Effectiveness evaluation of the Hispanic Workforce Research Project (HWRP)

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Effectiveness evaluation of the Hispanic Workforce Research Project (HWRP)

by

Fernando Aveiga

A thesis submitted to the graduate faculty
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Program of Study Committee:
Edward Jaselskis, Major Professor
   Francis Owusu
   Douglas Bonett
   Thomas Stout

Iowa State University

Ames, Iowa

2007

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For William and Acacia

Thanks for all your support throughout my college life
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ABSTRACT

Hispanics are a large and growing part of the United States workforce. Official projection state that by the year 2050 Hispanics will account for 25 percent of the population. For the Midwest in particular, the Hispanic population is expected to increase 35 percent by the year 2025. The construction industry is expected to experience greater percentage increase of its Hispanic population due to the labor intensive nature of the industry.

This study addresses the expected increase of Hispanic workers in the construction industry by investigating the best approaches for delivering training to construction crews with Hispanic workers as well as American supervisors and laborers in the State of Iowa. It also involved developing an integration on-site course. The Toolbox Integration Course for Hispanic workers and American supervisors (TICHA) is put to test during the construction season 2006 with the collaboration of three construction companies. The research methodology consisted of assessing the effects on communication, safety, work environment, and productivity as a result of the integration training.

Results show that integration on-site training decreases worker’s desirability to move and increases quality of work and productivity. Most importantly, experimental design was used to show the increasing levels of direct construction communication due to TICHA.

This study recommends the creation of a quasi-governmental program which can offer continuous research and training which can benefit the construction industry as well as society as a whole. The industry involvement in this process is crucial for contractors. Not only contractors reduce the insurance premiums when workers act safely, but workers with better communication skills are more productive.
CHAPTER ONE. Overview of the Hispanic Immigration and the Construction Workforce
Introduction

Is there a need to develop a Multicultural, Communication, and Safety Management Training Program for the Construction Industry in the U.S. Midwest? The answer to this question is a cautious yes. Hispanics\(^1\) constitute the group with the largest migration numbers to the United States. Traditionally, the construction industry has been a labor intensive field. This industry attracts low skill labor and due to the inherent risks in construction, wages tend to be higher than most low skill jobs (e.g. agriculture). Nevertheless workers are the most important factors in the production process, especially in labor intensive industries such as the construction industry. These are some of the reasons why a great number of Hispanic immigrants have pursued working in the construction industry. The continuous changes of the demographic composition of the U.S. forces different industries to be in a state of constant adaptation.

With the intention of making the construction industry more adaptable for these demographic changes, different players surrounding the industry have developed training materials. This training material as well as other research findings suggests that a multicultural, communication and management training program is necessary for the continue success of the industry in terms of its productivity and safety culture. While there is no debate whether the increasing inflow of Hispanic workers need adjusting for effective training, it is not yet clear who should bare the cost for implementing it. The construction industry is legally required to train its workers with courses ranging from safety to flagging; all which are not being properly delivered to the increasing Hispanic worker population in the industry. It is found that traditional methodology for delivering the training material will not work under such a labor diverse industry (Canales et al., 2007). Yet, a program of these characteristics is required for optimizing the industry’s training requirements, but it is the industry and/or the government who should request the creation of such a program.

Why then to remain cautious about the developing this training program when there is evidence for its need? As it is described in this article, implementing such a program needs the affirmation that a dynamic industry needs institutions that provide support for the

---

\(^1\) The term Hispanic refers to those individuals with a Spanish speaking heritage. Though Brazilians and other Latin Americans are not Hispanic, this article uses “Hispanic” as a generic term for all Latin American authorized or unauthorized workers.
changes it experiences. In addition, a joint collaboration of the industry\textsuperscript{2} and government and the cautious structuring of the training to be the most efficient possible are both requirement. While the training needs have been identified and benefits from training quantified\textsuperscript{3}, developing a program brings about new and unknown challenges that can only be faced with the government and industry joint collaboration.

This article highlights some of the official statistics on Hispanic immigration found in the U.S. Census Bureau and Bureau of Labor Statistics. The article continues reporting how Hispanic immigration is affecting the dynamics of various industries; in particular, the safety record of the construction industry. A review the current scholarly, government and industry efforts for confronting the changes happening in the construction industry’s labor force is reported. In terms of the capacities of the creation of the program suggested in this article, the problem of unauthorized workers in the industry impacts the industry negatively. Finally, this article concludes with a general summary of the issues and solutions for construction industry and illustrates the lessons that would help in the quest for developing the Midwest Multicultural Construction Workforce Program (MWP), possibly at the Center for Transportation Research and Education at Iowa State University\textsuperscript{4}.

U.S. Hispanic Demographics and projections

Population

Hispanics are considered the largest ethnic minority in the U.S. and are projected to make up about 25% of the workforce by 2050 (U.S. Census Bureau, 2000a).

Today, Hispanic workers in the U.S. comprise nearly 18% of the workforce (Canales et al., 2007). Due to the rapid growth of the Hispanic population in the U.S. during the past decade, Hispanics calls for recognition and an understanding of their influence over time in American society. By the year 2025, the U.S. population is expected to reach 419.9 million

\textsuperscript{2} Trade associations could take a major role in this effort due to their advertisement capacity and the services they could provide within their structural operative system.

\textsuperscript{3} See Nash’s (2004) for safety improvements due to training. Also refer to Chapter 4 for a study on increased productivity and quality of labor due to training.

\textsuperscript{4} See http://www.ctre.iastate.edu/
and Hispanics are projected to make up about a quarter (24.4%) of that total (U.S. Census Bureau, 2004d).

Table 1.1 shows all the Iowa neighboring states with the Hispanic populations for the year 2005 and its current projections for the year 2025. A common denominator in Table 1.1 is the similarity in the percentage increase in the Hispanic population over the next 20 years for all the reported Midwestern states.

Table 1.1. Iowa and neighboring States projected population increase for 2025

<table>
<thead>
<tr>
<th>States</th>
<th>2005</th>
<th>2025 (proj)</th>
<th>Percentage Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>61,000</td>
<td>96,000</td>
<td>37%</td>
</tr>
<tr>
<td>Minnesota</td>
<td>114,000</td>
<td>193,000</td>
<td>40%</td>
</tr>
<tr>
<td>Nebraska</td>
<td>72,000</td>
<td>111,000</td>
<td>35%</td>
</tr>
<tr>
<td>Kansas</td>
<td>166,000</td>
<td>281,000</td>
<td>40%</td>
</tr>
<tr>
<td>South Dakota</td>
<td>9,000</td>
<td>14,000</td>
<td>35%</td>
</tr>
<tr>
<td>Illinois</td>
<td>1,450,000</td>
<td>2,275,000</td>
<td>36%</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>156,000</td>
<td>236,000</td>
<td>33%</td>
</tr>
<tr>
<td>Missouri</td>
<td>105,000</td>
<td>172,000</td>
<td>38%</td>
</tr>
</tbody>
</table>

Source: Chicano Latino Affairs Council of the State of Minnesota
http://www.clac.state.mn.us/english/usproj.htm

As of July of 2005 the Hispanic population of the U.S. was 42.7 million, with 27.3 million coming from Mexico alone. In perspective, between July of 2004 and July 2005, one of every two people added to the U.S.’s population was Hispanic. In addition, within that period there was a 3.3 percent increase in the Hispanic population; making Hispanics the fastest-growing minority (U.S. Census Bureau, 2004a).

Not long ago, during the 1990 Census the Hispanic population was just slightly over 22.4 million. Today, the projections for 2050 are that the Hispanic population will be 102.6 million (U.S. Census Bureau, 2004a).

---

5 The author calculated the percentage increase from the Hispanic 2005 population and the projected for 2025
6 This estimate does not include the 3.9 million residents of Puerto Rico.
In terms of current language statistics, about 47 million Americans speak a language other than English of which ~28 million speak Spanish at home (U.S. Census Bureau, 2004d).

More than 10 million people living in the U.S. were born in Mexico and this is by far more than any country in the world. Other countries of birth that contribute large numbers of Hispanics are El Salvador (937,000), Guatemala (590,000) and Colombia (500,000) (U.S. Census Bureau, 2004c).

**Businesses**

In 2000, about 1.6 million businesses nationwide were Hispanic-owned. The rate of growth of Hispanic-owned business between 1997 and 2001 is of 31 percent while the national average is only 10 percent. The increase in Hispanic entrepreneurial activities has generated revenues of $222 billion for all industries in 2002. That is 19 percent higher than the revenues from 1997 (U.S. Department of Commerce, 2005). Forty four percent of all the Hispanic-owned firms are run by people of Mexican origin. Maybe the most relevant statistic is that one third of the all the Hispanic-owned businesses are related to construction. In addition, 15 percent of all the Hispanic labor force work in the construction industry (U.S. Department of Commerce, 2005) while 20 percent of all construction workers are Hispanics (Nash, 2003).

**Income and Poverty**

In 2004 the real median income of Hispanic households was $34,241 while the poverty rate was just below 22 percent. In addition, the Economic Research Service (2003) found that the increase in Hispanic immigration to rural areas has reduced the real wage level for both skilled and unskilled Hispanic workers in those areas. As well, it has contributed to a decrease of the real wage for all unskilled workers in rural areas (Neuman, 2003; Goodrum, 2004).

Relevant to the success of the construction industry is for workers to have health insurance. But 32.7 percent of Hispanics living in the U.S. lacked health insurance in 2004 (Neuman, 2003).
Education level is strongly correlated to income levels. In this case by 2004 only 12 percent of the Hispanic population of 25 years or older have a bachelor’s degree while 58 percent had at least a high school education (U.S. Department of Commerce, 2005). Table 1.2 shows that this figure has improved over the past two decades, but there is still an extremely large pool of unskilled workers with low education levels; the type usually used for the construction activities.

Table 1.2. Percent of Hispanic population age 25 and older, by years of school completed

<table>
<thead>
<tr>
<th></th>
<th>Less than 5 years of elementary school</th>
<th>High school completion or higher</th>
<th>4 or more years of college</th>
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<tr>
<td>1980</td>
<td>15.8</td>
<td>44.5</td>
<td>7.6</td>
</tr>
<tr>
<td>1990</td>
<td>12.3</td>
<td>50.8</td>
<td>9.2</td>
</tr>
<tr>
<td>2000</td>
<td>8.7</td>
<td>57.0</td>
<td>10.6</td>
</tr>
<tr>
<td>2005</td>
<td>7.9</td>
<td>58.5</td>
<td>12.0</td>
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Twenty percent of construction workers and about 18 percent of the labor force are Hispanics. In proportion, that is, Hispanics are quite important for the construction industry.

Hispanics, the Workplace, and a Construction Safety Mishap

Hispanic industries, dynamic training

Every industry in the United States is facing new challenges of growing numbers of minorities and immigrants speaking their native languages with limited or no knowledge of English. As the U.S. economy continues to expand and the baby boom generation retires over the next 30 years, the need for immigrant workers will increase significantly, creating new challenges to the U.S. economy (Sincavage, 2004). Numerous industries have already had to hire bilingual employees to communicate to workers, who come from numerous backgrounds (Canales et al. 2007).

7 According to the Bureau of Labor Statistics the total U.S. labor force was 152.8 million in January of 2007. See: http://www.bls.gov/news.release/empsit.nr0.htm
That is certainly the case for the Agricultural, Landscaping, and Golfing industries which have created extension programs to address the lack of training and safety education necessary for success. For instance, the agricultural extension program at the University of Florida has created and currently delivers the following programs in Spanish:

1. Worker Protection Standard for Worker and Handler.
2. Train the Trainer.
3. Private applicator.
4. General Standards (Core).
6. Commercial landscape maintenance.
7. Pest control technician training.\(^8\)

In a Golf Course Magazine article, Perry (2006)\(^9\) suggests that no solution to the Hispanic workforce contribution to the golfing industry happens at low costs. On the same note, Maloney (1996) at the Department of Applied Economics and Management at Cornell University considers the communication problem in the golf course maintenance industry generates two different types of issues. The lack of communications due to language and the lack of communications due to cultural differences are two separate issues, he argues.

The landscaping industry is facing similar issues and is reacting promptly to correct them. The Landscape Industry no longer operates without direct labor of Hispanics (Perry, 2006). According to the Hispanic Business Magazine, so far, most of the English training required for regular domestic workers has been translated to Spanish\(^10\).

These are only a few of the industries that have implemented aggressive training programs adapted for Hispanic worker’s culture and language. However, it is in the construction industry where the lack of such training has caused not only the common communication and productivity issues faced by other industries, but a safety record in decline.

\(^8\) Source: http://www.pbcgov.com/coopext/hispanic/about.htm
\(^10\) Source: http://www.hispaniclawnforum.com/forums/
Hispanics in construction

Population trends indicate that the number of Hispanic workers in construction continue to grow creating the need to develop strategies to blend cultures in the workplace. In some states such as California, New Mexico and Texas, Hispanics are already the majority of the construction workforce (Goodrum 2005).

In construction, Hispanic immigrants directly affect the labor composition of the industry. Traditionally, this industry has been male-dominated. In 2005, there were 108 Hispanic males per every 100 Hispanic females. This was in sharp contrast to the overall population, which had 97 males per every 100 females on the same year (U.S. Census Bureau, 2004c). This could be significant for the increasing pool of workers of a male-dominated industry.

Other demographic factors directly impact the construction industry. In 2005 the median age of Hispanic workers was of 27.2 years. This compares with 36.2 years for the population as a whole (U.S. Census Bureau, 2004c). A great number of these young workers prefer to work in construction11 (NIOSH, 2003).

Hispanics constitute about 20 percent of construction employees. In addition, one third of all Hispanic-owned businesses are related to construction and 15 percent of all the Hispanic labor force work in the construction industry (Nash, 2004).

In a rigorous socio-economic study conducted for the State of North Carolina, it was found that Hispanic workers contribute immensely to the state’s economic output and cost competitiveness in the construction industry. It was found that without Hispanic labor the state’s construction industry output would likely be considerably lower and the state’s total private-sector wage bill as much as $1.9 billion higher (Kasarda et al., 2006).

According to Mike Weiss, past chairman of the National Association of Home Builders (NAHB), Hispanics represent a significant solution to the semiskilled construction labor shortage12. “Many who have worked with and around Latino crews are aware that they have drive and desire to be productive. They came to this country for the same reason our

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11 In fact, the construction industry ranks 3rd in the number of work-related fatalities to youth (NIOSH, 2003).
ancestors did, to find a better life and being able to communicate is key to that”, Weiss adds. And so far the greatest challenges for increase productivity are language barriers and poor safety records.

A safety misfortune

The current wave of globalization has encouraged the mobilization of not only American construction firms into Latin-American countries to facilitate building their infrastructure but a great number of Hispanic13 construction workers to go to the United States. Despite the complex nature of blending the cultures in a dynamic construction industry, it is still possible to develop productive relationships between American supervisors and Latin-American workers. These productive relationships are extremely important. So far, however, the industry has failed to sustain a relationship that produces safer and more productive jobsites with higher effectiveness in the work quality. While the issues the industry faces go far beyond the topic of safety, it is this factor the most worrying.

The construction industry employed 2.9 million Hispanic workers in 2006, which accounts for 25 percent of the total employment of 11.8 million workers in the construction sector (Sarmiento, 2007).

Nationwide, Hispanic workers make up about 18% percent of the workforce, but they account for 13.8 percent of industrial workplace fatalities (Allen, 2007). Along with the population increase, Hispanic workers continue to have the highest fatalities (4.5/100,000 Hispanic workers) among cultural groups in the construction industry, as reported by the BLS in the National Census of Fatal Occupational Injuries in 2003. Furthermore, the construction sector carried the highest number (1,126) of fatal occupational injuries in 2003, especially among construction laborers (BLS 2003a).

In his well cited Visual Essay, Richardson (2005) shows the Hispanic fatality statistics in the construction industry. Richardson differentiates between U.S. born and foreign born Hispanics for comparison statistics. Overall, it is found that regardless of birthplace (or “nativity” as he calls it), Hispanic workers have the highest fatality rates of all

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13 The term Hispanic refers to those individuals with a Spanish speaking heritage. Though Brazilians and other Latin Americans are not Hispanic, this article uses “Hispanic” as a generic term for all Latin American authorized or unauthorized workers.
workers of any race. In Figure 1.1 Richardson reports that most foreign-born Hispanic
construction workers are not U.S. citizens. In the last decade, as the number of fatal incidents
has risen for Hispanic workers, the proportion of foreign-born Hispanics who die on the
jobsite has also increased as depicted in Figure 1.2.

The problem of the illegality facing many of these workers sometimes translates into
less accessibility to training and general civil rights. There are Hispanic workers who would
receive language or safety training if they had a legal authorization to work. On the other
hand, the larger number of foreign-born Hispanic fatalities could be due to their lack of
language knowledge.

As shown in Figure 1.3, homicide is not a cause of fatality for Hispanic workers in
the jobsite. “Fall to lower level” and “all other events” account for most of the fatality
incidents in construction.

Also Figure 1.4 highlights the need for safety training of foreign born Hispanic
workers as their fatality rate per 100,000 workers is significantly higher than U.S. born
Hispanic construction laborers. In conclusion, when the fatality rate of foreign-born
Hispanics is compared to the average of all Hispanics, regardless of birthplace, it is obvious
to think that most of the safety issue is a result of the new wave of immigrant Hispanic
workers.
Figure 1.1. Hispanic employment by number (in thousands) and percent aged 16 and older, 2004


Figure 1.2. Fatal work injuries involving Hispanic workers in private construction by nativity, 1993–2002

Figure 1.3. Percent of total fatal work injuries occurring to foreign-born workers by country of birth and primary fatal event in construction, 1996–2004


Figure 1.4. Fatal construction work injury rates for Hispanic workers, 2004

There is no doubt Hispanic workers are affecting the dynamics of the construction industry. Specially, as Nash (2004) reports, the safety record for all construction workers has not worsened dramatically while the same statistic for Hispanic construction workers are hitting all time records. The Hispanic safety record of the last decade, as shown in Figure 1.5, impedes the safety success of the construction industry while highlights the worsening of the working safety conditions of the Hispanic increasing population.

Figure 1.5. Then and now: the changing complexion of fatalities in construction

![Bar Chart](chart.png)


While the number for all construction workers has increased by a total of 1.2 percent, the number of fatalities for Hispanic workers has increased by 46.9 percent. In order words, if there were no Hispanic construction workers, ceteris paribus, the industry’s safety record will not appear as a major problem. The players of the construction industry nationwide
should now realize that the Hispanic workforce, foreign and U.S. born will continue to increase and that, up to now, at least 15 percent work in construction.\footnote{That takes into account both male and female. Few women work in construction. In consequence, it wouldn’t be pure guesswork to think that, ceteris paribus, at least 30 percent of the male Hispanic increasing workforce works and will work in construction for years to come.}

**Current Hispanic Construction Worker Training Programs**

**Government**

The Occupational Safety and Health Administration (OSHA) has special concerns for non-English speaking workers. According to the OSHA Trade News Release (2002), more than $2.2 million in new funding was allocated for outreach to Spanish and other non-English-speaking workers during the 2004 fiscal year. This is the first time OSHA’s budget included additional funding for Hispanic outreach (Canales, 2005). Moreover, OSHA is forming alliances with Hispanic leadership and community-based organizations and offering an ever-increasing number of publications and fact sheets in Spanish. OSHA will continue to expand ongoing Hispanic outreach projects such as the community-based efforts to disseminate safety and health information among immigrants in New York and New Jersey (OSHA, 2002).

OSHA’s most recent action has been the establishment of a help-hot-line\footnote{The number listed at the Georgia Mexican Consulate’s website is (404) 262-4466} for Hispanic workers who are concerned about safety and health hazards at their construction jobsites (OSHA, 2005). This project has taken place in conjunction with the Mexican Consulate located in Atlanta, Georgia. Bi-lingual consulate employees have been trained by the U.S. Labor Department to screen calls and connect workers with appropriate department staff for assistance. While this hotline serves for all industries under the U.S. Labor Department jurisdiction, about 90 percent of the callers have been Hispanic construction workers\footnote{See http://www.osha.gov/dcsp/alliances/regional/reg4/mexican_consulate_final.html.}.

**Industry**

Just in 2000, the state of Texas reported 81 Hispanic construction worker accidents that ended in death on the job. It is important to mention the efforts being made to minimize
Injuries among Hispanic workers on the $2.6 billion Dallas/Forth Worth Airport (DFWA) expansion project. The airport's safety program appears to be decreasing the high mortality rates for Hispanic workers by breaking down barriers of language, literacy, and culture. According to Nash (2004), the DFWA's Capital Development Program\(^\text{17}\), may have one of the best construction training programs in the United States due to its efforts in training Hispanic workers in health and safety as well as offering classroom instruction including helping workers understand basic construction terms, while hands-on training focuses on job skills.

In conjunction with the two primary contractors on the expansion project, BEST Institute, Inc., of Garland, Texas, developed this 40 hour training program for the Hispanic construction workers.

Nearly 13,000 workers have taken the BEST Institute's course\(^\text{18}\), which is offered in Spanish as well as in English. This course intends to teach the basic vocabulary and phrases used in everyday work situations and focus its teaching on vocabulary and phrases correlated to safety and health procedures.

Because the expansion of the DFWA is a large, publicly funded construction project that could afford such an extensive training program for Hispanic workers, the cost-effective usability of this training for private contractors has been doubtful. However, BEST Institute, Inc., and the contractors involved with originally developing this training course have considered the possibility of adapting it for use in other and smaller projects.

But what is most unique about DFWA’s safety program is its mandatory 40-hour bilingual safety training program. Nash (2004) shows that a safety training program for Hispanic workers reduces the fatality rate dramatically. This safety training program at the Dallas/Ft. Worth airport was successful in reducing operation costs related to lost time injuries and work casualties for Hispanic construction workers. In Figure 1.6, Nash is able to portray the potential gains from training. Compared to the national average for large construction endeavors, the DFWA experiences lower lost-work day cases rate as well as lower accident rates.

\(^{17}\) As the airport expansion project is called.
\(^{18}\) Equating to 23 million man-hours of construction
It is apparent that gains in productivity are related to decreasing lost-work days. As Nash (2004) shows, safety pays. As of December 2003, the average cost of Texas workers’ compensation claim was $11,058 while the same number for DFWA was $9,272.

Nash hopes DFWA’s expansion project is setting and example for others to follow. The cost of an ambitious training program is immediate. A small number of construction project are large enough for economies of scale to decrease aggressive training costs. For that reason, creating DFWA-like programs will need the joint support of construction associations, unions, academia, and government.

Figure 1.6. DFW’s Impressive Safety Record Incidence rates of injuries and illnesses per 100 full-timeworkers


**Academia**

The Georgia Technology Research Institute (Anonymous, 2004) believes that education in the construction industry is a matter of life and death and has shown great concern in the lack of job experience of Hispanics that is causing high mortality rates in Georgia. GTRI has created material to make federal mandated training more effective for
Hispanic construction workers. GTRI’s areas of study are divided in five categories: fall protection, scaffolding, trenching and excavation, electrical hazards, and materials handling. This material has been prepared for computer presentation for job orientations and has been distributed through building associations, statewide and regional OSHA offices and the Hispanic Chamber of Commerce (Anonymous 2004).

The state of Massachusetts has also given priority to this type of training program for Hispanic construction workers. The Department of Work Environment, University of Massachusetts-Lowell senses there is the need for linguistically and culturally appropriate occupational and health resources targeted to Spanish speaking workers (Brunett 2005). This entity has developed a complete set of safety and health educational materials for Hispanic construction workers that have been federally funded to be implemented in Lawrence, Massachusetts, a city with a majority Hispanic population. The structure of the training includes 13 modules of one hour duration each where 6 are mandatory and 7 are elective (Brunett 2005).

At the University of Kentucky, Paul Goodrum investigated possible factors explaining high mortality rates for Hispanic construction workers related to other races and ethnicities (Goodrum 2005). In addition, Michael Schulman from North Carolina State University and Tom O’Connor at the National Academy of Science have also given contributions in reaching adequacy in health and safety training for Spanish speaking construction workers (O’Connor 2004; Schulman 2005).

**Trade associations and the ideal private-government joint success**

Most of the efforts for tackling the communication, productivity and safety problems on construction jobsites have been led by academicians, entrepreneurs, and government agencies which have had little if none joint collaboration for implementing the programs. Moreover, these efforts only exist in blueprints or with courses sitting in shelves ready for the government and/or the industry’s cry for its practical use. Implementing a self-regulated and self-sustained quasi-governmental program¹⁹ is the next step forward the construction industry needs to take in order to assure its success. Alone, none of the parties would provide

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¹⁹ One in which the three parties, academia, industry and government take part.
successful solutions to the socioeconomic issues arising from the changing dynamics of the construction labor force. The most effective way to solve the challenges facing the construction industry is for all parties surrounding the construction industry to join efforts and solve common problems in a systematic and cooperative manner.

For instance, the Home Builders Institute\textsuperscript{20} created Sed de Saber\textsuperscript{TM}-Construction Edition to help builders address the language barrier and improve safety, quality and communication on the job site. This learn-at-your-own-pace course format gives Hispanic workers the opportunity to learn general and residential construction-specific English in about 16 weeks. The idea is to empower Hispanic workers by educating them at the same time builders cultivate a loyal and skilled workforce. Sed de Saber\textsuperscript{TM} first appeared in the hospitality industry in 2005 and has impacted over 26,000 workers in this industry\textsuperscript{21}. Sed de Saber translates as “Thirst for Knowledge” and its construction edition is currently being developed. It includes seven self-paced, interactive books that use Leap Frog Enterprise, Inc.\textsuperscript{TM} technology to teach workers 500 vocabulary words and more than 340 phrases commonly used in home building. Preliminary versions of this course material have had great reviews\textsuperscript{22}. However, there is no clear explanation on the strategies for delivering the training material. It is important to note, however, that the development of training material by trade associations is a positive sign that the industry demands new training for the needs of its workforce.

In the State of South Carolina, the private and public sector have teamed to develop short-term courses that tailor different types of work situation by teaching job-specific words and phrases. The Home Builders Association of South Carolina has teamed up with the creators of Command Spanish, a company from Massachusetts which has created various training materials for Hispanic construction workers. Dr. Sam L. Slick, president and CEO, says that Command Spanish focuses on “impacting psycho-metric skills to workplace employees instead of relying on the type of grammatical Spanish language skills people learn in high school.” He believes that Hispanic construction workers do not need to learn the English language as long as they can communicate effectively on the jobsite. The same

\textsuperscript{20} The workforce development arm of the National Association of Home Builders; a Trade Association.
\textsuperscript{21} http://www.hbi.org/
\textsuperscript{22} http://www.seddesaberconstruction.com/
works for American supervisors who should also know the basics of Spanish for construction (Allen, 2007).

There are several colleges in South Carolina that have instructors certified and licensed by Command Spanish to teach workplace Spanish at worksite through South Carolina. “One workplace fatality is one too many” has been the motto of the Hispanic Workforce Task Force program of the State of South Carolina23.

The Licensing and Regulation Agency (LRA) of the South Carolina Department of Labor (LLR) decided it was time to take action and formed the Hispanic Worker Safety Task Force. The Task Force was charged with evaluating the situation in South Carolina and coming up with ways to help employers make their worksites safer for Hispanics.

The joint collaboration of this Task Force is made up of representatives from LLR and OSHA office, industry leaders, safety experts and Hispanic leaders. In addition, colleges have contributed with the personnel for training. As stated above, no program would function properly without the joint collaboration of all the parties surrounding the construction industry. By 2006, the Task Force has provided training to more than 1,500 Hispanic workers in their language. Meanwhile, in comparison to previous years, the number of workplace fatalities among Hispanic workers in South Carolina declined in 2005 and 2006 according to its website (footnote 22).

What is most unique about the Hispanic Worker Task Force (HWTF) is its community development goal. The idea is that more safety on jobsites not only reduces costs and increases productivity to the industry, but builds better communities as a whole. This is the result of a State-Private sector effort: safer and more productive business and better communities.

Unfortunately, South Carolina is the only state which has implanted a formal research-training Hispanic support program for the construction industry. The overall gain of institutions such as the HWTF should be perused by more than just one state. In addition, creating programs that work with an interstate collaboration, may not be far from reachable.

23 See http://www.llr.state.sc.us/HispanicTaskForce/index.asp
Citizenship

As a whole, this article reports relevant information to the construction industry and the changing dynamics of its labor force. Also, this document lays the bases justification for the “cautious” implementation of a training program. A training program limited to training only per se? The demand for providing effective training for Hispanic workers is evident and the need irrefutable. Yet we argue that the proposed multicultural, communication, and safety management aspects of the training program would become the backbone of this effort. But such program should function comprehensively; its structure and objectives should contain factors that seek more than training and better numbers in the construction record (i.e. the safety, productivity and quality of work). The program should include aspects that address current socio-economic issues such as citizenship, labor rights, and exploitive relations. At first glance, the industry would think that developing a program which, on top of training, provides support to the social welfare of its Hispanics employees, would be costly and unattractive. As it turns out, Hispanics want to fit in by learning the language and the customs. Hispanics would become better workers when they and their families can enjoy the tranquility that legal citizenship, labor rights, and productivity-based pay systems could provide. Companies that treat their workers well keep them longer and they are loyal to the company. Including a citizenship24 package in the training program could not only benefit the worker, but also the companies. Developing a training program of this sort leads to all parties in the construction industry benefiting. In implementing this program nobody is worse off. This concept is as industry and socially desirable as it sounds. The citizenship aspect of the proposed program is, today, beyond the control of the individual employers. However, the employers could demand the government improvements in the immigration agenda.

Planning for a prosperous industry: developing the program for the U.S. Midwest

There has been no planning in construction industry for the increasing Hispanic population and the problems incurred in the industry. Hispanics and the problems that they bring to the industry are evident today. What is more evident, by 2010, more than 30 percent

24 The author doesn’t underestimate the potential of also including in the program an office for legal issues that provide services ranging from 401 (k) to filling out paper work related to work permits.
of the construction industry will be Hispanic authorized workers (NIOSH, 2004). That is not even considering those who work without a legal status which is the majority of workers (Richardson, 2005). What does this mean? That at least 3 out of 10 construction industry workers will be Hispanic in less than three years! This article acts as a sound alert which suggests the solution to the increasing problems the construction industry faces. Developing and delivering proper training to the evermore multicultural construction crews is a difficult but achievable task. Training material has been developed by different entities. However, with the exception of few large self-funded construction training programs, the implementation of such training has not existed or been efficient. While most construction companies are not large enough to conduct this effort alone and the projections for foreign-born Hispanics to arrive in this country will not decrease at least for the next 20 years, the construction industry still experiences lack of proper training and motivation to do something about it.

As it was shown in Table 1.1, the Hispanic migration projections to the Midwest are uniformly high for all the States. The solving of the various issues presented in this paper has been the primary goal of the Hispanic Workforce Research Project (HWRP) at the Center for Transportation Research Education at Iowa State University. This project is currently funded by the Iowa Department of Transportation and the Federal Highway Administration. The HWRP has two major components: the training and research component. In terms of the former, the HWRP has delivered a total of 156 hours of various training to about 30 different construction companies. Among the various training the HWRP has developed are:

- English as a Second Language for Construction
- Spanish as a Second Language for Construction
- Concrete Paving Construction Basics for Hispanics
- Stepping up to supervisor
- Toolbox Integration Course for Hispanic workers and American supervisors
- Train the trainer

That estimate doesn’t take into account all the future unauthorized (or illegal) Hispanic construction workers.
In terms of the research effort, the HWRP has been successful in understanding the training needs of crews with significant number of Hispanic workers. In general, it has been found that the most effective training is the one provided to American and Hispanic workers together at the jobsite during the construction season in simple 30 minute sessions26.

Making the case for the development of program at CTRE is difficult considering State’s individual interests. However, we believe that CTRE has the administrative set up for a program of this sort to benefit all the neighboring state’s construction industry. That is the case with the current Midwest Transportation Consortium based at CTRE.

Developing a finite project, from one that only benefits considerably few companies and one State in the Midwest, one that is a permanent training program to benefits all the construction industry in the Midwest is the HWRP’s vision of the future. As this article illustrates, the need to develop a multicultural, communication, and safety management Training Program for the Construction Industry in the U.S. Midwest is eminent. Now the next step forward is to sit the industry and the government in the table and show them that training pays for both business and society. Sooner or later the construction industry in the Midwest will have to implement a program of this sort. We hope it is sooner than later for the best of the industry.

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26 For an extensive review of the HWRP’s research finding see Canales et al., 2007.


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CHAPTER TWO. Overview of Phases I and II of the Hispanic Workforce Research Project (HWRP)
Introduction

A large part of the construction industry’s success relies on how well workers are trained for the different trades. Most importantly, the literature demonstrates that companies with more safety training are more productive and incur fewer costs as a whole (Jeffress, 2000). The Department of Civil, Construction and Environmental Engineering at Iowa State University conducted two studies for understanding the issues in construction due to the changing demographics in the workplace; changes that happen due to the increasing Hispanic population to the country and the Midwest. These two studies focused on understanding the issues in the construction jobsite from the Hispanics (Phase I) and then American supervisors’ perspectives (Phase II).

The development of both projects had independent functions and rationale but used the same research methodology. Nevertheless, the findings in Phase I led to the development of Phase II of a project now known as the Hispanic Workforce Research Project27. As it will be reported, both studies not only use the same research methodology, but come to the same conclusion: the language barrier is the major cause of the many issues involving the construction industry today. In this article, we summarize the main findings and activities of Phases I and II of the HWRP.

Research Methodology of Phases I and II

The objective of Phase I and II of this project were to understand the issues of the construction industry from the Hispanic laborer (Phase I) and American Supervisors perspectives (Phase II). It is important to notice that the courses and research described in this article are divided in two phases. For all two of the phases, a process was developed which involved designing, developing, and delivering training courses targeting the Hispanic worker and American supervisor. These courses were developed as a result of the findings of each of the phases of the research. The progression of both phases resulted in the development of three different courses with consistent research results. The methodology used for reporting the activities in Phases I and II, consists of three parts: (1) questionnaire survey development, data collection, data analysis, and survey results for the two phases; (2)

27 The author’s own work includes Phase III and IV of the same project described in the following chapters.
development and delivery of the training courses product of the two phases and; (3) 
Conclusions and how these two phases led to the development of Phases III and IV described in the rest of this Master’s Thesis.

**Questionnaire Survey and Design**

One questionnaire was designed for each of the phases: one for Hispanic craft workers and another for American supervisors. During Phases I and II, the goal of the questionnaires was to provide data necessary to bridge the gap between American supervisors and Hispanic construction workers by identifying the problems created by blending the two cultures into the workplace. The questionnaire for Hispanic workers (Phase I) was arranged in four parts related to the worker’s: (1) English speaking capabilities, (2) management training background, (3) safety awareness, and (4) personal background information. The questionnaire for the American supervisors (Phase II) was arranged in the following four categories: (1) Spanish speaking capabilities, (2) Hispanic cultural awareness, (3) safety aspects, and (4) personal background information.

**Data Collection**

Data collection for the Hispanic workers during Phase I of the research project was carried out through face-to-face interviews with construction workers on the jobsites. Several construction companies in Iowa were willing to collaborate and ten of them were contacted prior to conducting the interviews. Data collection was carried out with construction workers on the jobsites and a total of 97 responses were obtained.

Data collection for the American supervisors during Phase II of the research project was also carried out in the form of face-to-face interviews, on the jobsite or elsewhere, and mailed-in questionnaires. The companies targeted were those that had American supervisors in charge of a significant number of Hispanic employees within their organization. Of the 30 surveys initially planned, 38 were actually obtained from 15 construction companies in Iowa. Seventeen supervisors were interviewed personally and the rest of the questionnaires were filled out by supervisors on their own.
It is important to note that all the interviewers were bilingual fluent in English and Spanish (Arbelaez, 2003; Vazquez, 2005; Aveiga, 2006).

Data Analysis and Evaluation

Data analysis and evaluation were completed and used for the selection and development of the training courses. Microsoft Excel was used to store respondents’ information. Data analysis continued with the evaluation of the generated charts. Variability and similarities were extracted from the bar charts obtained for each question. Given the number of respondents, the data were subsequently exported to statistical software called JMP 5.0.1 for analysis.

Understanding Training Needs Hispanic Construction Workers

Survey Results-Phase I

Arbelaez (2003), find that traditional construction and safety training will no longer be effective in the industry as Hispanics are increasingly changing the cultural and language dynamics of the crew.

The survey was conducted to 97 Hispanic Construction Workers in the State of Iowa, results reflect the need of Hispanic workers to take ESL courses that are short and construction-focused. In other words, “language” was identified as the primary factor affecting productive relations on the jobsite.

In this initial phase of the HWRP, Arbelaez (Ibid) found that about 80 percent of Hispanic construction workers have lived in the U.S. from one to fifteen years and 67 percent of all the respondents plan to permanently stay in the U.S. In addition, 51 percent of Hispanic workers had less than one year or no experience in construction prior to living in the U.S. While a large number of them have never received formal construction training, language problem impedes Hispanics to receive the information needed to achieve the industry productive, quality, and safety standards.

Nevertheless, most of the questionnaire has questions directly related to communication skills and possible training interests. Having said that, 62 of the 98 Hispanic respondents said that they were not satisfied with their ability to communicate at the jobsite. While 92 percent of the
Hispanic workers would like to take English courses, only 32 percent of the workers said they had already taken courses to help them learn English with little success.

The vast majority (80%) recognized that it was very important to improve communication with supervisors and American co-workers. The survey clearly revealed that communication is the main problem on the jobsite and there is a lack of adequate training.

The need for future technical training of Hispanic construction workers was also revealed in this study. Eighty nine percent of Hispanic workers were interested in taking a technical training course. A technical training course is differentiated from the English as a Second Language (ESL) course in that it could further facilitate the use of machinery and heavy equipment and also enhance the work status of the worker within the crew. Moreover, about 55 percent of Hispanic workers prefer instruction in areas of carpentry and equipment while 78 percent of these workers currently have tasks that have to do with concrete and carpentry.

The overall jobsite condition was also a concern in this survey. Twenty three percent of the Hispanic workers have experienced a construction related accident. Also, 62 percent of these respondents were not satisfied with their ability to communicate at the jobsite.

Finally, it was also necessary to measure the desire of these workers to grow and step up to a supervisory position. When workers were asked whether or not they would like to take a course to be promoted to supervisor28, 86 percent of them answered positively.

All of the above were fundamental considerations to develop both the ESL and the Stepping Up to Supervisor (SUTS) courses for Hispanic craft workers.

**Understanding Training Needs American Construction Supervisors**

**Survey Results-Phase II**

Vazquez (2005) found that about 60% of the interviewed American supervisors have a total of 7 or more Hispanics in their crew29. Other key findings from the American supervisor survey are as follows:

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28 A supervisory position was understood as a leadership position such as foreman, crew leader, or supervisor, depending upon the company’s needs and the worker’s capabilities.
• Eighty two percent of the respondents stated that “Language” barriers are the most common problems encountered on the jobsite by American supervisors.

• Seventy eight percent of the American supervisors communicated with Hispanic workers in their crew using the English language.

• Seventy five percent of American supervisors have a link person (facilitator) who helps in communicating with the Hispanics in a crew. This confirms that many American supervisors are not capable of communicating directly with their Hispanic crewmembers because of language differences. This extra step for delivering the information may impact productivity.

Other problems encountered by the American supervisor were “Nonpunctuality,” “Collective protest,” “Lack of attention,” and “Leader development” on the part of the Hispanic worker. For instance, “Collective protest” is when a worker is suspended from the job temporarily (for any reason) and the rest of the crew does not show up to work the next day as a form of protest and support to the fellow worker. “Lack of attention” refers to subordinates that do not show interest and/or attention when tasks are assigned by a supervisor. Some supervisors find it difficult to assign a leader whom they believe has the appropriate capabilities to indirectly lead the crew and this problem is labeled as “Leader development.” Many Hispanics believe in “seniority,” and in many cases the assigned crew leader may not correspond with who the crew believes the leader should be. As a result, the assigned leader and/or the crew may not perform according to expectations. These problems arise mostly because American supervisors are unfamiliar with the differences between Hispanic and American cultures.29

29 This number is higher than the average official reporting that on average 2 out of 10 crew members are Hispanic (Nash, 2004). This difference could be explained by higher number of unauthorized workers coming into the industry (Richardson, 2005).

30 Hofstede’s (1984) model of culture explains these further, as described in chapter 3 of this document. Specifically, the cultural dimension of collectiveness vs. individualism explains the problem of collective protests for Hispanics.
Training Courses Development, Content, and Delivery

Based on available data and the results and recommendations obtained from the surveys conducted, two training courses were developed: ESL Survival Course and Stepping Up to Supervisor Course for Hispanic Construction Workers. The courses are intended for both Hispanic construction craft workers who need to develop language skills focused on construction and those with the willingness and skills that meet the requirements to advance to a supervisory position within an American construction company.

According to Canales (2005), a systematic approach to diversity training was necessary for the development of the proposed courses. Goldstein (1993) forces training developers to consider why training is needed, what should be covered in training, and how training outcomes should be measured. This approach was adapted and simplified for the purpose of training development for both Phases of the project.

English and Spanish as a Second Language Survival Course: Phases I and II

In the ESL and SSL Survival Courses, participants are provided with a booklet containing all the material, and a presentation is given by the instructor. The presentation has four parts: (1) meaning in English, (2) meaning in Spanish, (3) pronunciation of the word in English (for ESL) and Spanish (for SSL), and (4) a photo of the word. Every word included in the booklet is presented to participants in these four ways. The teaching process has the following sequence: (1) the word is shown and read to participants by the instructor in English and Spanish; (2) participants repeat the word several times; (3) participants write the pronunciation of the word (phonetic sound); and (4) comments are discussed.

The intent of the Spanish and English as Second Language Survival courses is to be highly interactive, provide basic material on only the necessary information, including construction-related vocabulary, names of tools and equipment, and simple direct language phrases to facilitate basic communication. These courses target American supervisors and Hispanic workers with a low level of second language knowledge in Spanish or English, respectively. Researchers structured the courses such that they contain two types of instructional materials: a Booklet (shown in Figure 1.1) and a visual presentation. The
booklet provided to trainees consists of a list of words sorted alphabetically and organized by categories. These categories include general vocabulary (alphabet, vowels, numbers and hand tools), resources (materials, workforce, and equipment), safety (safety equipment and safety signs), and other information (productivity, quality and survival phrases). The visual presentation contains pictures of the words and their meanings in English and Spanish. In addition to providing “survival words,” the course includes “survival phrases” to facilitate communication between the Hispanic worker and the American supervisor. This course is designed to be taught in one 8 hour session.

Figure 2.1. Inside Look at Pocket Size Booklet

Stepping Up to Supervisor Course for Hispanic Construction Workers

This is the name of a course developed by Arbelaez (2003) as a result of the Phase I research results. One of the results from Phase I survey suggested Hispanics are willing to learn leadership skills which in time will allow them to step up to a supervisory position. A construction craft worker who will become a supervisor is expected to be fluent in English since this is one of the initial requirements for advancement opportunities within an American construction company.

The following are the contents of the course by topic and subtopic:

- Part I: How to work with yourself
• Part II: How to work with an individual
• Part III: How to work with a group
• Part IV: Key points
• Evaluating yourself

The full course lecture is offered in Spanish with heavy emphasis in English terminology. The course material (workbooks) is delivered to the participant in both versions (English and Spanish). This course was offered three times with a total of 9 participants.

**Training Evaluation**

Survey results reflect the needs of Hispanic workers to take ESL courses that are short enough and construction-focused. Sixty five percent of the workers said they had not taken courses to help them learn the language, 57 percent expressed that duration (too long a course) was a concern since their courses were more than 40 hours. Learning construction-focused terminology was “very important” according to 55% and “important” to 28% of the workers.

**The Concrete Pavement Construction Basics Course (CPCB)**

In Phase II of the project Canales (2005) took a slightly different training approach, but with the same structural components as the SSL Survival Course. The CPCB course was designed to execute the specific technical and contextual needs of American supervisors within an appropriate timeframe. Some of the topics developed are concrete placement, finishing, and curing, among many others.

The CPCB course was successfully delivered in April 2005. A total of five people described as “foremen” and one “field supervisor” attended the training session. The subtopic selected by the construction organization for this session was Safety, and it lasted approximately two and one-half hours.
Evaluating Phases I and II of the HWRP

Why was there need for a Phase III of the HWRP project? Evaluations for all the four courses developed and delivered in Phases I and II were graded as “excellent” by the attendees. However, while the training material developed in these two phases go beyond any other effort for the problems of the recently “Hispanicized” construction industry, the approach to language instruction and orthodox class setting for delivering the course proved to attract few companies and attendees. The main argument was that 8-hour seminars during the construction season is not an effective way for training. In addition, Hispanics are not used to being in a class setting for long periods of time; retention of the material was one of the issues with the current methodology for teaching the courses. The training material needed for improving communications on the jobsite had successfully been developed. Now it was time to discover how training could be delivered to the American and Hispanic workers in a efficient and effective manner.

Phase III intends to add to the effort of the HWRP by exploring innovative and effective ways for delivering the training material developed by Arbelaez (2003), Canales (2005), and Vazquez (2005) (Aveiga, 2006).

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CHAPTER THREE. Identifying and Implementing Effective Training for Hispanic Craft Workers, American Supervisors, and DOT Inspectors through the Hispanic Workforce Research Project (HWRP)
Abstract

The number of Hispanic workers in the U.S. construction industry has been steadily increasing, and language and cultural barriers have sometimes arisen on the jobsite. Due in part to these barriers, the number of fatalities among Hispanics at construction sites in 2001 jumped 24%, while construction fatalities overall dropped 3% (Vazquez, 2004). This article, which constitutes Phase III of the Hispanic Workforce Research Project (HWRP, 2003), addresses these language and cultural barriers by investigating the most effective way to deliver training and how to restructure training material and methodology for Hispanic workers, American supervisors and workers, and department of transportation (DOT) inspectors.

The research methodology consisted of assessing the needs and interests of potential and current course participants in terms of exploring innovative ways to deliver the training. Using survey results, the traditional methodology and training material were then adapted and delivered to fit the specific needs of each audience. The survey findings suggested restructuring the courses described in Canales et al. (2007)31 which were delivered to eight highway construction companies and two DOT groups during the 2004 construction season and the winter of 2005. The courses described by Canales et al., consisted of four construction-focused language training courses. In adjusting the survey results, the research team developed a course for the construction season called Toolbox Integration Course for Hispanic workers and American supervisors (TICHA), which consists of nine 45-minute modules delivered to one construction company over 11 weeks in the summer of 2005. The TICHA training was developed to be a tool to facilitate integration among U.S. and Hispanic workers with the potential to increase productivity, and motivation at the jobsite, and decrease the existing high mortality rate for Hispanic workers.

Introduction

Population trends indicate that the number of Hispanic workers in construction will continue to grow creating the need to develop strategies to blend cultures in the workplace. In some states such as California, New Mexico and Texas, Hispanics are already the majority of

31 Paper that reviews the findings of Phases I and of the Hispanic Workforce Research Project (HWRP)
the construction workforce (Goodrum and Dai, 2005). The construction industry is always in need of specialized training to assure the best performance of its labor force (OSHA, 1996). Hence, in order to effectively blend Hispanic workers into the U.S. construction workforce, it was necessary to develop an understanding of the communication process and the role of language barriers to communication, and to identify the consequences of communication failures between the Hispanic worker and the American supervisor (Canales et al., 2007).

This paper explores the best practices for delivering training to American supervisors and workers, Hispanic construction craft workers, DOT inspectors and describes the development, delivery, and evaluation of construction-focused training courses that can facilitate not only communication but integration among these two groups. Furthermore, the paper presents a recommended strategy that can help evaluate the effectiveness of the training material presented in this paper.

The assessment was accomplished through a needs analysis survey of industry, conducted among a small sample of Iowa construction companies to identify the most pressing needs for training of blended culture construction crews. The needs analysis also helped identify resource constraints, such as amount of time that could be devoted to training, the best time of year to offer the program, etc.

As a follow-up to the academic literature review, a broader search of trade publications and government reports was conducted to identify current training programs available for Hispanic construction workers.

The results of the needs analysis were combined with appropriate cultural models briefly summarized in the literature32 to design, develop, and deliver the basic training courses the Toolbox Integration Course for Hispanic workers and American supervisors (TICHA)33. After initial field tests of the training courses, the program was evaluated by the participants to determine effectiveness. Finally, this paper concludes suggesting the quantitative assessment of the TICHA training using more construction companies as participants.

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32 For an extensive version of the cultural model analysis refer to Canales et al., 2007.
33 TICHA with “CH” pronounced as “SH” as “Chicago” is how it has been called by the researchers and participants of the training.
Literature Review

Integration and Cross Cultural Studies

For an excellent review of the different approaches to cultural identity and measurement in research studies, refer to a recent article by Soares, Farhangmehr, and Shoham (2007). In general, the authors state that there are four approaches to cultural identity and measurement, all of which have some inherent weaknesses. Two of the approaches to cultural identity and measurement (direct values inference and indirect values inference) pertain specifically to work values and cross-cultural management and are of interest to the development of cultural training programs such as the one described in this text.

Lawrence and Lorsch (1967), in a foundational article on cultural adaptation and change, stated that every organization is challenged to find the proper mix of cultural integration and cultural differentiation, and that the mix of adaptation strategies depends largely on the situational context the company is facing. Meyerson and Martin (1987) expanded on the early work of Lawrence and Lorsch by identifying the attributes of integration and differentiation approaches while adding the dimension of ambiguity to the cultural adaptation framework. According to Meyerson and Martin, the integration paradigm focuses on consistency of behaviors across organizational subgroups and consensus among all organizational members on the higher order values shared by the company, which are expressed through a common language to prevent ambiguity or individualization of actions. When attempting to integrate members, organizational leaders play a key role in creating the sense of culture and expressing the values of the organization.

On the other hand, the differentiation paradigm recognizes the importance of organizational subgroups and allows for inconsistencies in cultural identification that arise from outside influences on organizational members. A differentiation strategy suspends the assumptions of a common language while acknowledging that organizations are open systems influenced by external factors that effect a leader’s ability to impose shared values on all members of the organization. A differentiation approach recognizes the inevitability of cultural ambiguity and individualization, but attempts to reduce the impact of such ambiguity on the operations of the organization. Ambiguity is the degree to which cultural boundaries
are fixed and the permanence of subgroups is established. Cultural boundaries are temporary and hard to determine, with patterns of connections between subgroups changing based on the salience to the individual of the organizational issue or value under consideration (Canales et al. 2007).

The integration/differentiation/ambiguity framework has been used to analyze safety cultures in Danish manufacturing companies. The findings of the Danish case studies support the notion that some common cultural manifestations and values are present across subgroups, while there are also a number of cultural subgroups whose views and values are strongly differentiated, and common language and values are affected by ambiguity (Richter and Koch, 2004). In a study of a major construction company, English (2002) found that a rigorous cultural training program improved understanding and reduced inefficiencies in an organization with 3 major cultural groups (English, Xhosa, Afrikaans) and 28 differentiated subcultures in South Africa. Gilleard and Gilleard, (2002), working in an educational setting, argued that training and education developers need to become more proactive in developing challenging learning approaches, and more willing to integrate cross-cultural, language, and communication skills training, suggesting the need for multilingual (differentiated) training instead of the traditional reliance on dominant language training.

Speaking specifically of safety, Clarke (2003) argues that it will be more difficult to integrate employees from diverse backgrounds into a corporate safety culture, but that human resource managers must develop techniques and practices to develop and maintain positive safety attitudes for all employees. The first step in developing such techniques is to develop an understanding of cultural differences. Perhaps the most commonly used framework of cultural differences is Hofstede’s research on cultures (1984). Hofstede’s model can facilitate understanding of how people communicate with each other and help define the management styles most appropriate under a given circumstance and job setting.

Hofstede's (2001) study of cultural values has been replicated by a number of researchers and is a widely accepted framework of cultural values. Hofstede's model of cultural variations can also be applied to issues of linguistics and intercultural communication (Manning, 2004). Additionally, Rowlinson (2001) studied organizations in a
construction context and found that Hofstede’s dimensions of power distance and individualism explained differences in organizational commitment between cultures.

Even critics of such Hofstede’s frameworks\(^{34}\) for studying cultural differences acknowledge a small number of alternative methods available for researchers interested in examining cultural factors in construction labor and personnel issues. Since the focus of this paper is on developing a training program for blended Hispanic/American construction crews, Hofstede’s cultural value dimensions were used as the guiding framework for the development of the training program for Hispanic/American construction crews.

The Hofstede’s terminology for describing national cultures consists of five different criteria; has been cited in several similar works\(^{35}\). Hofstede call these criteria “dimensions” because they occur in combinations and are largely independent of each other. These five criteria are as follows: Large or small power distance, individualism versus collectivism, masculinity versus femininity, strong or weak uncertainty avoidance and time orientation (Nahavandi, 1997).

*Power distance* refers to the way society deals with the fact that people are unequal. In organizations, the level of power is related to the degree of centralization of authority and the degree of autocratic leadership. Hofstede (1984) established some relationships among these five dimensions, such as power distance and collectivism. Collectivist countries always show large power distances, but individualist countries do not always show small power distances.

*Individualism versus collectivism* involves the relationship between an individual and his or her fellow individuals. There are two categories: (1) societies in which ties between individuals are very loose, that is, everybody looks after his or her own self-interests (individualistic); and (2) societies in which the ties between individuals are very tight, that is, everybody looks after his or her group’s interests (collectivistic). Hispanic societies fall in the second category, where friendships prevail over tasks, and loyalty is very valuable among group members and between bosses and subordinates.

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\(^{34}\) See Soares et al., 2007; Phua and Rowlinson, 2004; Chan and Tse, 2004

\(^{35}\) For an extensive review on Hofstede’s work refer to Canales et al., 2007
Masculinity versus femininity is related to the division of roles between the sexes in society. Human societies traditionally have associated certain roles with men only or with women only. This is part of a socialization process, rather than a biological sex role. Latin countries such as Venezuela and Mexico are considered to be quite masculine biased. A high masculinity ranking indicates the country experiences a high degree of gender differentiation. In these cultures, males dominate a significant portion of the society and power structure, with females being controlled by male domination. A low masculinity ranking indicates the country has a low level of differentiation and discrimination between genders. In these cultures, females are treated equally to males in all aspects of the society (Hofstede, 1984).

Uncertainty avoidance indicates to what extent a culture can program a member to sense or feel about changing, unknown, or surprising situations. The two ends of this dimension are related to how strong or weak members accept or avoid uncertainties. Groups with weak uncertainty avoidance tend to accept the fact that the future is unknown and therefore accept each day as it comes. In contrast, other societies tend to reduce uncertainty in the future by creating security and avoiding risk. In this dimension, there exists a clear correlation between power distance and uncertainty avoidance. According to Hofstede, Hispanic societies show strong uncertainty avoidance with a large power distance, whereas in the American society and other countries with large populations with Anglo-European roots, an opposite correlation was found, that is, small power distance and weak uncertainty avoidance.

The time dimension of culture is related to the way people value the usage of time, how they set goals and objectives and how important and firm are the deadlines and time commitments. In the Long term dimension, values are oriented towards the future, like saving and persistence. In the Short term dimension, on the other hand, values are oriented towards the past and present, like respect for tradition and fulfilling social obligations. Hispanic workers typically lean towards the short term aspect of this dimension.

Comparison of management styles as they relate to Work vs. leisure, Direction vs. delegation, Theory vs. practice, Control, Staffing, Planning, Competition, Time, and Loyalty between Mexican and American cultures according to Hofstede (MGT 503) describe some examples of national cultural values that will help trainers better understand the impact of
cultural differences on the jobsite. According to the Hofstede’s findings on both the Mexican and American cultures (1983), it is concluded that in the workplace, Mexicans, as subordinates, expect to be told what to do, see hierarchy as an existential inequality, and consider their boss as a benevolent autocrat. Also, because of their collectivism, they see relationships more important than tasks.

Hofstede’s findings shaped the research team’s thinking regarding development of the delivery method for the training program and helped the researchers understand the cultural preferences of Hispanic workers and American supervisors. For instance, from Hofstede’s analysis, the research team determined that the program should be delivered in a group setting, with a clearly defined Hispanic leader who has the demonstrated support of the American supervisor, and should be flexible in delivery schedule (e.g. 30-45 minute modules which can be aggregated into longer sessions). The development of the course content, as opposed to delivery methodology, was driven more by industry-specific research and a review of existing programs, as discussed in the following section. In other words, the training material contains relevant information to the construction industry only, while, we believe the methodology we present in this manuscript for delivering training material can be extrapolated to various industries (i.e. our unconventional integration approach).

Methodology

The approach used to achieve the research and training objectives of our study were to:

- Review other similar efforts for developing construction training intended to improve communications and safety on the jobsite.
- Use a survey questionnaire to identify the most suitable and cost-effective training approaches for effectively reaching Hispanic workers, American supervisors, and Iowa DOT inspectors.
- Use survey findings for practical knowledge that illustrates similarities and differences in learning preferences among the three audiences.
- Use practical knowledge acquired for developing a course for effective training Hispanic construction workers and American supervisors.
• Deliver and produce a qualitative assessment of the training as well as reporting final recommendations.

**Questionnaire Design**

Two questionnaires, one for Hispanic workers and DOT inspectors and a second one with additional questions for American supervisors, were designed (see Appendixes A and B). The main objective of these questionnaires was to obtain the data necessary to understand and evaluate the needs and interests of American supervisors, Hispanic workers, and DOT inspectors with regard to training practices. After identifying these difficulties, suitable and effective training options could be evaluated and developed to facilitate solutions to the problems. The following seven specific objectives were selected for the design of the questionnaire for contractor employees (Hispanic workers and American supervisors) and DOT inspectors:

1. Determine current training practices of contractors for training their employees.
2. Determine the contractor’s preferences for training employees (e.g., classroom or on the job), during and/or outside of work hours.
3. Determine current training practices for Iowa DOT employees.
4. Determine Iowa DOT employees’ training preferences.
5. Identify the contractor’s resources for on-the-job training.
6. Determine patterns of needs, interests, and areas of opportunity for training.
7. Determine the factors and problems that prevent contractors from sending workers to receive training.

Having defined the objectives of the questionnaires, the sample size for the population was defined. It was determined that a preliminary estimate of 20 Hispanic workers, 10 American supervisors, and 10 DOT inspectors (40 random samples) was necessary to obtain enough data to draw and evaluate significant conclusions and generate recommendations. Factors influencing the sample size of the face-to-face survey consisted of the speed at which the assessment could be conducted on the jobsite, the type of survey
implemented, the availability of workers, and the willingness of the project supervisors at the
time of the interview. More specifically, the preliminary sample size was calculated
according to the number of American supervisors in the construction industry in Iowa,
obtained from the Bureau of Labor Statistics and the U.S. Census Bureau and according to

The process for the questionnaire for Hispanics was such that, once the factors of
sample size were taken into account, quantitative and qualitative measurements were
determined as well as question order and survey length. This step was mainly based on the
specific objectives of the survey. Initially, the questionnaire consisted of 11 questions
arranged in 4 categories of information, as follows: (1) current training practices, (2) training
preferences, (3) jobsite training resources, (4) general Hispanic workforce information.

The first draft of the questionnaire was pre-tested on one work site and had three
respondents; corrections and modifications were made accordingly. The final questionnaire
for Hispanic workers and DOT inspectors consisted of 14 quantitative and 4
qualitative/descriptive questions for total of 18 questions). The final questionnaire for
American supervisors includes the same questions with an additional 11 quantitative and 3
qualitative/descriptive questions (a total of 32 questions).

The final questionnaire consisted of the same four categories established before the
pretest. Appendix A contains the questionnaire in its final format.

Data Collection

Data collection was carried out by using face-to-face interviews with American
supervisors and Hispanic Workers on-the-jobsites with an e-mail approach for DOT
inspectors. Twenty three American supervisors and 68 Hispanic workers were interviewed
personally on the jobsite. Conversely, while the e-mail approach was used with the DOT
inspectors, only 5 were received and counted towards this study.

Seven construction companies in Iowa were willing to participate, and three of them
were contacted prior to conducting the interviews. Research team members served as project
contacts and explained the nature of the survey and requested permission in advance to enter
the jobsite. The extra pool of random data collected for Hispanic workers and American supervisors was helpful for testing and estimating significant parameters for this study.

Most of the construction projects chosen as data sources were located in Des Moines metro area, Ames, Burlington, Council Bluffs, and cities in which the availability of American supervisors was sufficient to conduct the survey.

**Data Analysis and Evaluation**

Data analysis and evaluation were completed and used for the selection and development of the methods for delivering the training courses in a cost- and time-effective way.

Statistical software JMP 5.0.136 was used to store for the data analysis. Thus, survey responses were input, coded, and kept confidential in a customized database. Totals and respective percentages were calculated, and charts were generated for each of the 19 questions (and the 33 questions used for American supervisors).

**Survey Results**

The four objectives of the questionnaire were as follows: (1) current training practices, (2) training preferences, (3) jobsite training resources, and (4) general Hispanic workforce information.

**Current Training Practices**

To obtain information that could facilitate to the development of the most efficient approach for delivering the courses developed to date; the questionnaire contained five specific questions (nine for American supervisors) that asked for specific details about the current training practices for Hispanic workers, American supervisors, and DOT inspectors. In this questionnaire, a distinction between formal classroom training and practical training at the jobsite was made.

With these questions in place, it was found that the hours contractors spend giving formal classroom training to American supervisors is greater than the training given to

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Hispanic workers. When the three populations were asked about the average hours of formal classroom training received per year, the mean response from Hispanic workers was 5.93 hours per year. It is important to note, however, that 42 out of the 68 Hispanic workers surveyed, or 62%, responded to have had no hours of formal classroom training in the last year. In contrast, the American supervisors mean response was 25 hours of formal classroom training per year.

This estimate was calculated after the omission of an outlier that responded to have had 200 hours of formal classroom training. Even though it was projected DOT inspectors received the most formal training out of the three populations, its average of 24 hours of formal training per year leads to the conclusion that this statistic is not significant. The main explanation for this phenomenon is the small sample of five surveyed DOT inspectors. Even though its p-value of 0.0217 suggests significance at the 5% level, variation for the five samples is too great to make accurate predictions.

When Hispanic workers were asked about the training time spent either in a formal classroom or on the jobsite, the response was that, on average, 79.2% of the training was given at the jobsite while 17.7% of the training was given in a formal classroom. Because the previous response showed a low number of yearly hours of formal classroom training, the hours of formal classroom training was regressed on this high percentage of time training at the jobsite. A negative and moderate correlation value (r-square 0.2315) consistent with our findings suggests that an average increase in training at the jobsite will result in a decrease in the average formal classroom training.

To collect more data that could assist in determining the current training practices contractors prefer for their employees, four more questions of this sort were asked of American supervisors.

It was found that, on average, American supervisors take charge of eight Hispanic workers per crew. The average time span during which these American supervisors have been working with Hispanic workers is eight years. In addition, American supervisors reported that an average of 82.25% of the training given to Hispanic workers takes place on the job. This result is consistent with the prior result of 79.2% when Hispanic workers
were asked to estimate the time spent in training at the jobsite. Finally, 96% of American supervisors said that Hispanic workers received most of their training during working hours.

**Training Preferences**

To obtain more information that could facilitate the development of the most efficient approach for delivering the courses developed to date, the questionnaire contained 10 specific questions (15 for American supervisors) focused on giving explicit details about the training preferences for Hispanic workers, American supervisors, and DOT inspectors. These questions were intended to provide a better understanding of the methods, times and seasons, and the locations that would help these courses be delivered more effectively.

In the case of Hispanic workers, 34 out of 68 (50%) responded that the best day to receive training is Monday. In addition, 21% (the second largest response) of Hispanic workers expressed no difference. Likewise, the majority of American supervisors and DOT workers expressed the same preference, but with the difference that most American supervisors said that any day is fine to receive training. However, when American supervisors were asked about the best day on which to train Hispanic workers, 43% said Monday and 26% (the second largest response) said that any day to be preferred.

Interestingly, the great majority, 78.3%, of the three populations said that the preferred time of the day to receive training is in the morning. Even more convincing, 87% of American supervisors prefer to have their Hispanic workers trained in the morning.

Both Hispanic workers’ and American supervisors’ preferences for training Hispanic workers show strong similarities. However, when the question was asked of the preferable time of the year to receive training, variation in responses among groups and within groups is predominant. While 30.8% of Hispanic workers favor the option of being trained during the summer, only 16.6% of American supervisors seemed to prefer that their Hispanic workers be trained during the summer. However, when American supervisors were asked the preferred season for their own training, 4.1% of them responded during summer season or during the construction season. Although most American supervisors (50%) preferred that Hispanic workers be trained during the winter or off-season, American supervisors also
prefer their Hispanic workers to have more opportunities for receiving training during the construction season than the American supervisors themselves have.\textsuperscript{37}

Lastly, the three populations were asked about the best method or approach to be applied for their training. With the intention of finding the preferred methods to use, four questions (seven for American supervisors) were developed. Two questions aimed to analyze the differences in preference between the duration of regular construction training and the duration of training as it relates to learning a foreign language. It was found that 34.4% of all three populations prefer to receive training on any topic for one to two hours, while 34.9% of all three populations prefer to receive training as it relates to learning a foreign language for three to four hours. To the question about the duration of regular construction training, 30% of all three groups responded with “no preference.” For the question about the duration of training as it relates to learning a foreign language, 30.5% of all three populations preferred one to two hours.

This high demand and interest for training as it relates to learning a foreign language is evident when looking at these percentages. Even more significant, 66.67% of American supervisors said that they would like to be trained in learning a foreign language for duration of three to four hours. Furthermore, 43.3% and another 43.3% of American supervisors said they prefer training for their Hispanic workers to last for one to two hours and three to four hours, respectively, which also suggests a strong desire for more training.

When these three populations were asked about the best method for training, both in the classroom and on the job, an outstanding majority of 72.1% responded that they prefer face-to-face interaction with an instructor for both training in the classroom and on the job. It is remarkable that most of the respondents requested a high personalized level of instruction.

This high percentage that preferred face-to-face interaction with an instructor may be a consequence of the limited knowledge about the new technologies and methods that could be used to deliver courses more efficiently.

\textsuperscript{37} Throughout the conduction of the survey the idea that the employer pays for the training is sustained and assumed.
Jobsite Training Resources

To obtain more information that would help develop the most efficient approach for delivering the courses developed to date, the questionnaire contained two simple yes or no questions that asked respondents to give detail about the availability of jobsite training resources for Hispanic workers, American supervisors, and DOT inspectors. These questions were intended to provide a better understanding of the ways new technologies could help deliver more cost- and time effective courses.

Interestingly, 80% of Hispanic workers claimed not to have a trailer or other facility adequate for training on the jobsite. In contradiction to this finding, 70.8% of American supervisors stated that their jobsite had a trailer or other facility adequate for training. This inconsistency is intriguing and may be a result of the Hispanic or American respondents’ misunderstanding of the question. Many of the interviews were conducted at the headquarters of the company, reason why this question could not have been verified empirically.

To check for consistency, the DOT inspectors’ estimates were observed; four of the five interviewed responded that they did not have a trailer or other facility adequate for training on the jobsite. There may also have been a misunderstanding of the word “trailer,” and the DOT inspectors may have read over the option in parentheses, “(or facility).” When asked about internet access at the jobsite, 54.1% of American supervisors responded “Yes”. Conversely, 56% and 39.3% of Hispanic workers responded to the same question with “I don’t know” and “No,” respectively. These results make logical sense, as the American supervisors would be more likely than Hispanic workers to use the internet on the jobsite38.

General Hispanic Workforce Information

To determine patterns of needs, interests, and areas of opportunity for training Hispanic workers and to consider the ways this information applies to the American supervisors’ desires to train their Hispanic workers, four descriptive open-ended questions (seven for American supervisors) were asked. In addition, these questions try to determine

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38 This is not to say that Hispanics have access to internet on jobsites.
the factors and problems that prevent contractors from sending their Hispanic workers and American supervisors to receive training.

When asked what they considered to be the main problem(s) on the jobsite in terms of their own training needs, 83% of the three populations responded “language” and “little time available.” A similar question was asked to American supervisors, but this question focused on the problem as it relates to Hispanic workers. An overwhelming 90.9% of the respondents said that language was the main problem on the jobsite.

A subsequent question that asked respondents to propose solutions for these training deficiencies provided appealing results. Specifically, 53.8% of Hispanic workers believe that the solution for these problems will come with “more construction-related training in both languages for American supervisors and themselves.” The second most popular solution Hispanic workers offered was to “dedicate more time on a weekly basis” to receiving these courses.

American supervisors were asked to answer the same question in terms of their own purposes and the purposes of their Hispanic workers. In the former, American supervisors’ three main proposed solutions for training deficiencies are to commit to more training, trade jobs during training time, and provide construction-related language in both languages for Hispanic workers and American supervisors. Though learning a foreign language is important to the respondents (and represented more than 22% of the results), the significance of this statement is not clearly shown until the assessment of the latter question. In fact, 80% of American supervisors responded that providing construction-related language training in both English and Spanish for Hispanic workers and American supervisors is the most important solution for the training deficiencies that exist on the jobsite.

Two final questions for the three populations asked them to comment about training preferences in terms of when and where the training should happen. Taking into account all three populations, the respondents stated that the best \(^{39}\) time to receive training is in the mornings (28.3%), the second best time to receive training is on Saturday mornings (15%), the third most common response was that there is no preference in terms of time (13%), and the fourth best time to receive training is on Mondays (9%). By the time the three

\(^{39}\) In terms of less disruption of the productive practices.
populations answered this question at this point in the survey, a similar quantitative/specific question had been asked, to which 78.3% of the three populations responded that the preferred time of the day to receive training is in the morning and 87% of American supervisors prefer to have their Hispanic workers trained in the morning.

Though these results are consistent for both questions, there is evidence that by the end of the survey respondents gave major consideration to the option of receiving training on Saturdays and not only on Mondays. Only 14.7% of Hispanic workers preferred Saturdays, compared to the 50% that preferred Mondays. In addition, when American supervisors were asked about the preferred day on which to train their Hispanic workers, 43.4% responded Monday and none responded Saturday as a choice. This data suggest that questions with limited choices bring more consistent results. Moreover, it is important to note that 22.6% of all three populations said that any day is good for training.

Likewise, the three populations responded to the question about the preferred location for the training by stating “training on the jobsite” and “classroom close to the jobsite,” with 41.9% and 38.7% of the response, respectively. Because this was an open-ended qualitative question, there is no way to test this hypothesis unless the question is asked again with limited options.

With the intent of measuring the willingness of these three populations to take the courses developed to date, a hypothetical question was added to the survey. Willingness and interest in taking the courses is measured as function of miles a worker is willing to drive to receive the course. In asking this question, it was assumed that all respondents had transportation available to them. It was found that, on average, the three populations are willing to drive 72.9 miles to receive these courses. On average, Hispanic workers are willing to drive 71.2 miles, American supervisors are willing to drive 74.3 miles, and DOT inspectors are willing to drive 92.5 miles to receive these courses. Generally, it should be noted that the Hispanic workers have less income to pay for gasoline. Despite this factor, Hispanics, on average, responded that they are willing to drive as much as the other two groups to receive the training.
Training Course Development

The problem addressed in this manuscript involves overcoming the challenges inherent in delivering the course materials previously developed\textsuperscript{40} to the intended audiences, including Hispanic workers and American supervisors. Due to a hectic construction season in which workers put in long days and sometimes weekends to complete projects, providing the training developed previously by Canales et al. (2007)\textsuperscript{41} was a difficult task. As depicted in the results section, orthodox methodologies for delivering training to multicultural crews during the busy construction season were not successful in impacting large number of subjects. For this reason an integration jobsite course was developed.

\textit{Toolbox Integration Course for Hispanic workers and American supervisors (TICHA)}

After examining the survey results, the research team created a course for the construction season. TICHA is a product of this research and has the following characteristics:

- Contains flashcards and quick references, including English and Spanish spelling and pronunciation
- Includes survival phrases
- Includes topics that go beyond language learning (e.g., cultural differences and safety)
- Is designed not to interrupt the daily operations of the American-Hispanic crews
- Has crew integration as the main goal
- Can be customized to specific projects and crew needs at the time the course is received

\textsuperscript{40} The delivery of the material discussed in Canales et al., 2007 was not successful. All sessions had low attendance.
\textsuperscript{41} Described in Phases I and II of the HWRP.
• Is designed to facilitate “real-time integration” between Hispanic workers and American supervisors. Our belief is that integration between these groups would minimize hazards and miscommunication and increase harmony and productivity on the jobsite.

In proceeding with the delivery of training with such characteristics, the research team followed one crew during the 2005 construction season in the state of Iowa. This crew received ten sessions of the TICHA course, which were enough for the research team to make essential inferences about and improvements to this course. TICHA contains the following modules:

• Module 1. Construction Materials
• Module 2. Pronunciation and Alphabet
• Module 3. Hand Tools
• Module 4. Safety Equipment
• Module 5. Numbers
• Module 6. Construction Personnel
• Module 7. Construction Machinery
• Module 8. Construction Quality
• Module 9. Colors, Time, and Measurements

The vital contribution of the work of Canales et al. (2007), which consists on the development of two separate courses, was their similarity to each other, which made it easy for the research team to put them together to form combined English-Spanish toolbox talk material. Flashcards were a crucial element of this course. In addition, reference sheets have been created for all of the TICHA sessions.

All module flashcards and reference sheets can be found in Appendixes C and D. These reference sheets are mainly used for the topics containing phrases. The phrases are

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42 English as a Second Language for Construction and Spanish as a Second Language for Construction
divided in two columns and separated by language, with the written phonetic spellings below the phrases.

One effective way to deliver these courses to a large number of crews is to train and provide the “link” persons with the material presented above. TICHA would make a greater impact in the construction industry and in society if this practice is implemented. For topics such as cultural models and customized technical vocabulary, the research team would step in to conduct the sessions in their routinely. However, most of the sessions presented above could be learned and taught by the “link” person, as long as he/she receives the necessary knowledge and technical support required for teaching and evaluating the results of the course.

**On-the-Job TICHA**

As described above, 11 short toolbox talks that would come to be called TICHA were delivered to a crew from GUS Construction, Inc., on five different sites from June to September of 2005.

For this specific crew, Friday was found to be the preferred day, and 30 minutes before work (6:30 a.m.) was the preferred time for training. The toolbox talks were a success and, based on the experienced gained in these 11 toolbox sessions given during the construction season and the preliminary survey results; TICHA was formally developed by November of 2005. The research team kept a journal with notes of the effects this toolbox course had on the participants. These notes record the progression of the workers and the most effective ways for teaching such toolbox courses. The following are some of the comments extracted from the journal:

- 1st session. “Hispanic workers portrayed motivation and excitement for the course, while the American supervisor seems hesitant about it. Nine out of the ten workers in this crew are Hispanic.”
- 2nd session. “American supervisor ’breaks the ice’ trying to pronounce the words in Spanish. Hispanic workers start to feel comfortable to speak after their supervisor led by example.”
• 3rd session. “A ‘link’ Hispanic worker is detected, and he shows interest in taking the Stepping Up to Supervisor (SUTS) course” (Developed by Arbelaez, 2003)

• 4th session. “‘Problems of the day’ are addressed in this session, as the American supervisor requests that the research team explain the differences in name of the three kinds of chains used in this crew. According to supervisor, some of these workers have been with him for three years and until that moment they could not hear the difference between ‘sling chain,’ ‘log chain’, and ‘long chain.’ That has been clarified to the Hispanic crew, and productivity is expected to increase.”

• 5th session. “The crew feels more tired that usual, as they had been working until late the night before. American supervisor request a quiz for the next session.”

• 6th session. “Quiz show that Hispanic workers have improved their communication ability and interaction confidence towards their American supervisor.”

• 7th session. “Oral and survey feedback was received. Results indicate that the course has been effective in the 30-minute toolbox fashion.”

• 8th session. “It was reported by a new worker that Larry surprised him on his first day on the job as he heard on the jobsite words such as ‘cuidado,’ ‘como se dice,’ and ‘traiga.’”

• 9th session. “It was noted that 80% of the workers, including the American supervisor, know about 90% of the vocabulary presented in these flashcards.”

• 10th session. “Members of the DOT onboard for this research project visit jobsite and listen to a Hispanic worker express his gratitude for the training that we have been providing. American supervisors ask the trainer to come back one more time.”

• 11th session. “Hispanic workers say that their American supervisor is less stressed out by them now after taking the courses. The research team believes this is due to the integration approach.”

Other empirical results from the survey include the following:

• American supervisors prefer their workers to receive the training half an hour before the day’s operations begin or during lunch time
• Integration instruction (i.e., cultural awareness, safety standards, improved relationships, and language instruction) should be the focus of the course and not only language instruction.

• American supervisors find the course to be a waste of time during the initial sessions, while Hispanic workers look forward to these courses.

• American supervisors, as well as Hispanic workers, find the course extremely useful and rewarding by the end the course.

• Each session of the course should not last longer than 45 minutes in order to avoid disrupting the day’s operations.

Overall, findings show increasing interaction on the jobsite between American supervisors and Hispanic workers. TICHA’s main benefit, in addition to the language instruction, is encouragement for the American supervisors and Hispanic workers to interact and recognize their differences in a friendly and supervised way on the jobsite. Evaluations of this course were collected and many described the course as “very helpful” and “very useful” in the everyday communication process.

Instructors are to discuss aspects of cultural dimensions or cultural differences that give Hispanic workers a sense of confidence that goes beyond just pronouncing the word correctly. By discussing the cultural dimensions as described by Hofstede (1984), participants get sensitized to the fact that we are all different, that cultural diversity exists, and that we are somehow located or belong/behave in one or more of the Hofstede’s dimensions.

The American supervisor who evaluated the TICHA delivery suggested that this course continue, as the course helped him “understand how the workers think and how to manage them more effectively.” Many Hispanic workers wrote in their feedback that, after going through the 11 sessions of training, they felt their relations with their supervisor improved. These are representative instances of the positive feedback received from this specific crew.
Classroom-Adapted TICHA

From February to April 2006, a classroom-adapted version of TICHA was formally taught to six construction companies and one group of DOT inspectors. The reason why this training is “adapted” has to do with the teaching methodology implemented. In the classroom setting, instead of having the instructor talk, the crew is separated in small groups which are forced to interact to each other while learning the material provided. This resembles what happens during the TICHA offered on the jobsite.

What varies is that before the crew is broken into small groups, there is a one hour interactive session on cultural differences. This cultural talk, all the American supervisors and Hispanics present are ask to give examples of Hofstede’s explanations of cultural differences. During this hour a strong emphasis is given on the effect of cultural differences to communications between supervisors and workers as well as the Hispanic safety culture.

The audience for this course mostly included American supervisors interested in learning more Spanish construction language and other integration-related topics, such as cultural differences, safety expectations in Latin American countries, and other issues related to communication. The following Iowan entities participated in the classroom-adapted TICHA:

- Concrete Foundations
- Absolute Construction
- Mannatts Construction (Ames)
- Mannatts Construction (Mahaska County)
- Kareth Construction
- Schmidt Construction Co., Inc.
- DOT inspectors, Mahaska County

Each of these groups received eight hours of training. Some of them preferred to receive the eight hours in one long session, in two sessions of four hours each, or in four sessions of two hours each. It was found that the most effective formal instruction is
experienced when the course is taught in four or two sessions instead of one large session of eight hours.\footnote{Canales et al., 2007 conducted 8hrs training sessions and is believed it is one of the reasons attendance was low.}

\textbf{Flagger Courses}

The research team also had the opportunity to teach a flaggers course\footnote{A course required by the Iowa DOT by law. It teaches workers to use the different types flags for controlling vehicle traffic.} to the Hispanic workers of Concrete Foundations during the first week of April 2006. This course was taught by a certified trainer in English along with the research team, which provided the translation of course materials in Spanish.

Upper management personnel of this company argued that they did not “know how all the other contractors could teach this course without translation services.” In light of this comment, it was found that during an earlier flagging course none of the Hispanic laborers undertook the session. For the flaggers course in both English and Spanish, however, Hispanic workers and upper management were pleased with the service provided, and the Hispanic workers have now been properly trained to perform the important task of flagging.

This again raises the question whether all the training effort provided for and by the construction industry may not be achieving its training goals.

\textbf{General Remarks on Training}

There has been a natural progression in the development of the training material presented in this paper as a continuation from Canales (2007) efforts for delivering crucial training for a ever more multi-linguistic and cultural crews in the construction industry.

This course can be adapted to traditional classroom settings as well as toolbox talks on the jobsite. During this progression of events, the research team reached the goal of finding the most effective way to teach the material developed to date in two learning environments.

There are several challenges for the instructor of TICHA:
• Moderate, if not, extensive knowledge of bilingual construction knowledge is needed.
• The personality of the instructor is a key factor, provided that this person needs to be accepted by crews with two different groups separated by different cultures and languages.
• Instructor’s success is measured in how much bilingual talking happens between American and Hispanic subjects during the session.
• Many workers do not participate during the sessions and it is the instructor’s job to make sure all subjects participate.
• Keeping subjects on task is difficult once more trust is built with instructor. The reason is that subjects sometimes use the training as a “break” and could fall into the habit of not participating.

CONCLUSIONS

Contractors and society as a whole will benefit from implementing a training program suited for their Hispanic construction workers and American supervisors. Some of the possible potential benefits of this training program are a reduction of accident rates, increased productivity, better quality of work, as well as other intangible factors such as fewer conflicts, increased morale, and higher retention rates. Due to the contractor’s responsibility to schedule the work activities and resources, the training program should be contractor-driven for its adoption and implementation.

This paper investigates how construction crews prefer to receive the training in terms of 1) teaching methodology and 2) course structure. Key survey results reaffirm the need for Hispanic workers and American supervisor to be integrated by using the developed courses in a more effective way.

In conclusion, it would be quicker, more cost-effective, and easier to train American supervisors and Hispanic workers at the same time using the integration approach rather than the language approach used in earlier phases. This new approach allows the crew to “break the ice,” which is necessary in crews where two or more cultures are represented. In the case of Hispanic workers and American supervisors, the integration approach using TICHA seems
to approach the optimal methodology for effective training that can benefit by taking advantage of this course.

For the success of these courses, it is recommended that the course be delivered by individuals who possess multicultural experience in the construction industry, specifically Hispanic and American cultures, and who are fluent in both English and Spanish. This will provide the participants with a good understanding of the differences between the two cultures and encourage interaction in the classroom through real experiences. The courses must also fit the contractors’ work schedules or seasons. For example, the TICHA course was best taught before the work operations started or during lunch, while the classroom setting version of this course was taught immediately before the construction season began in order for the participants to retain the knowledge as long as possible.

Contracting companies should be the driving force behind the implementation of these training programs, since upper management involvement and support plays a big role in the success of the program.

As the Literature Review reports, the TICHA integration approach of delivering training is unique in its kind. The authors suggest that these courses be taken by construction companies who have three or more Hispanic workers in their crews.

**RECOMMENDATIONS**

Further research should be performed to understand the impact of TICHA course in terms of productivity, conflict, quality of work and accident rates. More research should also be performed to understand the best ways for Hispanics to learn English and American supervisors to learn Spanish. If the effect of the training is found to be significant, contractors will have greater motivation to train their crew.

A train the trainer course should also be developed in order for Hispanic and American supervisors to receive instruction on how to deliver TICHA on their own. During daily operations, contractors could train their workers using TICHA once a week for half an hour before the working day starts or during lunch time. If a comprehensive “train the trainer” course can be implemented massively, the benefits from having a large pool of
trainer-workers performing on site training could easily impact the whole State of Iowa and not only few construction companies.

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ACKNOWLEDGEMENTS

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CHAPTER FOUR. Delivering Effective Construction Training for American Supervisors and Hispanic Craft Workers
Abstract

This article quantifies the effect of the implementation of integration training in both language proficiency and crew cohesiveness among workers in Iowa’s construction crews with Hispanic workers. All the participants rendered a test measuring language proficiency for non-native language (either Spanish or English) at the beginning of the construction season in (May-June) 2006. Thirty seven subjects grouped in six crews received nine TICHA\textsuperscript{45} modules focused on language development and group interaction, whereas the remaining 18 workers (four crews) comprised the control group. A final test was applied at the end of the season (November-December 2006) to measure the language progress between the experimental and control groups. Results show that integration training significantly improves communication on the jobsite. This improvement has close links with decreasing turn over rates and more effective work relations.

Introduction

The Hispanic population changes are impacting U.S. demography. Currently, this cultural group counts with the higher growth rates and larger immigration share in the United States. The U.S.’s Hispanic workforce grew from 5.9% in 1980 to 20% in 2000 and is expected to increase to 36% in 2010, whereas the national workforce is projected to grow only 12% during the same period. The participation of Hispanics in the construction industry has been continuously growing. From 1996 to 2001 they expanded from 10% to 18% of the construction workforce, accounting for more than 1.3 million of workers. This population is overrepresented in some of the most dangerous occupations; also they have the higher fatality and injury occupational rates in comparison with any other ethnic group in the United States (O’Connor et al 2005). According to the Bureau of Labor Statistic (2005) the fatality rate for Hispanics is about 20% higher than the rates for white or black laborers.

To date, very little construction research has targeted Hispanic workforce in the United States. In fact, Brunette (2004) mentioned that only one study out of 106 funded by the United States National Institute of Occupational Safety had a Hispanic component. In

\textsuperscript{45} Toolbox Integration Course for Hispanic workers and American supervisors described in Chapter 3 of this thesis.
addition, there is a lack of dissemination of the results in mainstream media as well as poor training programs that consider the Hispanic component among companies (Arbalaez 2004). In consequence, even when the importance of the Hispanic workforce is widely recognized among construction companies (Nash 2004, AFL-CIO 2005), the impact of a multicultural environment in terms of productivity and safety is still poorly known.

Iowa construction crews are changing rapidly with the incorporation of Hispanic laborers in the workforce. A previous study developed by the Hispanic Workforce Research Project\textsuperscript{46} showed that by 2005, 60\% of the supervisor in central Iowa reported more than 7 Hispanic workers in their crew. At the same time, 62\% of Hispanic and 84\% of American supervisors were not satisfied with their proficiency in speaking English or Spanish respectively. Moreover, 78\% of the American supervisors use English as the only language to communicate on the jobsite, which parallels 82\% of respondents stating that communication and language barriers were the main reason for job conflicts. These findings highlighted the need of implementing appropriate training programs that increase not only the ability to communicate but also the integration within peers in construction\textsuperscript{47}.

The time constraints and irregular schedules of construction crews make it difficult for the full attendance of participants to formal classes difficult. The program developed a new approach called Toolbox Integration Training for Hispanic and American Supervisor (TICHA). The new course involves a series of 30-min modules to be delivered directly on the jobsite. Therefore, the course fulfills the objective of increase language skill and integration within the crew with a minimal disruption on the crew’s daily operations.

The objective of this study was to measure quantitatively the effect of TICHA in the communication skills of Hispanic and American workers among construction crews of mid-Iowa. In addition, it was measured the acceptance of the methodology among workers and supervisors, including material quality, teaching approach, vocabulary studied, and time use.

\textsuperscript{46} Finding of this paper has been summarized in Chapter 2 of this thesis.
\textsuperscript{47} Described in Chapter 3 of this thesis.
Research Approach

Descriptive Statistics

Although this study focuses on the TICHA impact on communication, the unique opportunity of conducting a research experiment this large permitted us to ask general background questions. Descriptive information was collected among participants, which included age, school attendance, and residence time in USA and previous experience in construction activities. It is important to understand the American and Hispanic worker profiles in order to better interpret the effects of the training instrument in learning communication skills for labor improvements on construction jobsites.

Experimental Design

In order to achieve the stated objectives the TICHA was delivered to six construction crews specialized on road and bridge maintenance, whereas four crews functioned as control groups. It is important to notice that the crews considered as “experimental” in Table 4.1 were not an option of the researchers. Each of the three companies agreed for the experiment with the condition of training the crews that, according to upper management, had more problems related to miscommunications, productivity, and safety. Table 4.2 verifies this assertion, which shows that Hispanics had higher scores than American supervisors previous to training. This means that without training Hispanics have more English skills than Americans have Spanish, with regard to the standard test for construction terminology. In addition, within the native English speakers there is no significant different between the experimental and control groups.48 Nevertheless, Hispanics in the control group had significant higher scores than those in experimental groups. Upper management selected experimental groups according to their needs. Indeed, the experimental groups showed lower values in the communication standard tests we provided. Finally, in Table 4.2 AW, HW and S stand for American Workers, Hispanic Workers and American Supervisors, respectively.

48 In terms of the “S” (supervisor) category, Jay, Concrete Foundations Supervisor is bilingual which skew the average for the experimental group dramatically. Without Jay in the data set, there is, in fact, no difference in the communication level between control and experimental American supervisors.
Indeed, a test measuring language proficiency of each laborer was performed before training. American and Hispanic workers tested their proficiency recognizing words and phrases directly related with construction terminology or basic skills of communication. A second test was performed after training.

Using survey questionnaires at the end of the construction season, we collected information about the training effectiveness, safety, conflict frequency and conflict resolution. All these surveys were presented to the entire crew. Additional surveys were
completed by the supervisors describing the productivity and quality of tasks among workers, who were sorted by their ethnic background.

**Research Methodology**

**Questionnaires Development**

Various questionnaires were developed and used for the collection of data. The questionnaires in Appendixes E and F evaluate the success of TICHA’s training materials, methods and delivery performance in English and Spanish, respectively. Initially, this questionnaire was set as the main instrument for assessing TICHA’s materials and instructor’s performance. Due to time restraints at the time of conducting the survey, a shorter version of this assessment was integrated into the questionnaires in Appendixes N and O to measure the TICHA effectiveness, collect general profiling information, and ask questions on subjects related to improving the nature of the training program. In this case, crew members were asked on how the feasibility of conducting a “train the trainer” course that permits more crews to receive training. Nevertheless Appendix E and F can now be use to evaluate TICHA in the future occasion when training, and not research, is the main objective at the time of the jobsite visit.

The questionnaires in Appendixes I and J evaluate the construction terminology general knowledge of construction workers in English and Spanish. Two questions were randomly selected from each of the nine modules of TICHA. On the other hand, the questionnaire in Appendix K was used during every training session to take attendance. This is important to know since the research’s validity depends on the subjects’ continuous exposure to the treatment (the TICHA training). Table 4.1 shows the percentage attendance with respect to the actual crew member numbers.

**Quantitative Data Collection**

Once upper management of the three company participants as well as the Human Subjects Office at Iowa State University provided with permission to enter the jobsite all the
crews were asked all the questions related to construction terminology found in Appendixes I and J. This happened in the period between May and June of 2006.

After 16 weeks of training, the same crews were asked the same questions. The only difference with this second time was the extra time used to conduct research using additional questionnaires found in Appendixes E, F, L, M, and N. Once the surveys were completed, the data was encoded in a Excel spread sheet. The data was encoded by a research assistant, was rechecked in order to minimize errors.

**Data Analysis**

Once all the data were collected and divided, they were then transferred to the Statistical Package for Social Sciences (SPSS) version 15.0. The analysis was performed systematically beginning with performing descriptive data, collecting means and a few comparisons for the general background data. Next, simple t-tests and ANOVA was used determine possible difference between pre and post-training data. While some tables were generated in SPSS, most of them plus histograms were designed using Microsoft Excel.

**Survey Results**

This section includes a brief summary of the notes collected during the training. It has been organized in terms of the modules. The observations of common occurrence among crews are described in the qualitative analysis section. Next, the results of the class evaluation and perspectives on a possible future train the trainer course are reported. Before the results of the language communication study, the crew profiling information is revealed.

**Observations**

The major objective of this research was to quantitatively show the impact of the TICHA in improving communication and productive relations on the jobsite. Nevertheless, during the training sessions there were hundreds of observations that were not captured by the face-to-face interviews. During the ~8 month period of this study, the research team recorded comments made by construction workers and kept a hand written journal including
observations of the general behavior of the research subjects during the training sessions. A summary of this recording and observations are briefly summarized as followed:

- **Module 1**: “Supervisors are reluctant to participate in training, while Hispanics show their excitement. Hispanics also believe that instructor works for company.”
- **Module 2**: “Hispanics warm up to instructor and start complaining about their issues on the jobsite.”
- **Module 3**: “Supervisors are now active during the training session; this happens in all the crews.”
- **Module 4**: “During this safety vocabulary module, supervisors ask for more bilingual safety training during next season.”
- **Module 5**: “By now, it is clear that Americans are learning the materials considerably faster than Hispanics. Americans admit they look over notes before instructors come in.”
- **Module 6**: “Hispanics report to instructor that supervisor speaks words in Spanish during regular work hours. They say that it is usually done to ‘crack a joke.’”
- **Module 7**: “Hispanics complain that the training is not intensive. That is, they would prefer the training to take place during the first nine weeks of the season.” “Hispanics request to review the first three modules to ‘refresh’ the training material.”
- **Module 8**: “While supervisors seem to be the most studious, American workers report to instructor that they see better communication between Hispanics and American supervisor. They claim that supervisor has been more ‘relaxed’ with Hispanics for some time now.”
- **Module 9**: “Americans and Hispanics request more training and additional modules in (1) body parts, (2) language safety training, and (3) more action verbs.”

**Class and Train the Trainer Evaluation**

Although the training evaluations were satisfactory to good among participants, Hispanics tended to express more satisfaction with the approach and topics practiced then Americans did. Vocabulary, sentences used and materials delivered were better evaluated by Hispanics, whereas the interactive approach was similarly good for all the workers. In general, all workers were eager about the idea of more training throughout the summer. Even so, the Hispanics tended to show more interest in future training than the Americans.

In terms of the “train the trainer” question, there was no detectable difference between the control and the experimental groups or by ethnicity in terms of their perception of a new training program taught by member of the same crew. The general trend was skepticism about this initiative in most cases because they did not consider the supervisor as
the ideal trainer. Frequent comments about this included lack of experience in teaching, poor use in Spanish and lack of time for extra activities.

Figure 4.1 shows crew members’ perception of the impact of the class in the daily activities. Hispanics considered the morning class session was beneficial in terms of cheering up the day. However, American workers rated this lower. In contrast, American workers considered the class duration (30 min) more positively than the Hispanics who usually desired more time per session and reviewing sessions. Both groups considered that the training was helpful for improving daily communication and consequently the productivity on the jobsite. In concordance with this perception they did not consider the morning class interferes in the daily activities.

Figure 4.1. Perception of TICHA impact on daily activities during the delivery of the modules by American and Hispanic workers. Grouped bars marked were categories rated significantly different between groups (** p < 0.01).

Figure 4.2 depicts the results of the training evaluation. Hispanics value the training materials and the content in terms of its vocabulary and sentences significantly more than
American workers. As expected, Hispanics are significantly more eager to receive training next year than the American counterparts. This is clearly explained by their desire to learn construction terminology in English which would allow Hispanics to integrate into the crew more effectively. On the other hand, it is quite noticeable how both Hispanic and American workers grade the “interaction” component of the training as the most helpful of all. This is the only aspect of the course Americans graded higher than Hispanics in this section.

Figure 2. Perception of TICHA components by American and Hispanic workers. Grouped bars marked were categories rated significantly different between groups (* p < 0.05; ** p < 0.01)

Crew profiling
Workers were relatively young with a mean age of 29 years. This is usually the case for the construction industry. Among companies worker age was similar with the only exception of the supervisors in United Contractors, who had on average 43 years. Concrete Foundations showed larger variability in the age of Hispanic workers that the other companies, whereas Absolute Construction tended to hire the youngest Hispanic workers. This relationship is shown in Figure 4.3.
In terms of experience in the construction industry positions, as expected, American supervisors have more years. However, it is quite noticeable the supervisors in the company specializing on highway and bridge construction (United Contractors) employ mostly Hispanic workers. In addition, this company employees workers who in every position possess more experience in construction. Since the other two companies are specialized in smaller type of concrete work, it was expected their experience requirement was lower. Still, the considered smaller project scope companies employ Hispanics as well as Americans while the larger one has few Americans laborers who didn’t respond this question. Workers experience was in most cases low. In fact, 50% of the workers reported less than 4 years working in a construction company. American workers had on average more experience than Hispanic workers but it is probably highly influenced by United Contractor foreman, who had more than 20 years of experience. Figure 4.4 shows this relationship.

In terms of education, 38% of workers had 12 year and 50% have less than 12 years of formal education. In addition, only 12% of the participants had a college education. Hispanic had less formal education than Americans and the trend was steady among companies. Nevertheless, within positions there was no significant difference in years of education. For instance, Hispanics in the three companies had about the same education levels. It is noticeable, though, United Constructors’ crews had slightly more years of formal education than the other companies. This is another indicator that companies performing more difficult tasks are hiring more educated workers. With this small data set it is impossible to determine if also most large companies are hiring mostly Hispanic workers as United has shown. Figure 4.5 shows this relationship.

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49 This subject was not accounted as a supervisor. This crew has a supervisor and a foreman. The foreman has been analyzed as part of the American construction workers as he still receives directions from the supervisor and works closely with Hispanics as much as other laborers do.
Figure 4.3. Worker’s age by position and company

![Bar chart showing worker's age by position and company]

Figure 4.4. Worker’s construction experience by position and company

![Bar chart showing worker's construction experience by position and company]
Pre test results (Table 4.2) demonstrated some differences between control and experimental groups. However, initial differences between American and Hispanic workers in terms of non-native language proficiency were quite differentiated. American workers knew on average only 20% of the words and phrases in the test whereas Hispanics had on average 50% of the answers correct. Nonetheless, the Hispanic scores were influenced by link-persons\textsuperscript{50} that knew on average 80% of the answers. Hispanic considered as nonlink-persons had similar results to those of American workers.

The post test provided interesting results as shown in Figures 4.6 and 4.7. First, it showed an overall improvement among workers in language proficiency, moving from 40% to 65% of answers correct on average between the pre and the post test. Second, the training seemed to improve largely the Spanish knowledge among American workers due to the evident difference between the control and the experimental group. Such a difference is not

\textsuperscript{50} Termed coined by Canales et al. (2007) to describe a Hispanic worker and American supervisor’s “man of trust” who happens to communicate well with Hispanics and Americans. Sometimes, within fortunate companies, the “link-person” is bilingual. To be a “link-person” there is no need to be bilingual, but quite communicative and experienced in construction terminology and processes. Specially, the link-person has been described by American supervisors as “the Hispanic who understands me without me opening my mouth” (Larry, Gus Construction Inc. American Supervisor during Phase III of the HWRP)
observed on the Hispanic group, which showed that Hispanics in control groups still are forced to learn some construction English terminology throughout the season. Still, Hispanics on the experimental category learned more than the ones in the control category. Finally, the difference in foreign language knowledge disappeared between Americans and Hispanics in the experimental but not in the control group, suggesting that Americans in control groups did not show interest to learn Spanish whereas Hispanic in the control group did learn some English independently of the training provided.

The differences between the test, found in Table 4.3 and Figure 4.8, provides with additional evidence of the effectiveness of the training in terms of communication. It confirms that Americans learned as much as Hispanics in the experimental groups, while Americans in the control group tended to even forget words during the period of the study. Moreover, it is evident that Hispanics in the control group learned new words despite the lack of participation in the training. However, the proportion of learned words and phrases was higher on the experimental group, suggesting that the training helped to accelerate the learning rate of English among Hispanic workers.

The scores after receiving the training indicated an improvement for all groups in the experimental group. In general, all in the experimental category had a similar high score, ranging from 50-70% correct answers out of the 18 questions (100%). In contrast, the control groups had variable responses between categories. Supervisors and American workers showed no improvement in their proficiency speaking Spanish, whereas the Hispanic workers showed improvement although lower than that of the experimental Hispanic group.

The trend in language learning between the control and experimental groups is evident when the difference between pre and post tests is plotted. The difference for the control group was lower for the three categories when compared with the experimental group. In fact, American craft-workers and supervisors had zero to negative scores. In contrasts, the experimental groups experienced a significant improvement, which was especially evident for English-speaking participants. Hispanics showed improvement in both categories but workers in the experimental group learned more words in comparison with the control group.
Figure 4.6. Percentage score of control group by category of pre and post test

Figure 4.7. Percentage score of experimental group by category of pre and post test
Figure 4.8. Percentage difference between pre and post test by category and position

![Graph showing percentage difference between pre and post test](image)

Table 4.3. Difference Percentage between pre and post test by category and position

<table>
<thead>
<tr>
<th>Position x Category</th>
<th>Mean</th>
<th>Std. Error</th>
<th>95% Confidence Interval</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
<td></td>
</tr>
<tr>
<td>A-CW</td>
<td>-6.7E-016</td>
<td>12.824</td>
<td>-25.771</td>
</tr>
<tr>
<td>Control</td>
<td>41.111</td>
<td>8.111</td>
<td>24.812</td>
</tr>
<tr>
<td>Experimental</td>
<td>41.111</td>
<td>8.111</td>
<td>57.410</td>
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<tr>
<td>H-CW</td>
<td>11.111</td>
<td>5.235</td>
<td>.590</td>
</tr>
<tr>
<td>Control</td>
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<td>3.627</td>
<td>21.632</td>
</tr>
<tr>
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<td>3.627</td>
<td>39.289</td>
</tr>
<tr>
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<td>9.068</td>
<td>-21.001</td>
</tr>
<tr>
<td>Control</td>
<td>37.302</td>
<td>6.855</td>
<td>23.526</td>
</tr>
<tr>
<td>Experimental</td>
<td>37.302</td>
<td>6.855</td>
<td>51.077</td>
</tr>
</tbody>
</table>

Regression Analysis

A regression analysis (Figure 4.9) indicated that the pre-test score was an important factor to predict the post-test score. Both tests were positively related, indicating that individuals with high scores at the beginning of the experiment would have a high score at
the end of the training season. The relationship was different between the control and experimental groups. For the control group, the intersection was close to zero, indicating that individuals with low scores at the beginning of the training season did not improve during the work-season. The low dispersion of dots also suggests that the participants showed basically the same knowledge between tests. In contrast, the experimental group showed a lift in the intersection, indicating that even participants with the lowest scores in the pre-test had a significant increment during the training.

Figure 4.9. Regression analysis Pre vs. Posttest scores

Construction Language Proficiency Perceptions

At the start of this project, it was not clear whether the research methodology implemented for the experimental design was going to yield results. A “backup” set of questions were asked in order to quantify the subject’s perceptions on their ability to communicate and ask questions before and after the TICHA delivery. The positive results support the appropriateness of the research methodology.

Figure 4.10 shows the response of the participants to their perception of the ability to communicate with the supervisor before and after the training; we found this varies between
ethnic groups. Similar to the results from the language test, the experimental group showed a higher change in their confidence to speak in other language than the control group. The change was similar between American and Hispanic participants, suggesting that the whole crew in general improved significantly their ability to communicate in another language.

The perception of confidence to ask questions was highly influential among Hispanics in the experimental group in comparison with the control group. In contrast, American workers showed a higher confidence independent of the training. Probably, the fact that most questions are directed to the supervisor and in English explains the lack of differences between control and experimental American workers.

Figure 4.10. Difference percentage perceptions in ability to communicate before and after training by position.

CONCLUSIONS

In conclusion, this study highlighted the importance of conducting training with non-English and native speaking populations in the construction industry together and on the jobsite. It emphasized the need to design and deliver linguistic and culturally appropriate materials that could be easily understood by the target audience. In addition, such activities might contemplate the interaction among all ethnic groups in the crew as an attempt to improve cohesiveness and reduce the risk of personal conflicts. Future investigation must
focus on the monitoring of the training at long-time scales and the economical impact that personnel turnover has on crew’s performance.

Teams are a popular means to improve quality, reduce cost and develop construction projects more efficiently. However, these teams may confront many issues and divisions that would decrease their productivity as long as their members become demoralized and ineffectual. Language barriers have demonstrated to be an important component in the increment of conflicts and accidents among workers, suggesting that it is directly related to decrease in team productivity. In recent years, the Hispanic population showed a vigorous growth in the U.S. Midwest construction components, exposing supervisors to new challenges in communication.

This study provided the first attempt to deliver integration training to construction crews in Iowa. The main results of this study were as follows:

- Willingness by most workers to participate and learn a new language.
- American supervisors had even performance in learning Spanish construction terminology in proportional terms.
- Increased group cohesiveness after training which is reflected in more confidence asking questions and communication skills.
- A sense that Hispanic workers that are more integrated stay longer in the same company.\textsuperscript{51}
- Great reception of the TICHA approach for delivering effective training.

More importantly, TICHA significantly improve language communication on the jobsite. This first attempt with the “toolbox integration” approach, the results suggest that the class is improving the interaction among workers. In fact, as described in the observational section of the results, even early skeptical American supervisors and workers were incorporated quickly in the classroom dynamic and showed remarkable improvement in both personal relationships and Spanish skills after the season.

\textsuperscript{51} Quantitatively shown in Chapter 5
RECOMENTATIONS

Effective training has been delivered to construction crews, now the suggestion is for more companies to take part of this training. In order to impact more construction crews, it is recommended to aggressively deliver a train the trainer course with the idea of implementing training that reduces conflicts to a massive number of construction crews.

Based the results we also recommend the participation of supervisors and workers in the learning and interaction process. Encouraging Hispanics to learn English along with safety rules and construction skills has worked as shown in training. Government and the industry should now join the effort for improving the training effectiveness to the construction sector of the economy.

REFERENCES


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CHAPTER FIVE. Effect of Cultural Diversity on Productivity, Quality of Work, and Conflict Resolution among Construction Hispanic workers and American Supervisor Workers
Abstract

This article quantifies the effect of communication and conflict on the performance of construction crews with Hispanic workers. Sixty nine Hispanic and American construction workers completed a test measuring the frequency, type, and resolution of conflict. Conflict theory is used in explaining effects how multicultural construction crews are impacted in terms of worker’s productivity, safety, and quality of work. The results show that greater frictions on the jobsite produce negative effect on various aspects of the construction industry experience. Integration training is suggested to alleviate conflicts on the jobsite.

Introduction

Conflicts at the workplace involve an array of attitudes and behaviors that directly or indirectly affects the cohesiveness among members of a work group (Masters and Albright, 2002). Although this kind of situations are normal and, in most cases, expected as part of the routine in the realization of any activity, rarely conflicts are thoroughly assessed (Braithwaite, 2001). Further, the mislead of conflict resolution may incur in direct costs for the organization such as decrease in productivity (De Dreu and Beersma, 2005), increase employment turnover (AFL-CIO, 2005; Kacmar et al., 2006) and even monetary losses related to litigation or health care costs (Dement and Lipscomb, 1999). In addition, persistent conflictive conditions may lead to indirect costs such as losing market opportunities and problems hiring new personnel that may exceed direct costs (Masters and Albright, 2002).

Although recognized as an important factor explaining personnel performance in the workplace, work conflicts have been poorly assessed in most industrial and organizational studies (Masters and Albright, 2002). The fact that interpersonal relationships are important has long been recognized (Baron, 1991) but formal theories describing the interaction and approaches to resolve conflicts are relatively recent and rarely tested empirically (Jehn, 1995, 1997; Alper et al., 2000). Nonetheless, the interest in exploring the effect of conflict on jobsites increases as conflict levels rise due to the increases in diversity (i.e. ethnic, gender, culture) in jobsites globally.

The objective of this study is to understand the effect of cultural diversity on productivity and conflict resolution among construction crew workers in Iowa. This objective
includes estimating conflict frequency, the perceived differences in conflict resolution between ethnic groups, and the effect of conflict frequency on productivity, safety record and work quality. Finally, the study included the supervisors’ perceived value of Hispanic workers in comparison with American workers.

**Literature Review**

**Conflict Theory: managing conflicts in multicultural work environments**

The conflict process is separated in four phases (Figure 5.1). First, conflict emerges when two parties dispute about the use of resources or information (conflict issues) (De Dreu et al., 1999). In the case of information, the conflict might be related to ways to use resources (intellective conflicts) or preferences in the use of resources (evaluative conflicts) (Ibid). Once established, the quarrel bring up different feelings about the other party which would be influenced by the concern about self concepts, the other’s position and external influences such as stereotypes and hierarchical position in the group (conflict experience). The development of the conflict at this point depends on the conflict management strategy adopted within the group, which can also feedback the issue and the conflict experience (Figure 5.1). Given the importance of conflict management in organizations, there is a myriad of strategies dealing with friction on the jobsite (Pruitt and Rubin, 1986). One of the most accepted theories, named Dual Concern Theory (DCT), was proposed by Blake and Mouton (1964) and revised by Deutsch (1973) in his Theory of Cooperation and Competition.

This theory argues that conflict management is a function of self-concern and the concern for others. The interaction between these two factors heads to different ways of conflict resolution (De Dreu, et al., 2001). For instance, high concern for self and low concern for others results in forcing one’s will on others in order to get an agreement, usually by threats, persuasive arguments and positional commitments. In contrast, low concern for self and high concern for others results in a preference for yielding, which leads to accepting the other’s will in the negotiation. Low concern for both self and others results in a preference for avoiding or reducing the importance of the conflict, whereas high concern for self and others will involve a problem solving process, oriented toward an interchange of
information among parties and making trade-offs between relevant and irrelevant issues. More recently, human resource managers have been looking for a middle ground in negotiations or an intermediate concern that leads toward a compromise process that could be interpreted as a half-hearted problem solving (Pruitt and Rubim, 1986) or a distinct strategy that matches one another’s concessions (Van de Vliert, 1997). Figure 5.2 diagrams the Dual Concern Theory idea in which the conflict processes and teamwork performance yield to a “resolution” which could determines work environment and task performance in the workplace.

Finally, the resolution would yield an integrative settlement, a compromise between parties, an imposition or an impasse as outcome, depending on the conflict management strategy used. Each phase in the process will influence the resulting resolution, which subsequently may define the contextual environment and task performance among peers and eventually future conflicts on the jobsite.

Figure 5.1. Graphic representation of conflict process and its relationship with work team performance. Boxes on the top represent phases of the conflict process. Modified from De Dreu et al. (1999).
The effect of conflict on task performance is not clearly defined. Most authors differentiate at least two kinds of conflict at workplaces; conflicts related to personal relationships and conflicts emerging from work-team task performance (Jehn, 1997). Relationship conflicts have been negatively related to productivity in most studies and are broadly accepted as a detrimental trait to be avoided in the jobsite (De Dreu and Breesma, 2005; Dijkstra et al., 2005; Guerra et al., 2005). On the other hand, the effects of task conflicts are amply debated among authors. Some studies state this kind of conflict is as negative as the relationship conflicts (De Dreu and Weingart, 2003), whereas others suggest that intermediate level of conflicts are beneficial and even necessary to improve productivity in work-teams (Lovelace et al., 2001; Pelled et al., 1999). The last group argues that lack of task conflict lead to passiveness and high levels imply excessive time solving disagreements, intermediate levels increase creativity and improve productivity. Therefore, they suggest a curvilinear relationship between task conflict level and team performance (Jehn, 1995). This relationship is shown in Figure 5.3.

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Figure 5.2. Graphic representation of Dual Concern Theory. As reviewed by Deutsch (1973).

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52 “Task” meaning the usual discussion related to work activities at the workplace.
Additional studies indicate further variables to consider in work conflict studies. First, the level of complexity in tasks seems an important factor (Jehn et al., 1999). Low-skill jobs had moderate responses to conflict in comparison with cognitive jobs. Nonetheless, cognitive jobs had positive responses to task conflicts whereas any kind of conflict was detrimental in low-skill jobs (Pelled et al., 1999). Likewise, task conflicts benefited more groups with high expectations for job positions than workers with low expectative of moving up within a company (Guerra et al., 2005). Furthermore, management strategies and the presence of a third party in resolving conflicts can have an important impact in the effect of conflicts in workers performance, especially when supervisors maintain a clear division between personal problems and differences in task solutions at work (Giebels and Janssen, 2005).

Figure 5.3. Graphic representation of Jehn’s (1995) Conflict-Productivity Relationship.

![Diagram of Conflict-Productivity Relationship]

The cultural background in conflict resolutions has been poorly assessed. Social analysts suggest that cultural bounds among peers could be an important factor understanding work conflicts as well as solving them (Muchinsky, 1990, Arai et al., 2001). Between individualistic and collectivist societies for instance, it has been proposed that individualistic societies would look for autocratic or adversarial mechanisms to solve problems, whereas
collectivist societies would prefer advising or avoiding strategies that would not threaten the group interests (Hosftede, 1984, 1991, Navahandi, 1997). This theory has not been tested so far, as most investigations in this field have been conducted in USA and European societies, where individualism is the predominant cultural background (Cropanzano et al., 1999). Therefore, conflict studies in other cultural contexts could give important insights about how to solve work confrontations, especially among groups with different cultural backgrounds.

**Research Hypothesis**

**Implications for Hispanic Construction Workers**

Construction companies in the United States are often affected by conflicts among crew workers, although knowledge about the effect of disputes in the workplace on the crew’s performance is relatively limited (De Dreu and Beersma, 2005). For instance, Thomas (1992) reported that a foreman spent on average as much as 20% of his working time solving conflicts in the workplace, even though foremen did not identify this time as an important task within their chores. Ruttember and Lazo (2004) identified miscommunication as one of the most frequent sources of conflicts among construction workers. In their study they detected that foremen are less willing to explain procedures to non-English speaking workers, even if they are not trained to do some specific tasks. Also, it is frequent that other laborers get frustrated and yell at workers who do not understand English. Many times English speakers discourage the non English proficient worker to skip part of the construction processes because they could not learn it at once (Ruttember and Lazo, 2004). As a result, often non-English speaking laborers work under unsafe conditions, without appropriate equipment and/or with productivity limitations.

This situation is reflected by the construction Hispanic population in USA. Construction workers who identified themselves as Hispanics increased from 5% to 23% of the labor population in USA from 1980 to 2003 (BLS, 2004). As much as 45% of them recognized their English levels as “less than well” with up to 17% admitting they do not speak English at all (Dong and Platner, 2004). This population is also the only ethnic group with an increasing incidence of fatalities and workplace injuries among construction workers.
in the country (CPWR, 2002). In fact, according with the National Research Council (2003), Hispanics are 2.5 times more likely to be killed and 50% more likely to be injured than the average U. S. worker, even when the rate of accidents for Hispanic laborers is probably underreported. Furthermore, the language barrier has been identified as a common obstacle for position promotions (Gilleard and Gilleard, 2002), which is one of the reasons that the Hispanic labor population has the lowest upgrades among ethnic groups in USA (Tomaskovic-Devey and Zimmer, 2004).

Even when Hispanic workers comprise a significant proportion of the labor force in construction crews in the Midwest of the U.S., there is no major effort to understand the demography and importance of this group for this region. As part of the Hispanic Workforce Research Project (HWRP), preliminary results depicted Hispanic workers in the Mid-Iowa as mostly composed of young immigrants (> 50% sampled population between 20-30 years-old), with little experience in construction tasks (averaging 4 years of experience) and low levels of the local language (recognized ~30% of elemental English words directly related to their activities). Therefore, they carry out low-skilled tasks with limited access to machinery or problem-solving tasks and usually excluded from the making-decisions process on the job site. Under this scenario, several hypotheses about work conflict in construction crews are suggested:

**Frequency of conflicts**

H1. English language knowledge of Hispanic workers correlates positively with length of residence and construction experience in the U.S.

H2. Frequency of conflicts between Hispanic and American workers will be negatively correlated with time of residence and construction experience of Hispanics in USA

H3. English knowledge of Hispanic workers will correlate positively with relationships with American workers.

H4. Construction experience would be positively correlated with job satisfaction

H5. Construction experience would be negatively correlated with changing-job intentions.

Rationale: Regarding the importance of integration in collectivistic societies we could expect higher levels of friction from Hispanic workers that are not still integrated in their working
group. Language appears as a key barrier for Hispanic workers in the integration process. Since language skills are likely enhanced by the time of exposure to the language itself, we could expect that language knowledge and time of residence as well as construction experience to be correlated. Further, we could expect that those laborers that overcome the language barrier would feel more integrated with the crew, decreasing the frequency of conflicts and increasing the perception of relationships with American fellows.

**Dealing with conflicts**

H5 Hispanic workers will rather avoiding responding to conflict higher than American workers.

H6 American workers will rate negotiation responses to conflict higher than Hispanic workers.

H7 Hispanic workers will prefer to seek a third party as a resource for solving problems higher than American workers.

Rationale: Hopkins (2003) and Halcarz (2003) reported that Hispanic workers rarely report unsafe or conflictive situations because of their limited communication skills and, in many cases, afraid of losing their jobs. So, they are usually assigned to high-hazard activities with little understanding about safety requirements, which is often translated on higher injury and fatality rates in comparison with average labor workers (Anderson et al., 2000). According with the Dual Concern Theory we could expect a low self concern among Hispanic workers due their immigrant condition, lack of experience low communication skills, and high concern about Americans opinion when solving conflicts. Therefore, they would perceive solving conflicts as a yielding attitude toward American’s opinions. Nonetheless, we expect that American workers will have a different perception, considering the designation of tasks a fair strategy. At the end, our purpose is to depict that even within crews conflict management could be differently perceived among workers. Finally, we would expect that the collectivist Hispanic cultural background would lead toward third party solutions in the workplace more often than that for American workers.
Conflict management and team effectiveness

H 8 Crews that rely on negotiation approaches will develop better strategies for solving conflicts.

H 9 Crews that rely on competitive approaches will develop lower feelings of efficacy about solving conflicts.

H 10 Crew’s feeling of solving conflict efficacy will be positive correlated with their productivity assessment.

Rationale: Because conflicts are a central factor in working groups, conflict management may contribute significantly to crew’s overall performance. When working groups are unable to solve conflicts at workplaces, teams become demoralized and unable to perform effectively (Alper et al., 1999). Further, the Theory of Cooperation and Competition foresee higher conflict effectiveness among groups with negotiation approaches in solving conflicts, as they tend to view a conflict as a mutual problem that needs collective solution. On the other hand, competitive groups tend to view conflicts as a win-lose struggle, which may induce to obstructions in solving efforts (Tjosvold et al., 1999). Therefore, we expect that the solving conflict approach used on a crew would affect the supervisor’s perception about team’s conflict efficacy. Furthermore, we predict that this perception would be positively correlated with the perception of productivity among supervisors. We also expect that some task conflict to increase productivity slightly (Jehn, 1995).

In summary and based on the current information we expected four main trends in this study: (1) a significant increase in the proficiency of the secondary language (either Spanish or English among American or Hispanic workers respectively) for TICHA trained workers in comparison with control groups; (2) a positive correlation between time of residence in USA and English proficiency among Hispanic workers; (3) a trend to yielding-forcing conflict resolution between Hispanic and American workers; and (4) a negative relationship between conflict frequency and productivity among construction crews.
Research Methodology

Before the initial research objectives were in place, a test measuring the language proficiency of each laborer was performed before training. American and Hispanic workers were asked to recognize words and phrases directly related with construction terminology or basic skills of communication. Along with this test, descriptive information was collected among participants, which included age, school attendance, and residence time in USA and previous experience in construction activities. A second test was performed before training.

In order to achieve the stated objectives, survey questionnaires were used to collect information on at the end of the construction season. Information about the training effectiveness, safety, conflict frequency and conflict resolution was successfully collected. As described in Table 5.1, these surveys were conducted to the entire 10 crews from three different Iowa construction companies. Additional surveys were filled out by the supervisors describing the productivity and quality of tasks among workers, who were divided by their ethnic background.

Table 5.1. Summary of crews and activities during the delivering of the Toolbox Integration Course for Hispanic workers and American supervisors, Phase IV.

<table>
<thead>
<tr>
<th>Supervisor</th>
<th>Hispanic workers</th>
<th>American workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>John</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Jim</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Jay</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Kyle</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Matt</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Jason</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Dave</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Cory</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Chad</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Adam</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
<td><strong>49</strong></td>
</tr>
</tbody>
</table>

53 This section of the research is described in Chapter 4 of this thesis.
**Questionnaires Development**

The questionnaires in Appendix G and H measure the safety performance for a construction season in English and Spanish, respectively. This questionnaire is adapted from Adelstein (1952) Accident Proneness Analysis of Shunter’s Accidents. On the other hand, the questionnaire’s in Appendix L and M measure frictions, relations, and productivity of construction crews according to supervisor’s perceptions and responses of the crew as a whole. These questionnaires are written in English and Spanish, respectively. The questions related to the measurement of friction or conflict on the jobsite were adapted from De Drew (2001) and his “theory-based measure[ment] of conflict management strategies in the workplace.” Meanwhile, the methodology for measuring productivity of workers consisted in developing a set of questions for American supervisors. In terms of evaluating work effectiveness American supervisors were asked to grade workers on the basis of 1) Punctuality, 2) Listening skills, 3) Finishing tasks on time, 4) Concentration, 5) Helping others, 6) Respect tasks of others, 7) Giving opinion on processes, 8) Initiative. In terms of evaluating work functionality, American supervisors were asked to grade workers on the bases of 1) Reviewing work, 2) Redo work, 3) Extra effort, 4) Wasting materials, 5) Exceeding requirements, 6) Preventing accidents, 7) Looking for new productive ways, 8) Overusing sick reports. In terms of directly evaluating work productivity, American supervisors are asked to grade workers on the basis of 1) Quickly perform, 2) High quality, 3) Efficient without supervision, 4) Understand assignments, 5) Repetitiveness. Lastly in terms of evaluating work time use, American supervisors are asked to grade workers on the basis of 1) Finishing before deadline, 2) Never working extra hours, 3) Spending excessive time in breaks, 4) Frequency of injuries. In conclusion, though all the four measurement categories and various subdivisions are related to productivity, they were divided. It is helpful to understand the difference between productivity measure by effectiveness or by efficiency54.

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54 A worker can do things efficiently (fast) but not be effective. For instance, Hispanic workers repeat work often.
**Data Collection**

When upper management of the three company participants as well as the Human Subjects Office at Iowa State University granted the permission to enter the jobsites all the crews were asked the questions related to construction terminology found in Appendixes G, H, L and M. This happened in the period between November and December of 2006.

The great majority of the data was collected on face-to-face interviews with the exception of 10 workers that were contacted over the phone either because they had left the company during the construction season or missed work the day of the interview. Once the surveys were completed, the data was encoded in an Excel spreadsheet. When the data were encoded by one research assistant, it was rechecked by another research assistant in order to minimize typos or wrong encoding.

**Data Analysis**

When the data were collected and divided in different Excel spreadsheets, it was then transferred to the Statistical Package for Social Sciences (SPSS) version 15.0. The analysis was systematically beginning with performing descriptive data, collecting means and a few comparisons for the general background data. Next, simple t-tests and ANOVA was used determine possible differences between responses by company and position. Finally, correlation analyses were performed matching most of the variables related to productivity. While some tables were generated in SPSS, most of them plus histograms were designed using Microsoft Excel.

**Survey Results**

**Supervisor’s Rating of American and Hispanic Workers Performance**

Figure 5.4 summarizes the supervisors’ perception of major traits related to worker productivity and quality. Effectiveness refers to the employee attitude toward work tasks in terms of punctuality, respect and cooperativeness in work. Functionality relates to the adequate use of materials, work performance and initiative of the workers. Productivity considers the diligence and efficiency in performing tasks and time use relies on the use of
time in finishing tasks. Supervisors seem to have different perceptions about their employees depending on the ethnic group. They presented better evaluations for Hispanic workers in general, although the differences were more evident for effectiveness and productivity, whereas evaluations were similar for functionality and time use.

Figure 5.4. Supervisor’s evaluation of work performance by American and Hispanic workers in their crews. Grouped bars marked were categories rated significantly different between groups (* p < 0.05).

**Frequency of Conflicts**

As depicted in Figure 5.5, the perception of conflicts is fairly similar among workers. In general, language and communication problems were rated as the most frequent reason for conflict among peers. This problem was highlighted by Hispanic workers, who may find this limitation as the most important barrier on the workplace. Personal friction and task conflicts were similarly rated among workers. Finally, the frequency of problems caused by unsafe
behavior is generally perceived as low, suggesting that safety practices are rarely a reason for disagreements among workers.

Figure 5.5. Frequency of conflict by type and position.

Conflict Resolution

Conflict resolution strategies varied among workers depending on ethnicity and position in the crew (Figure 5.6). In general compromising and negotiation strategies were highly rated for all participants, suggesting that these strategies are well accepted among peers as a way to solve the conflicts. However, supervisors also rated forcing as a plausible way to solve conflicts. In fact, this strategy was preferred over compromising, suggesting that supervisors tend to impose more their ideas rather than by dialogue among peers. Contrastingly, both Hispanic and American workers did not consider the forcing approach as better than negotiation or compromising strategies, also suggesting that they might have a
yielding attitude toward the supervisor. The avoiding approach had also remarkably
differences among groups. Hispanics highlighted this approach as acceptable whereas the
supervisors rarely considered this approach as a viable way to solve problems. It is possible
that the immigrant condition of most Hispanics workers influence their idea to stay out of
problems whereas the supervisors feel the urgency to solve problems due to their leadership
position in the crew.

Figure 5.6. Strategies for solving conflict by position. Grouped bars marked were categories
rated significantly different between groups (* p < 0.05).

**Productivity Measurement**

Measuring productivity in construction is a difficult task. First, data available for
measuring the productivity of a construction crew are scarce. Second, researchers did not
agree on the best method for measuring productivity. Our research approach, however, was
to ask the supervisor of each of the ten different construction crews participating in this study
to measure productivity of all the workers by position as shown in Figure 5.6. However, as
shown in Table 5.1, Hispanic construction workers out number American laborers. In
addition, averages of each crew were calculated for measuring the supervisor’s perception of productivity and compare it with all the responses relate to conflict among peers. The rationale is, ultimately, to improve crew productivity without differentiation between ethnic groups. The Time use and productivity variables are measured in terms of percentages and the questions were asked of the supervisor only. The answers were summed and the total of possible points is counted as 100 percent. The rest of the variables come of questions asked to the whole crew of Hispanic workers, American supervisors and laborers using the linkert scale of 1 to 5.

Figure 5.7 shows a strong negative correlation between productivity and conflicts related to personal relationships. This result is supported by Jehn’s (1995) model of conflict and productivity, shown in Figure 5.3, in which all relationship conflict directly affect productivity. Jehn (Ibid), also predicts that some task conflict improves efficiency in terms of processes. Hence the correlation between productivity and task conflict is not as strong as shown in Figure 5.8. In fact, the correlation is not significant at p < 0.05.

In the observational results section, more than one American supervisor stated that productivity should be a function of turnover rates. This affirmation is partially supported by Figure 5.11. This figure shows correlation between desire to move and productivity. In the desire to move variable we try to capture the turn over rate, but it is yet not clear whether the turn over rate is capture in is totality with this variable. Nevertheless, Figure 5.9 captures the effect of workers desire to move in terms of relationship conflict (already shown to affect productivity). Conflict is also related to miscommunications. This result leads us to think that training that improves relationships and language proficiency on the jobsite decreases the desire to move of workers. Hence, this would improve productivity according to supervisors.

Job satisfaction was an important factor of this study. We find that workers who are satisfied with their job make better use of their time. This fact alone has major implication in terms of productivity. Job satisfaction in this sense was broadly defined. For that reason a future study should explore what satisfies workers and what other reasons, in addition to conflict, are considered for leaving the company.
Figure 5.7. Correlation Productivity vs. Relationship conflicts

Figure 5.8. Correlation Productivity vs. Task conflicts
Figure 5.9. Correlation Desire to move vs. Relationship conflict

Figure 5.10. Correlation Time use vs. Job satisfaction
Quality of Work Measurement

Measuring the quality of work is more subjective than the measurement of productivity. American supervisors have a good sense of who is working efficiently. But it is difficult to control for the quality of the work when a crew is usually divided in different groups. Nevertheless, we conclude that more efficient workers as a whole perform better quality work. Initially, the research team planned to collect Iowa DOT data on concrete quality for various projects. However, this approach for measuring of quality of work doesn’t consider aspects such as weather conditions. By asking each supervisor to rate his workers on the basis of effectiveness and efficiency at the end of the construction season, provides us with the overall perception measurement of the whole season regardless of the significant effects of variables like weather. As done in the productivity section, the rest of the variables are drawn from answers collected from all the workers in the ten crews.

Figure 5.12 suggests that as the level of conflict due to language miscommunications decreases the effectiveness of workers increases. As stated before, an effective employee is defined as one who has a positive attitude toward work tasks in terms of punctuality, respect towards others, and willingness to cooperate at work. On the other hand, a functional
employee is the one with great attitudes in use of materials, work performance, and initiative. On that note, we find that laborers considered as non-functional by the supervisor have high desire to leave the company.

Figure 5.12. Language Conflict vs. Effectiveness

![Graph showing the relationship between Language Conflict and Effectiveness](image)

Figure 5.13. Desire to move vs. Functionality

![Graph showing the relationship between Desire to move and Functionality](image)
Preliminary Safety Record

For effective experimental safety research, three to four years of data are recommended (Wong, 1994). Future research should consist on continuing redelivery of the TICHA while tracking the accident and fatality rates of a large number of crews. Nash (2004), collected safety data for three years for a project of more than 29 million of man hours of construction conformed mostly by Hispanic workers. Later Nash (Ibid), compares the safety record of those who received training against the state and national records and finds that safety training pays in terms of time loss. Table 5.3 contains the results of the safety questionnaire presented to Hispanic workers as a part of the current study\textsuperscript{55}. No statistical difference was found between control and experimental groups in terms of number of accidents per person. Future studies should also compare the rate of injury between Americans and Hispanics. While we expect Hispanics to be injured more often as shown in the Chapter 1 discussion on the national statistics, the effects of TICHA on safety could be assessed.

Table 5.3. Summary table for safety records among Hispanic workers interviewed

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported Accidents</td>
<td>13</td>
<td>28</td>
</tr>
<tr>
<td>Rate (Accidents / person)</td>
<td>1.08</td>
<td>1.03</td>
</tr>
<tr>
<td>Most frequently body part affected</td>
<td>Fingers</td>
<td>Fingers</td>
</tr>
<tr>
<td>Severity</td>
<td>No first aid necessary</td>
<td>No first aid necessary</td>
</tr>
<tr>
<td>Time lost</td>
<td>&lt; 1 hr</td>
<td>&lt; 1 hr</td>
</tr>
<tr>
<td>Absences for accidents</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Absences for illness</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

CONCLUSION

In conclusion, this study highlighted the importance of conducting research with non-English speaking populations in the construction industry. It emphasized the need to design

\textsuperscript{55} Even though no statistical differences were found, keeping record of this data is important; especially when this same companies could be part of a future study and comparison tests be performed.
Teams are efficient means to improve quality, reduce cost and develop construction projects more efficiently. However, these teams may confront many issues and divisions that would decrease of their productivity as long as their members become demoralized and ineffective. Language and cultural barriers have been demonstrated to be an important component do explaining conflicts and accidents among workers, suggesting that it is directly related to decrease in team productivity. In recent years, the Hispanic population showed a vigorous growth in the U.S. Midwest construction components, exposing supervisors to new challenges in communication.

This study provided the first attempt to deliver training to construction crews in Iowa. The main results of this study were as follows:

- Desire to move is strongly correlated to relationship conflict.
- Productivity is correlated mostly to language miscommunications and relationship conflict.
- Hispanics use the avoiding strategy for solving conflicts while American supervisors prefer to confront conflicts.
- Most of the conflicts occurring on the jobsite are of language issues
- Supervisors feel Hispanic workers are more efficient and productive, but similarly effective as American workers.
- Quality of work increases as personal conflicts decrease.

These results lead us to conclude that training that improves relationships and language proficiency on the jobsite decreases the desire to move of workers. Hence, this would improve productivity according to supervisors.

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56 Described in Chapter 4 of this thesis.
RECOMENTATIONS

Based on the conclusions, it is recommended integration training to a greater number of construction crews, especially those with a high proportion of Hispanic workers continue to be delivered. Participation of supervisors and workers in the learning and interaction process is crucial for reducing the implicit imperfections of relations on the jobsite.

Future investigation should also compare the rate of injury between Americans and Hispanics. While we expect Hispanics to be injured more often as shown in Chapter 1’s report on the national statistics, the effects of TICHA on safety could be assessed. In addition, monitoring of the training for a longer period and the economical impact that personnel turnover has on crew’s performance should also be research investigation of the future. These types of studies benefit both, the construction industry as well as society.

REFERENCES


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CHAPTER SIX. Evaluating the Hispanic Workforce Research Project (HWRP):
Drawing conclusions on the present and future training needs for a multicultural
construction industry
Introduction

In trying to solve the problems that Iowa construction industry is facing, the Iowa Department of Transportation (Iowa DOT), along with Iowa State University’s Department of Civil, Construction, and Environmental Engineering\(^{57}\), the Center for Transportation Research & Education\(^{58}\) and other organizations, are taking action to face the new challenges the construction industry experiences. The Hispanic Workforce Research Project (HWRP) is the name of this effort. Besides the previous mentioned participants, this ambitious five year project has been possible due to the collaboration and participation of more than 20 construction companies and the Association of General Contractors of Iowa. Considerably, the HWRP is one major academic research effort for understanding the socio-economic and labor management problems the industry faces in light of the inclusion of Hispanics to their construction crews.

This article summarizes the most important findings of the HWRP. The unique characteristic of the HWRP is that, unlike similar academic efforts\(^{59}\), it has been able to impact a large number of companies by using training in a practical way. Large parts of the findings from the research are directly related to the observations and analysis of the training sessions themselves. Before concluding with suggestions for the development of a more stable training program that benefits the construction industry, we suggest the model used for the construction industry as transferable for programs targeting other cultural-ethnic groups than Hispanics as well as other industries than Construction.

Hispanic labor force

Hispanic workers are vital for the success of the construction industry (Sehene, 2007). According to the Bureau of Labor Statistics, two of every three job openings for construction in 2006, were given to foreign-born Hispanic workers. In addition, according to the Pew Hispanic Center\(^{60}\), the construction industry is the largest employer of short-term illegal workers with some 550,000 unauthorized migrants arriving between 2000 and 2005. This

\(^{57}\) See www.ccee.iastate.edu/
\(^{58}\) See www.cte.iastate.edu/
\(^{59}\) See Chapter 1 for a review of other similar academic efforts.
\(^{60}\) See http://pewhispanic.org/factsheets/factsheet.php?FactsheetID=28
center also estimates that “more than 1.4 million unauthorized workers are employed in the construction industry”, accounting for about 12% of the industry workforce, the largest share of unauthorized workers in any major industry category. Short-term unauthorized workers account for somewhat less than 5% of the construction industry workforce.

This increase in the construction population is the central element for various issues arising in the construction industry. Though the list of issues occurring due to the demographic change is vast, the alarming issue is the worsening accident and fatality rates within the construction industry (Nash, 2004). Communication issues the nature of current training practices, and the relations on the construction jobsite explain most of the negative safety records in the industry.

**Communication isn’t language only**

Most of the current efforts for minimizing the communication problems occurring on construction jobsites have been characterized by the development of language training such as the English as a Second Language for construction (Brunett, 2005; Anonymous, 2004; Canales, 2005). Chapter 3 of this thesis, which represents Phase III of the HWRP, shows that, so far, language training has not considered other aspects that contribute to the definition of communicational training. For instance, Aveiga-Alcívar (2006) finds that a large number of crews have a Hispanic leader\(^{61}\) who is not the worker with the greater English language proficiency. It is found that American supervisors decide who will be a Hispanic leader depending on aspects that go beyond language proficiency such as understating of American culture, supervisor’s expectations, construction processes, Hispanic leadership, safety standards, company goals

Aveiga-Alcivar (Ibid) finds that communication, defined as language only, has been the cause of major failure in the development of the training courses. The integration factor is now the objective of the training methodology of the HWRP. There are crews with a bilingual Hispanic leader who have major communication problems unrelated to language and vice versa.

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\(^{61}\) Named “link persons” by Canales (2005)
To achieve integration between American Supervisors and Hispanic workers, it was necessary to develop an understanding of the communication process, the role of language barriers to communication, and identification of the consequences of the lack of communication between the both parties. Despite the complex nature of blending cultures, it is still possible to develop productive relationships with Hispanic workers. A product of these and other realizations is the Toolbox Integration Course for Hispanic workers and American supervisors called TICHA.

Between May 2005 and May 2007, TICHA has delivered more than 76 sessions representing more than 113 hours of training. Thirteen companies have received TICHA. Evaluations and feedback received from the TICHA suggests that the integration approach of the training is the most successful aspect of the training as a whole.

While the principal issue of the training material developed in the past was the industry’s lack of interest, TICHA suggests that training during the construction season is suitable for the construction industry. Crew members are forced to interact with each other by acquiring language skills, cultural knowledge and safety training which together embrace the concept of integration of the members of the crew as well of the training topics necessary to keep construction industry standards desirably high.

Training works

Nash (2004) demonstrates that when construction, language and safety training is delivered at the same time to Hispanic workers, the safety record improves dramatically. In Phase IV of the HWRP, it is shown that integration training (TICHA) improves construction language skills. In addition, it was found that language improvements reduce turnover rates and frictions it increases productivity and quality of work on construction crews.

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62 See the literature review in Chapter 3
63 See Chapter 3 for extensive description of the course
64 See Chapter 4 for training evaluations results
65 See Chapters 4 and 5.
66 It is important to note that the measurement of this variables used survey results for American supervisors and Hispanic workers as independent indicators. Correlations were then drawn.
Reducing Conflicts reduces costs

Overall, American supervisors and Hispanic workers recognize that training in communication skills is necessary to bridge the existing language and cultural gap amongst the two groups. Integration between these groups improves the communication process which as a result minimizes hazards and increasing harmony and productivity on the jobsite. As more accidents occur on the jobsite, most of them due to lack of safety training and language skills, insurance premiums to the construction industry will also keep increasing. If the integration effort is applied to most construction crews with Hispanic workers, the safety record will rapidly improve\(^{67}\) resulting in saving in health insurance premiums.

Another of the many aspects of cost reductions to the construction company deals with the major concern of American supervisors: turnover rates! According to the survey results of Phase IV of the HWRP, American supervisors measure productivity by how many workers who were trained this season return the next one. It was explained that training a Hispanic worker, due to the cultural and language barrier, to the desired standards takes more than half of the construction season. Therefore, it is crucial for companies to assure harmony and good working conditions to the laborers. When a Hispanic worker was asked why he would return to the company next season, he answered “in the meat industry I don’t have to interact with my supervisor as often”\(^{68}\). A construction trained Hispanic construction worker who plans to go back to the meat industry is an implicit cost that the construction company could save if the worker felt integrated into the crew. Hence, if the worker receives training that would improve his communication with the supervisor; the chances of his staying would increase. That would result in training time next season.

In terms of productivity, if Hispanic workers understand directions from the American supervisor, whether because of improved language skills or to better “readings” of the supervisor, due to the integration training, processes will become more efficient and effective. For instance, American supervisors believe Hispanic workers are more efficient

\(^{67}\) As described in Nash (2004).

\(^{68}\) Comment drawn from face-to-face interviews during the development of Phase IV of the HWRP.
than Americans (e.g. take less breaks at work), but are hardly effective. That is, Hispanics redo work often due to miscommunications. Also, Hispanics get injured more often\textsuperscript{69}.

Along with the above, more aspects of the training reduce costs for construction companies. Specially, the training material that has been delivered by the HWRP has been publicly funded. Why? Providing construction integration training to the industry improves society as a whole. A safer construction industry translates into a healthier society. In addition, the language skills learned for construction are used in the everyday experience, making Hispanics better consumers and producers. In summary, the concept of Pareto efficiency\textsuperscript{70} applies in this situation in which effective training provides no losers and lots of winners.

**Transferring the Model**

Transferability of the structure of the courses presented in this article can exist at both the cultural and language levels independently and interchangeably. For instance, the French economy has experienced immigration mostly from citizens of its former colonies (i.e. Algeria) in the last several decades. These French immigrants do not experience the language barrier problem, but come from different backgrounds and cultures. Conversely, another problem could be found within the same country. The two main languages in the People’s Republic of China are Mandarin and Cantonese. Also, even cultural differences among ethnic groups in China are vast. The integration approach for construction training can be useful when developing courses that aim to increase communication at the jobsite in a specific language.

In addition, the problem in which both barriers (language and culture) happen interchangeably is common in Iowa as well. Even though the Hispanic population outnumbers them, there is a growing Bosnian minority population in Iowa. The experience of the HWRP leads us to think the research model for Hispanic workers can be transferred to groups like Bosnian construction workers. It is very important to keep in mind that the final

\textsuperscript{69} See footnote 13.

\textsuperscript{70} A situation is said to be Pareto efficient if there is no way to rearrange things to make at least one person better off \textit{without} making anyone worse off (Stiglitz, 1982).
The objective of this training is to promote integration on the jobsite between the immigrant worker, in this case Hispanic, and the supervisor, in this case American.

However, transferring this model to construction industries in other countries and to other ethnic groups within the United States has limited possibilities. We believe the integration approach for training could serve more than just only the construction industry. For instance, the hotel and restaurant industry requires lots of communication at work. Orthodox methods of training such as ESL courses will not solve the communication problem completely. The Hispanic worker expects the boss to tell him what to do while the American boss expects the worker to contribute in the decision making process. ESL course alone, without the integration aspect will not tackle the many other communication issues that go beyond language.

A training program for all

Effective training at large scales have only been possible in large companies working in large construction projects (Nash, 2004). The overhead structure of these endeavors permits training programs to be privately funded. However, most construction companies as well as projects are of small scale (Ibid). For that reason a training project such as the HWRP, though it is full of good intentions, is not reaching the majority of construction companies in the state of Iowa or any of its neighboring states.

High demand for effective on-site and short integration training during the construction season is a result of the projections of the Hispanic labor force to Iowa as well as all its neighboring states. Keeping the safety, productivity and quality standards of the construction industry high is not a process that happens in the short term without training that works for the current changes in the labor force. Chapters 3, 4 and 5 of this document show that effective training achieves the higher communication levels which in turn yield more productive and safer crews. Even though society as well as construction companies benefit from this research project, the private sector has yet to show a more interest for formalizing a stable program that can continue in their benefit. Therefore, we propose the development of a

---

71 See Chapter 1 for a review on Hispanic population projections to the Midwest.
program whose mission is to perform research and provide effective on-site and in-class training to American and Hispanic workers (and multicultural in general) to improve construction project productivity, quality, and safety.

The proposed program should contain both a research and training component (depicted in Table 6.1); the same way the project\textsuperscript{72} has been performing for the last 5 years. The research component should explore new frontiers such as:

- Creation of new training materials
- Continuous improvement of training methodology
- Develop new delivery approaches (e.g., using technology)
- Measure effectiveness
- Perform company- and crew-specific assessments\textsuperscript{73}
- Perform major studies with greater data sets
- Explore other socio-economic aspect for improving the construction industry (e.g. studies of the impact of the unauthorized worker on the industry)
- Provide consulting services to industry which involve serious research efforts

On the other hand, the training component of the program could offer training during the construction and the winter seasons to construction companies. Training such as TICHA, OSHA in Spanish, Train the Trainer, Flagging are some of the many opportunities involved in this component. The training aspect of the proposed program should contain constant improvements and reviewing of the new materials as well as the ones already developed.

\textsuperscript{72} Notice that I propose changing the name from a project to a program that is more stable and provides short as well as long-term assistance to the construction industry.

\textsuperscript{73} Appendix P depicts the crew assessment reports that each company participant in Phase IV if the HWRP received. This type of assessment services allow company in understanding the crew composition and making better decision on how to construct productive teams.
**Table 6.1. Summary of sessions and lesson-time invested on the Effective Training for American Supervisors with Hispanic Construction Workers Project. Data from sessions 2004-2007.**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Delivered class</th>
<th>Participants</th>
<th>Sessions</th>
<th>Time (hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase IV</td>
<td>On-the-job</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TICHA</td>
<td>United-Concrete-Absolute</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td>Phase IV</td>
<td>Flagging</td>
<td>Construction Foundations</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Phase IV</td>
<td>Cultural Outreach</td>
<td>English for construction</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Phase IV</td>
<td>Cultural Outreach</td>
<td>English for construction</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total Phase IV</td>
<td></td>
<td></td>
<td>56</td>
<td>59</td>
</tr>
<tr>
<td>Phase III</td>
<td>On-the-job</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase III</td>
<td>TICHA</td>
<td>GUS construction</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Concrete, Absolute, Mannats, Kareth, Schmidt, DOT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Phase III</td>
<td>On-the-job</td>
<td></td>
<td>7</td>
<td>56</td>
</tr>
<tr>
<td>Phase II</td>
<td>CPCB course</td>
<td>15 companies</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Phase II</td>
<td>SSL</td>
<td>15 companies</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Total Phase II</td>
<td></td>
<td></td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Phase I</td>
<td>CPCB* course</td>
<td>15 companies</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Phase I</td>
<td>SSL*</td>
<td>15 companies</td>
<td>No reported</td>
<td>No reported</td>
</tr>
<tr>
<td>Phase I</td>
<td>ESL* adaptation</td>
<td>15 companies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>87</td>
<td>156</td>
</tr>
</tbody>
</table>

*ESL = English as Second Language  
*SSL = Spanish as Second Language  
*CPCB = Concrete Paving Construction Basics

Who are then the customers for a program of this magnitude? The main beneficiary of such a program will be the construction teams that build/maintain Iowa’s transportation infrastructure. In addition, the residential and home building industry would consider this program an asset for its training needs. The main customers for this type of program would be the private sector who can organize the funding structure for such program through trade associations such as the Associate General Contractors and Masters Builders of Iowa.

74 [www.agcia.org](http://www.agcia.org)  
75 [www.mbionline.com](http://www.mbionline.com)
So far, the HWRP has operated at the Center for Transportation Research & Education (CTRE) at Iowa State University. The program proposed in this article could form synergies with other outreach programs based at CTRE such as the Local Technical Assistance Program\(^76\) (LTAP) and the Construction Pavement and Technology Program (CP Tech Center)\(^77\). In addition, while the bulk of the research could take place at CTRE, the training frontiers could go beyond the state of Iowa with the collaboration of other outreach center in various neighboring universities.

The Iowa DOT and the Federal Highway Administration have funded the HWRP since its beginnings. While one of the many objectives for providing funding for research is to produce findings that improve the competitiveness of construction companies, much of the concerns of these government entities have to do with how unprepared society is for the projected increase of Hispanics joining the construction season. This demographic change in the industry affects the process and quality of building the roads tax payers demand to be safe and of high quality.

In summary, the creation of the program suggested in this document will assist all the players in the construction industry in maintaining safety standards despite rapid changes in its labor force. The funding for creating the suggested program should come from the beneficiaries. That is, the industry and the government should reach an agreement for the funding of a program of the mentioned characteristics. Moreover, considering the objectives of the program the name “Research Institute for Multicultural Workforce Education” (RIME) is the one we propose in this article.

As it is stated at the end of Chapter 1, “Sooner or later the construction industry in the Midwest will have to implement a program of this sort. We hope it is sooner than later for the best of the industry.” The RIME is characterized to be the type of institutions that have allowed this country’s economic success. This article proposes the creation of the RIME as the best practice to tackle the current and future training needs of the construction industry.

\(^76\) www.ctre.iastate.edu/ltap
\(^77\) www.ctre.iastate.edu/cmat
REFERENCES


http://www.ctre.iastate.edu/reports/hispanic_workforce3.pdf

http://www.bls.gov/iag/construction.htm


ACKNOWLEDGEMENTS

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- Iowa State University, International Diversity Scholarship, Fall 2002-2005

PROFESSIONAL EXPERIENCE:
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- Columnist, Iowa State University, Iowa State Daily, 2006-2007

PROFESSIONAL PUBLICATIONS:


Appendix A. Questionnaire for Construction Employees:
Iowa DOT Inspectors, Contractor’s Supervisors and Hispanic Employees
(English Version)
ESL/SSL TRAINING

Questionnaire for Construction Employees:
Iowa DOT Inspectors, Contractor’s Supervisors and Hispanic Employees

Conducted by: Iowa State University and the Iowa Department of Transportation

Anonymity: Your answers to the following questions will be completely anonymous and the results will be held strictly confidential and will be used for statistical purposes only and not linked to the respondent.

General Objective:
The main objective of this survey is to determine the level of interest, and best method for training Contractor employees and Iowa DOT inspectors. This training would be based on the needs, interests and preferences as they relate to the delivery of Construction Communication Spanish/English to Contractors Supervisors, their Hispanic workers and Iowa DOT inspectors who deal directly or indirectly with those Hispanic workers. These assessments will help develop the appropriate methods, timing and technology suitable for effective delivery of training courses aimed to creating a starting point for each population to begin learning the basics of how to communicate with other.

Specific Objectives

1. Determine current training practices for contractor’s employees.
2. Determine current training practices for Iowa DOT’s employees
3. Determine the contractor’s preferences for training employees (e.g. classroom, on-the-job, INC), during or off work hours.
4. Identify the contractor’s resources for on-the-job training (e.g. trailer, classroom)
5. Determine patterns of needs, interests, and areas of opportunity for training.
6. Determine the factors and problems that prevent the contractor and DOT from training employees

Note: This questionnaire will take approximately 15-20 minutes to complete.
Respondent Information

Name (optional): ________________________
Job title: ______________________________
Company: ______________________________
Phone No.: Office (optional):_______ Mobile (optional): ________________
Email (optional): ________________________________________________
Gender (please circle one):   1=Male  2=Female

Question for Iowa DOT and the Contractor Supervisors: Frequency of interaction with Hispanic construction workers (# interactions per week)

_______________________(#)

Current Training Practices
1. How many hours (average) of formal classroom training do you typically receive per year?

_______________________(hours)

2. How many years ago did you begin receiving this formal training?

_______________________(years)

3. Where do you typically receive training? Please identify the percentage of time spent in a formal classroom or on the jobsite. If you received all of your formal training in the classroom, then place a “0” in the “% of time on the jobsite” and “100” in the “in a classroom”.

4. % of time on the jobsite________ % in a classroom setting____________

5. When do you usually receive training?

1= during work hours 2= after work hours

6. What is your best day of the week to receive training?

1= Monday 2= Tuesday 3= Wednesday 4= Thursday 5=Friday
6= Saturday 7= Sunday

7. At what time of the day would you prefer to have training

1= Morning 2= Afternoon 3= Evening after work

8. At what time of the year do you prefer to have training?

1= Winter break 2= Afternoon 3= Anytime

If you answered 3, please explain: _________________________________________
9. What would be your preference as it relates to the duration of training on any topic per any given event?

1= 1-2 hrs  
2= 3-4 hrs  
3= 4-8 hrs  
4= no preference

10. What would be your preference as it relates to the duration of training as it relates learning a foreign language per any given event?

1= 1-2 hrs  
2= 3-4 hrs  
3= 4-8 hrs  
4= no preference

11. If your method for training is the classroom, indicate your best preference for training.

1= Face-to-face with the instructor  
2= INC/Videoconferencing  
3= Either of the above

12. If your method for training is on-the-job, indicate your best preference for training.

1= Face-to-face with the instructor  
2= Video Streaming; synchronous (to your computer at the same time instructor presents material)  
3= Video Streaming; asynchronous (to your computer using prerecorded materials)  
4= INC/ Videoconferencing  
5= Any of the above

13. How far would you be comfortable traveling to receiving training?

_________________________(miles)

14. Do you have a trailer (or facility) adequate for training on the jobsite?

1= Yes  
2= No

15. Do you have access to the internet at the jobsite?

1= Yes  
2= No  
3= I do not know

**General Questions**

16. What do you consider to be your main problem(s) on the job site as they relate to your own training needs?

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

17. What solution(s) do you propose to solve any training deficiencies that exist (if any)? Please mention times, places, methods, and other solutions, as appropriate

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
18. What is your training preference as it relates to when and where?

________________________________________________________________________

________________________________________________________________________

19. Would you like to make any additional comment/suggestions?

________________________________________________________________________

________________________________________________________________________

If you are an American construction supervisor, please go to question 20. Otherwise, you are done with the survey. Thank you for your participation.

Please send completed survey to:

Iowa Department of Transportation Employee:
Craig Russell
800 West Lincoln Way
Ames, Iowa 50010
Phone: (515) 294-1422
Email: craig.russell@dot.state.ia.us

Hispanic Employees:
Dr. Edward Jaselskis
450 Town Engineering Building
Iowa State University
Ames, Iowa 50011
Phone: (515) 294-7531
Email: ejaselsk@iastate.edu

Additional Questions for Construction Supervisors

Hispanic Workforce Information

20. How many workers do you typically have in your crews?
   ______________________________(#)

21. How long have you supervised Hispanic workers?
   ______________________________(#)

22. Where do you typically provide training to your Hispanic workers?
   1= % on the jobsite______  2= % in the classroom______
23. When do they usually receive training?
1= during work hours  2= after work hours

24. What do you consider is the best day to provide training to your Hispanic workers?
1= Monday  2= Tuesday  3= Wednesday  4= Thursday  5= Friday
6= Saturday  7= Sunday

25. At what time of the day would you prefer to have them trained?
1= Morning  2= Afternoon  3= Evenings

26. At what time of the year would you prefer to have them trained?
1= Winter Break  2= Construction Season  3= Anytime

27. What would be your preference as it relates to the duration of training for your Hispanic workers on any topic per any given event?
1= 1-2 hrs  2= 3-4 hrs  3= 4-8 hrs  4= no preference

28. If your method for training is the classroom, indicate your best preference for training.
1= Face-to-face with the instructor
2= INC/Videoconferencing
3= Either of the above

29. If your method for training is on-the-job, indicate your best preference for training.
1= Face-to-face with the instructor
2= Video Streaming; synchronous (to your computer at the same time instructor presents material)
3= Video Streaming; asynchronous (to your computer using prerecorded materials)
4= INC/ Videoconferencing
5= Any of the above

30. How far would be convenient for your workers to travel to receive training?
___________________________(miles)

**General Questions**

31. What do you consider to be your main problem(s) on the job site as they relate to training Hispanic workers?
____________________________________________________________________________________

32. What solution(s) do you propose to solve any training deficiency (if any)? Please mention times, places, methods, and other solutions, as appropriate
33. What is your training preference as it relates to when and where?

Your participation is greatly appreciated…

THANK YOU

Please send your completed survey to:
Dr. Edward Jaselskis
450 Town Engineering
Iowa State University
Ames, Iowa 50011
Phone: (515) 294-0250
Email: ejaselsk@iastate.edu
Appendix B. Cuestionario Para Empleados en Construcción:
Inspectores de Iowa DOT. Supervisores y Trabajadores Hispanos en Constructora
(Versión en Español)
ENTRENAMIENTO ESL/SSL

Cuestionario Para Empleados en Construcción:
Inspectores de Iowa DOT. Supervisores y Trabajadores Hispanos en Constructoras

Conducido por: Iowa State University Fecha:___________________
y el departamento de transportación.

Anónimo: Las respuestas a las siguientes preguntas serán guardadas en su anonimato y sus resultados va a ser guardados estrictamente para usos de estudio estadísticos y que no están relacionados con el participante.

Objetivo General:
El objetivo principal de esta encuesta es de determinar el nivel de interés, y la mejor metodología a emplearse para ofrecer entrenamiento a trabajadores en constructoras y a los inspectores del DOT. Estas respuestas ayudaran a desarrollar métodos apropiados, su tecnología y coordinación, que será los indicados para brindar efectivas charlas que ayuden con lo básico que ayudara a que los participantes mejores las comunicaciones entre ellos.

Objetivos Principales

7. Determinar las prácticas actuales de entrenamiento de las constructoras.
8. Determinar las prácticas actuales de entrenamiento de empleados de Iowa DOT.
9. Determinar las preferencias de constructoras sobre el lugar, método y momento ideal para recibir entrenamiento.
10. Identificar los recursos de constructoras para dar cursos en el lugar de trabajo.
11. Determinar los patrones de interés, necesidades y áreas oportunas de entrenamiento.
12. Determinar factores y problemas que previenen a constructoras y inspectores de DOT a recibir el entrenamiento.

Nota: Esta encuesta tomará aproximadamente 15 minutos en completar.
Información del Entrevistado

Nombre (opcional): ________________________
Título de puesto: _______________________________
Compañía: ______________________________
Tel. No.: Oficina (opcional):_______Celular (opcional): ________________
Email (opcional): ________________________________________________
Sexo (colocar círculo): 1=Masculino 2=Femenino

Practicas Actuales

34. ¿Cuántas horas (promedio) de entrenamiento formal en un salón de clase recibes típicamente cada año?  
__________________________ (horas)

35. ¿Cuántos años hace que empezaste a recibir esta capacitación formal?  
__________________________ (anos)

36. ¿Donde recibes típicamente la capacitación? Por favor indetificar el porcentaje de tiempo que pasas capacitándote en un salón formal o en la obra. Si tu recibes toda tu capacitación formal en un salón, entonces coloca un “0” en el “% de tiempo en la obra” y un “100” en el “en un salón de clase”.

37. % de tiempo en la obra % de tiempo en salón de clase____________

38. ¿Cuándo recibes típicamente capacitación?  
1= durante horas de trabajo  2= después de horas de trabajo

39. ¿Cuál es el mejor día para recibir capacitación?  
1= Lunes  2= Martes  3= Miércoles  4= Jueves  5= Viernes  
6= Sábado  7= Domingo

40. A qué hora del día preferirías recibir capacitación?  
1= Mañana  2= Tarde  3= después de horas de trabajo

41. En qué periodo del año prefieres recibir capacitación?  
1= Receso de invierno2= Temporada de construcción  3= Cualquier rato  
Si respondiste 3, por favor explica:_________________________________________

42. ¿Cuál es tu preferencia en cuanto a la duración de la capacitación en cualquier tópico por evento?  
1= 1-2 hrs  2= 3-4 hrs  3= 4-8 hrs  4= no preferencia
43. ¿Cuál es tu preferencia en cuanto a la duración de la capacitación por evento para aprender un idioma extranjero?

1= 1-2 hrs  
2= 3-4 hrs  
3= 4-8 hrs  
4= no preferencia

44. Si tu método de capacitación es el salón de clase, indica cuál es tu preferencia para capacitarte..

1= Cara-a-cara con instructor  
2= INC/Videotransmisión  
3= Cualquiera de los dos

45. Si tu método de capacitación es en la obra, indica cuál es tu preferencia para capacitarte.

1= Cara-a-cara con instructor  
2= Video; sincronizado (a tu computadora el mismo tiempo que el instructor presenta el material)  
3= Video; no sincronizado (a tu computadora usando material pregrabado)  
4= INC/ Videoconferencia  
5= Cualquiera de los de arriba

46. ¿Qué tan lejos te sentirías cómodo viajando para recibir la capacitación?

_________________________(millas)

47. ¿Tienes un trailer (instalación) adecuada para recibir capacitación en la obra?

1= Sí  
2= No

48. ¿Tienes acceso al Internet en el lugar de trabajo?

1= Sí  
2= No  
3= No se

Preguntas Generales

49. ¿Cuál consideras que es tu principal problema(s) en la obra en relación a tus necesidades de capacitación?

________________________________________________________________________

________________________________________________________________________

50. ¿Qué solución(es) propones para resolver cualquiera de las deficiencias de capacitación (si existen)? Por favor menciona tiempos, lugares, métodos, y otras soluciones como consideres adecuado.

________________________________________________________________________

________________________________________________________________________

51. ¿Cuál es tu preferencia de capacitación con relación al “cuando” y al “dónde”?
52. ¿Te gustaría agregar comentarios y/o sugerencias adicionales?

Favor enviar la encuesta a:

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450 Town Engineering Building
Iowa State University
Ames, Iowa 50011
Phone: (515) 294-7531
Email: ejaselsk@iastate.edu
Appendix C. Toolbox Integration Course for Hispanic workers and American supervisors TICHA’s Flash Cards
Module 1. Construction Materials

Sponsored by the Iowa Department of Transportation

Prepared by
IOWA STATE UNIVERSITY
Center for Transportation Research and Education
Department of Civil, Construction, and Environmental Engineering

Aluminum
Alúminom

Aluminio
Ah-loomi-neeo
Block
Bloc

Bloque
Block-ay

TICHA Module 1, Flashcard 2
Nails
Nayls

Clavos
Klah-bows

Rebar
Ree-bar

Varilla
Vah-ree-ya
Pronunciación en Inglés

• “ch” se pronuncia como “sh” en Sasha
• “h” se pronuncia como “j” en jarra
• “y” se pronuncia como “ia” en iato
• “i” se pronuncia como “ae”
• “o” se pronuncia como “ou”
• “u” se pronuncia como “iu”
Aggregate  
Aggregado  
Agreget

Bag  
Saco  
Bag

TICHA Module 2, English Flashcard 2

TICHA Module 2, English Flashcard 3
Carpenter  Carpintero

Carpenter

Dig  Excavar / Escarbar
Deg

TICHA Module 2, English Flashcard 4

TICHA Module 2, English Flashcard 5
Equipment  Maquinaria

Fence  Barda / Cerca

TICHA Module 2, English Flashcard 6

TICHA Module 2, English Flashcard 7
Glass
Glas

Vidrio

Hardhat
Jard jat

Casco

TICHA Module 2, English Flashcard 8
TICHA Module 2, English Flashcard 9
**Inch**

**Pulgada**

---

**Jack**

**Gato (Hidraulico)**

---

TICHA Module 2, English Flashcard 10

TICHA Module 2, English Flashcard 11
Knife
Naif

Cuchillo / Navaja

Ladder
Lader

Escalera

TICHA Module 2, English Flashcard 12

TICHA Module 2, English Flashcard 13
Masonry
Meisonry

Noise
Nois

Albañilería

Ruido

TICHA Module 2, English Flashcard 14

TICHA Module 2, English Flashcard 15
Oil

Aceite / Petroleo

Pavement

Pavimento
Road  Camino / Vía
Roud

Scaffolding  Andamio
Scaffolding
Utilities
Iutilitis

Servicios

Water
Guater

Agua

TICHA Module 2, English Flashcard 20

TICHA Module 2, English Flashcard 21
Yield
Ield

Ceder

Zone
Zoun

Zona

TICHA Module 2, English Flashcard 22

TICHA Module 2, English Flashcard 23
Spanish Pronunciation

• “I” is pronounced as “ee” in feet
• “u” is pronounced as “oo” in pool
• “h” is always silent
• “J” is pronounced as “h” in hen
• “Ñ” is pronounced as “ny” in canyon
• “y” alone is pronounced as ee
• “y” in a word is pronounced as “j” in jar

Aggregate
Ah-gre-ga-do

Agregado
Barrier  Barrera  Bah-ray-ra

Footing  Cimiento  See-mee-en-to
Defect
Deh-fec-toe

Dig
Excavar / Escarbar
Ex-ca-var / Es-car-bar

TICHA Module 2, Spanish Flashcard 5
TICHA Module 2, Spanish Flashcard 6
Ironworker

Fee-eh-bero

Jack

Ga-toe

TICHA Module 2, Spanish Flashcard 7

TICHA Module 2, Spanish Flashcard 8
Overtime
Horas Extras
Oh-ras Extras

Inspection
Inspección
Ins-piec-see-on

TICHA Module 2, Spanish Flashcard 9
TICHA Module 2, Spanish Flashcard 10
Boss

Jefe

He-fe

Equipment

Maquinaria

Maki-na-ria
Laborer  
Obrero / Peón  
Oh-bre-roe/Peh-ón

TICHA Module 2, Spanish Flashcard 13

Inch  
Pulgada  
Pool-ga-da

TICHA Module 2, Spanish Flashcard 14
Noise
Ruido
Ru-ee-do

Utilities
Servicios
Ser-vee-seeos
Glass

Vidrio
Vi-dree-o

Zone

Zona
So-na
Module 3. Hand Tools

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Bender
Doblador

Bender
Doh-blah-door

TIDHA Module 3, Flashcard 1
Cutter
Cater

Cortador
Cor-ta-door

Floats
Flouts

Llanas
Ja-na

TICHA Module 3, Flashcard 4

TICHA Module 3, Flashcard 5
**Pliers**

Plaiers

**Pinzas**

Peen-sas

---

**Saw**

So

**Serrucho**

Say-rroo-cho

---

TICHA Module 3, Flashcard 8

TICHA Module 3, Flashcard 9
Tape (to measure)  Cinta (métrica)
Teip (to meshure)  Seen-ta (may-tree-ca)
Module 4. Safety Equipment

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Boots (steel toe)  Botas (punta de acero)
Buts (stil tou)  Bo-tas
(poon-tah de a-se-ro)
Extinguisher
Extinguidor

First Aid Kit
Ferst eid ket

Botiquín
Bo-tee-keen
Flash light
Flash lait

Linterna
Lean-tear-na

Gloves
Gloubs

Guantes
Goo-wan-tes
Goggles
Gagols

Gafas
Ga-fas

Hardhat
Jardhet

Casco
Kas-co

TICHA Module 4, Flashcard 6

TICHA Module 4, Flashcard 7
Vest
Vest

Chaleco
Cha-lay-co

TiCHA Module 4, Flashcard 10
Module 5. Numbers

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TICHA Module 5, Flashcard 1
Dee-ays-see-sayss  Dee-ays-see-o-choe  Vain-te
Dee-ays-see-see-ai-te  Dee-ays-see-nue-ve

Sixtin  Eitin  Tuenti
Seventin  Naintin

TICHA Module 5, Flashcard 4

Vain-tee oo-no  Vain-tee dos

21,  22,  ...  
Tuenti uan  Tuenti tu

TICHA Module 5, Flashcard 5
TICHA Module 5, Flashcard 6

Trainta  Traintah-ee-oono  Traintah-ee-dos
30, 31, 32, ...
Therti  Therti uan  Therti tu

TICHA Module 5, Flashcard 7

Qua-ren-ta  Seen-quen-ta  Say-sen-ta  Say-ten-ta
40, 50, 60, 70,
Fourti  Fifti  Sixti  Seventi
Oh-chen-ta  No-ven-ta  Syen
80, 90, 100

Eiti  Nainti  Uan jandred

Syen-to Dee-ayss  Syen-to Vain-te  Dos-syen-tos
110, 120, ..., 200

Uan Jandred ten  Uan Jandred tuenti  Tu Jandred

TICHA Module 5, Flashcard 8
TICHA Module 5, Flashcard 9
Module 6. Workforce Personnel

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Boss
Bos

Jefe
He-fay
Electrician
Electricista

Engineer
Ingeniero

TICHA Module 6, Flashcard 2
TICHA Module 6, Flashcard 3
Foreman
Fourman

Capataz
Ca-pa-tas

TICHA Module 6, Flashcard 4

Helper
Jelper

Ayudante
Ah-you-dan-te

TICHA Module 6, Flashcard 5
Surveyor
Surveior

Topógrafo
Topogra-fo

TICHA Module 6, Flashcard 10
Module 7. Construction Machinery

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Backhoe  Retroexcavadora
Bak jo   Retroexca-vah-do-ra

TICHA Module 7, Flashcard 1
Compactor
Compactor

Compactador
Compac-ta-door

Crane
Krein

Grúa / Pluma
Groo-ah / Ploo-mah

TICHA Module 7, Flashcard 2

TICHA Module 7, Flashcard 3
Motorgrader
Motogreider

Motoniveladora
Moto-knee-ve-la-do-ra

Jumping jack
Yampin Yac

Apizonadora
Ah-pee-so-na-do-ra
Screeder  
Scrider

Allanadora  
Ah-ya-na-do-ra

Dump Truck  
Damp Trok

Camión de Volteo  
Ca-meeon day Vol-tay-o
Module 8. Construction Quality

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Adequate Tool
Edecueit Tul

Herramienta Adecuada
Ai-ra-mee-en-tas
A-dai-qua-das
Teamwork  
Trabajo en equipo

TICHA Module 8, Flashcard 8
TICHA Module 8, Flashcard 9
Violations
Violeishions

Violaciones
Vee-o-la-seeo-nes

TICHA Module 8, Flashcard 10
Module 9. Colors, Time, and Measurements

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<table>
<thead>
<tr>
<th>Colors</th>
<th>Colores</th>
</tr>
</thead>
<tbody>
<tr>
<td>ielou</td>
<td>Amarillo</td>
</tr>
<tr>
<td>Blu</td>
<td>Azul</td>
</tr>
<tr>
<td>Red</td>
<td>Rojo</td>
</tr>
<tr>
<td>Grin</td>
<td>Verde</td>
</tr>
<tr>
<td>Guait</td>
<td>Blanco</td>
</tr>
<tr>
<td>Blac</td>
<td>Negro</td>
</tr>
<tr>
<td>Oranch</td>
<td>Naranja</td>
</tr>
<tr>
<td>Grey</td>
<td>Gris</td>
</tr>
</tbody>
</table>

A-ka-re-yo
A-sool
Ro-ho
Ver-dai
Blan-ko
Ne-groh
Naran-ha
Greese

TiCHA Module 9, Flashcard 1
Days of the Week

Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday

Lunes
Martes
Miércoles
Jueves
Viernes
Sábado
Domingo

TICHA Module 9, Flashcard 2

Months of the Year

January
February
March
April
May
June
July
August
September
October
November
December

Enero
Febrero
Marzo
Abril
Mayo
Junio
Julio
Agosto
Septiembre
Octubre
Noviembre
Diciembre

TICHA Module 9, Flashcard 3
Linear

- 1” inch = 2.54 centimetro
- 12” (inch) = 1 foot = 30.48 centimetro
- 1’ or ft (foot) = 0.33 yardas
- 1 mile = 1.61 kilometro
<table>
<thead>
<tr>
<th>Unit</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 square inch</td>
<td>6.45 centimetro$^2$</td>
</tr>
<tr>
<td>1 foot$^2$</td>
<td>929.03 centimetros$^2$</td>
</tr>
<tr>
<td>1 mile$^2$</td>
<td>2.59 kilometro$^2$</td>
</tr>
<tr>
<td>1 Acre</td>
<td>4050 metros$^2$</td>
</tr>
<tr>
<td>1 Acre</td>
<td>0.40 Hectarias</td>
</tr>
<tr>
<td>1 Yard$^2$</td>
<td>9 ft$^2$</td>
</tr>
</tbody>
</table>

TICHA Module 9, Flashcard 6
Appendix D. Toolbox Integration Course for Hispanic workers and American supervisors

TICHA’s Reference Sheets
Toolbox Integration Course for Hispanic Workers and American Supervisors

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Prepared by Iowa State University

Project Background
The overall Hispanic Workforce Research Project includes three phases:
Phase I. Construction Language Course for American Supervisors
Phase II. Construction Language Course for Hispanic Workers
Phase III. Toolbox Integration Course for Hispanic Workers and American Supervisors

TICHA Overview
The Toolbox Integration Course for Hispanic Workers and American Supervisors (TICHA) contains the following modules:
Module 1. Construction Materials
Module 2. Pronunciation and Alphabet
Module 3. Hand Tools
Module 4. Safety Equipment
Module 5. Numbers
Module 6. Construction Personnel
Module 7. Construction Machinery
Module 8. Construction Quality
Module 9. Colors, Time, and Measurements

TICHA
- Contains flashcards and quick references, including English and Spanish spelling and pronunciation
- Includes survival phrases
- Touches topics that go beyond language learning (e.g., cultural differences and safety)
- Is designed not to interrupt the daily operations of the American-Hispanic crews
- Has crew integration as the main goal
- Can be customized to specific project and crew needs at the time the course is received

Using TICHA
In the everyday operations, contractors could train their workers using TICHA once a week for half an hour before the working day starts or during lunch time. It is recommended that the instructor of this course be a worker in the crew. Construction crews often have a bilingual Hispanic worker and leader, known as the “link” person.

Benefits
This course is designed to facilitate integration of the Hispanic worker and the American supervisor. Integration between these groups would minimize hazards and miscommunication and increase harmony and productivity on the jobsite.
## Module 1. Construction Materials

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
<th>Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aluminum</strong></td>
<td><strong>Aluminio</strong></td>
<td>Ab-loomi-nee</td>
</tr>
<tr>
<td><strong>Block</strong></td>
<td><strong>Bloque</strong></td>
<td>Block-ay</td>
</tr>
<tr>
<td><strong>Brick</strong></td>
<td><strong>Ladrillo</strong></td>
<td>La-dree-yo</td>
</tr>
<tr>
<td><strong>Cement</strong></td>
<td><strong>Cemento</strong></td>
<td>Ceh-mén-to</td>
</tr>
<tr>
<td><strong>Concrete</strong></td>
<td><strong>Concreto</strong></td>
<td>Con-cray-to</td>
</tr>
<tr>
<td><strong>Dirt / Dust</strong></td>
<td>Tierra / Polvo</td>
<td>Tee-eh-rah / Pol-vo</td>
</tr>
<tr>
<td><strong>Lumber</strong></td>
<td><strong>Madera</strong></td>
<td>Mahd-ehr-ah</td>
</tr>
<tr>
<td><strong>Mortar</strong></td>
<td><strong>Mortero</strong></td>
<td>More-té-ro</td>
</tr>
<tr>
<td><strong>Nails</strong></td>
<td><strong>Clavos</strong></td>
<td>Klah-bows</td>
</tr>
<tr>
<td><strong>Rebar</strong></td>
<td><strong>Varilla</strong></td>
<td>Vah-ree-ya</td>
</tr>
<tr>
<td><strong>Sand</strong></td>
<td><strong>Arena</strong></td>
<td>Ah-ray-nah</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td><strong>Agua</strong></td>
<td>Ah-gwa</td>
</tr>
<tr>
<td><strong>What is your name?</strong></td>
<td>¿Cómo se llama?</td>
<td>Com-oh seh ee-ama?</td>
</tr>
<tr>
<td><strong>What is your address?</strong></td>
<td>¿Cuál es su dirección?</td>
<td>Koo-ahl ehs zoo dee-rectión?</td>
</tr>
<tr>
<td><strong>How old are you?</strong></td>
<td>¿Qué edad tiene?</td>
<td>Ke eh-dad tee-ene?</td>
</tr>
<tr>
<td><strong>Sign here</strong></td>
<td>Firme aquí</td>
<td>Firm-eh ah-kee</td>
</tr>
<tr>
<td><strong>Do you have a driver's license?</strong></td>
<td>¿Tiene licencia de conducir?</td>
<td>Tee-eh-neh lee-sen-sea the con-doo-sir?</td>
</tr>
<tr>
<td><strong>Do you speak English?</strong></td>
<td>¿Habla Inglés?</td>
<td>Ah-bla een-glés?</td>
</tr>
<tr>
<td><strong>Do you understand English?</strong></td>
<td>¿Comprende usted Inglés?</td>
<td>Com-prehn-deh oos- ted een-glés?</td>
</tr>
<tr>
<td><strong>Do you write English?</strong></td>
<td>¿Escribe usted Inglés?</td>
<td>Es-cree-beh oos- ted een-glés?</td>
</tr>
<tr>
<td><strong>Who do we call in case of emergency?</strong></td>
<td>¿A quien llamamos en caso de emergencia?</td>
<td>Ah kee-en yah-mah-mos ehn cah-soh the eh-mer-hencia?</td>
</tr>
<tr>
<td><strong>What is your social security number?</strong></td>
<td>¿Cuál es su número de seguro social?</td>
<td>Koo-ahl ehs zoo nó-o-meh-roh the seh-goo-roh soh-ciál?</td>
</tr>
</tbody>
</table>
## Module 2. Pronunciation and Alphabet

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hello</strong></td>
<td><strong>Hola</strong></td>
</tr>
<tr>
<td><em>Jelou</em></td>
<td><em>Oh-la</em></td>
</tr>
<tr>
<td><strong>What is your name?</strong></td>
<td>¿<strong>Cual es su nombre?</strong></td>
</tr>
<tr>
<td><em>Guat is ior neim</em></td>
<td><em>Koo-ahl ehs soo nohm-breh</em></td>
</tr>
<tr>
<td><strong>How do you say that in English?</strong></td>
<td>¿<strong>Como se dice eso en Español?</strong></td>
</tr>
<tr>
<td><em>Jao du yu sey dat in inglish?</em></td>
<td><em>Coe-moe say dee-say eh-so ehn Ehs-pan-yol?</em></td>
</tr>
<tr>
<td><strong>I do not understand/ I understand</strong></td>
<td>No entiendo/Entiendo</td>
</tr>
<tr>
<td><em>Ai du not anderstand/Ai anderstand</em></td>
<td><em>No ehn-tee-ehn-doe/ ehn-tee-ehn-doe</em></td>
</tr>
<tr>
<td><strong>Watch out!</strong></td>
<td>Cuidado</td>
</tr>
<tr>
<td><em>Watch aut!</em></td>
<td><em>Kwee-dâh-doe</em></td>
</tr>
<tr>
<td><strong>Please</strong></td>
<td>Por favor</td>
</tr>
<tr>
<td><em>Plis</em></td>
<td><em>Pour fah-vore</em></td>
</tr>
<tr>
<td><strong>Thank you</strong></td>
<td>Gracias</td>
</tr>
<tr>
<td><em>Denkiu</em></td>
<td><em>Grâh-see-ahs</em></td>
</tr>
<tr>
<td><strong>Dangerous</strong></td>
<td>Peligroso!</td>
</tr>
<tr>
<td><em>Denyeros</em></td>
<td><em>Peh-lee-grôw-so</em></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Si</td>
</tr>
<tr>
<td><em>Ies</em></td>
<td><em>See</em></td>
</tr>
<tr>
<td><strong>Good Morning</strong></td>
<td>Buenos dias</td>
</tr>
<tr>
<td><em>Gud mourning</em></td>
<td>Buh-eh-nose dee-ahs*</td>
</tr>
</tbody>
</table>
### Module 3. Hand Tools

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bender</td>
<td>Doblador</td>
</tr>
<tr>
<td>Broom</td>
<td>Escoba</td>
</tr>
<tr>
<td>Bucket</td>
<td>Cubeta</td>
</tr>
<tr>
<td>Cutter</td>
<td>Cortador</td>
</tr>
<tr>
<td>Floats</td>
<td>Llanas</td>
</tr>
<tr>
<td>Hammer</td>
<td>Martillo</td>
</tr>
<tr>
<td>Level</td>
<td>Nivel</td>
</tr>
<tr>
<td>Shovel</td>
<td>Pala</td>
</tr>
<tr>
<td>Tape (to measure)</td>
<td>Cinta (métrica)</td>
</tr>
<tr>
<td>Cutter</td>
<td>Cortador</td>
</tr>
<tr>
<td>Level</td>
<td>Nivel</td>
</tr>
<tr>
<td>Pliers</td>
<td>Pinzas</td>
</tr>
<tr>
<td>Saw</td>
<td>Serrucho</td>
</tr>
<tr>
<td>Screwdriver</td>
<td>Desarmador</td>
</tr>
<tr>
<td>How many feet?</td>
<td>¿Cuántos pies?</td>
</tr>
<tr>
<td>Measure four by three feet</td>
<td>Mida cuatro por tres pies</td>
</tr>
<tr>
<td>Measure the height of _____</td>
<td>Mida el largo de _____</td>
</tr>
<tr>
<td>Use three markers</td>
<td>Use tres marcadores</td>
</tr>
<tr>
<td>Can you work extra-hours?</td>
<td>¿Puede trabajar horas extras?</td>
</tr>
<tr>
<td>Measure the width of _____</td>
<td>Mida el ancho de _____</td>
</tr>
<tr>
<td>Measure the length of _____</td>
<td>Mida el largo de _____</td>
</tr>
<tr>
<td>How many feet?</td>
<td>¿Cuántos pies?</td>
</tr>
<tr>
<td>Jao meny fit?</td>
<td>Koo-ahn-tos pee-ehs?</td>
</tr>
</tbody>
</table>
## Module 4. Safety Equipment

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Boots (steel toe)</strong></td>
<td><strong>Botas (punta de acero)</strong></td>
</tr>
<tr>
<td><strong>Buts (stil tou)</strong></td>
<td><strong>Bo-tas (poon-tah de a-se-ro)</strong></td>
</tr>
<tr>
<td><strong>Extinguisher</strong></td>
<td><strong>Extinguidor</strong></td>
</tr>
<tr>
<td><strong>Extinguisher</strong></td>
<td><strong>Ex-ting-gee-door</strong></td>
</tr>
<tr>
<td><strong>First aid kit</strong></td>
<td><strong>Botiquín</strong></td>
</tr>
<tr>
<td><strong>Ferst eíd ket</strong></td>
<td><strong>Bo-tee-kee</strong></td>
</tr>
<tr>
<td><strong>Gloves</strong></td>
<td><strong>Guantes</strong></td>
</tr>
<tr>
<td><strong>Gloubs</strong></td>
<td><strong>Goo-ewan-tes</strong></td>
</tr>
<tr>
<td><strong>Goggles</strong></td>
<td><strong>Gafas</strong></td>
</tr>
<tr>
<td><strong>Gagols</strong></td>
<td><strong>Ga-phas</strong></td>
</tr>
<tr>
<td><strong>Hardhat</strong></td>
<td><strong>Casco</strong></td>
</tr>
<tr>
<td><strong>Jadhat</strong></td>
<td><strong>Kas-co</strong></td>
</tr>
<tr>
<td><strong>Harness</strong></td>
<td><strong>Arnés</strong></td>
</tr>
<tr>
<td><strong>Jarnes</strong></td>
<td><strong>Are-néss</strong></td>
</tr>
<tr>
<td><strong>Signs</strong></td>
<td><strong>Letreros</strong></td>
</tr>
<tr>
<td><strong>Sains</strong></td>
<td><strong>Lay-tray-ros</strong></td>
</tr>
<tr>
<td><strong>Flash light</strong></td>
<td><strong>Linterna</strong></td>
</tr>
<tr>
<td><strong>Flash lait</strong></td>
<td><strong>Leen-ter-nah</strong></td>
</tr>
<tr>
<td><strong>Vest</strong></td>
<td><strong>Chaleco</strong></td>
</tr>
<tr>
<td><strong>Vest</strong></td>
<td><strong>Cha-leh-coh</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What is your telephone number?</strong></td>
<td><strong>¿Cuál es su número de teléfono?</strong></td>
</tr>
<tr>
<td><strong>Wat is iour telefoun namber?</strong></td>
<td><strong>Koo-ahl ehs soo noó-meh-roh the teléhpho-nho?</strong></td>
</tr>
<tr>
<td><strong>Are you sick?</strong></td>
<td><strong>¿Está enfermo?</strong></td>
</tr>
<tr>
<td><strong>Ar iu sec</strong></td>
<td><strong>Ehs-tah ehn-pher-moh?</strong></td>
</tr>
<tr>
<td><strong>Are you hurt?</strong></td>
<td><strong>¿Está herido?</strong></td>
</tr>
<tr>
<td><strong>Ar iu hert?</strong></td>
<td><strong>Ehs-tah eh-ree-doh?</strong></td>
</tr>
<tr>
<td><strong>Do you have a medical problem?</strong></td>
<td><strong>¿Tiene usted algún problema médico?</strong></td>
</tr>
<tr>
<td><strong>Du iu jav ei médical problem?</strong></td>
<td><strong>Tee-eh-neh oos-ted ahl-goón problema méh-dee-coh?</strong></td>
</tr>
<tr>
<td><strong>Call for help!</strong></td>
<td><strong>Llama ayuda!</strong></td>
</tr>
<tr>
<td><strong>Col for jelp!</strong></td>
<td><strong>Yama ah-yoo-dah!</strong></td>
</tr>
<tr>
<td><strong>Go for help!</strong></td>
<td><strong>Vaya por ayuda!</strong></td>
</tr>
<tr>
<td><strong>Gou for jelp!</strong></td>
<td><strong>Vah-yah poor ah-yoo-dah!</strong></td>
</tr>
<tr>
<td><strong>Don't move!</strong></td>
<td><strong>No se mueva!</strong></td>
</tr>
<tr>
<td><strong>Dont muv!</strong></td>
<td><strong>Noh seh moo-eh-vah!</strong></td>
</tr>
<tr>
<td><strong>Get the first aid kid</strong></td>
<td><strong>Traiga la caja de primeros auxilios</strong></td>
</tr>
<tr>
<td><strong>Guet de ferst eíd kit</strong></td>
<td><strong>Trah-ee-gah lah kaha the pree-meh-rohs aux-ee-lee-ohs</strong></td>
</tr>
<tr>
<td><strong>Do you use alcohol?</strong></td>
<td><strong>¿Usted bebe alcohol?</strong></td>
</tr>
<tr>
<td><strong>Du iu ius alcojol?</strong></td>
<td><strong>Oss-ted beh-beh al-co?</strong></td>
</tr>
<tr>
<td><strong>We are taking you to a doctor</strong></td>
<td><strong>Vamos a llevarle a un doctor.</strong></td>
</tr>
<tr>
<td><strong>Wi ar teikin iu tu ei dóctor</strong></td>
<td><strong>Vah-mohs ah yeh-bar-teh ah oon doctór.</strong></td>
</tr>
</tbody>
</table>
Module 5. Numbers

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>Uno</td>
</tr>
<tr>
<td>Two</td>
<td>Dos</td>
</tr>
<tr>
<td>Three</td>
<td>Tres</td>
</tr>
<tr>
<td>Four</td>
<td>Cuatro</td>
</tr>
<tr>
<td>Five</td>
<td>Cinco</td>
</tr>
<tr>
<td>Six</td>
<td>Seis</td>
</tr>
<tr>
<td>Seven</td>
<td>Siete</td>
</tr>
<tr>
<td>Eight</td>
<td>Ocho</td>
</tr>
<tr>
<td>Nine</td>
<td>Nueve</td>
</tr>
<tr>
<td>Ten</td>
<td>Diez</td>
</tr>
<tr>
<td>Eleven</td>
<td>Once</td>
</tr>
<tr>
<td>Twelve</td>
<td>Doce</td>
</tr>
<tr>
<td>Thirteen</td>
<td>Trece</td>
</tr>
<tr>
<td>Fourteen</td>
<td>Catorce</td>
</tr>
<tr>
<td>Fifteen</td>
<td>Quince</td>
</tr>
<tr>
<td>Sixteen</td>
<td>Dieciséis</td>
</tr>
<tr>
<td>Seventeen</td>
<td>Diecisiete</td>
</tr>
<tr>
<td>Eighteen</td>
<td>Dieciocho</td>
</tr>
<tr>
<td>Nineteen</td>
<td>Diecinueve</td>
</tr>
<tr>
<td>Twenty</td>
<td>Viente</td>
</tr>
<tr>
<td>Twenty one</td>
<td>Veintiuno</td>
</tr>
<tr>
<td>Thirty</td>
<td>Treinta</td>
</tr>
<tr>
<td>Thirty one</td>
<td>Treinta y uno</td>
</tr>
<tr>
<td>Forty</td>
<td>Cuarenta</td>
</tr>
<tr>
<td>Fifty</td>
<td>Cincuenta</td>
</tr>
<tr>
<td>Sixty</td>
<td>Sesenta</td>
</tr>
<tr>
<td>Seventy</td>
<td>Setenta</td>
</tr>
<tr>
<td>Eighty</td>
<td>Ochenta</td>
</tr>
<tr>
<td>Ninety</td>
<td>Noventa</td>
</tr>
<tr>
<td>One hundred</td>
<td>Cien</td>
</tr>
<tr>
<td>One hundred ten</td>
<td>Ciento diez</td>
</tr>
<tr>
<td>Two hundred</td>
<td>Doscientos</td>
</tr>
<tr>
<td>One thousand</td>
<td>Mil</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bring me the _______</td>
<td>Traiga el _______</td>
</tr>
<tr>
<td>Bring mi de</td>
<td>Tra-ee-gah ehl</td>
</tr>
<tr>
<td>(or) la_________</td>
<td>(or) lah_________</td>
</tr>
<tr>
<td>Can someone translate?</td>
<td>¿Puede alguien traducir?</td>
</tr>
<tr>
<td>Can som uan transleit?</td>
<td>Poo-eh-deh al-guee-ehn tra-doo-seer?</td>
</tr>
<tr>
<td>Clean this up</td>
<td>Limpie esto</td>
</tr>
<tr>
<td>Clean dis ap</td>
<td>Leem-pee-eh ehs-toh</td>
</tr>
<tr>
<td>Good job!</td>
<td>Buen trabajo!</td>
</tr>
<tr>
<td>Gid yob!</td>
<td>Boo-en trah-bah-hoh!</td>
</tr>
<tr>
<td>Keep the jobsite clean</td>
<td>Mantenga la obra limpia</td>
</tr>
<tr>
<td>Kip de yoh sait clin</td>
<td>Man-ten-gah lah oh-bra lim-pee-ah</td>
</tr>
<tr>
<td>Move the equipment</td>
<td>Mueva el equipo</td>
</tr>
<tr>
<td>Muv de equipment</td>
<td>Mooe-va el ekipoh</td>
</tr>
<tr>
<td>Pick up the trash</td>
<td>Recoja la basura</td>
</tr>
<tr>
<td>Pic ap de trash</td>
<td>Reb-coh-ha lah bah-sub-rah</td>
</tr>
<tr>
<td>Work safely</td>
<td>Trabaje con cuidado</td>
</tr>
<tr>
<td>work seifil</td>
<td>Tra-bah-he con koo-ee-dah-doh</td>
</tr>
<tr>
<td>Take this to _______</td>
<td>Lleve esto a _______</td>
</tr>
<tr>
<td>Teik dis to _______</td>
<td>Yeve ehs-to ah _______</td>
</tr>
<tr>
<td>What is that?</td>
<td>¿Qué es eso?</td>
</tr>
<tr>
<td>Wast is dat?</td>
<td>Ké ehs ehso _______</td>
</tr>
</tbody>
</table>
## Module 6. Workforce Personnel

<table>
<thead>
<tr>
<th>Role</th>
<th>Spanish</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boss</td>
<td>Jefe</td>
<td>He-fay</td>
</tr>
<tr>
<td>Electrician</td>
<td>Electricista</td>
<td>Elec-tree-sys-ta</td>
</tr>
<tr>
<td>Engineer</td>
<td>Ingeniero</td>
<td>In-he-knee-eh-ro</td>
</tr>
<tr>
<td>Foreman</td>
<td>Capataz</td>
<td>Ca-pa-tas</td>
</tr>
<tr>
<td>Helper</td>
<td>Ayudante</td>
<td>Ah-you-dan-te</td>
</tr>
<tr>
<td>Inspector</td>
<td>Inspector</td>
<td>Inspector</td>
</tr>
<tr>
<td>Operator</td>
<td>Operador</td>
<td>Operator</td>
</tr>
<tr>
<td>Superintendent</td>
<td>Superintendente</td>
<td>Superinten-den-te</td>
</tr>
<tr>
<td>Surveyor</td>
<td>Topógrafo</td>
<td>Topogra-phon</td>
</tr>
</tbody>
</table>

- **When will you finish?**
  - **Wen wil iu finish?**
  - ¿Cuando va a terminar?
- **When will you start?**
  - **Wen will iu estart?**
  - ¿Cuando va a comenzar?
- **Where is the _____?**
  - **Wer is de_____?**
  - ¿Donde esta el (or) la ______?
  - Don-deh ehs-tah ehl (or) lah____?
- **Where is your _____?**
  - **Where is iour _____?**
  - ¿Donde esta su ____?
  - Don-deh ehs-tah zoo____?
- **How do you say ____ in English?**
  - **Jao du iu sei____ in Inglish?**
  - ¿Como se dice _____ en Español?
  - Co-moh seh dee-seh____ en Espanyol?
- **You must use _____ for safety**
  - **Lu most ius_____ for seifti**
  - Usted debe usar _____ por seguridad
  - Oos-ted deh-beh oo-sahr____ poor seh-goo-ree-dah |
- **Watch out!**
  - **Watch aut!**
  - Cuidado!
  - Ku-ee-dah-doh!
- **Hazard!**
  - **Jasard!**
  - Peligro!
  - Peh-lee-groh!
- **Get out of the way**
  - **Get aut od de wei**
  - Haste para un lado
  - Ass-teh pah-rah oon lah-doh
- **Be careful**
  - **Bi kerful**
  - Ten cuidado
  - Ten coo-ee-dah-doh
## Module 7. Construction Machinery

<table>
<thead>
<tr>
<th>Tool</th>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backhoe</td>
<td>Retroexcavadora</td>
<td>Retroexca-vah-do-rah</td>
</tr>
<tr>
<td>Bak jo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compactor</td>
<td>Compactador</td>
<td>Compac-ta-door</td>
</tr>
<tr>
<td>Crane</td>
<td>Grua</td>
<td>Groo-ah</td>
</tr>
<tr>
<td>Krein</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulldozer</td>
<td>Tractor</td>
<td></td>
</tr>
<tr>
<td>Bulldozer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excavator</td>
<td>Excavadora</td>
<td>Exca-vah-doh-ra</td>
</tr>
<tr>
<td>Excavator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorgrader</td>
<td>Motoniveladora</td>
<td>Moto-knee-veh-la-do-ra</td>
</tr>
<tr>
<td>Motorfreider</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jumping jack</td>
<td>Apizonadora</td>
<td>Ah-pee-so-na-do-ra</td>
</tr>
<tr>
<td>Yampin yac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loader</td>
<td>Cargador</td>
<td>Car-ga-door</td>
</tr>
<tr>
<td>Louder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paver</td>
<td>Carpeteadora</td>
<td>Carpetay-tah-do-ra</td>
</tr>
<tr>
<td>Peiver</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screeeder</td>
<td>Allanadora</td>
<td>Ah-ya-na-do-ra</td>
</tr>
<tr>
<td>Scrider</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### How do you say ____ in English?  
### ¿Cómo se dice ____ en Español?  

<table>
<thead>
<tr>
<th>Tool</th>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td>I need that tool</td>
<td>Necesito esa herramienta</td>
<td>Noh-seh-see-toh eh-sah eh-rrah-mee-ehn-tah</td>
</tr>
<tr>
<td>I do not understand</td>
<td>No entiendo</td>
<td>No en-tee-ehn-doh</td>
</tr>
<tr>
<td>Can you repeat that?</td>
<td>¿Puede repetirlo?</td>
<td>Pooh-eh-deh reh-peh-teer-loh?</td>
</tr>
<tr>
<td>Speak slowly, please</td>
<td>Hable lento, por favor</td>
<td>Ah-bleh lehn-toh, poor fah-vor</td>
</tr>
<tr>
<td>Do not do that</td>
<td>No haga eso</td>
<td>Noh ah-gah eh-soh</td>
</tr>
<tr>
<td>Do you understand?</td>
<td>¿Me entiende?</td>
<td>Meh en-tee-ehn-deh?</td>
</tr>
<tr>
<td>Thank you</td>
<td>Gracias</td>
<td>Grah-see-as</td>
</tr>
<tr>
<td>Denkiu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Put your hard hat on</td>
<td>Póngase el casco</td>
<td>Póhn-gah-seh el kas-koh</td>
</tr>
<tr>
<td>Put ior jard jat on</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bring me the ____ , please</td>
<td>Traiga el (or) la ____ , por favor</td>
<td>Trah-ee-gah ehl (or) la ____ , poor fah-vor</td>
</tr>
<tr>
<td>Bring mi de ____ , plis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Module 8. Construction Quality

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate Tool</td>
<td>Herramienta Adecuada</td>
</tr>
<tr>
<td>Defect</td>
<td>Defecto</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Evaluación</td>
</tr>
<tr>
<td>Inspection</td>
<td>Inspección</td>
</tr>
<tr>
<td>Instructions</td>
<td>Instrucciones</td>
</tr>
<tr>
<td>Mistake</td>
<td>Error</td>
</tr>
<tr>
<td>Safety</td>
<td>Seguridad</td>
</tr>
<tr>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Teamwork</td>
<td>Trabajo en equipo</td>
</tr>
<tr>
<td>Violations</td>
<td>Violaciones</td>
</tr>
<tr>
<td>Go up, please</td>
<td>Suba</td>
</tr>
<tr>
<td>Go down</td>
<td>Baje</td>
</tr>
<tr>
<td>Move to the right</td>
<td>Muevase a la derecha</td>
</tr>
<tr>
<td>Move to the left</td>
<td>Muevase a la izquierda</td>
</tr>
<tr>
<td>How do you say that in English?</td>
<td>¿Cómo se dice eso en Español?</td>
</tr>
<tr>
<td>I do not understand</td>
<td>No entiendo</td>
</tr>
<tr>
<td>I understand</td>
<td>Entiendo</td>
</tr>
<tr>
<td>Repeat</td>
<td>Repita</td>
</tr>
<tr>
<td>Bring me the _____, please</td>
<td>Traiga _____, por favor</td>
</tr>
<tr>
<td>Bring mi de _____, plis</td>
<td>Trai-gah _____, poor fah-vor</td>
</tr>
<tr>
<td>The site is _____ miles from here</td>
<td>El sitio es _____ millas de aquí</td>
</tr>
<tr>
<td>De sait is _____ mails from jir</td>
<td>El see-tee-oh es _____ mee-yahs deh aki</td>
</tr>
</tbody>
</table>
Module 9. Colors, Time, and Measurements

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meter</td>
<td>Metro</td>
</tr>
<tr>
<td>Miter</td>
<td>Meh-tor</td>
</tr>
<tr>
<td>Centimeter</td>
<td>Centímetro</td>
</tr>
<tr>
<td>Centimeter</td>
<td>Cen-teé-meh-troh</td>
</tr>
<tr>
<td>Feet</td>
<td>Pies</td>
</tr>
<tr>
<td>Fit</td>
<td>Pee-ehs</td>
</tr>
<tr>
<td>Foot</td>
<td>Pie</td>
</tr>
<tr>
<td>Fity</td>
<td>Pee-éh</td>
</tr>
<tr>
<td>Acre</td>
<td>Acre</td>
</tr>
<tr>
<td>Eiquer</td>
<td>Ah-creh</td>
</tr>
<tr>
<td>Yard</td>
<td>Yarda</td>
</tr>
<tr>
<td>Yard</td>
<td>Jar-dah</td>
</tr>
<tr>
<td>Miles</td>
<td>Milla</td>
</tr>
<tr>
<td>Mail</td>
<td>Mee-jah</td>
</tr>
<tr>
<td>Kilometer</td>
<td>Kilometro</td>
</tr>
<tr>
<td>Kilometer</td>
<td>Kee-loh-meh-troh</td>
</tr>
<tr>
<td>Hectares</td>
<td>Hectarias</td>
</tr>
<tr>
<td>Jectars</td>
<td>Ek-tah-ree-ahs</td>
</tr>
<tr>
<td>Diameter</td>
<td>Diametro</td>
</tr>
<tr>
<td>Diameter</td>
<td>Dee-ah-meh-troh</td>
</tr>
</tbody>
</table>

| Measure _____ feet | Mide _____ pies |
| Use the tape to measure the surface | Usa la cinta para medir la superficie |
| That costs twenty dollars | Eso cuesta veinte dólares |
| Find the ______ | Busca la ____ (or) el_______ |
| The crane is behind you | La grúa esta atrás de ti |
| The surface is _____ feet long | La superficie es ____ pies de largo |
| The temperature tomorrow is ___ | La temperatura mañana es___ |
| What color is that? | ¿Qué color es eso? |
| It looks horizontal | Se ve horizontal |
| It looks jorisonal | Seh veh or-ee-son-tal |
| It looks vertical | Se vey vertical |
| It luks véréctal | Seh veh ver-ti-cál |
Appendix E. Questionnaire Evaluation of the Toolbox Integration Course for Hispanic workers and American supervisors
TICHA Evaluation

Questionnaire for American Supervisors
Toolbox Integration Course for Hispanic workers and American supervisors

Conducted by: Iowa State University and the Iowa Department of Transportation

Anonymity: Your answers to the following questions will be completely anonymous and the results will be held strictly confidential and will be used for statistical purposes only and not linked to the respondent.

General Objective:

The main objective of this evaluation is to understand how successful the TICHA training has been throughout its sessions.

Note: This evaluation will take approximately 15-20 minutes to complete.
## Toolbox Integration Course for Hispanic workers and American supervisors (TICHA)

### EVALUATION

**Personal**

<table>
<thead>
<tr>
<th>Company name: __________________________</th>
<th>Phone #: ____________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your name: ____________________________</td>
<td>Phone #: ____________</td>
</tr>
<tr>
<td>Occupation: ___________________________</td>
<td>Date: ________________</td>
</tr>
</tbody>
</table>

**Course Contents**

How was the overall class content?

- __Too basic__
- __About right__
- __Too difficult__

Was the order of the topics easy to follow?  
- __Yes__
- __No__

How much of the information presented will be useful to you in your job?

- __All__
- __Most__
- __About 50%__
- __Some__
- __None__

What is the most useful information you received?

________________________________________

______________________________________________________________________

What is the least useful information you received?

________________________________________

______________________________________________________________________

**Instructor & Assistant Trainer**

<table>
<thead>
<tr>
<th>Trainer</th>
<th>Assistant Trainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name (1): __________________________</td>
<td>Name (2): __________________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge of subject</th>
<th>Deficient</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(1)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
<tr>
<td>Communicated clearly</td>
<td>__________</td>
<td>__________</td>
<td>__________</td>
<td>__________</td>
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<tr>
<td>Effective presentation tools</td>
<td>__________</td>
<td>__________</td>
<td>__________</td>
<td>__________</td>
</tr>
<tr>
<td>Responded well to questions</td>
<td>__________</td>
<td>__________</td>
<td>__________</td>
<td>__________</td>
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</tbody>
</table>

How would you rate the trainers’ interests in you training?

- __Without interest__
- __Impartial__
- __With interest__
- __Very interested__

**Overall Training**

<table>
<thead>
<tr>
<th>Was the class what you expected?</th>
<th>Not at all</th>
<th>Definitely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comments:</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

| Was the class a worthwhile investment? | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Comments:                              |   |   |   |   |   |   |   |

| Has your confidence in speaking English improved? | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Comments:                                          |   |   |   |   |   |   |   |

<p>| Would you recommend this course to others? | <strong>No</strong> | <strong>Maybe</strong> | <strong>Probably</strong> | <strong>Definitely</strong> |
| Comments:                                  |        |           |              |               |</p>
<table>
<thead>
<tr>
<th>Training Workbooks</th>
<th>How would you rate the training?</th>
<th><em>Poor</em></th>
<th><em>Average</em></th>
<th><em>Excellent</em></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Were they complete?</td>
<td><em>Poor</em></td>
<td><em>Average</em></td>
<td><em>Excellent</em></td>
</tr>
<tr>
<td></td>
<td>Were they accurate</td>
<td><em>Poor</em></td>
<td><em>Average</em></td>
<td><em>Excellent</em></td>
</tr>
<tr>
<td></td>
<td>Were they activities useful?</td>
<td><em>Poor</em></td>
<td><em>Average</em></td>
<td><em>Excellent</em></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>How would you rate?</td>
<td></td>
<td><em>Poor</em></td>
<td><em>Average</em></td>
<td><em>Excellent</em></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
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</tbody>
</table>

The following information will be used to improve this training course in all the aspects previously evaluated for future opportunities.

I would tell someone considering this course…

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

This course could be better if…

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What can you say to others who think they don’t need training? Why should someone consider taking this training course?

________________________________________________________________________________________
________________________________________________________________________________________
Appendix F. Evaluación de Curso de Integración en el Lugar de Trabajo entre Trabajadores Hispanos y Supervisores Americanos
Evaluación de Curso TICHA

Entrenamiento de Integración en el Lugar de Trabajo entre Trabajadores Hispanos y Supervisores Americanos

Conducido por: Iowa State University
Fecha: ____________________
y el departamento de transportación.

Anónimo: Las respuestas a las siguientes preguntas serán guardadas en su anonimato y sus resultados va a ser guardados estrictamente para usos de estudio estadísticos y que no están relacionados con el participante.

Objetivo General:
Entender como Supervisores Americanos y Trabajadores Hispanos califican el entrenamiento TICHA.

Nota: Esta evaluación tomará aproximadamente 15 minutos en completar.
## TICA
### EVALUACION

<table>
<thead>
<tr>
<th>Personal</th>
</tr>
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<tbody>
<tr>
<td>Nombre de su compañía: ___________________________</td>
</tr>
<tr>
<td>Su nombre: ___________________________ Teléfono: ______________</td>
</tr>
<tr>
<td>Ocupación: ___________________________ Fecha: ________________</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Contenidos del Curso</th>
</tr>
</thead>
<tbody>
<tr>
<td>¿Cómo estuvo el contenido general del curso?</td>
</tr>
<tr>
<td>__ Muy básico  __Normal  __Muy difícil</td>
</tr>
</tbody>
</table>

| ¿El orden de los temas fue fácil de seguir? |
| __ Si  __No |

| ¿Qué tanta información presentada será útil para tu trabajo? |
| __Toda __La mayoría __Un 50% __Alguna __ Nada |

| ¿De la información que recibiste, cuál es la más útil? |
| ___________________________ |

| ¿De la información que recibiste, cuál es la menos útil? |
| ___________________________ |

<table>
<thead>
<tr>
<th>Instructor &amp; Asistente</th>
</tr>
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<tbody>
<tr>
<td>Nombre del Instructor (1): ___________________________</td>
</tr>
<tr>
<td>Nombre del Asistente (2): ___________________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deficiente</th>
<th>Deficiente</th>
<th>Justo</th>
<th>Bueno</th>
<th>Excelente</th>
</tr>
</thead>
<tbody>
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<td>(1)</td>
<td>(2)</td>
<td>(1)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

| Conocimiento del tema |
| __                     |

| Se comunicó claramente |
| __                     |

| Usó herramientas efectivas |
| __                     |

| Respondió bien a preguntas |
| __                     |

| ¿Cómo calificarías el interés de los instructores en capacitarte? |
| __Sin interés  __Imparcial  __Con interés  __Muy interesado |

<table>
<thead>
<tr>
<th>Calificación General</th>
</tr>
</thead>
<tbody>
<tr>
<td>¿El curso fue lo que esperabas?</td>
</tr>
<tr>
<td>Definitivamente no</td>
</tr>
<tr>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

| Comentarios: |
| ___________________________ |

| ¿Valió la pena el tiempo invertido? |
| 1 2 3 4 5 6 7 |

| Comentarios: |
| ___________________________ |

| ¿Sientes que tu confianza mejoró? |
| 1 2 3 4 5 6 7 |

| Comentarios: |
| ___________________________ |

| ¿Recomendarías este curso a otros? |
| __No  __Tal vez  __Probablemente  __Definitivamente |

| Comentarios: |
| ___________________________ |
¿Cómo calificarías los libros de trabajo?
- Malo
- Promedio
- Excelente

¿Estaban completos los libros de trabajo?
- Malo
- Promedio
- Excelente

¿Fueron específicos los libros de trabajo?
- Malo
- Promedio
- Excelente

¿Las actividades fueron útiles?
- Malo
- Promedio
- Excelente

Comentarios: ___________________________________________________________

¿Cómo calificarías el salón de clase y equipo?
- Malo
- Promedio
- Excelente

Comentarios: ___________________________________________________________

La siguiente información será utilizada para mejorar el curso en todos los aspectos evaluados anteriormente para futuras oportunidades

Yo le diría a alguien que este considerando este curso que…

________________________________________________________________________

________________________________________________________________________

Este curso podría ser mejor si…

________________________________________________________________________

________________________________________________________________________

¿Qué les podrías decir a aquellos que piensan que capacitación no es necesaria? ¿Por qué debería una persona considerar participar en este curso?

________________________________________________________________________

________________________________________________________________________
Appendix G. Questionnaire Evaluation of the Safety Record Post Training for Hispanic Workers
Hispanic Worker’s Survey
Measuring Safety and Accident Incidence

1. In the last three months how many times in this construction season have you been in situations in which you almost had an injury?

2. In the last three months how many times in this construction season have you had minor injuries (for example, hit your fingers with a hammer, stuff falling on your foot, something hit you in the shoulder, etc…)

3. In the last three months, how many days have you missed work due to sickness and/or injury?

4. In the last three months, how many times have you visited the doctor due to sickness

5. In the last three months, how many times have you visited the doctor due to injury?

6. In the last three months, how many times did you see a fellow Hispanic worker almost get injured?

Names
1) (number of times)
2) (number of times)
3) (number of times)

7. In the last three months, how many times did you see a fellow Hispanic worker get a minor injury (for example, hit his fingers with a hammer, stuff falling on his foot, something hitting him in the shoulder, etc…)?

Names
1) (number of times)
2) (number of times)
3) (number of times)

8. In the last three months, how many times did you see a fellow Hispanic worker miss a day’s of work due to an injury?

Names
1) (number of times)
2) (number of times)
3) (number of times)
<table>
<thead>
<tr>
<th></th>
<th>Severity</th>
<th>Lost time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 = Near Miss; 2 = Injury no First Aid (No doctor); 3 = First Aid at job; 4 = First aid + Doctor; 5 = Fatality</td>
<td>1 = Non-loss time; 2 = lost time less than hour; 3 = lost time hours; 4 = lost time days; 5 = lost time months</td>
</tr>
<tr>
<td>1</td>
<td>Property Damage</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Fingers</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Hand</td>
<td></td>
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<tr>
<td>4</td>
<td>Forearm</td>
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<tr>
<td>5</td>
<td>Arm</td>
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<td>Head</td>
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<td>7</td>
<td>Shoulder</td>
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<td>8</td>
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<td>9</td>
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<td>11</td>
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<td>15</td>
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<td>17</td>
<td>Eye (Foreign Body)</td>
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<td>Bruises and Contusions</td>
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<td>26</td>
<td>Wounds and Abrasions</td>
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<td>Sprains and Strains</td>
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<td>28</td>
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Appendix H. Cuestionario de Evaluación del Record de Accidentes Pos-Entrenamiento
Encuesta a Trabajadores Hispanos
Midiendo Seguridad en el Trabajo

1. En los últimos tres meses ¿cuántas veces has estado en una situación en la que casi te accidentas pero nada pasó?

2. En los últimos tres meses ¿cuántas veces has tenido accidentes leves? (Por ejemplo, que algo se te cae en el pie, o te machucas el dedo, etc.)

3. En los últimos tres meses ¿cuántas veces has faltado al trabajo ya que has estado herido o enfermo?

4. En los últimos tres meses ¿cuántas veces has visitado al médico dado a enfermedad?

5. En los últimos tres meses ¿cuántas veces has visitado a un doctor por heridas?

6. De las veces que te has herido, si te hubiera pasado en casa, ¿te hubieras tomado más tiempo para curarte o visitado al doctor?

7. En los últimos tres meses ¿cuántas veces viste que un compañero hispano casi se accidente?

Nombres
1) _________ (numero de veces)
2) _________ (numero de veces)
3) _________ (numero de veces)
8. En los últimos tres meses, cuantas veces viste que tus compañeros hispanos tuvieron una accidente leve

Nombres
1) ________ (numero de veces)
2) ________ (numero de veces)
3) ________ (numero de veces)

9. En los últimos tres meses, ¿cuantas veces viste que tu compañero hispano no vino al trabajo dado a una herida, enfermedad o que fue al médico?

Nombres
1) ________ (numero de veces)
2) ________ (numero de veces)
3) ________ (numero de veces)
<table>
<thead>
<tr>
<th>Severity</th>
<th>Lost time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Posibilidad de accidente</td>
<td>1 = No perdio tiempo</td>
</tr>
<tr>
<td>2 = Lesion sin primeros auxilios</td>
<td>2 = menos de una hora</td>
</tr>
<tr>
<td>3 = Primeros Auxilios</td>
<td>3 = mas de una hora</td>
</tr>
<tr>
<td>4 = Primeros auxilios y doctor</td>
<td>4 = mas de un dia</td>
</tr>
<tr>
<td>5 = Fatigabilidad</td>
<td>5 = mas de un mes</td>
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<table>
<thead>
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<th>1</th>
<th>2</th>
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Appendix I. Pretest General Knowledge

Toolbox Integration Course for Hispanic workers and American supervisors
Pretest General Knowledge
Toolbox Integration Course for Hispanic workers and American supervisors

Conducted by: Iowa State University
and the Iowa Department of Transportation

Anonymity: Your answers to the following questions will be completely anonymous and the results will be held strictly confidential and will be used for statistical purposes only and not linked to the respondent.

General Objective:
The main objective of this pre-test is to understand the general knowledge of construction language, cultural awareness, and safety aspects.

Note: This evaluation will take approximately 15-20 minutes to complete.
1) The Spanish word for “block” is _________________
2) The Spanish word for “hardhat” is _________________
3) The Spanish word for “bucket” is _________________
4) The Spanish word for “goggles” is _________________
5) The Spanish word for “forty four” is _________________
6) The Spanish word for “laborer” is _________________
7) The Spanish word for “crane” is _________________
8) The Spanish word for “safety” is _________________
9) The Spanish word for “red” is _________________
10) The Spanish word for “Tuesday” is _________________
11) The Spanish word for “arm” is _________________
12) The Spanish word for “square feet” is _________________
13) The Spanish word for “please” is _________________
14) The Spanish word for “bring me” is _________________
15) The Spanish word for “tomorrow” is _________________
16) The Spanish word for “how do you say?” is _________________
17) The Spanish word for “watch out!” is _________________
18) The Spanish word for “give me” is _________________
19) From the scale from 1 to 7 how do you feel your daily communication with Hispanic workers affects their:

<table>
<thead>
<tr>
<th>Impact</th>
<th>Small</th>
<th>Great</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

a. Productivity

b. Safety

c. American cultural understanding 1 2 3 4 5 6 7

20) From the scale from 1 to 7 how do you feel an “integration” course on the jobsite during the summer could help Hispanic workers:

<table>
<thead>
<tr>
<th>Impact</th>
<th>Small</th>
<th>Great</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

a. Productivity

b. Safety

c. American cultural understanding 1 2 3 4 5 6 7
Appendix J. Pre-examen Conocimiento General
Curso de Integración entre Trabajadores Hispanos y Supervisores Americanos
Pre-examen Conocimiento General
Conducido por: Iowa State University                Fecha:_________________
y el departamento de transportación.

Anonimato: Las respuestas a las siguientes preguntas serán guardadas en su anonimato y sus resultados
va a ser guardados estrictamente para usos de estudio estadísticos y que no están relacionados con el
participante.

Objetivo General:
    Entender el conocimiento general de los trabajadores Hispanos sobre palabras de construcción en
Inglés.

Nota: Esta evaluación tomará aproximadamente 15 minutos en completar.
1) ¿Cómo se dice “Bloque” en Inglés? ___________________
2) ¿Cómo se dice “Casco” en Inglés? ___________________
3) ¿Cómo se dice “Cubeta” en Inglés? ___________________
4) ¿Cómo se dice “Gafas” en Inglés? ___________________
5) ¿Cómo se dice “cuarenta y cuatro” en Inglés? _______________
6) ¿Cómo se dice “obrero” en Inglés? ___________________
7) ¿Cómo se dice “grúa” en Inglés? ___________________
8) ¿Cómo se dice “seguridad” en Inglés? ________________
9) ¿Cómo se dice “rojo” en Inglés? ___________________
10) ¿Cómo se dice “Martes” en Inglés? ________________
11) ¿Cómo se dice “brazo” en Inglés? ________________
12) ¿Cómo se dice “pie cuadrado” en Inglés? ________________
13) ¿Cómo se dice “por favor” en Inglés? ________________
14) ¿Cómo se dice “tráeme” en Inglés? ________________
15) ¿Cómo se dice “mañana” en Inglés? ________________
16) ¿Cómo se dice “como se dice” en Inglés? ________________
17) ¿Cómo se dice “Cuidado” en Inglés? ________________
18) ¿Cómo se dice “dame” en Inglés? ________________
19) En una escala del 1 al 7 como piensas la comunicación que tienes diaria con trabajadores y supervisores hispanos afecta tu:

<table>
<thead>
<tr>
<th>Impacto</th>
<th>Pequeño</th>
<th>Impacto</th>
<th>Gran</th>
</tr>
</thead>
<tbody>
<tr>
<td>d.</td>
<td>Productividad</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>Seguridad</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td>Entendimiento de Cultural Americana</td>
<td>2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

20) En una escala del 1 al 7 como piensas que un curso de “integración” durante el verano puede impactar la:

<table>
<thead>
<tr>
<th>Impacto</th>
<th>Pequeño</th>
<th>Impacto</th>
<th>Gran</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Productividad</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>Seguridad</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>Entendimiento de Cultural Americana</td>
<td>2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
Appendix K. TICHA’s Attendance Sheet
Attendance Sheet for Delivering of TICHA

Module #__________________________

Company Name __________________________________

Supervisor's Name ________________________________

Date ____________________________________________

<table>
<thead>
<tr>
<th>Name of Worker: a letter is assigned to non-Hispanics</th>
<th>Number Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix L. American Supervisor
Measuring Frictions, Relations, and Implicit Productivity on the Jobsite
American Supervisor Survey
Measuring Frictions, Relations and Implicit Productivity on the Jobsite

1) Measuring Frequency of the Conflicts

In the last three months, how often did you perceive tension or frustration on the jobsite because of differences between American and Hispanic laborers in:

<table>
<thead>
<tr>
<th></th>
<th>1 = Almost never</th>
<th>2 = Seldom</th>
<th>3 = Sometimes</th>
<th>4 = Often</th>
<th>5 = Almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personalities, attitudes, values, sense of humor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language misunderstandings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsafe behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explain:
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

2) Measuring Conflict Management

Please, assess to what extend you and your Hispanic team members agree or disagrees with the following strategies to solve conflicts:

<table>
<thead>
<tr>
<th></th>
<th>1 = Strongly disagree</th>
<th>2 = Disagree</th>
<th>3 = Partially agree</th>
<th>4 = Agree</th>
<th>5 = Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussing the issue to work out a decision</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperate to understand other’s point of view</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Settle the issue through “give and take”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressuring others to enforce your ideas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sticking to your position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoiding the issue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using loud voice to make a point</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acting as if nothing happened</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calm the</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3) Measuring Job Satisfaction

Do you consider that you feel highly satisfied in your job?

<table>
<thead>
<tr>
<th>1 = Strongly disagree</th>
<th>2 = Disagree</th>
<th>3 = Partially agree</th>
<th>4 = Agree</th>
<th>5 = Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Would you agree with the idea of moving to a new job?

<table>
<thead>
<tr>
<th>1 = Strongly disagree</th>
<th>2 = Disagree</th>
<th>3 = Partially agree</th>
<th>4 = Agree</th>
<th>5 = Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4) Measuring Functionality Hispanic workers vs. American workers

How do you grade Hispanic and American Laborers in the following situations? 1 means “low grade” and 5 means “high grade”

<table>
<thead>
<tr>
<th>Task</th>
<th>Hispanic Labors</th>
<th>American Labors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Punctuality in attending meetings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Careful listening to supervisor’s opinions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finishing tasks before deadlines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keep concentration during tasks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help each other with all the tasks and schedules</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respecting one another’s tasks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giving their opinion about important decisions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Looking for new methods to improve performance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5) Measuring team effectiveness Hispanic workers vs. American workers

Which are the more frequent attitudes among your Hispanic and American craft workers? 1 means “low grade” and 5 means “high grade”

<table>
<thead>
<tr>
<th>Task</th>
<th>Hispanic Labors</th>
<th>American Labors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Reviewing daily work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redo work because of slack performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dedicating extra efforts to their jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wasting materials or misusing tools or machinery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exceeding productivity requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preventing actions that avoid personal or machinery damage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Looking for new ways to be more productive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overusing sick reports</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6) Productivity assessment

Please, make an assessment about how do you rate your workers in terms of (1 means “low grade” and 5 means “high grade”)

<table>
<thead>
<tr>
<th>Processes</th>
<th>Hispanic Labors</th>
<th>American Labors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Quickly perform job assignments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performs high quality job assignments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Works efficiently without supervision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understands orders and job assignments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workers have specific and repetitive jobs assigned</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time use</th>
<th>Hispanic Labors</th>
<th>American Labors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Finish all tasks before time expected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never work extra hours to finish incomplete work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spends too much time on breaks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workers get injured often</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix M. Hispanic Workers
Measuring Frictions, Relations, and Implicit Productivity on the Jobsite
Hispanic Worker’s Survey
Measuring Frictions, Relations, and Implicit Productivity on the Jobsite

1) Measuring Frequency of the Conflicts

In the last three months, how often did you perceive tension or frustration on the jobsite because of differences between American and Hispanic laborers in:

<table>
<thead>
<tr>
<th>Issue</th>
<th>1 = Almost never</th>
<th>2 = Seldom</th>
<th>3 = Sometimes</th>
<th>4 = Often</th>
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<tr>
<td>Personalities, attitudes, values,</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>sense of humor</td>
<td></td>
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<tr>
<td>Task problems</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Unsafe behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explain:
__________________________________________________________________________________________
__________________________________________________________________________________________
____________________________________

2) Measuring Conflict Management

Please, assess to what extent you and your American team members agree or disagree with the following strategies to solve conflicts:

<table>
<thead>
<tr>
<th>Strategy</th>
<th>1 = Strongly disagree</th>
<th>2 = Disagree</th>
<th>3 = Partially agree</th>
<th>4 = Agree</th>
<th>5 = Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussing the issue to work out a decision</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperate to understand other’s point of view</td>
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<td></td>
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</tr>
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<td>Settle the issue through “give and take”</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Pressuring others to enforce your ideas</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sticking to your position</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Avoiding the issue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using loud voice to make a point</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 = Strongly disagree</td>
<td>2 = Disagree</td>
<td>3 = Partially agree</td>
<td>4 = Agree</td>
<td>5 = Strongly agree</td>
<td></td>
</tr>
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<td>---------------------</td>
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<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>Acting as if nothing happened</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calm the disagreement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workers asking supervisor for help</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Looking for outside assistance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3) Measuring Job Satisfaction

Do you consider that you feel highly satisfied in your job?

<table>
<thead>
<tr>
<th>1 = Strongly disagree</th>
<th>2 = Disagree</th>
<th>3 = Partially agree</th>
<th>4 = Agree</th>
<th>5 = Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Would you agree with the idea of moving to a new job?

<table>
<thead>
<tr>
<th>1 = Strongly disagree</th>
<th>2 = Disagree</th>
<th>3 = Partially agree</th>
<th>4 = Agree</th>
<th>5 = Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>
Appendix N

American Supervisor and Worker

Measuring Class Effectiveness in Improved Communications and Train the Trainer Perspectives
American Supervisor and Worker’s Survey
Measuring Class Effectiveness in Improved Communications and Train the Trainer Perspectives

1) How was the class’s difficulty level?

<table>
<thead>
<tr>
<th>1) Too basic</th>
<th>2) Basic</th>
<th>3) About Right</th>
<th>4) Difficult</th>
<th>5) Very Difficult</th>
</tr>
</thead>
</table>

2) Do you think this language training improves your ability to communicate with the Hispanic workers?

<table>
<thead>
<tr>
<th>1 = Not helpful at all</th>
<th>2 = Somehow helpful</th>
<th>3 = Moderately helpful</th>
<th>4 = Helpful</th>
<th>5 = Very helpful</th>
</tr>
</thead>
</table>

3) How useful do you consider the following parts of the training program?

<table>
<thead>
<tr>
<th>1 = Not helpful at all</th>
<th>2 = Somehow helpful</th>
<th>3 = Moderately helpful</th>
<th>4 = Helpful</th>
<th>5 = Very helpful</th>
</tr>
</thead>
</table>

1. Training materials (reference sheets and flashcards)
2. Specific questions to Freddy (instructor)
3. Interaction with Hispanic peers on the jobsite
4. Spanish Vocabulary
5. Spanish Sentences
6. Safety at work
4) Back to the beginning of the season and prior to the training, how would you rate your confidence in speaking Spanish to Hispanic workers?

<table>
<thead>
<tr>
<th>1) No confidence</th>
<th>2) Low confidence</th>
<th>3) Some confidence</th>
<th>4) Confidence</th>
<th>5) High confidence</th>
</tr>
</thead>
</table>

5) After recently completing the training how would you rate your present confidence in speaking Spanish?

<table>
<thead>
<tr>
<th>1) No confidence</th>
<th>2) Low confidence</th>
<th>3) Some confidence</th>
<th>4) Confidence</th>
<th>5) High confidence</th>
</tr>
</thead>
</table>

6) Thinking back to the beginning of the season and prior to the training how would have rated your confidence in asking questions to Hispanic workers?

<table>
<thead>
<tr>
<th>1) No confidence</th>
<th>2) Low confidence</th>
<th>3) Some confidence</th>
<th>4) Confidence</th>
<th>5) High confidence</th>
</tr>
</thead>
</table>

7) After recently completing the training how would you rate your confidence in asking questions to Hispanic workers?

<table>
<thead>
<tr>
<th>1) No confidence</th>
<th>2) Low confidence</th>
<th>3) Some confidence</th>
<th>4) Confidence</th>
<th>5) High confidence</th>
</tr>
</thead>
</table>
Please, assess to what extent do you agree or disagree with the following questions

8) The morning training interrupts the day’s productivity of the crew

<table>
<thead>
<tr>
<th>1 = Strongly disagree</th>
<th>2 = Disagree</th>
<th>3 = Partially agree</th>
<th>4 = Agree</th>
<th>5 = Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

9) The training in the morning helps to start the day with a fresher mind

<table>
<thead>
<tr>
<th>1 = Strongly disagree</th>
<th>2 = Disagree</th>
<th>3 = Partially agree</th>
<th>4 = Agree</th>
<th>5 = Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10) The training in the mornings improves your productivity at work

<table>
<thead>
<tr>
<th>1 = Strongly disagree</th>
<th>2 = Disagree</th>
<th>3 = Partially agree</th>
<th>4 = Agree</th>
<th>5 = Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

In terms of the way the training was taught, please assess the following questions:

11) You would describe the 30 minutes-9 modules of the course as:

<table>
<thead>
<tr>
<th>1 = Too short</th>
<th>2 = Somewhat Short</th>
<th>3 = About right length</th>
<th>4 = Somewhat long</th>
<th>5 = Too long</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12) Considering how often you apply what you learned in the training, would you describe the 30 minutes-9 modules of the course as:

<table>
<thead>
<tr>
<th>1 = Not Useful at work</th>
<th>2 = Somewhat useful at work</th>
<th>3 = Sometimes useful at work</th>
<th>4 = Often useful at work</th>
<th>5 = Very useful at work</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13) How much do you desire to receive training next summer?

<table>
<thead>
<tr>
<th>1 = I don’t care</th>
<th>2 = Some training is ok</th>
<th>3 = I would receive training</th>
<th>4 = I want training</th>
<th>5 = I really want training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14) Would you have any concerns with a Hispanic person in the crew together with the American supervisor conducting the training in the mornings for 30 minutes just like Freddy did this summer?

<table>
<thead>
<tr>
<th>1 = It definitely will work</th>
<th>2 = It will work</th>
<th>3 = It barely will work</th>
<th>4 = It will not work</th>
<th>5 = It definitely will not work</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please explain why it would or wouldn’t work?

__________________________________________________________________________________________
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Appendix O. Hispanic Worker
Evaluando la Efectividad de las Clases y Mejoras en Comunicación
Encuesta de Trabajadores Hispanos
Evaluando la Efectividad de las Clases y Mejoras en Comunicación

1) ¿Cómo estuvo el nivel de dificultad de la clase?

<table>
<thead>
<tr>
<th>1) Muy Básico</th>
<th>2) Básico</th>
<th>3) Bien</th>
<th>4) Difícil</th>
<th>5) Muy difícil</th>
</tr>
</thead>
</table>

2) ¿Piensas que estos cursos te ayudan a comunicarte con:

<table>
<thead>
<tr>
<th></th>
<th>1 = No ayuda</th>
<th>2 = Ayuda poco</th>
<th>3 = Ayuda a veces</th>
<th>4 = Ayuda</th>
<th>5 = Ayuda Bastante</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) el supervisor?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) los trabajadores Americanos?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) otros trabajadores Hispanos?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3) Evalúe las siguientes características del entrenamiento

<table>
<thead>
<tr>
<th></th>
<th>1 = No ayuda</th>
<th>2 = Ayuda poco</th>
<th>3 = Ayuda a veces</th>
<th>4 = Ayuda</th>
<th>5 = Ayuda Bastante</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Materiales de entrenamiento (tarjetitas y hojas)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Las preguntas a Freddy (instructor)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. La interacción con los Americanos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Vocabulario en Inglés</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Oraciones en Inglés</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Seguridad en el trabajo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4) Piensa que es el inicio de la temporada de construcción. ¿Cómo calificabas tu confianza al hablar inglés?

<table>
<thead>
<tr>
<th>1) No Confianza</th>
<th>2) Poca Confianza</th>
<th>3) Confianza Intermedia</th>
<th>4) Confianza</th>
<th>5) Alta Confianza</th>
</tr>
</thead>
</table>

5) Ahora, después de finalizar el curso. ¿Cómo calificas tu confianza al hablar inglés?

<table>
<thead>
<tr>
<th>1) No Confianza</th>
<th>2) Poca Confianza</th>
<th>3) Confianza Intermedia</th>
<th>4) Confianza</th>
<th>5) Alta Confianza</th>
</tr>
</thead>
</table>

6) Piensa que es el inicio de la temporada de construcción. ¿Cómo calificabas tu confianza al hacerle preguntas a tu supervisor?

<table>
<thead>
<tr>
<th>1) No Confianza</th>
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<th>3) Confianza Intermedia</th>
<th>4) Confianza</th>
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</tr>
</thead>
</table>

7) Ahora, después de finalizar el curso. ¿Cómo calificas tu confianza al hacerle preguntas a tu supervisor?

<table>
<thead>
<tr>
<th>1) No Confianza</th>
<th>2) Poca Confianza</th>
<th>3) Confianza Intermedia</th>
<th>4) Confianza</th>
<th>5) Alta Confianza</th>
</tr>
</thead>
</table>
Por favor, dime cuán de acuerdo estas con las siguientes preguntas:

8) El entrenamiento por la mañana interrumpe la producción del día.

<table>
<thead>
<tr>
<th>1 = Muy poco de acuerdo</th>
<th>2 = Poco de acuerdo</th>
<th>3 = Parcialmente de acuerdo</th>
<th>4 = De acuerdo</th>
<th>5 = Muy de Acuerdo</th>
</tr>
</thead>
</table>

9) El entrenamiento por la mañana te ayuda a comenzar el día con la mente fresca.

<table>
<thead>
<tr>
<th>1 = Muy poco de acuerdo</th>
<th>2 = Poco de acuerdo</th>
<th>3 = Parcialmente de acuerdo</th>
<th>4 = De acuerdo</th>
<th>5 = Muy de Acuerdo</th>
</tr>
</thead>
</table>

10) El entrenamiento por la mañana ayuda tu productividad.

<table>
<thead>
<tr>
<th>1 = Muy poco de acuerdo</th>
<th>2 = Poco de acuerdo</th>
<th>3 = Parcialmente de acuerdo</th>
<th>4 = De acuerdo</th>
<th>5 = Muy de Acuerdo</th>
</tr>
</thead>
</table>

11) ¿Cómo describes el curso en cuanto a su duración?

<table>
<thead>
<tr>
<th>1 = Muy corto</th>
<th>2 = Corto</th>
<th>3 = Buen tiempo</th>
<th>4 = Algo Largo</th>
<th>5 = Bastante Largo</th>
</tr>
</thead>
</table>

12) Basado en que tan seguido aplicas lo aprendido¿ cómo calificas al curso?

<table>
<thead>
<tr>
<th>1 = No útil en trabajo</th>
<th>2 = Algo útil</th>
<th>3 = A veces útil</th>
<th>4 = Útil</th>
<th>5 = Muy útil</th>
</tr>
</thead>
</table>

13) ¿Qué tanto deseas recibir entrenamiento el siguiente verano?

<table>
<thead>
<tr>
<th>1 = No deseo entrenamiento</th>
<th>2 = Deseo poco entrenamiento</th>
<th>3 = Deseo el entrenamiento</th>
<th>4 = Me gusta el entrenamiento</th>
<th>5 = Me encantaría mas entrenamiento</th>
</tr>
</thead>
</table>
14) ¿Crees que la clase puede ser enseñada por tu supervisor en conjunto con otro hispano? ¿Crees que funcionaría?

<table>
<thead>
<tr>
<th>1 = Definitivamente funcionaria</th>
<th>2 = Funcionaria</th>
<th>3 = No se si funcionaria</th>
<th>4 = No funcionaria</th>
<th>5 = Definitivamente no funcionaria</th>
</tr>
</thead>
</table>

Explique sus razones

__________________________________________________________________________________________
__________________________________________________________________________________________
____________________________________