistent with labor market standards is a key component in a rehabilitative agenda for any correctional system (Gaes, 2009; Petersilia, 2003). If CDCR acts on these recommendations, the curricula chosen for vocational education in California's prisons will be more effective in teaching inmates a viable trade. An effective curriculum delivered increases the probability of parolees achieving gainful employment and decreases the likelihood these inmates will return to prison for a new crime or parole violation.

In evaluating curricula, it is important to ask whether the training does, in fact, add to the capabilities of a parolee in a manner which reflects conditions in the job market. Effective vocational educational curricula for a correctional environment should focus on training students to at least a semi-skilled level (L.D. Horst, personal communication, October 15, 2009). In bringing such skills to employers, potential employees offer extra value to their ability to do the job that others without the training cannot. To identify possible new hires, employers often require prior certification of skills as a signal of competence. In fact, in many fields there are formal restrictions on hiring employees who do not have certification at a semi-skilled level. In addition to getting a parolee hired in the first place, a semi-skilled position points parolees towards well-defined long-term possibilities for career development.

The following six recommendations are based on the researchers careful examination of the 12 curricula included in this study. These recommendations focus on the most pressing issues confronting vocational education in California's prisons as suggested by the analysis of the curricula used in these classes.

1. Standardization and Certification

CDCR should continue to focus on purchasing curricula that are standardized and align with national certification standards. Such standardization is consistent with the intent of AB 900 and the California Logic Model, and correlates well with the characteristics of high quality curricula as indicated by the TECA rubric. CDCR must ensure vocational education classes reflect industry standards, and reflect actual work requirements. The vocational education classes in turn must actually train students to meet core trade

requirements for knowledge and skill. In particular, the NCCER curricula evaluated in this study embodies the benefits of aligning with a national certification agency by accomplishing these very goals.

Standardization and certification is important for a number of other reasons as well. First, a standardized curriculum provides inmates a viable education that translates to better employment prospects and reduced recidivism. For example, alignment with a national certification agency ensures the curricula matches industry standards, guaranteeing students have been exposed to current trade requirements. Second, standardization of the curricula means inmates are exposed to the same course materials if they are transferred to another prison where the same class is offered. In some cases, inmate students will even be able to continue their training at Community Colleges which transfer in the credits inmates receive while incarcerated. Third, it helps teachers as they prepare lessons for a variety of students with varying levels of interest and ability. Finally a standardized curriculum that is paired with accredited curriculum benefits the students once they are paroled. Standardized curricula and certification signals potential employers about the kind and quality of education the parolee received and their level of preparedness to perform the work required. Taken all together, standardized curricula and certification improves the likelihood that a parolee will find a job, stay out of prison, and improve public safety.

2. Course Time Expectations

CDCR needs to adopt curricula with varying time expectations for completion. On the one hand, more difficult or challenging curricula take longer to complete and must only be offered to inmates who have the time to complete the course in prison. On the other hand, less challenging curricula that can be taught in a short amount of time should be afforded inmates who have just a few months left in prison. In other words, simpler and shorter courses like Janitorial are highly appropriate for inmates with shorter terms to parole, as in the case of Level 1 yards. Such courses are also likely to have a great impact on recidivism prevention simply because there are more inmates cycling through them. Finally, they are also appropriate for the many inmates—students with lower reading abilities. Longer, more difficult courses like Electrical are more appropriate when inmates have a longer time before parole, and strong reading and math skills. Curricula need to be selected and designed in a fashion which reflects the prison environment in which they are implemented. The curricular strengths and limitations of different courses in turn need to be made clear to inmate counselors, classification committees, teachers, and inmates.

3. Readability

In implementing curricula for vocational education in California's prisons, administrators should be mindful of the difficulty of the materials they selected. Matching an inmate's TABE score, with a minimum reading level required to be placed in a course, and the Flesch-Kincaid grade level necessary to understand the material, could improve the likelihood that students will be successful. CDCR should avoid placing inmates in classes where the material will be too challenging for them to understand.

For students who desire to learn a trade, but may not be prepared for the vocational class, they should be assigned to Adult Basic Education, not Vocational Education. If this is not feasible, a variety of interventions can be used. For instance, CDCR could use flexible scheduling to include those who are near the appropriate reading level required to take vocational education courses concurrently with literacy courses. Another idea is to employ alternative instructional strategies, such as peer tutoring, to support struggling readers who are motivated to take and complete vocational education courses. However, ultimately the key is to match students with curriculum difficulty.

4. General Deficiencies

CDCR should take notice of and address some of the general deficiencies found in this curriculum evaluation. For example, the lack of diversity in most of the curricula examined here can have unanticipated negative consequences on students, especially those from minority groups who may already feel alienated. More pragmatically, students need to be prepared to enter a diverse work force and understand how to work with others from different ethnicities or lifestyles. Consequently, the vocational education curricula used by CDCR should initiate a greater effort by students to address personal qualities, such as workplace ethics, accountability, and responsibility. Both of these recommendations can be accomplished by selecting curricula with diversity and personal qualities built in, or by bringing in supplementary materials to address these important issues.

5. Re-evaluate Every Curriculum and Course

It is recommended that CDCR consider undertaking efforts to redesign or revise the planned curriculum judged as Weak or Adequate to improve the viability of these courses. Methods of improving these curricula can include matching materials to the TECA criteria and other fundamental characteristics of high quality curricula. The curricula should be standardized and offer certification so parolees can positively signal their accomplishments. Improved or strengthened curricula should provide students with both entry level, semi-skilled, and more advanced skills. Curricula considered Good or Excellent should be scrutinized in the same fashion. Every curricula evaluated in this report, and their associated classes, could benefit from a number of improvements designed to make vocational education programs as successful as possible.

6. Teacher's Manuals

Finally, the evaluation of the planned curriculum indicates that greater resources must be afforded vocational education teachers, particularly in the form of teacher's editions of books and instructional manuals. Prison classes are already tough enough to teach without insisting that teachers improvise and create curricula themselves. Ideally, these resources would come as ancillary materials prepared by the publishers of the selected curricula. If this not an option, CDCR should invest in the development of a teacher's manual for each of the vocational courses it administers. This resource should provide teachers with a variety of instructional strategies, classroom activities, and a wide range of test questions to be used for examinations and as practice for the students. Other information that could help the teachers do the best job possible in CDCR's difficult

teaching environment should also be included. A benefit of providing teachers this information would be a greater degree of consistency across classes at different institutions throughout the state. Standardizing instruction could also help improve the performance of struggling teachers. The end result would be better prepared students who possess measured knowledge about the trade they are learning.

Summary

To summarize, it is clear that many of the forces that impact learning by inmates are beyond the control of those who are charged to teach them. The list seems overwhelming: an extensive criminal history, alienation, negative school experiences, learning disabilities, mental illness, and so much more. However, to improve both educational outcomes and lower recidivism rates, CDCR must focus its energies on the forces it can impact. Providing standardized curricula that are attached to national certification standards, placing students in classes they have time to complete, ensuring that students can understand the curricula, addressing diversity and personal qualities such as workplace ethics, and providing instructional strategies used to bring content to students will all help to improve the efficacy of vocational education programs offered prisoners throughout the state and improve public safety.

CONCLUSIONS

This report evaluates the planned curriculum for the 12 vocational education courses included in this study. Based on TECA and Flesch-Kincaid Grade Level analysis, it is evident that some of the curricula are better structured for inmate-student success than others. Success, in this context, means both completion of the course and productive reintegration back into society once paroled. This is important, because historically inmates who have participated in vocational education while incarcerated have lower recidivism rates than inmates who do not (Aos et al., 2001; Gaes, 2009; Petersilia, 2003). This is just one reason why educational programming in California's prisons is a central component of the California Logic Model (Expert Panel, 2007) and AB 900.

By increasing post-release employment opportunities, the CDCR meets its obligation to improve public safety through reduced recidivism. If Petersilia's (2003) estimate that vocational education can result in a 10% to 30% reduction in recidivism is accurate, Californians can expect a clear benefit from their investment in these classes. Even if we conservatively assume the reduced recidivism benefit is only 10%, a great number of economic benefits can be expected. Applying such numbers to a typical 27 student CDCR vocational education class means that instead of 13.5 inmates returning to prison with a new felony (representing a 50% recidivism rate), 12 or fewer will return (representing a drop of 10% in recidivism). Assuming a conservative estimate of just a two year sentence for the new felony, and an annual incarceration cost of \$40,000, this reduced recidivism means one well-run class would save the state over \$80,000 in incarceration costs in the first year. Extrapolated across every course throughout California's prison system over multiple years, the savings to the state would reach tens

of millions of dollars. This estimate does not reflect cost savings to victims or inmate families, or welfare costs for inmate children. Nor does this estimate take into consideration the benefits of having these parolees being employed and paying taxes, and the increased economic activity from their participation in the marketplace. In this context, the 7:1 rate of return on the costs of vocational education programs for the incarcerated become very plausible (Phipps et al., 2002), making vocational education a wise investment for CDCR and California.

References

- Aos, S., Phipps, P. Baroski, R., & Lieb, R. (2001). *The comparative costs and benefits to reduce crime*. Seattle, WA: Washington State Institute for Public Policy.
- Appleton, J., Lawrenz, F. Craft, E., Cudmore, W., Hall, J., & Waintraub, J. (2007). Models for curricular materials development: Combining applied development processes with theory. *Journal of Science Education and Technology*, 16, 491-499.
- Arney, J.B., Jones, I.S., & Blankenship, D.C. (2003). *Indices of readability and usability of online juror education materials*. Retrieved October 16, 2009, from www.businesscommunication.org/conventions/Proceedings/2003/PDF/25ABC03.pdf.
- California Department of Corrections and Rehabilitation Press Release (2007). "Expert Panel on Corrections Reform Offers California a Roadmap for Reducing Recidivism and Overcrowding." <http://www.cdcr.ca.gov/News/ExpertPanel.html>
- California Department of Corrections and Rehabilitation (2009). Weekly report of population (October 7, 2009). Retrieved October 17, 2009, from www.cdcr.ca.gov/Reports_Research/Offender_Information_Services_Branch/WeeklyWed/TPOP1A/TPOP1Ad091007.pdf.
- Craft instructor's guide. Instructor certification training program. (March, 2007). Gainesville, FL: National Center for Construction Education and Research.
- DuBay, W.H. (2004). *The principles of readability*. Costa Mesa, CA: Impact Information.
- English, F. W., & Larson, R.L. (1996). *Curriculum management for educational and social service organizations*. Springfield, IL: Charles C. Thomas, Publisher, Ltd.
- Expert Panel (2007). California Department of Corrections and Rehabilitation expert panel on adult offender and recidivism reduction programming report to the California State Legislature. A roadmap for effective offender programming in California. Retrieved on March 4, 2008 from cdm15024.contentdm.oclc.org/cdm4/item_viewer.php?CISOROOT=/p178601ccp2&CISOPTR=316.
- Finch, C.R., & Crunkilton, J.R. (1999). *Curriculum development in vocational and technical education: Planning, content and implementation* (5th ed.). Needham Heights, MA: Allyn & Bacon.
- Flesch, R. (2004). *How to write plain English*. Retrieved October 16, 2009, from www.manq.canterbury.ac.nz/courseinfo/academicwriting/glesch.html.

- Freda, M.C. (2005). The readability of American Academy of Pediatrics patient education brochures. *Journal of Pediatric Health Care*, 19, 151-156.
- Friedman, D.B., & Hoffman-Goetz, L. (2006). A systematic review of readability and comprehension of instruments used for print and web-based cancer information. *Health Education and Behavior*, 33, 3, 352-373.
- Gaes, G. G. (2009). *The impact of prison education programs on post-release outcomes*. The Urban Institute, Reentry Roundtable on Education, March 31, and April 1, 2008. Retrieved on August 15, 2008 from www.urban.org/projects/reentry-roundtable/roundtable10.cfm.
- Glickman, C.D., Gordon, S.P., & Ross-Gordon, J.M. (2010). *Supervision and instructional leadership; A developmental approach (8th ed.)*. Boston, MA: Allyn & Bacon.
- Griesinger, W.S., & Klene, R.R. (1984). Readability of introductory psychology textbooks: Flesch versus student ratings. *Teaching of Psychology*, 11, 90-91.
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77, 81-112.
- Hill, J.D., & Flynn, K.M. (2006). *Classroom instruction that works with English language learners*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Hunter, M., & Russell, D. (1981). *Increasing your teaching effectiveness*. Palo Alto, CA: Learning Institute.
- Jonsson, A., & Svingby, G. (2007). The use of scoring rubrics: Reliability, validity, and educational consequences. *Educational Research Review*, 2, 130-144.
- Joyce, B., Weil, M., & Calhoun, E. (2004). *Models of teaching (7th ed.)*. Boston, MA: Allyn & Bacon.
- Keiser, J., Lawrenz, F., & Appleton, J. (2004a). Technical education curriculum assessment. *Journal of Vocational Education Research*, 29, 181-194.
- Keiser, J., Lawrenz, F., & Appleton, J. (2004b). Technical education curriculum assessment rubric. Western Michigan University, The Evaluation Center. Retrieved August 10, 2008 from www.wmich.edu/evalctr/ate/evalproducts.htm.
- Keiser, J., Lawrenz, F., & Appleton, J. (2004c). Evaluation of materials produced by the ATE program. Western Michigan University, The Evaluation Center. Retrieved September 15, 2008 from www.wmich.edu/evalctr/ate/2004_Materials_Development_Report.pdf.

- Mailloux, S.L., Johnson, M.E., Fisher, D.G., & Pettibone, T.J. (1995). How reliable is computerized assessment of readability? *Computers in Nursing*, 13, 221-225.
- Marzano, R.J. (2003). *What works in schools, translating research into action*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Marzano, R.J., Pickering, D.J., & Pollock, J. E. (2001). *Classroom instruction that works*. Alexandria, VA: Association for Supervision and Curriculum Development.
- McKenzie, D. L. (2009). *Structure and components of successful educational programs*. The Urban Institute, Reentry Roundtable on Education, March 31, and April 1, 2008. Retrieved August 15 from <http://www.urban.org/projects/reentry-roundtable/roundtable10.cfm>.
- McNeil, J. (1996). *Curriculum: A comprehensive introduction* (5th ed.). New York, NY: Harper Collins.
- Petersilia, J. (2003). *When prisoners come home: Parole and prisoner reentry*. Oxford, NY: Oxford University Press.
- Picus, L. O., & Wattenberger, J.L. (Eds.). (1996). *Where does the money go?* Thousand Oaks, CA: Corwin.
- Public Safety and Offender Rehabilitation Services Act of 2007 (Assembly. Bill No. 900 (2006-2007 Reg. Sess.)).
- Reys, R., Reys, B., Lapan, R., Holliday, G., & Wasman, D. (2003). Assessing the impact of standards based middle grade mathematics curriculum materials on student achievement. *Journal for Research in Mathematics Education*, 34, 74-76.
- Stevens, K.T., Stevens, K.C., & Stevens, W.P. (1992). Measuring the readability of business writing: The cloze procedure versus readability formulas. *The Journal of Business Communication*, 29, 367-382.
- Stockmeyer, N.O. (2009). Using Microsoft Word's readability program. *Michigan Bar Journal*, 88, 46-47.
- Taylor Fitz-Gibbon, C., & Morris, L.L. (1987). *How to design a program evaluation*. Newbury Park, CA: Sage.
- Three Judge Court, in the Eastern District of California (2009). *Ralph Coleman et al., Plaintiffs vs. Arnold Schwarzenegger et al.; and Marciano Plata et al., vs Arnold Schwarzenegger et al. Opinion and order. Case 3.01-cv-01351-TEH Filed 08/04/09. 184 pp.*
- Tyler, R. (1950). *Basic principles of curriculum and instruction*. Chicago, IL: University of Chicago Press.

United States Department of Labor. (1991). *Secretary's Commission on Achieving Necessary Skills (SCANS): What work requires of schools*. Retrieved on July 8, 2008 from wdr.doleta.gov/SCANS/whatwork/.

Weiss I.R., Knapp, M.S., Hollweg, K.S., & Burrill, G. (Eds.). (2001). *Investigating the influence of standards: A framework for research in mathematics, science, and technology education*. Washington, D.C.: National Academy Press.

Wiggins, G. (1998). *Educative assessment: Designing assessments to inform and improve student performance*. San Francisco, CA: Jossey-Bass.

Appendix A

Courses, Texts and Time

Auto Mechanics

Gilles, T. (2004). *Automotive service, inspection, maintenance, repair* (2nd ed.). Clifton Park, NY: Delmar Learning.

Gilles, T., & Rockwood, C. (2004). *Lab manual to accompany automotive service, inspection, maintenance, repair* (2nd ed.). Clifton Park, NY: Delmar Learning.

Building Maintenance

Construction technology (Volume 2). (2002). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Core curriculum: *Introductory craft skills* (3rd ed.). (2004). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Carpentry

Carpentry fundamentals (Level 1) (4th ed.). (2006). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Carpentry fundamentals (Level 2). (2001). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Core curriculum: *Introductory craft skills* (3rd ed.). (2004). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Electrical Works

Core curriculum: *Introductory craft skills* (3rd ed.). (2004). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Electrical (Level 1). (2005). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Electrical (Level 2). (2005). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Electrical (Level 3). (2005). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Electrical (Level 4). (2005). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Heating, Ventilation and Air Conditioning (HVAC)

Core curriculum: Introductory craft skills (3rd ed.). (2004). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

HVAC (Level 1) (3rd ed.). (2007). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

HVAC (Level 2). (2001). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

HVAC (Level 3). (2002). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

HVAC (Level 4). (2003). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Janitorial Services

Carpet and upholstery care: Custodial maintenance. (2001). Buffalo Grove, IL: TPC Training Systems.

Cleaning chemicals: Custodial maintenance. (2001). Buffalo Grove, IL: TPC Training Systems.

Floors and floor care equipment: Custodial maintenance. (2001). Buffalo Grove, IL: TPC Training Systems.

Maintaining floors and other surfaces: Custodial maintenance. (2001). Buffalo Grove, IL: TPC Training Systems.

Restroom care: Custodial maintenance. (2001). Buffalo Grove, IL: TPC Training Systems.

Safety and health. (2001). Buffalo Grove, IL: Schoolcraft Publishing.

Landscaping

Installation; Landscape training manual for installation technicians. (2006). Herndon, VA.: PLANET, Professional Landcare Network.

Irrigation; training manual for installation technicians. (2003). Herndon, VA: Associated Landscape Contractors of America.

Nursery professional workbook (2nd ed.). (2006). Sacramento, CA: California Association of Nurseries and Garden Centers, California Certified Nursery Professionals.

Maintenance; Landscape training manual for installation technicians. (2005). Herndon, VA.: PLANET, Professional Landcare Network.

Pittenger, D.R. (2006). Retail garden center manual. Oakland, CA: University of California Agriculture and Natural Resources Publication 3492.

Mill & Cabinetry

Cabinetmaking. (2003). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Carpentry fundamentals (Level 1) (4th ed.). (2006). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Core curriculum: Introductory craft skills (3rd ed.). (2004). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Office Services and Related Technologies

Fosegan, J.S. (2003). Alphabetic indexing rules; Application by computer (4th ed.). Mason, OH: Southwestern.

Hoggatt, J.P., & Shank, J.A. (2006). Century 21 computer keyboarding. Mason, OH: South-Western.

Means, T. (2004a). Business communication. Mason, OH: South-Western.

Means, T. (2004b). Business communication study guide. Mason, OH: South-Western.

Microsoft Access. (2003a). Benchmark series. St. Paul, MN: EMC Paradigm Publishing.

Microsoft Word. (2003b). Benchmark series. St. Paul, MN: EMC Paradigm Publishing.

- Microsoft Power Point. (2003). Benchmark series. St. Paul, MN: EMC Paradigm Publishing.
- Pasewark, W.R. (2006). Calculators: Printing and display (4th ed.). Mason, OH: South Western.
- Rutkowsky, N. (2004). Word, 2003, specialist. *Benchmark series; Microsoft Specialist Approved Courseware*. St. Paul, MN: EMC Paradigm Publishing.
- Zedlitz, R. (2005). Getting a job process kit (5th ed.). Cincinnati, OH: South-Western.

Painting

- Core curriculum: Introductory craft skills (3rd ed.). (2004). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.
- Industrial painting. (1998). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.
- Painting (Level 1). (1997). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.
- Painting (Level 2). (1997). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.
- Painting (Level 3). (1997). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.
- Painting (Level 4). (1997). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Plumbing

- Core curriculum: Introductory craft skills (3rd ed.). (2004). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.
- Plumbing (Level 1) (3rd ed.). (2005). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.
- Plumbing (Level 2) (3rd ed.). (2005). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.
- Plumbing (Level 3) (3rd ed.). (2006). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Plumbing (Level 4) (3rd ed.). (2006). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Welding

Core curriculum: Introductory craft skills (3rd ed.). (2004). Trainee Guide, Now with Soft Skills, NCCER, Upper Saddle River, NJ: Pearson.

Welding (Level 1) (3rd ed.). (2003). NCCER, Upper Saddle River, NJ: Pearson.

Welding (Level 2) (3rd ed.). 2003). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Welding (Level 3). (2003). NCCER Trainee Guide, Contren Learning Series. Upper Saddle River, NJ: Pearson.

Appendix B

TECA Rubrics

Reviewer Name: _____

OVERVIEW:

These rubrics are for the evaluation of materials developed by Advanced Technological Education (ATE) projects and centers. Elements of quality were identified in a literature review and an analysis of the ATE program evaluation issue papers. These quality indicators were summarized and mapped to the rubric categories. There are three types of ratings: specific, holistic, and overall.

The SPECIFIC RATINGS should be done first.

- Reviewers are to answer only the set of items related to their expertise, either “industry or content specialist” or “curriculum, instruction, & assessment specialist.”
- Reviewers are asked to answer some yes or no questions, provide a rating of quality, and give evidence to support the ratings.

The second set of items is HOLISTIC RATINGS.

- These are broad and are meant to capture the general quality of the materials.
- These questions are to be answered by all the reviewers.

The third item is an OVERALL RATING.

- This is a summary assessment of the effectiveness of the materials in helping students learn the knowledge and skills and/or practices needed to be successful in the technical workplace.
- Reviewers are asked to provide both a rating and the evidence to support the rating.
- This question is to be answered by all reviewers.

Rating Scale

- All items are rated on a five-point scale from 0 to 4.
- Zero means none of the characteristics described in the question are reflected in the materials.
- Four indicates that all of the characteristics described in the question are reflected in the material.
- The NA means “Not Applicable” and DK means “Don’t Know.” These should only be used in rare circumstances.

SPECIFIC RATINGS

CURRICULUM, INSTRUCTION, & ASSESSMENT SECTION

(**only answered by the curriculum, instruction, and assessment specialists**)

Please answer the Yes or No questions first by circling yes or no for each item.

They are intended to help you reflect on specific elements of the materials and to help you understand the intent of the rubric question. They are meant to be representative of some important elements but not inclusive of all.

I. Instructional Strategies

Do the materials suggest how to teach?	Yes or No
Could the materials be used by someone unfamiliar with them?	Yes or No
Do the materials recommend instructional resources?	Yes or No
Do the materials provide any on-going support (e.g., listserv or website)?	Yes or No
Do the materials offer strategies for adapting them to other situations (e.g., grade, student population or content standard)?	Yes or No
Can activities be used by individuals as well as small groups and large groups of students?	Yes or No
Can information be investigated in alternative ways?	Yes or No
Can information be presented in alternative ways?	Yes or No

1. To what extent do the materials support instructional strategies that actively engage all learners?

NA/DK 0 1 2 3 4

- 0: Materials *do not* support effective instructional strategies that actively engage all learners.
- 1: Materials are *weak* at supporting effective instructional strategies that actively engage all learners.
- 2: Materials are *adequate* at supporting effective instructional strategies that actively engage all learners.
- 3: Materials are *good* at supporting effective instructional strategies that actively engage all learners.
- 4: Materials are *excellent* at supporting effective instructional strategies that actively engage all learners.

Describe the evidence that supports your rating:

II. Problem Solving

<i>Are students required to recognize particular types of problems?</i>	Yes or No
<i>Do the materials contain activities that require students to perform multiple steps before arriving at a solution?</i>	Yes or No
<i>Do the materials contain activities that require students to collect information or data before making a decision?</i>	Yes or No
<i>Are there activities that require students to consider constraints, risks, or alternatives before making a decision?</i>	Yes or No

2. To what extent do the materials develop problem solving and critical thinking skills? That is, do the materials encourage students to learn how to approach problems, to think both creatively and analytically, and to make knowledge based decisions?

NA/DK 0 1 2 3 4

- 0: Materials *do not* develop problem solving and critical thinking skills.
 1: Materials are *weak* at developing problem solving and critical thinking skills.
 2: Materials are *adequate* at developing problem solving and critical thinking skills.
 3: Materials are *good* at developing problem solving and critical thinking skills.
 4: Materials are *excellent* at developing problem solving and critical thinking skills.

Describe the evidence that supports your rating:

III. Integration of General Education Content

<i>Do the materials require students to locate, understand and interpret written information in professional documents, manuals, web sites, or books?</i>	Yes or No
<i>Are students required to communicate technical concepts verbally, in Writing, or in visual aides such as charts or graphs?</i>	Yes or No

3. To what extent do the materials integrate general education skills such as English, technology, and written and oral communication?

NA/DK 0 1 2 3 4

- 0: Materials *do not* integrate general education skills.
 1: Materials are *weak* at integrating general education skills.
 2: Materials are *adequate* at integrating general education skills.
 3: Materials are *good* at integrating general education skills.
 4: Materials are *excellent* at integrating general education skills

Describe the evidence that supports your rating:

IV. Assessment

<i>Are the assessments closely aligned with the learning objectives?</i>	Yes or No
<i>Do the required activities and assessments have more than one correct answer?</i>	Yes or No
<i>Do the assessments provide feedback to the student and an opportunity to improve performance?</i>	Yes or No
<i>Do the assessments integrate specific professional or industry skills?</i>	Yes or No
<i>Do the assessments allow students to demonstrate their understanding and abilities in different ways?</i>	Yes or No
<i>Do the assessments have activities that use real world situations?</i>	Yes or No
<i>Do the assessments provide feedback to the instructor that could be used to improve the materials?</i>	Yes or No

4. To what extent do the assessments or required activities measure the adequacy of the student's knowledge and skills required in the workplace?

NA/DK 0 1 2 3 4

- 0: The assessments *do not* measure the knowledge and skills required in the workplace.
 1: Assessments are *weak* at measuring the knowledge and skills required in the workplace.
 2: Assessments are *adequate* at measuring the knowledge and skills required in the workplace.
 3: Assessments are *good* at measuring the knowledge and skills required in the workplace.

- 4: Assessments are *excellent* at measuring the knowledge and skills required in the workplace.

Describe the evidence that supports your rating:

V. Personal Qualities

- Do the materials require students to coordinate their efforts with others? Yes or No
- Are there activities or assessments that require students to meet deadlines? Yes or No
- Are there opportunities for students to demonstrate individual responsibility? Yes or No
- Do the materials contain activities that require students to manage their own behaviors? Yes or No
- Do the materials contain activities that require students to set their own levels of personal performance? Yes or No

5. How well do the materials develop personal qualities required for professional employment? These might include character traits, behaviors and attitudes that are needed for personal growth and professional development such as responsibility, self-management, and integrity.

NA/DK 0 1 2 3 4

- 0: Materials *do not* develop personal qualities needed for professional employment.
- 1: Materials are *weak* at developing personal qualities needed for professional employment.
- 2: Materials are *adequate* at developing personal qualities needed for professional employment.
- 3: Materials are *good* at developing personal qualities needed for professional employment.
- 4: Materials are *excellent* at developing personal qualities needed for professional employment.

Describe the evidence that supports your rating:

VI. Diversity

- Do the materials include examples from a variety of types of workplaces and settings?* Yes or No
- Do the materials encourage students to understand how to work with people from different backgrounds?* Yes or No
- Do the materials reflect the growing diversity of the workforce?* Yes or No
- Do the materials include references that broaden the students' awareness of different cultural and socioeconomic groups?* Yes or No

6. To what extent do the materials reflect the experiences and perspectives of different cultural and socioeconomic groups?

NA/DK 0 1 2 3 4

- 0: Materials *do not* reflect perspectives of different cultural and socioeconomic groups.
- 1: Materials are *weak* at reflecting perspectives of different cultural and socioeconomic groups.
- 2: Materials are *adequate* at reflecting perspectives of different cultural and socioeconomic groups.
- 3: Materials are *good* at reflecting perspectives of different cultural and socioeconomic groups.
- 4: Materials are *excellent* at reflecting perspectives of different cultural and socioeconomic groups.

Describe the evidence that supports your rating:

HOLISTIC RATINGS (**answered by all reviewers**)

- 1. Industry Standards & Practices:** Materials should clearly reflect learning objectives that are based on current business, industry, and technology standards and practices.

Linked: Industry & Content rubrics 1, 2, 3, 4, & 5

NA/DK 0 1 2 3 4

- 0: The materials *do not* reflect any industry standards and practices.
- 1: The materials are *weak* at reflecting industry standards and practices.
- 2: The materials are *adequate* at reflecting industry standards and practices.
- 3: The materials are *good* at reflecting industry standards and practices.
- 4: The materials are *excellent* at reflecting industry standards and practices.

- 2. Real World Curriculum:** Materials should engage learners in ways to help them understand the reality of the profession they seek. Instruction should be related to workplace needs. Materials should use tasks that are real activities that people perform while “on the job.”

Linked: Industry & Content rubrics 1, 2, 3 & 5
Curriculum, Instruction, & Assessment rubrics 1 & 4

NA/DK 0 1 2 3 4

- 0: The materials *do not* engage the learner in real world tasks.
- 1: The materials are *weak* at engaging the learner in real world tasks.
- 2: The materials are *adequate* at engaging the learner in real world tasks.
- 3: The materials are *good* at engaging the learner in real world tasks.
- 4: The materials are *excellent* at engaging the learner in real world tasks.

- 3. Workplace Competencies:** How well do the materials enable students to develop the high performance skills needed to succeed in a high performance workplace? The Secretary’s Commission on Achieving Necessary Skills (SCANS) was appointed by the Secretary of Labor to determine the skills people need to succeed in the world of work. According to the SCANS Report, high performance workers need a solid foundation in: basic literacy (reading, writing, listening, and speaking), computational skills, applying technology, and understanding social, organizational, and technological systems. They also need thinking skills to put knowledge and resources to work and the personal qualities that make them dedicated, reliable, and able to work with others.

Linked: Industry & Content rubrics 3, 4, & 5
Curriculum, Instruction & Assessment rubrics 2, 3, 4, & 5

NA/DK 0 1 2 3 4

- 0: The materials *do not* develop workplace skills.
- 1: The materials are *weak* at developing workplace skills.
- 2: The materials are *adequate* at developing workplace skills.

- 3: The materials are *good* at developing workplace skills.
- 4: The materials are *excellent* at developing workplace skills.

4. Access to In-Depth Understanding: How well do the materials allow all learners to acquire in-depth understanding? Such practices include instructional strategies that actively engage students and allow them to learn in ways consistent with their preferences. The materials also require students to synthesize, generalize and evaluate information and to develop complex understandings of the content by exploring connections and relationships. In addition, materials that allow access to in-depth understanding are also well organized, easy to follow, and contain assessments and activities that are aligned with the content.

Linked: Curriculum, Instruction, & Assessment rubrics 1, 2, 3, 4, 5, & 6

NA/DK 0 1 2 3 4

- 0: The materials *do not* support in-depth understanding.
- 1: The materials are *weak* at supporting in-depth understanding.
- 2: The materials are *adequate* at supporting in-depth understanding.
- 3: The materials are *good* at supporting in-depth understanding.
- 4: The materials are *excellent* at supporting in-depth understanding.

OVERALL RATINGS (**answered by all reviewers**)

Please rate the effectiveness of the materials in having students learn the knowledge and skills or practices needed to be successful in the technical workplace. Select the description that best characterizes your overall assessment. ***This rating is not intended to be an average of all the previous ratings, but your overall judgment of quality and likely impact of the materials. Please describe the evidence that supports your rating in the space provided.***

To what extent will the materials help students learn the knowledge and skills or practices needed to be successful in the technical workplace?

NA/DK 0 1 2 3 4

- 0: The materials *will not* help students learn knowledge and skills or practices needed to be successful in the technical workplace..
- 1: The materials *will be weak* at helping students learn knowledge and skills or practices needed to be successful in the technical workplace.
- 2: The materials *will be adequate* at helping students learn knowledge and skills or practices needed to be successful in the technical workplace.

- 3: The materials *will be good* at helping students learn knowledge and skills or practices needed to be successful in the technical workplace.
- 4: The materials *will be excellent* at helping students learn knowledge and skills or practices needed to be successful in the technical workplace.

Describe the evidence that supports your rating:
