

Performance of ESL Students on a State Minimal Competency Test¹

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The Hawaii State Test of Essential Competencies (HSTEC) is a minimal competency test which students must pass to graduate from high school. This paper focuses on differences in HSTEC (Form G) performance between 300 ninth grade students of limited English proficiency (SLEP) and the 318 ninth grade students used in the original norming sample (NORM group). The analyses indicate that SLEP students form a distinctly separate population from the NORM group ($F = 206.21, p < .01$) with SLEP students scoring 26.14 points lower than the NORM group on average. At the same time, those subtests which the SLEP students found to be more difficult were correspondingly difficult for the NORM group. Though there were no significant differences found among the various SLEP group ethnicities, there were significant differences among the HSTEC subtests and for interactions between ethnicity and the subtests. The results are discussed in terms of language training that some of the SLEP students should receive so that they can demonstrate their true abilities on the HSTEC.

INTRODUCTION

The effects of language and culture on standardized test scores has been a controversial issue in the educational testing literature for years (e.g., Kennedy, 1972), and it remains an important concern as large numbers of immigrant children in the United States are coming up against various types of standardized tests (e.g., NCTPP, 1990; Schmidt, 1990). This is especially true in the State of Hawaii, where the mixing of many different cultures has been a sociopolitical trend for over a century.

The *Hawaii State Test of Essential Competencies (HSTEC)* is a minimal competency test that has been administered in the State of Hawaii since 1983. The HSTEC is a requirement for graduation in Hawaii in that it allows students to demonstrate satisfactory

performance in 14 of the 15 Essential Competencies (see description of the academic areas covered in the Materials section of this paper below) that must be passed before a diploma will be issued in the state. The fifteenth competency is in Oral Communication, which is assessed by teacher observation. Students first take the HSTEC in the ninth grade and, if they do not pass, they may take it again in the tenth, eleventh, and twelfth grades. Alternatively, students may choose to pass performance tests administered by Essential Competencies Certification Centers.

The research reported in this paper explores differences in the performance of various subgroups of ESL students found within the population of students who normally take the test. ESL students in this population are represented by a group called students of limited English proficiency (SLEP). Membership in this SLEP group is restricted to anyone who has been identified by the state (based on native language and/or place of birth [DOE, 1982]) as a nonnative speaker of English and who is therefore currently enrolled in the SLEP program of supplementary instruction in English language skills.

The overall purpose of this study was to determine both whether there are differences in performance between SLEP students and the overall norm group taking the test and whether there are differences among the major nationalities found within the SLEP group. It was also hoped that the underlying causes of any such differences could be identified to some extent. To those ends, the project was organized around the following research questions:

- 1) What are the descriptive statistics for the HSTEC and each of its Essential Competency subtests for ninth grade SLEP students and for a ninth grade norm group sampled from the entire population?
- 2) Do SLEP students constitute a group significantly different from the NORM group in terms of their overall HSTEC scores?
- 3) Are there any significant mean differences among ethnic groups (as determined by self-reported ethnicity) in the SLEP sample?

METHOD

Subjects

In May 1989, 19,312 students took the HSTEC Form G (DOE, 1989). Of these students, 10,858 were in the ninth grade; 6,277 were in the 10th grade; 1,823 were in the 11th grade; 38 were in the 12th grade (136 did not report their grade level). This is the population of students to which the results of this study can reasonably be generalized--a population made up of all grade levels in all of the high schools on the major islands in the Hawaiian archipelago.

The analyses in this study focused on the performances of ninth grade students since this was the largest group of students and was the only group taking the HSTEC for the first time. If differences in performance existed between SLEP students and the norm, it was expected to be clearest at the ninth grade level because those students who passed the HSTEC in the ninth grade would not be taking it again in subsequent grades.

The goals of this study involved making comparisons, in one way or another, between NORM group performance and SLEP performance. The NORM group data were based on all ninth grade students included in the final 1987 field test results for Form G. These NORM group students, numbering 318, had been selected from six high schools across the state such that they formed a stratified sample (in terms of sex and ethnicity) of the entire population. This sample included 51.9% males and 48.1% females from the following ethnic backgrounds: Filipino (23.5%), Hawaiian (20.6%), Japanese (15.6%), White (17.8%), and Other (22.5%). These ethnicities were based on self-reported data.

SLEP students account for a relatively small proportion of the entire population in the Hawaii schools and are spread fairly thinly across the state. To obtain a representative sample of such students, all SLEP students enrolled in the ninth grade at 16 different high schools were selected from the group of 10,858 ninth graders who took Form G in May 1989. This SLEP group was selected so that rural/urban and large/small high schools were represented from each of the main islands. This sample, numbering 300 in total, was selected to be representative of the approximately 1,200 ninth grade SLEP students who took Form G. The SLEP group included 54.3% males and 45.7% females from the following

ethnic backgrounds: Chinese (15%), Filipino (41%), Indochinese (6%), Korean (9%), Samoan (14.7%), and Other (14.3%).

Materials

The original forms of the HSTEC were developed by the Educational Testing Service, and other versions have subsequently been supervised by the Northwest Regional Educational Laboratory. Form G was used because it was one of the two current forms being administered statewide, and data were therefore readily available. It contained 140 multiple-choice items including ten items for each of the following Essential Competencies (ECs):

- 1) Read and use printed materials
- 2) Complete commonly used forms
- 3) Demonstrate writing skills
- 4) [Not tested--Oral competency assessed by teacher observation]
- 5) Use computational skills
- 6) Use measuring devices
- 7) Interpret common visual symbols
- 8) Reach reasoned solutions
- 9) Distinguish fact from opinion
- 10) Use resources for learning
- 11) Identify effects of health abuse
- 12) Identify occupational requirements
- 13) Knowledge of U.S. government
- 14) Knowledge of political processes
- 15) Knowledge of citizen rights

The test was found to have an internal consistency reliability (K-R20) of .96 for the total scores and subtest estimates ranging from .49 to .84 when administered to the ninth graders (Arter, Deck, & Nickel, 1987). The validity of the test was supported by clear-cut item specifications and content analysis of the test forms.

Procedures

All of the students included in this study took the HSTEC under similar large-scale testing conditions. In other words, test booklets, number two pencils and machine-scorable answer sheets were used everywhere. Though Form G of the HSTEC was

administered at various times and at diverse sites across the state, all students involved in this study took it as part of the Hawaii State Department of Education's testing program. Thus the testing conditions for the NORM group and SLEP students can be assumed to have been about the same across the state.

Analyses

The demographic data and test results were recorded for each student on an IBM AT computer using a spreadsheet program. All statistics were calculated using either the *ABSTAT* (Anderson-Bell, 1989) or *SYSTAT* (Wilkinson, 1988) statistical analysis programs. The analyses included descriptive statistics, frequencies, and percentages, all of which were calculated to help in describing the main groups and subsamples. Several *F* tests were used to compare the NORM and SLEP groups: one for mean differences and another to compare the variances produced by the two groups. Two-way repeated-measures analysis of variance (ANOVA) procedures were used to make other mean comparisons for the fourteen essential competencies (ECs) as the repeated factor and SLEP group ethnicities as the other factor. The alpha level for all statistical decisions was set at $\alpha \leq .01$.

RESULTS

This section will provide a straightforward technical report of the results of this study, while the Discussion section that follows will provide less technical explanations framed as direct answers to the original research questions posed at the outset of this paper.

Descriptive Statistics

The overall results from the analysis of scores on the HSTEC Form G are shown in Table 1 for the NORM sample students and SLEP students. The first two rows of these descriptive statistics show the number of students (*N*) who took the examination and the number of items (i.e., test questions) on each form. The mean, median, standard deviation (SD), minimum (Min) and maximum (Max) scores, range, reliability (K-R20), and standard errors of measurement (SEM) are reported in the rows that follow:

TABLE 1
Summary Descriptive Statistics for NORM and SLEP Samples
for Ninth Grade Only

Statistic	Norm Sample	SLEP Students
N	318	300
Items	140	140
Mean	89.60	63.46
Median	94.00	62.00
SD	25.40	19.02
Min	7.00	10.00
Max	132.00	127.00
Range	126.00	118.00
K-R20	.96	.92
SEM	5.00	5.41

Starting with central tendency, Table 1 shows that there was a 26.14 point difference between the means for the two groups. This difference can safely be attributed to other than chance factors because it was found to be statistically significant using the F ratio on a one-way ANOVA procedure ($F = 206.21$, $p < .01$, $df = 1, 616$ [not shown in Table 1]). More importantly, this difference in means was meaningful because it was large.

In terms of dispersion, Table 1 also reveals that the standard deviations, minimum scores, maximum scores, and ranges all indicate that the performances of the SLEP students were somewhat more homogenous than those for the NORM sample, i.e., the SLEP students' scores were not generally as widely distributed as those for the NORM group. The differences in variances between these two groups were also tested using the F ratio ($F = 1.7834$, $p < .01$, $df = 317, 299$ [not shown in Table 1]) and found to be significantly different. Thus the observed differences in the score variances are probably due to systematic (other than chance) factors.

In both groups, however, the distributions appear to be approximately normal, i.e., both are reasonably well centered and have ample room, above and below the mean, for at least two standard deviations. If there is any problem at all in the distributions, it is that there may be a slight negative skew (or ceiling effect) in the distribution of scores for the NORM sample. These distributions are mentioned here because normal distribution is an assumption of the statistical analyses that follow.

It is also worth noting in Table 1 that the reliability for the SLEP students was slightly lower than that for the NORM group

and that the SEM was correspondingly higher. Regardless of this small difference in reliability, the test appears to be acceptably reliable for both groups.

One observation that surfaced early in this study was that some members of the SLEP group were passing most of the HSTEC subtests and could be presumed to be within easy range of passing the remaining subtests during the tenth, eleventh, or twelfth grades. In order to further study the levels of performance among the SLEP students, their previously assigned Department of Education (DOE) English proficiency ratings were examined. These proficiency ratings were based on scores either from the *Language Assessment Scales* (Avila & Duncan, 1977) or *Basic Inventory of Natural Language* (Herbert, 1979), which were converted to a common scale (DOE, 1982).

At the outset of this study, it also seemed apparent that those students who had received a DOE proficiency rating of Non-English Proficient (NEP) were a distinct group which scored much lower than all other students within the SLEP category (see Table 2). As such, the NEP students were initially treated as a separate group. The remaining SLEP students were divided into groups based on the number of ECs that they passed as follows: the HIGH group (those who passed 10 or more of the 14 EC subtests, the MIDDLE group (those who passed between five and nine ECs, and the LOW group (students who passed between zero and four ECs). To pass any given EC, a 70% score was required (or seven correct answers out of the ten questions) on that subtest. The performances of the HIGH, MIDDLE, and LOW groups as well as the NEP students are reported for each EC in Table 2. The mean, standard deviation, and number of students are reported in each case.

Table 2 shows how consistently the NEP student performance resembles that of the LOW group more than it does that of the HIGH and MIDDLE groups. This similarity in performance may indicate that the LOW and NEP students form a single, more homogeneous group that is having considerable difficulty with the HSTEC. Table 2 also reveals how the MIDDLE and HIGH groups perform incrementally better than the lowest two groups on every subtest, and that the HIGH group performs better than the NORM group on all but two of the subtests. These results indicate that not all of the SLEP students are at risk of failing the HSTEC. The identification of those students who are likely to fail and prediction of their HSTEC performances are discussed elsewhere (J.D. Brown, 1990).

TABLE 2
 Characteristics of the SLEP Subgroups on Individual Essential Competencies (ECs)

SUBGROUP Statistic	EC1	EC2	EC3	EC5	EC6	EC7	EC8	EC9	EC10	EC11	EC12	EC13	EC14	EC15
NORM SAMPLE (N=318)														
Mean	7.20	7.60	6.20	6.30	6.60	7.00	5.70	5.90	7.00	7.40	6.50	5.40	5.00	5.80
SD	1.70	2.00	2.20	2.40	2.20	2.10	2.40	2.90	2.70	2.80	2.70	2.60	2.40	2.40
HIGH SLEP (N=42)														
Mean	7.36	7.52	6.17	7.14	6.60	7.00	5.83	5.76	7.67	7.67	7.21	6.02	5.71	6.38
SD	1.36	1.12	1.90	1.92	1.98	1.50	1.49	1.94	1.17	1.49	1.26	1.46	1.47	1.86
MIDDLE SLEP (N=92)														
Mean	5.59	6.38	4.66	5.77	4.91	6.23	4.22	4.43	6.09	5.85	5.89	4.62	3.93	4.82
SD	1.60	1.63	1.54	2.41	1.97	1.57	1.52	1.85	1.43	1.77	1.89	1.50	1.44	1.49
LOW SLEP (N=113)														
Mean	4.21	4.49	3.58	3.02	3.56	4.16	3.17	2.94	3.73	4.39	3.58	2.95	2.81	3.42
SD	1.65	1.64	1.53	1.78	1.74	1.69	1.65	1.61	1.82	1.91	1.70	1.54	1.34	1.63
NEP (N=53)														
Mean	3.98	4.15	3.13	3.72	4.11	4.55	3.36	3.30	3.72	3.92	3.17	2.68	2.89	3.94
SD	1.45	2.18	1.52	2.42	2.02	2.10	1.77	1.70	1.93	1.97	1.76	1.63	1.61	1.73

The Effects of Ethnicity on HSTEC Performance

Another set of analyses examined ethnicity and differential performance on the 14 Essential Competencies. The purpose of these analyses was to discover any existing patterns that might point to contrastive cultural or language problems amenable to remediation. To that end, descriptive statistics were calculated for each ethnic group. Then the means of the ethnic groups on each of the Essential Competencies were analyzed for significant differences.

Overall Comparisons of Ethnic Groups

Table 3 shows the means, standard deviations, and number of subjects for each ethnicity. All ethnicities were identified by self-reported data on place of birth, first language, and language spoken at home:

TABLE 3
Descriptive Statistics for Ethnicity Groupings

ETHNICITY	Mean	SD	N*
Chinese	66.9333	18.4507	45
Indochinese	60.6842	14.9780	19
Korean	66.2963	21.1348	27
Filipino	62.9024	18.2251	123
Samoan	58.9773	17.2499	44
Other**	58.7083	20.6850	24

*Total N is less than 300 due to missing data

**It was felt that ethnicities with very small samples (of 5 or less) might not be representative of the groups involved.

Ethnic Groups and Essential Competencies

To examine the performances of the various ethnic groups in more detail, a two-way repeated-measures analysis of variance procedure was performed with subtest scores as the dependent variable and the following two independent variables: Essential Competencies (ECs are a repeated factor with 14 levels) and ethnicity (ETHNICITY is a grouping factor with six levels). The results of this ANOVA are shown in Table 4:

TABLE 4
Two-Way Repeated-Measures ANOVA Results for Essential
Competencies (ECs) by Ethnicity

SOURCE	df	SS	MS	F	p
BETWEEN GROUPS	281	6858.47			
ETHNICITY	5	149.36	29.8723	1.2289	0.2957
GROUPS WITHIN ETHNICITY	276	6709.11	24.3084		
WITHIN GROUPS	3666	10566.80			
ECs	13	935.46	71.9584	28.1466	0.0000
ECs x ETHNICITY	65	458.37	7.0518	2.7583	0.0000
ECs x GROUPS WITHIN ETHNICITY	3588	9172.94	2.5566		
TOTAL	3947	17913.80			

As can be seen in Table 4, there is no significant difference between groups due to ethnicity, while significant F ratios were found within groups for the ECs as well as for the interaction effect of the two variables (ECs x ETHNICITY). That the differences due to ethnicity (on ECs combined) were not significant indicates that any differences observed among the means for the different ethnic groups can be interpreted as due to chance alone. The significant mean differences found among the ECs implies that at least some of the mean differences found among the various ECs (for all ethnicities combined) were different on the basis of something other than chance. The significant interaction effect between ethnicities and ECs indicates that some ethnicities scored relatively higher on some of the ECs while other ethnicities scored relatively higher on other ECs to the degree that the patterns are probably due to other than chance factors.

Descriptive statistics for the comparisons being made between Essential Competencies and ethnicity groupings are reported in Table 5. The first set of statistics is for the ECs when calculated across all ethnic groups. The second set is for ethnicities when calculated for all ECs:

TABLE 5
Descriptive Statistics for Essential Competencies and Ethnicity Groupings*

FACTOR	LEVEL	Mean	SD	N
ECs				
	EC1	4.96809	1.91892	282
	EC2	5.42199	2.06546	282
	EC3	4.12057	1.82304	282
	EC5	4.53191	2.65462	282
	EC6	4.44681	2.10887	282
	EC7	5.21631	2.02810	282
	EC8	3.82624	1.81775	282
	EC9	3.82624	1.99330	282
	EC10	4.97163	2.21751	282
	EC11	5.09574	2.11621	282
	EC12	4.68085	2.27572	282
	EC13	3.80496	1.91294	282
	EC14	3.54610	1.74117	282
	EC15	4.29433	1.90576	282
ETHNICITY				
	Chinese	4.78095	2.14934	45
	Indochinese	4.33459	1.98411	19
	Korean	4.73545	2.32479	27
	Filipino	4.49303	2.10536	123
	Samoaan	4.21266	2.04945	44
	Other	4.19345	2.15547	24

*The statistics for the interactions of ECs and ETHNICITY are given in Table 6.

The means for each ethnic group on each of the ECs are shown in Table 6. The corresponding means for the NORM group are also given at the top of the table for comparison purposes. The overall trend is about the same for all of the ethnic groups, i.e., the subtests which were most difficult for one ethnic group (i.e., ECs 8, 9, 13, 14, and 15) were more difficult for all ethnic groups. Table 6 also shows that the same ECs have correspondingly lower means for the NORM group as well.

One seeming contradiction needs to be addressed. Even though no significant overall mean differences were found among the different ethnic groups, there are apparent differences in Table 6. It appears that one ethnic group may perform better than the others on one EC, while another ethnic group will perform best on the next EC. For example, the Chinese clearly scored highest on EC2, while the highest score for the Indochinese were on EC10, for the

Koreans on EC5, for the Filipinos on EC11, etc. The point is that such relative differences in performance among the ethnic groups throughout the data are the cause of the significant interaction effects reported in Table 4. Thus the significant interaction effects found in Table 4 are an indication that different groups perform better or worse on different ECs. However, when the effect is averaged out across ECs, the overall mean performances were not found to be significantly different for ETHNICITY.

TABLE 6
Mean Scores on EC Subtests for NORM Group and Predominant Ethnicities

GROUP	EC1	EC2	EC3	EC5	EC6	EC7	EC8
NORM Group	7.20	7.60	6.20	6.30	6.60	7.00	5.70
Chinese	5.18	6.11	4.24	6.44	4.78	5.36	4.29
Indochinese	4.95	5.05	3.89	4.37	4.84	4.95	2.89
Korean	5.15	5.59	4.33	6.70	5.04	5.93	3.48
Filipino	4.79	5.34	4.18	3.98	4.33	5.27	4.04
Samoan	5.07	5.07	4.20	3.18	4.11	4.84	3.34
Other	5.13	5.29	3.38	3.96	4.08	4.79	3.88

GROUP	EC9	EC10	EC11	EC12	EC13	EC14	EC15
NORM Group	5.90	7.00	7.40	6.50	5.40	5.00	5.80
Chinese	3.80	5.16	5.00	4.69	4.22	3.38	4.29
Indochinese	3.89	5.26	4.95	4.58	3.37	3.26	4.42
Korean	4.11	4.78	4.74	4.44	3.81	3.93	4.26
Filipino	3.71	5.20	5.33	4.90	3.66	3.66	4.52
Samoan	3.68	4.36	5.20	4.66	3.89	3.32	4.05
Other	4.38	4.54	4.38	3.92	3.96	3.50	3.54

In the same vein, it is interesting to note that on EC5 (Use of Computational Skills), the Chinese and Korean groups not only outperformed the other ethnicities, they also scored higher on average than the NORM group. The Chinese and Korean students may have performed better on this EC because 1) it required less language manipulation to perform the tasks required (i.e., answer mathematical problems), 2) some, or all, of the Chinese and Korean students had received superior mathematics training at some time during their lives, or 3) some combination of the above.

Concerning the comparisons between the ethnicities and the NORM group, it was pointed out in the discussion of Table 1 that the average overall performance of the SLEP students (i.e., all ethnic groups taken together) was found to be 63.46 points, while the mean for the NORM group was 89.60. This difference was also found to be statistically significant ($F = 206.21, p < .01$). More importantly, however, the difference between means for the SLEP and NORM groups was a large 26.14 points, which indicates that the NORM students scored 41% higher than the SLEP students. Clearly, the overall difference in performance between SLEP and NORM students is also reflected in each of the individual EC results as shown in Table 6. While the sources of systematic difference which are of most interest in this study are the variations in ethnic background, there may be many other underlying causes.

DISCUSSION

Research Question 1

What are the descriptive statistics for the HSTEC and each of its Essential Competency subtests for the ninth grade SLEP students and for a ninth grade norm group sampled from the entire population?

The descriptive statistics shown in Table 1 indicate that the overall HSTEC scores are reasonably well centered and dispersed for both the NORM and SLEP groups. However, more detailed analysis of the descriptive statistics for groups within the SLEP sample, whether based on the HIGH, MIDDLE, LOW, and NEP categories, or ethnicity (see Tables 2 and 3), indicate that such overall statistics miss important aspects of what is going on in these data. For instance, some SLEP students perform above the mean of the NORM group and some ethnic groups appear to outperform others.

Research Question 2

Do SLEP students constitute a group significantly different from the NORM group in terms of their overall HSTEC scores?

From the examination of the descriptive statistics presented in Tables 1 and 2, it appears that the SLEP students, as defined in this study, do indeed constitute a separate population. Not only was a statistically significant difference found between the overall means of the two groups (SLEP vs. NORM), but the difference was meaningful--amounting to 26.14 points. The SLEP group was also found to be significantly more homogeneous in the way that their scores varied around the mean. Thus the SLEP students can fairly safely be considered a separate population within the total group that took the test.

However, it was also clear that SLEP students vary in important ways in terms of their scores on the whole HSTEC, as well as on the individual ECs. By separating SLEP students (on the basis of the number of ECs that they passed) into the HIGH, MIDDLE, and LOW groups, it became apparent that the HIGH group of SLEP students performed better on average than the NORM group students. Hence, not all SLEP students are at risk of failing the HSTEC. However, the LOW and NEP groups appear to be similar in average performance and are clearly the students that must be carefully identified as those most at risk of failing the HSTEC (see J.D. Brown, 1990 for more on identifying such students).

Research Question 3

Are there any significant mean differences among ethnic groups (as determined by self-reported ethnicity) in the SLEP sample?

With a few exceptions, the overall difference between SLEP and NORM group students was also found at the subtest level. The one exception was that two of the groups, the Chinese and Koreans, performed above the NORM on EC5, which tested use of computational skills (see Table 6). In addition, the average score of 42 of the SLEP students, i.e., those categorized into the HIGH group, was higher than the NORM group average on all but two of the ECs.

Despite these exceptions, the performance of SLEP students classified in the MIDDLE, LOW, and NEP groups was consistently lower than the NORM group on each subtest. Moreover, those subtests which the NORM group found to be more difficult were also correspondingly more difficult for the SLEP groups. In addition, no significant differences were found for ethnicity, though there were clearly significant differences between the ECs, as well as significant interaction effects (see Tables 4, 5, and 6).

CONCLUSIONS

This study has discovered a number of apparent patterns in the data which can and should be used to help those SLEP students who are most at risk of failing the minimal competency test:

- 1) SLEP students can fairly safely be considered a separate population within the total group that took the test because a significant difference was found in mean performance between the SLEP students and the NORM group. In addition to being significant, this difference was a meaningful 26.14 points (on a scale of 140).
- 2) The performance of SLEP students classified in the LOW and NEP groups indicates that these are the students who must be identified for further help (see J.D. Brown, 1990 for strategies to identify such students).
- 3) No significant differences were found for ethnicity, though there were clearly significant differences between the ECs, as well as interactions between ethnicity and ECs. It was also noted that those subtests which the NORM group found to be more difficult were also correspondingly more difficult for the SLEP groups.

As hypothesized at the outset of this paper, the students' backgrounds (in terms of language and ethnicity) do affect their scores on standardized tests--at least in Hawaii. It seems obvious that those students needing help in overcoming this effect should receive comprehensive ESL training commensurate with the guidelines provided in Hale (1974) and TESOL (n.d.). However, in Hawaii, we feel that additional types of training might be necessary. Accordingly, specially designed materials have recently been developed to provide SLEP students with training in the

general linguistic and cultural content of the subject matter competencies being assessed by the HSTEC (Sajna & Brown, 1990), as well as with test-taking strategies (Z.A. Brown, 1989) that can also help them to succeed. The purpose of all of these efforts is to provide the LOW/NEP students with a "level playing field" when they sit down to demonstrate their subject matter competencies on the HSTEC. Such additional types of training may also prove useful in helping SLEP students in other states which have minimal competency tests.

Suggestions for Future Research

As with most research, more questions have been raised in the process of doing this study than have been answered directly. These include:

- 1) Will similar results be obtained during subsequent years in the State of Hawaii, as well as in other parts of the United States?
- 2) Are there identifiable linguistic characteristics for individual subtests, or even individual items, which might account for the observed overall differences between SLEP and NORM group performances?
- 3) Are there variations in the degree to which the performances of different ethnic groups are affected by linguistic, cultural, and background factors?
- 4) How can ESL students who are at risk of failing a state minimal competency test because of language problems be identified before taking the test so that they can receive appropriate linguistic instruction?

It is hoped that further studies will be conducted along these lines.

NOTES

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