Implementing and Assessing an Onsite Bilingual Educational Program for Hispanic Nursery Workers in Ohio[1]

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Abstract

Technical training plays a significant role in job retention, advancement and increased remuneration potential. Bilingual content has been shown to improve Hispanics understanding of the subject matter and English skills. Family income is a major stabilization or destabilization force in families. We hypothesized that by providing a series of three bilingual training sessions to Hispanic nursery workers related to American culture/life skills (LS) and/or horticulture skills (HS) that could potentially lead to job advancement opportunities, we could improve workers' self-esteem, work motivation and family-relations. There were three main objectives to this study: 1) to assess the validity of a Spanish translated version of The Index of Family Relations (IFR) and the Rosenberg Self-Esteem Scale (RSE) to evaluate family adjustment problems and self-esteem, respectively, when administered to 97 adult Hispanic nursery employees in seven Ohio nurseries in 2005 and 2006; 2) to determine if nurseries differed in their training needs; and, 3) to define which type of training LS or HS (without LS) could improve family adjustment and/or self-esteem. Ninety seven (43% female, 57% male) of 150 employees originally contacted (35%), completed all three trainings and both pre- and post-testing, which were requirements for inclusion in the analyses. The 35% attrition rate (26% with males, 8% with females, averaged over 7 nurseries) indicates the difficulties in offering even a free, on-farm training program for Hispanic nursery employees. The results of the Chronbach's alpha for the IFR and RSE were 0.8 and 0.68 before and 0.86 and 0.7 after the training, respectively, indicating that the IFR and RSE (> 0.6 required validity) tests were valid and marginally valid, respectively, for this audience. Differences in RSE ($p < 0.0078$) and IFR ($p < 0.0625$) scores were detected using before and after scores across nurseries with non-opposing or identical distributions. The results indicate that self-esteem and to a lesser extent family relations can be improved by providing nursery need specific training and LS training having the greatest effect across nurseries. At one nursery IFR scores above 30 were observed with only LS lowering scores to non-critical. At some sites basic LS trainings seemed critical before successful HS training discharge. This study seems to identify problem employers and could be fundamental in improving employer/worker relationships within the nursery industry.

Index words: nursery work force, labor efficiency, labor retention, Spanish, Rosenberg Self-Esteem Scale, Index of Family Relations, training, horticultural skills, life skills.

Significance to the Nursery Industry

In a recent nine-state survey conducted by The Ohio State University (OSU), it was shown 70% of nursery general laborers were Hispanics, 22% understood English, and the worker turnover rate was (> 52%) over a 5-year period of employment. This poor retention rate is only surpassed by the accommodation and food services industry at 56.4%. Language and cultural barriers between Hispanic laborers and English supervisors hamper productivity, efficiency, safety, training and opportunities for advancement, increased remuneration and retention. The lack of workforce stability becomes an industry and societal issue, especially in Ohio where the nursery/landscape industry is one of the states' largest employers. Significant variability in audience needs between nurseries was found in this study. At some nurseries the employees were in need of basic life skills (LS) training, whereas at other sites advanced horticultural skills (HS) training was possible. Significant differences between nurseries for Index of Family Relations (IFR) and Rosenberg Self-Esteem (RSE) scores were found and an equalizing effect of LS training was evident with both tests, suggesting preliminary trainings in non-HS are required for successful HS training discharge over diverse locations. Field observations (FOs) were also collected at each training program and compiled in a notebook. Positive correlations between nursery manager attitudes (FOs) to training, as demonstrated by training facilities and worker attendance at sessions, and RSE and especially IFR scores before and after trainings were apparent. Future studies should focus on manager attitudes affecting limitations to Hispanic employee training, effects of conversational English training programs on worker retention and productivity and improving motivation in female employees.

Introduction

According to the United States (US) Census (2000) there are 42.7 million Hispanics in the country (33). This amount represents 14% of the total US population. It is calculated that by 2100, one in three people in the US will be Hispanic (5). Hispanics are becoming the main source of labor in many production and service-oriented businesses in the US. The nursery industry is an example of this phenomenon. This

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industry is one of the most important agricultural sectors in the US exceeding $16 billion in sales during 2006 (12).

For years, one of the most significant hindrances to growth in the green industry has been labor (20). Despite over 40% of each nursery unit's production costs, and 20 to 39% of gross sale (3) going to labor, surprisingly little is known about this workforce. Labor shortages [ex. Expiration of H2-B Returning Worker Exemption (i.e. capping H-2B to 60,000 in 2008)] (14), immigration reform ('*our nation's broken immigration policy*') (2) and legal status of employees (ex. Social Security No-match Rule) (23) are reported in every issue of every nursery/landscape trade magazine, newsletter and website; however, there are few studies addressing labor issues in US nurseries. In a recent OSU multi-state survey, 70% of nursery general laborers were Hispanics, aged 18–34, 48.2% female, 22% understood English, 75% earned $6 to 10/hr and laborer retention was less than 50% after five years of employment (1). The highest worker turnover rate in the United States is in the accommodation and food services sector at 56.4% (21). At more than 52% the nursery industry ranks second only to this employment unstable industry. With an estimated cost of $4,000–$7,000 to replace an hourly worker (15), efforts to stabilize the nursery industry workforce are critical to this industry's economic survival. Additionally, in Ohio where the nursery/landscape industry is one of the largest employers, surpassed only by Florida, California and Texas in terms of worth contributed to the state's economy (10), improved economic stability for the industry translates into economic stability for the state. The impact on state or societal stabilization is further realized via the impact of training and advancement opportunities on family income which is a major stabilization or destabilization force in families (7, 9).

There are multiple implications of poverty on children and family life. Parents in poverty find it hard to be consistent in discipline, responsive to children's needs, and to provide a range of socially and educationally stimulating experiences. Previous surveys have indicated employer provided training opportunities are positively received by Hispanic nursery employees, improved worker/manager relations and that the technical training needs within this audience are tremendous (19). In addition, technical training is known to play a significant role in employee retention (40), advancement (18), increased remuneration and productivity (6). Mexican and other Hispanic immigrants have significantly lower levels of education than any other American groups, including their American native-born counterparts (35). Therefore, another potential benefit of employee training might be to reduce the educational gap for Hispanics nursery employees.

Notwithstanding the benefits of employee training to the employer, employee, industry and society, the employer considers the training of Hispanic workers a major undertaking, because of language and culture barriers, labor shortages and increased cost. Stup and Maloney (2003), working with dairy industry managers in Pennsylvania, found those offering training to Hispanics compared to English speaking employees had significantly increased training budgets (31). There is a widely recognized need to develop training programs and publish information in Spanish (19), while the English skills of the Hispanic workers improve. Delivery of information in workers primary language will facilitate learning of information and widespread use of safety practices in the workplace (17). In addition, learning is simply more effective in the native language of the learner (4). Although workers prefer content in Spanish, bilingual content is also well received. The use of bilingual content gives an added value to lectures, increasing industry subject vocabulary in both languages. Bilingual content not only helped Hispanics understand the subject matter, but also helped them learn English (17, 36).

The traditional Hispanic family is founded on the supremacy of the father and the corresponding self-sacrifice of the mother (27). Thus, when the wife works outside the home, the husband may view her employment as due to his own inadequacy as a provider rather than a role and a responsibility to be shared (13). Therefore, stress on the wife working outside the home is elevated. The feelings of male inadequacy have also translated into aggression towards his wife, resulting in a need for government agency intervention or arbitration (Franklin County, OSU Extension, Personal communication). This increase in aggression under these circumstances seemed to be experienced more frequently in Hispanic households than in non-Hispanic (Franklin County, OSU Extension, Personal communication).

We hypothesized that by providing a series of three training sessions to Hispanic nursery workers related to American culture/life skills (LS) and/or horticulture skills (HS), we could help to improve the workers' self-esteem, motivation at work and family-relations. The target audience for this project was male and female Hispanics 18 years and older working in the Ohio nursery industry, with nuclear families in the US. There were three main objectives to this study: 1) to assess the validity of a Spanish translated (A. Acuna) version of The Index of Family Relations (IFR) (11) and the Rosenberg Self-Esteem Scale (RSE) (25) to evaluate family adjustment problems and self-esteem, respectively, when administered to a group of adult Hispanic nursery employees in eight Ohio nurseries in 2005 and 2006; 2) to determine if nurseries differed in their training needs or preferences; and, 3) to define which type of training LS or HS (without LS) could improve family adjustment and/or self-esteem. A self-administered course evaluation (CE) and field observations (FOs) were also collected at each training program with the objectives of determining training preferences, employee perception of usefulness and effect on motivation and the managers' view of training.

Materials and Methods

Eight nurseries with geographic representation from the two major growing regions in Ohio were randomly selected on the basis of the following three criteria. The nursery owners/managers were willing to commit staff time to participate in the three training sessions. Second, the nursery had a sufficient number of Hispanics employed during the summers of 2005 and 2006 to justify trainer time conducting a free, on-farm training program (i.e. minimum of eight workers/site). Third, Hispanic workers had immediate family living with or near the employee in Ohio. This third criterion was considered the most limiting. Previous studies in Ohio had indicated many Hispanic nursery workers were migrants and their families resided out-of-country (19). However, by contacting nursery owners in early spring of 2005, several nurseries with employees matching the criteria were identified and an original test group of 150 employees from 8 nurseries [four in Southeastern (SE) Ohio and four in Northwestern (NW) Ohio] was established.

Seven of the eight nurseries selected completed the training. One SE nursery left the study before testing and trainings began, after delays in start time were experienced due to difficulties in obtaining OSU, Office of Responsible Research Practices (ORRP) (22), Institutional Review Board (IRB) approval in 2005. The SE nursery owner also perceived potential contradictions between their own current training program content and OSU's that could lead to worker confusion, ex. differences in pruning methods. The employer did not want their employees exposed to instruction or information outside of their own. Ninety seven (43% female, 57% male) of the 150 employees (35%) completed all three trainings and both pre- and post-testing, which were requirements to be included in the analyses. A voluntary group of Hispanic workers in each nursery was studied. The size of each group varied from 9 to 37 participants per nursery, according to the size of the nursery and the willingness of the workers to participate as identified by providing written informed consent. All research activities involving human subjects must be reviewed and approved by an IRB in accordance with the OHRP guidelines (22). The IRB also ensures, when required, that human subjects only volunteer to participate in research after providing legally effective informed consent (22**)** *and that the identity of all participants and thus employers must be kept confidential*. Following IRB procedures, each participant filled a consent form in Spanish before the program was initiated. The Spanish consent form was translated by A. Acuña from the English version and completed a required review which was conducted and approved by Dr. D. Long and T. Morgan (OSU, Department of Spanish and Portuguese) and OSU IRB (22).

In each nursery, the group was divided randomly into two sub-groups. Both sub-groups received the three sessions (40 minutes each) of HS, which included basic anatomy and plant development, pruning, and nutrition in woody plants. One of the sub-groups also received three sessions (15 minutes each) of LS topics, which included 'you and your family's needs in the United States', 'social support in your community', and 'communication.' Therefore, two subgroups of with LS or HS (without LS) existed. All the trainings were taught in Spanish with key concepts in English. The HS were selected on the basis of Hispanic employer preferences indicated on a survey conducted in January 2005 at an OSU Nursery Short Course (A. Acuña and H. Mathers, results unpublished). The LS topics were chosen under the guidance of OSU, College of Social Work. The period of time between trainings at each nursery was approximately 1.5 to 2 weeks. The total length of time to complete the three trainings [3(HS) or 3(HS + LS)] per nursery was approximately 50 days. The four nurseries in NE Ohio were visited during summer 2005. Due to delays in IRB approval in 2005, three nurseries in the SE were visited during summer 2006.

Three tests were utilized to measure the impact of the bilingual training programs: IFR, RSE and a CE. The IFR, RSE were completed before and after, and the CE only after training. The IFR is designed to measure the severity of family relationship problems as seen by the respondent viewing the family as a unit (11). Scores can range from 0 to 100 where higher scores indicate greater amounts of family discord. The IFR consists of 25 items asking subjects to assess their own feelings about their quality of family life. The scale includes 'my family gets on my nerves,' 'I feel like a stranger in my family,' 'the members of my family really care about each other', 'I am proud of my family.' Each item is answered on a 5-point scale (1 = rarely or none of the time, to 5 = most or all of the time). Hudson (1982) designed the scale with a 'clinical cutting score' of 30. People who score over 30 generally have been found to have problems in their perception of family relationships. IFR reliability is > 0.90, validity is > 0.60 and the test requires the subjects have a Flesch-Kincaid grade level of 5 (11).

Dr. Morris Rosenburg developed the RSE as a measure of global self-esteem, in 1965 (25). The RSE measures the self acceptance aspect of self-esteem. This scale was created originally for high school students. The RSE is a ten item, four point Likert scale with items answered on a range from 'strongly agree' to 'strongly disagree.' The scale includes statements related to overall feelings of self-worth or self-acceptance, 'I take a positive attitude towards myself;' I wish I could have more respect for myself.' Scores range from 10–30, scores between 15 and 25 are within a normal range; scores below 15 suggest low self-esteem (25). This scale is well known for its reliability and validity, and is frequently used to measure self-esteem. The scale has also been used to show some correlation of self-esteem with work-related attitudes (29). No official Spanish version of the IFR or RSE existed prior to this study. A. Acuña translated the English version and a required review was conducted and approved by Dr. D. Long and T. Morgan (OSU, Department of Spanish and Portuguese) and OSU IRB. Both tests were selected under the guidance of OSU College of Social Work.

A CE was completed after the program. We were interested in what topics were important to workers, whether three training sessions were sufficient to learn about their jobs, and whether work attitudes were changed by training. Answers to the questions from the CE were analyzed using frequencies in percentages of the total number of workers who responded. FOs were also collected at each training program and compiled in a notebook. Observations included but were not limited to, information collected in one-on-one conversations, interactions of individuals with other course participants, manager attitude about training, training facilities available and nationality of the participants.

Data was collected, classified and analyzed by nursery, treatment (with and without LS) and gender of the participant using the statistical and data management package SPSS (®2006 SPSS Inc. Chicago, IL, SPSS.com). A paired t-test was calculated over treatment (with or without LS) and nursery for IFR and RSE, using total scores before and after the training. In addition, a one-tailed t-test was performed for each nursery on IFR scores, testing the hypothesis that IFR difference scores (after training minus before training initiated) would be lower (indicate improvement) for those who received the LS training than for those who received no LS training. A one- tailed t-test was also calculated to test the hypothesis that RSE difference scores would be higher for those receiving LS training versus those receiving no LS training. An independent t-test was calculated for IFR and RSE scores using gender as a variable using mean scores before and after trainings. When t-tests were employed the Student's test was used, with the exception of when $N <$ 50 then a Wilcoxon Matched-Pairs Signed-Ranks test was implemented for the smaller sampling. For IFR and RSE tests a Chronbach's alpha was calculated to measure reliability (as values approach 1.0, reliability increases). According to Springer et al. (2002), reliability is concerned with a desired

reproducibility of scale scores (30). A tool is said to be reliable to the extent that it performs consistently during repeated use. Nurseries were graphed in geographic order from most extreme NE to SW, so that correlations (if present) could be determined in graphing.

Results and Discussion

The 35% training attrition rate over the 8 nurseries originally contacted for the study and 24% averaged over the 7 completing nurseries (26% with males, 8% with females) was indicative of the difficulties in offering even a free, on-farm training program for Hispanic nursery employees. Previous programming with Hispanic employees has shown a major limitation to training is managers' attitudes. Only exceptional employees that managers believe 'merit' exposure to seminars, bus tours, newsletters or on-farm visits receive any extension contact (19). In this study, due to the established selection criteria, we had exposure to those who did not 'merit' the training, in the owner's opinion. One of the largest factors involved in participant training attrition rates was managers requiring the services of employees elsewhere on the nursery (FO determinations) on scheduled training days and therefore the workers were unable to attend all three sessions (a requirement for inclusion in the analyses). Training attrition was highest at nursery four with 73% of men and 50% of women unable to complete the program. The second highest rate of training attrition was nursery six, with 29% of men and 7% of women unable to complete the program.

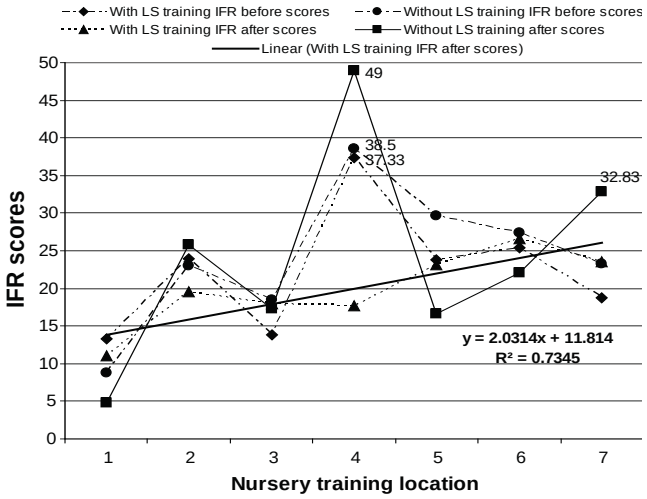

Fig. 1. IFR (Index of Family Relationship) mean scores before and after trainings and separated by training type i.e., {3 |(45 minute sessions) horticultural skills (HS)| *or* 3 |HS + (15 minute sessions) life skills (LS)|} at seven Ohio nurseries during the summers of 2005 and 2006. With life skills and after training showed a linear trend ($R_2 = 0.7345$) (calculated by Excel) and indicating an increase in IFR scores from north to south of 2.0314 at each nursery evaluated. Differences in IFR scores across nurseries with non-opposing or identical distributions using before and after scores were significant at $p \leq 0.0625$. Only workers who completed the three sessions and the IFR test before and after the trainings with fewer than three missing questions were considered in the analysis. IFR test scores of 30 and above are indicative of problems in family relations; data values above 30 are labeled. Scores can range from 0 to 100 with higher scores indicate greater amounts of family discord (11).

Generally, training attrition was significantly less for women. With the exception of nursery four and six, all women at other sites completed the training. The lowest training attrition rate was found at nursery three (0%), followed by nursery one (8%). These were also the only two nurseries with only male subjects participating in the study. We speculate that the same factors that caused the high training attrition rate in this study may contribute to the high (52%) employment attrition rate for the industry, i.e. insignificance placed on training for advancement opportunities, exclusion from opportunities to learn beyond the employers' instructions/information, removal from scheduled events and inflexibility of employer.

The results of the Chronbach's alpha to test validity for the IFR and RSE were 0.8 and 0.68 before and 0.86 and 0.7 after the training, respectively. Indicating that the IFR test was valid and the RSE marginally (> 0.6 required validity) for this audience. However, both tests had lower validity than with English audiences and difficulties stemming from cultural differences between American and Hispanic society were observed during testing (FOs). The only report of the IFR with Hispanics is an English version with bilingual adult Hispanic college students (37). The standard deviation observed in the Weisskirch study (2006) was 10.15 (in a scale from 0 to 100) and the Chronbach's alpha was 0.92, indicating the IFR was a valid test for this English speaking audience (37). In our study however, the standard deviation was much higher (up to 19.24), and the Chronbach's alpha was lower. Hispanics employees had difficulty answering certain IFR questions (FOs), which we feel related to the cultural differences between Americans and Hispanics. The workers especially had problems with statement number six in the IFR, 'I really do not care to be around my family.' Family is so important in Hispanic cultures (8, 26, and 28) that the question prompted many workers to ask, '*What does this mean?*', as this was an unfamiliar concept.

The RSE has been widely used in Hispanic populations but always in its English version (16, 24, 32, 34, and 37). The Chronbach's alpha values obtained for RSE in Hispanic populations have had moderate values ranging from 0.76 (34) to 0.8 (16, 24, 32, 37). For our study the RSE, Chronbach's alpha values of 0.68 and 0.7 are in the lower range compared to English speaking Hispanics.

Significant differences between nurseries for IFR and RSE scores were found and the stabilizing or equalizing effect of LS training was evident with both tests (Figs. 1 and 2, respectively) possibly suggesting preliminary trainings in non-HS are required prior to successful HS training over diverse locations. Variability between nurseries decreased the ability of the IFR and RSE to assess differences between LS or HS (without LS) training assessed over nurseries. Employee training attrition leading to smaller sample sizes also contributed to lack of test precision. However, over nurseries comparing before and after scores, differences in RSE ($p < 0.0078$) and IFR ($p < 0.0625$) scores (calculated by Wilcoxon Matched-Pairs Signed-Ranks Test) were detected. In the Wilcoxon test opposing trends are removed [i.e. IFR, nursery three and seven removed (Fig. 3); RSE, nursery four, six, and seven removed (Fig. 4)].

Nursery four and to a lesser extent nursery five were the only sites to show differences in IFR scores due to training type (Fig. 1). Generally, training with LS had a significant impact on improving IFR scores but the effect was greatest

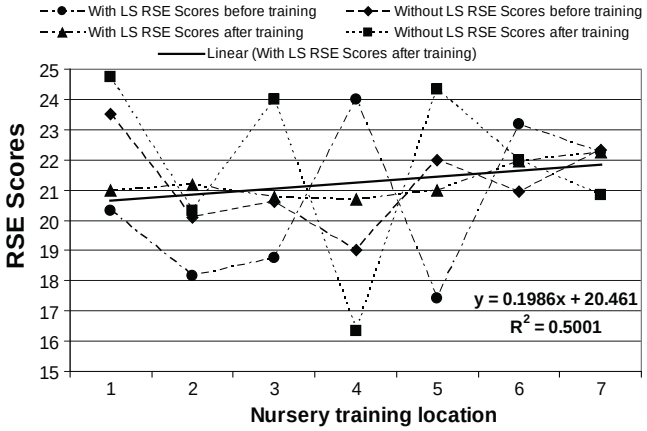

Fig. 2. RSE (Rosenberg Self Esteem) mean scores before and after trainings and separated by training type, i.e., that consisted of {3 [(45 minute sessions) horticultural skills (HS)] *or* 3 [HS + (15 minute sessions) life skills (LS)]} at seven Ohio nurseries during the summers of 2005 and 2006. Nurseries are arranged from the furthest NE location to the furthest SW. Differences in RSE scores across nurseries with non-opposing or identical distributions using before and after scores were significant at $p \leq 0.0078$. Only workers who completed the three sessions and the RSE test before and after the trainings with fewer than three missing questions were considered in the analysis. RSE test scores can range from 10–30, scores between 15 and 25 are within a normal range; scores below 15 suggest low self-esteem (25).

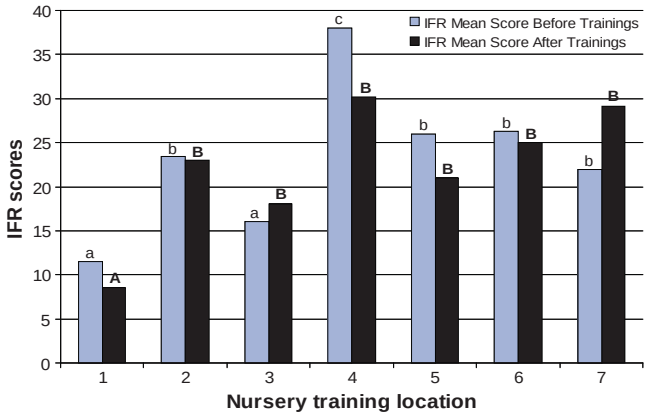

Fig. 3. IFR (Index of Family Relationship) mean scores before and after trainings averaged over training type, i.e., {3 [(45 minute sessions) horticultural skills (HS)] *or* 3 [HS + (15 minute sessions) life skills (LS)]} at seven Ohio nurseries during the summers of 2005 and 2006. Nurseries are arranged from the furthest NE location to the furthest SW. Different letters signify the least significant difference (LSD) p = 0.05 within training type between nurseries, lower case before training and upper case after. Only workers who completed the three sessions and the IFR test before and after the trainings with fewer than three missing questions were considered in the analysis. IFR test scores of 30 and above are indicative of problems in family relations. Scores can range from 0 to 100 with higher scores indicate greater amounts of family discord (11).

at nursery four. Life skills training on IFR scores was the only evaluation time and method to show a linear trend (R_2 = 0.7345) and indicating an increase in IFR scores from NE to SW of 2.0314 at each nursery evaluated (Fig. 1). Horticultural training (without LS) improved IFR scores at nursery five but had the opposite effect at nursery four and to a lesser extent seven (Fig. 1). We feel this effect at nursery four was due to the tremendous needs at this nursery that were far beyond the scope of horticultural training (FOs). In some agricultural industries migrant labor only exists in areas with established Hispanic populations; however, this is not true in the nursery industry. The community and communication support offered by the established population of the area is lacking increasing the need for LS training. The findings at nursery four further support this assumption as nursery four was the most geographically isolated nursery from established Hispanic populations.

Hudson (1982) designed the IFR scale with a 'clinical cutting score' of 30 (11). IFR test scores > 30 are indicative of problems in family relations (11). Nursery four had the highest (i.e. worst) IFR scores before and after trainings, with before scores significantly higher than other sites (Fig. 3). Nursery four IFR scores of 38.5 and 37.3 (without and with LS before training, respectively) and 49 after training without LS only decreased to non-critical levels after LS (17.67) (Fig. 1). Nursery four was also the nursery with the greatest improvement in IFR scores with LS training and the least improvement without (Fig. 1). Nursery seven had mean scores above 30 after training without LS (Fig. 1). Nursery three and seven had lower IFR scores before LS training indicating an opposing trend to the other five nurseries where LS training reduced (i.e. improved) IFR scores (Fig. 1). Nursery five had a score of 30 without LS training before the sessions. Nursery five, one and six showed significant improvements in IFR scores with HS (without LS) training, with the greatest improvement with nursery five. At these nurseries the basic needs of the employees were less (FOs) and more advanced intervention beyond life skills, potentially leading to advancement, seemed to be achievable. Nursery one had significantly superior IFR scores before and after trainings compared to all sites (Fig. 3).

All the RSE scores before and after the program were in the normal range (15 to 25) (Fig. 4). None of the scores were below 15 (indicating low self-esteem). Mean differences (MDs) were calculated by subtracting the after training scores from the before and tested using a one-tailed t-test for each nursery. These MDs indicated at nursery two, workers who received LS training had significantly better scores than those who did not (Table 1). Nursery two and five had low RSE scores before trainings; however, these were not significantly different from other sites (Fig. 4). After the trainings both nurseries improved their scores, with nursery five becoming comparable to nurseries one, three and six and significantly higher than nursery four (Fig. 4). Nursery four and seven showed a counter trend versus other sites with nursery four having significantly lower RSE scores after training versus other sites. Those workers scored better after the program than workers who did not receive LS training (Table 1). However, at nursery six, the results were opposite; workers who received HS training had better scores than those who received only LS training. At nursery six perhaps workers thought more advancement opportunities were possible with horticultural training, again illustrating the marked differences in needs between nurseries.

Mathers (2003) found that in Ohio, the backgrounds of employees were more diverse and included people from Guatemala, Puerto Rico, Brazil, Nicaragua, and Mexico (19). This diversity was evident in this current study as well (FOs).

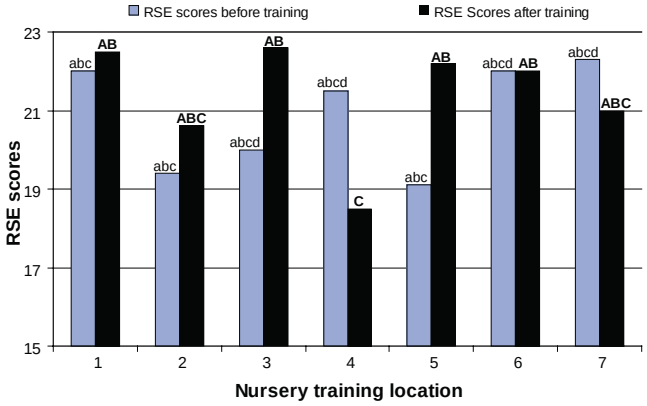

Fig. 4. RSE (Rosenberg Self Esteem) mean scores before and after trainings averaged over training type i.e., that consisted of {3 [(45 minute sessions) horticultural skills (HS)] *or* 3 [HS + (15 minute sessions) life skills (LS)]} at seven Ohio nurseries during the summers of 2005 and 2006. Nurseries are arranged from the furthest NE location to the furthest SW. Different letters signify the least significant difference (LSD) p = 0.05 within training type between nurseries, lower case before training and upper case after. Only workers who completed the three sessions and the RSE test before and after the trainings with fewer than three missing questions were considered in the analysis. RSE test scores can range from 10–30, scores between 15 and 25 are within a normal range; scores below 15 suggest low self-esteem (25).

Cultural, language dialect and experience level seem to have created significant differences that need to be considered for the Ohio audience in the delivery of technical information. It has been recognized that nationality and keeping people from the same country within a crew will result in better worker rapport (39). In this study we found certain nationalities clustering in certain nurseries and regions of the state (FOs). Mathers (2003) also found during the surveys that in certain regions of Ohio's Latino workers appeared to have much less experience in the U.S. and the nursery industry than in other states (19). This was evident in this study as well and created significant difference in the needs at the various nursery sites.

Wilson (2006) indicates the best employees to train are those who have a passion for training and have worked their way up in the field (38). These are employees who have demonstrated they understand the connection between training and advancement. Based on Wilson's observations (38) and our FOs, we speculate nursery four and seven employees had the least interest in training, because employees observed few opportunities for advancement with their current employer. Again, managers at nursery four seemed to have the most negative attitude toward training (FOs). We feel this impacted the employees in terms of lack of interest. The negative attitude was exemplified in provision of the worst training facilities of all seven nurseries, constantly removing employees during and before training sessions, and observed poor foreperson attitude before the sessions began. Obviously, the owners of all seven nurseries that participated in this study were interested in training their Hispanic employees; however, the manager's commitment to the program at some sites was marginal, potentially indicating a communications gap between owners and managers regarding the relevance of training.

The Hispanic employees at nursery one and three were the most inquisitive and technically advanced (FOs) of any group evaluated in 2005 or 2006. Nursery one and three also had the best training facilities (FOs) and took the training opportunities presented the most seriously, with demonstrated better attendance than any of the five other sites. The results seem to indicate that self-esteem (Fig. 2) and to a lesser extent family relations (Fig. 1) can be improved by providing training specific to the needs of the audience with LS training having the greatest effect across nurseries. Greater improvement in IFR scores could also suggest that the RSE test was not as reliable as the IFR, for this audience and concurring with the results of the calculated Chronbach's alpha values and values reported by other researchers in English speaking audiences.

Table 1. RSE (Rosenberg Self-esteem scale) mean difference scores (calculated by subtracting the RSE test post-training scores from the RSE test pre-training scores) trainings consisted of three (40 minute) horticultural skills (HS) + three (15 minute) life skills (LS) or three HS trainings without LS. The one-tailed t tests are calculated on the mean difference scores for each treatment in each Ohio nursery. The difference in number of workers between nurseries is due to the size of the nursery and employee willingness to participate in this voluntary study. Differences in numbers of participants between with LS and without LS training were due to the worker turnover, worker commitment elsewhere by employer and absenteeism within each nursery.

Nursery	Treatment	Number of workers[z]	Mean difference	Standard deviation of the difference	T value	p value one tailed
1	With LS training	6	0.67	3.07	–0.34	0.37
	Without LS training	4	1.25	0.94		
2	With LS training	6	3.00	3.58	1.66	0.05
	Without LS training	10	0.20	3.08		
3	With LS training	4	2.00	3.74	–0.60	0.28
	Without LS training	5	3.40	3.29		
4	With LS training	3	–3.33	4.93	–0.20	0.44
	Without LS training	3	–2.67	5.50		
5	With LS training	5	3.60	4.98	0.39	0.35
	Without LS training	3	2.33	3.05		
6	With LS training	19	–1.21	5.26	–1.43	0.08
	Without LS training	16	1.06	3.90		
7	With LS training	4	0.00	2.16	0.52	0.31
	Without LS training	6	–1.50	5.36		

[z]Only workers who completed the three sessions and the RSE test pre- and post- trainings with fewer than three missing questions were considered in the analysis. RSE test scores of 15 and below are indicative of low self-esteem. Higher scores equal higher self-esteem.

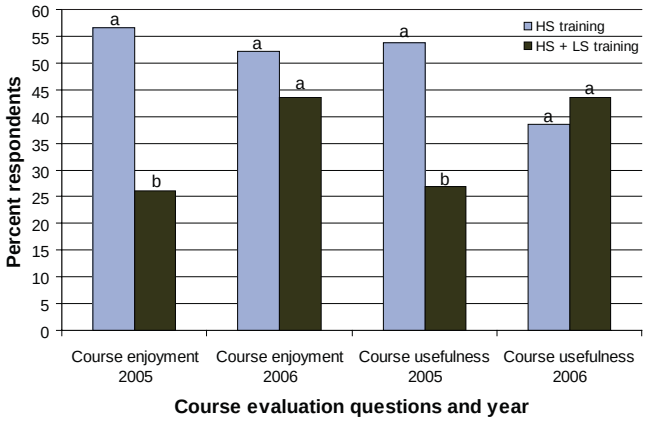

Fig. 5. Course evaluation percent responses for two questions administered after trainings averaged over nurseries for training type i.e., trainings consisted of {3 [(45 minute sessions) horticultural skills (HS)] *or* 3 [HS + (15 minute sessions) life skills (LS)]} at seven Ohio nurseries during the summers of 2005 and 2006. Different letters signify the least significant difference (LSD) p = 0.05 between training type within year and question.

2005 course evaluation results (Fig. 5) indicated employees thought HS training was the most enjoyable and most useful to them in their current positions (Fig. 5) and 76% of participants either agreed or strongly agreed that their attitude towards work had improved after these trainings (results not shown). Follow-up surveying also indicated significant advancement opportunities occurred for those that took part in the training sessions, with those participating expressing more competence about their jobs (data not shown). In 2006, four additional questions were included in the course evaluation. A total of 85.44, 83.6 and 75.92% of the participants agreed or strongly agreed they learned new things, learned things that made them feel more competent about 'my job' and their job attitudes changed after the program. Surprisingly, 58.1% of the workers surveyed thought that three horticultural classes were enough (data not shown). Perhaps this result reflects the employees' lack of exposure to the nursery industry and appreciation of its complex nature. No significant differences were found between gender for IFR or RSE before and after the trainings. This study seems to identify problem employers and could be fundamental in improving employer/worker relationships within the nursery industry.

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