The study explored how much student engagement and teacher variables predicted student achievement. Since students were nested within a classroom, hierarchical linear modeling (HLM) was employed for the analysis. The results represented that student engagement had positive effects on student academic growth per month in reading after taking into account student variables such as gender, SES, and race. Teachers’ years of experiences had positive effects on the average academic gains per month. These findings suggested that student engagement and teachers’ experiences were worthy of being emphasized for better student achievement.

key words: student engagement, student achievement, hierarchical linear modeling
I. Introduction

Student engagement is the most immediate and persisting issue for improving student learning. Research finds out that the most obviously disengaged students disrupt classes, skip them, or fail to complete assignments. In contrast, engaged students make a psychological investment in learning and try hard to learn what a school offers. They take pride not simply in earning the formal indicators of success(grades), but in understanding the material and incorporating or internalizing it in their lives(Newmann, 1992).

Engagement is conceptualized as a psychological process, specifically, the attention, interest, investment, and effort that students expend in the work of learning(Marks, 2000). The concept of engagement includes affective participation as well as a behavioral one in the learning experience. Steinberg(1996) emphasizes not only students’ “motivation to learn” but also their “interest” and “emotional involvement” with school. Previous studies show that there is a strong positive relationship between engagement and academic achievement across diverse populations(Finn, 1993; Marks, 2000).

In spite of the significant impact of engagement, research on factors that might improve engagement, especially on teacher variables affecting engagement, is sparse. The lack of research is surprising when it is considered that teachers are the most significant people in schools for boosting student engagement and achievement(Brandt, 1998; Hill & Crevola, 1999; Newmann, 1992; Strong et al., 1995; Wasley, 1999; Wolfe, 1998). To help address these shortcomings, this study includes teacher variables as well as student engagement. Verifying teacher qualities helps policy makers and administrators to make a research–based decision for better teacher recruitment.

For the analysis, multi–level modeling or hierarchical linear modeling(HLM) is employed. Multi–level modeling is an extension of regression analysis and gives a good solution to figure out type I error inflation and aggregation bias problems. HLM helps an investigator to find out with more accuracy the effects of an upper unit variable(e.g. teacher) on lower unit outcomes(e.g. students) within a multi–level structure.
Another good point of this investigation is in the high degree of external validity. The Prospects data for this investigation are a nation-wide collection on a large scale. In total, 372 schools were selected for the Prospect score sample and the average sample size per school was approximately 70 students (Jones et al., 1991: 9–10). The large-scale sample size and representation enhance external validity of this investigation. Although three level analysis is possibly made with the school-level data, two level analysis with student and teacher variables is employed for this research.

The main research question is addressed as this: How much academic achievement can be predicted by student engagement and teacher variables? According to the previous research (Finn, 1993; Marks, 2000), student engagement and academic achievement have a positive relationship. This research will add to this line of literature by examining the link between student engagement and fall-to-spring achievement gains.

II. Research on Student Achievement

1. Historical Review on Student Achievement

Research on a relationship between education resources (e.g., money, curricula, and facilities) and education outcomes (e.g., student achievement, cognitive development) has taken large part of educational research in the twentieth century (Shavelson & Towne, 2002). Coleman et al.’s Equality of Educational Opportunity (1966) was the beginning of research to explore school effects on student achievement in the United States (Burstein, 1980; Bryk & Raudenbush, 1992; Sammons, 1999; Shavelson & Towne, 2002; Teddlie & Reynolds, 2000). The Coleman report concluded that the impact of school on student achievement was little, after controlling for the socio-economic status of the students (Coleman et al., 1966). Just after the report was published, another study called Children and their Primary Schools (1967), known as the Plowden Report, was released in England and repeated the conclusions of the Coleman
The limitation of the early studies is that they do not improve the practice of the school in their input–output model (Teddlie & Reynolds, 2000). This model is criticized because it is too simple and does not consider process. Reynolds et al. (2000) mentioned that, “… a major criticism of the early school effects literature was that school/classroom processes were not adequately measured, and that this contributed school-level variances being attributed to family background variables rather than educational processes.” (pp.8–9). Shavelson & Towne (2002) also criticized that Coleman did not capture either how school and classroom processes transformed educational resources into educational outcomes or how contextual factors contributed to increase student outcomes.

As Shavelson & Towne (2002) indicated, early research on direct effects of educational resources on student outcomes was too simple. Researchers began to establish links between resources, transformational educational processes, and student outcomes over time (Shavelson & Towne, 2002). Overcoming the critical notes on the early research, this research takes student engagement as one of educational processes and explores linkage between educational process and student outcomes.

2. Engagement and Academic Achievement

Engagement represented active involvement, commitment, and concentrated attention, in contrast to superficial participation, apathy, or lack of interest (Newmann et al., 1992: 11). Newmann et al. (1992) defined student engagement in academic work as the student’s psychological investment in and effort directed toward learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote. Marks (2000) synthesized the definitions of several researchers and defined engagement as a psychological process, specifically, the attention, interest, investment, and effort students expended in the work of learning. This definition included affective aspects of engagement as well as academic ones. Finn (1993) explained engagement with four levels and those levels of engagement changed with an individual’s age.
Explaining engagement with a participation-identification model, Finn(1993) found that there was a strong linear association of participation with academic achievement. In other words, the higher the participation level, the higher the achievement scores in reading, mathematics, science, and social studies. Newmann et al.(1992) underscored the significance of student engagement by citing students’ interviews. The students in their study stated that engagement encouraged them to work hard. In most studies, there were no significant interactions of participation with gender or race/minority(Greenwood, 1991). That is, the strong association of participation with achievement was supported for male and females, and for Asian, Hispanic, African American, and non-Hispanic White students alike. Hines et al.(1986) showed that task engagement mediated teacher behavior and student achievement. Silverman(1985) showed student characteristics mediated engagement and outcomes in physical education.

3. Teacher Variables and Student Achievement

Teachers’ years of experience, type of certification, and highest degree earned are used as the measures of teacher quality for this study. According to the 50-state survey, such teacher qualities as years of teaching experience, professional learning and education, and licensure were selected as factors that would improve student achievement(Kaplan & Owings, 2001). Hedges et al.(1994) explored that teacher experience and teacher education were the most important input variables to enhance students’ academic achievement. Greenwald et al.(1996) aggregated results from 60 primary production function studies and found that teacher education and teacher experience had strongest relations to student achievement.

An advanced degree is highly recommended for a teacher’s professional development. Researchers generally looked at master’s degrees as another way to measure the effects of formal teacher preparation(The Abell foundation, 2001). However, teachers with masters’ degrees are not significantly more effective than those without them, unless the teachers are at the secondary level and the masters’ degrees are in the academic discipline being taught(The Abell foundation, 2001). Kain & Singleton(1996) concluded that schools that served poor children had more teachers without advanced degrees but they did not attribute
the lack thereof to lower student achievement.

Darling-Hammond (2000) found that full certification was more influential on student achievement than students’ demographic information such as poverty, minority status, and language background. She contended that the proportion of fully certified teachers in a state was the most consistently significant predictor of student achievement in reading and math. The strongest negative predictor of student achievement was the proportion of new teachers who were uncertified (Darling-Hammond, 1997; 2000).

III. Methods

1. Sample

This study is based on the Prospects data, which are national survey data. The Prospects data were collected from the spring of 1991 to the spring of 1994. The focus of this paper is on the sample of about 6,000 first grade students and about 460 reading teachers from the fall to spring of the 1991-1992 school year. Using proportionate allocation, a probability sample of students would have included only about 15 to 20 percent of population (Jones et al., 1991: 6-7).

2. Variable Description

Student and teacher variables are summarized at Table 1. As for teacher variables, teachers’ years of experiences, type of certification, and degree are selected, because they are commonly regarded as the most influential variables. Student’s gender, race, and SES are controlled because they are significant student background variables in most studies. Since each school has different test date, academic gains per month should be used for accurate measurement of student achievement.
### Table 1. Variable and Sample Description

<table>
<thead>
<tr>
<th>Teacher Variables</th>
<th>Coding</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certification</td>
<td></td>
<td>A categorical variable answering for types of certification</td>
<td></td>
</tr>
<tr>
<td>No certification</td>
<td>0</td>
<td>5</td>
<td>1.1</td>
</tr>
<tr>
<td>Probationary/temporary</td>
<td>1</td>
<td>31</td>
<td>7.0</td>
</tr>
<tr>
<td>Permanent</td>
<td>2</td>
<td>410</td>
<td>91.9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>446</td>
<td>100</td>
</tr>
<tr>
<td>Teacher’s degree</td>
<td></td>
<td>A dichotomous variable indicating whether or not a teacher had the master’s degree</td>
<td></td>
</tr>
<tr>
<td>Master’s degree and above</td>
<td>1</td>
<td>156</td>
<td>35.0</td>
</tr>
<tr>
<td>Below master’s degree</td>
<td>0</td>
<td>290</td>
<td>65.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>446</td>
<td>100</td>
</tr>
<tr>
<td>Student Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>3,141</td>
<td>50.6</td>
</tr>
<tr>
<td>Female</td>
<td>0</td>
<td>3,067</td>
<td>49.4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>6,208</td>
<td>100</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>dummy</td>
<td>223</td>
<td>3.6</td>
</tr>
<tr>
<td>Black/not of Hispanic</td>
<td>dummy</td>
<td>1,186</td>
<td>19.1</td>
</tr>
<tr>
<td>origin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/not of Hispanic</td>
<td>dummy</td>
<td>3,949</td>
<td>63.6</td>
</tr>
<tr>
<td>origin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>dummy</td>
<td>700</td>
<td>11.3</td>
</tr>
<tr>
<td>American Indian/Alaskan</td>
<td>dummy</td>
<td>83</td>
<td>1.3</td>
</tr>
<tr>
<td>Other</td>
<td>dummy</td>
<td>67</td>
<td>1.1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>6,208</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teacher variables</th>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years of Experiences</td>
<td>446</td>
<td>13.52</td>
<td>9.03</td>
<td>A continuous variable based on teachers’ answers for the question, “how many years in total have you taught at either elementary or secondary level?”</td>
</tr>
</tbody>
</table>

**Student variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Engagement</td>
<td>6,208</td>
<td>0</td>
<td>1.00</td>
<td>A standardized composite measure of student’s attendance patterns, doing classwork, attentive in class, and discipline (α = .80)</td>
</tr>
<tr>
<td>SES</td>
<td>6,208</td>
<td>0</td>
<td>1.00</td>
<td>A standardized composite measure of parents’ educational level, occupational prestige, and total family income</td>
</tr>
<tr>
<td>Monthly Growth of</td>
<td>6,208</td>
<td>12.82</td>
<td>8.28</td>
<td>Differences of reading scores between fall, 1991 and spring, 1992 that are divided by months between the two test dates.</td>
</tr>
<tr>
<td>Achievement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Items related to student engagement are selected based on the theory of engagement (Finn, 1989; 1993), and recoded for statistical analysis. Indicators of student engagement consist of attendance patterns, discipline, and curricular activities (Table 3).

Table 2. Items for Measuring Student Engagement

<table>
<thead>
<tr>
<th>Source</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Profile recorded by teachers</td>
<td>How many days of school did this student miss this school year?</td>
</tr>
<tr>
<td></td>
<td>How many times was the student late for school this school year?</td>
</tr>
<tr>
<td></td>
<td>Indicate the number of times this student has ever been suspended from school this year (Suspension means the student is asked to leave for a period of time, but is permitted to come back to the school this year).</td>
</tr>
<tr>
<td></td>
<td>This student pays attention in class.</td>
</tr>
<tr>
<td></td>
<td>This student disrupts the class.</td>
</tr>
<tr>
<td></td>
<td>This student is willing to follow rules.</td>
</tr>
<tr>
<td></td>
<td>This student can understand and follow directions.</td>
</tr>
<tr>
<td></td>
<td>This student completes homework assignments.</td>
</tr>
<tr>
<td></td>
<td>This student completes seatwork (classroom) assignment.</td>
</tr>
<tr>
<td></td>
<td>This student asks questions in class.</td>
</tr>
<tr>
<td></td>
<td>This student volunteers answers/take part in class discussions and conversations.</td>
</tr>
<tr>
<td></td>
<td>This student works hard at school.</td>
</tr>
<tr>
<td></td>
<td>This student cares about doing well in school.</td>
</tr>
<tr>
<td></td>
<td>This student gets along with teachers.</td>
</tr>
<tr>
<td>Parents questionnaire</td>
<td>I think my child believes he or she cares about doing well in school.</td>
</tr>
<tr>
<td></td>
<td>I think my child believes he or she gets along with teachers.</td>
</tr>
<tr>
<td></td>
<td>I think my child believes he or she enjoys school.</td>
</tr>
</tbody>
</table>

3. Analytical Approach

Regarding student engagement and teacher effects on student achievement, multi-level or hierarchical data analysis is implemented. The “nested” structure of multi-level data has dependency among individuals within units in an upper level (Kreft & Leeuw, 1998; Snijders...
& Bosker, 1999). Ignoring dependency that belongs to an upper-level unit means ignoring the hierarchy of data structure, which causes "aggregation bias". This leads to a faulty conclusion about the effects of variables (Van der Leeden, 1998: 271-273). Multi-level data analysis overcomes the weaknesses of traditional regression models in that it has an ability of modeling individual changes rather than a group-mean profile (Guo & Hussey, 1999; Kreft & Leeuw, 1998).

The data that are used here have a hierarchical relationship. Students are regarded as the first level, and teachers that are responsible for the students are located in the upper level (level-2). Multi-level modeling is the most appropriate method to be implemented because student engagement and teacher characteristics affect student achievement with two different levels.

The main research question is to see if student engagement has the effects on student academic achievement after controlling student background variables such as gender, SES, race. Student variables are situated within teacher variables as student engagement is influenced by teacher variables like teachers’ years of experience, degree, and certification. These relationships are expressed with the following equations.

Achievement gains = \( \beta_0 + \beta_1 \text{(Student engagement)} + \beta_2 \text{(Gender)} + \beta_3 \text{(SES)} + \beta_4 \text{(Asian)} + \beta_5 \text{(Black)} + \beta_6 \text{(Hispanic)} + \beta_7 \text{(American Indian/Alaskan)} + \beta_8 \text{(Others)} + \varepsilon_{ij} \)

\( \beta_0 = \gamma_{00} + \gamma_{01} \text{(Yrs. of Experience)} + \gamma_{02} \text{(Degree)} + \gamma_{03} \text{(Certification)} + \varepsilon_{0j} \)

\( \beta_2 = \gamma_{20} \)

\( \beta_3 = \gamma_{30} \)

\( \beta_4 = \gamma_{40} \)

\( \beta_5 = \gamma_{50} \)

\( \beta_6 = \gamma_{60} \)

\( \beta_7 = \gamma_{70} \)

\( \beta_8 = \gamma_{80} \)
In these equations, $\beta_0$ is the average achievement gain for students in a teacher $j$, and $\beta_{ij}$ represents the relationship between student engagement and monthly achievement gains for students in a teacher $j$. Since the effect of student engagement on reading achievement is not hypothesized same across the teachers, $\beta_{ij}$ is set random in the model. Student level variables are centered on their class means. The $\gamma_{1}$, $\gamma_{2}$, and $\gamma_{3}$ reflect the teacher-level prediction coefficients, and $u_{j}$ represents level-2 residual.

IV. Results

1. Empty Model

In order to explore the research question, analysis begins with an empty model with neither student- nor teacher-level predictors. This empty model estimates the overall average academic achievement gains per month, and the level-one and the level-two variance simultaneously. The results of the empty model are displayed in Table 3. The average classroom growth rate per month is as large as 12.7945. The student-level variance for student’s achievement growth rate is 58.2794. The within-teacher variance of academic gains a month(58.2794) is larger than the between-teacher variance(10.6123). It indicates that the effects of the student variables are much larger than those of the teacher variables.

The intra-class correlation estimates that represent the proportion of variability among teachers are $0.1540[(10.6123/(58.2794+10.6123))]$. The variability is moderate to proceed with multi-level analysis(Lee & Smith, 1996). However, multi-level analyses are still meaningful for this sample because the random effect for the classroom mean academic gains, $u_{0j}$, is significant.
Table 3. Empty Model for Academic Gains per Month

<table>
<thead>
<tr>
<th>Fixed effect</th>
<th>Coefficient</th>
<th>se</th>
<th>T ratio</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom mean academic gains per month, $\gamma_{oo}$</td>
<td>12.7945*</td>
<td>0.1867</td>
<td>68.514</td>
<td>0.000</td>
</tr>
<tr>
<td>Random effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom mean academic gains per month, $u_{ij}$</td>
<td>10.6123*</td>
<td>445</td>
<td>1548.5159</td>
<td>0.000</td>
</tr>
<tr>
<td>Level-1 effect, $r_{ij}$</td>
<td>58.2794</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Student Model

At level-one, academic gains for a student $i$ under the classroom teacher $j$ is regressed on student engagement after controlling student’s gender, SES, and race. The results show that student engagement has a positive relationship with academic gains per month (Table 4). As one unit of student engagement is increased, student achievement is improved by 1.7417 per month. Gender has significantly negative effects on student’s academic gains. Negative effects of gender indicate that girls outperform boys in learning reading for an academic year. According to the results, girls learn 0.7598 per month more than boys.

Race makes differences in learning reading subject for the first graders. Asian students get 3.4926 more scores per month on average than White students for the first year schooling. The Black and the Hispanic group also have the positive coefficients that represent that Black (1.1810) and Hispanic (1.6544) students learn more per month than White students for that period. However, it should be understood that higher learning rate does not always mean higher achievement scores in post-test.

Table 4. Student Model for Academic Gains per Month

<table>
<thead>
<tr>
<th>Fixed effect</th>
<th>Coefficient</th>
<th>se</th>
<th>T ratio</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom mean academic gains per month, $\gamma_{oo}$</td>
<td>12.7551*</td>
<td>0.1845</td>
<td>69.128</td>
<td>0.000</td>
</tr>
<tr>
<td>Student engagement differentiation, $\gamma_{ij}$</td>
<td>1.7417*</td>
<td>0.1155</td>
<td>15.076</td>
<td>0.000</td>
</tr>
</tbody>
</table>
3. Student-Teacher Model

A multi-level model is completely set up with student- and teacher-level variables. Since the significance test of the residual variance at the teacher level show that both the classroom mean and student engagement differentiation still vary across the teachers even after considering the effects of gender, SES, and race (refer to Table 4), the teacher-level variables are added as predictors of $\beta_g$ and $\beta_{ij}$.

A teacher’s years of experience variable is the only teacher-level variable that has significant effects on student achievement. The teacher’s years of experience variable has positive effects on the mean academic gains per month in reading when other variables are controlled. It means that students learn more if they are taught by a more experienced teacher. Students learn 0.0656 more per month compared with the students that learn from one-year less experienced teacher. The level-two residuals, $u_{0g}$ and $u_{ij}$, are significant, which represents that there are significant teacher effects on student achievement (Table 5).
Table 5. Hierarchical Linear Model Predicting Academic Gains per Month

<table>
<thead>
<tr>
<th>Fixed effect</th>
<th>Coefficient</th>
<th>se</th>
<th>T ratio</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom mean academic gains per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept, $\gamma_{00}$</td>
<td>12.7438*</td>
<td>0.1810</td>
<td>70.4209</td>
<td>0.000</td>
</tr>
<tr>
<td>Years of experience, $\gamma_{01}$</td>
<td>0.0656*</td>
<td>0.0208</td>
<td>3.144</td>
<td>0.002</td>
</tr>
<tr>
<td>Certification, $\gamma_{02}$</td>
<td>0.1325</td>
<td>0.4986</td>
<td>0.266</td>
<td>0.790</td>
</tr>
<tr>
<td>Highest degree earned, $\gamma_{03}$</td>
<td>0.3871</td>
<td>0.3914</td>
<td>0.989</td>
<td>0.323</td>
</tr>
<tr>
<td>Student engagement differentiation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept, $\gamma_{10}$</td>
<td>1.7279*</td>
<td>0.1168</td>
<td>14.790</td>
<td>0.000</td>
</tr>
<tr>
<td>Years of experience, $\gamma_{11}$</td>
<td>0.0035</td>
<td>0.0131</td>
<td>0.270</td>
<td>0.787</td>
</tr>
<tr>
<td>Certification, $\gamma_{12}$</td>
<td>0.2719</td>
<td>0.4173</td>
<td>0.652</td>
<td>0.514</td>
</tr>
<tr>
<td>Highest degree earned, $\gamma_{13}$</td>
<td>-0.2797</td>
<td>0.2695</td>
<td>-1.038</td>
<td>0.300</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Random effect</th>
<th>Variance Component</th>
<th>df</th>
<th>$X^2$</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom mean academic gains per month, $u_0$</td>
<td>0.1248*</td>
<td>411</td>
<td>1523.7041</td>
<td>0.000</td>
</tr>
<tr>
<td>Student engagement differentiation, $u_1$</td>
<td>0.0367*</td>
<td>411</td>
<td>506.2818</td>
<td>0.001</td>
</tr>
<tr>
<td>Level-1 effect, $r_y$</td>
<td>0.0075*</td>
<td>411</td>
<td>487.1669</td>
<td>0.006</td>
</tr>
</tbody>
</table>

V. Conclusion

The research question is how much student engagement and teacher variables predict student academic achievement. The primary interest of this research question is the effects of student engagement on academic achievement. For exact measurement, the achievement is measured by monthly growth of reading scores. The significant random effects of classroom mean academic gains per month and student engagement differentiation allow multi-level analyses to be implemented.

After taking into account student variables such as gender, SES, and race, student
engagement has positive effects on student academic gains per month in reading. The results show that a student’s academic achievement is improved by 1.7417 as one standard deviation of student engagement increases. Since Finn (1993), Newmann et al. (1992), and Greenwood (1991) found a positive relationship between engagement and student academic achievement, the results of this research are consistent with their findings. In other words, the results consistently show that more-engaged students tend to learn more than less-engaged students during the first-year schooling.

Among student background variables, gender has significantly negative effects on academic gains per month in reading. The negative coefficient of gender shows that girls learn more than boys in reading class. Although gender effects on academic achievement are still inconclusive, girls tend to outperform boys in reading (Andre, 1999; Gambell & Hunter, 2000). Asian, Black and Hispanic first grade students significantly learn more per month during the academic year than White first grade students. When Asian, Black, and Hispanic consist of the minority group, it can be said that minority students learn more than White for the first year of schooling. However, the result needs to be carefully interpreted because it does not mean that minority group students get higher scores than White students. In fact, minority students still get lower scores than White students at the post-test even though academic gains per month of the minority students are larger than White students during the period. Effects of race on academic achievement are also difficult to conclude, because there have been controversial research results on the effects of race. Race has often been studied with consideration of socio-economic status. Previous research showed that the minority students from low socio-economic status tended to have low academic achievement (Steele, 1992).

Among level-two variables, teachers’ years of experience have positive effects on the average academic gains per month. Previous research on the effects of the teachers’ years of experience supported a positive relationship between teachers’ experience years and student academic achievement (Hedges et al., 1994; Kaplan & Owings, 2001). During their first year of schooling, students tend to get a 0.0655 higher score per month if they are taught by one year more experienced teacher.

The results of this research support the previous research results by exploring that student
engagement does positively affect student academic achievement. Improving students’ academic achievement gets more attention since school effectiveness and school accountability are emphasized that are measured by students’ academic achievement scores. Accordingly, student engagement is worthy of being emphasized in that student engagement makes a significant contribution to student academic achievement.

This research shows that a teacher makes differences in student engagement. The previous research tends to attribute student engagement to student characteristics. However, this research shows that student engagement can be different depending on teacher characteristics that students are taught by. The research results represent that teacher’s years of experiences contribute to improving student achievement. It implies that teacher’s years of experiences are worthy of being rewarded in teacher recruitment and rewarding system.

There are some suggestions for further study. First, this study does not apply full definition of engagement because the first graders are selected for the study. A student engagement study needs to be extended through middle and high school years. Secondly, the data for this study are based on the U.S. environment. A study on student engagement and the effects should be explored in Korea. Thirdly, further research is needed to see if these results are consistent in other subjects such as math and science.
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risk versus non-risk students. *Exceptional Children*, 57(6), 521-35.


국문초록

학업성취도 예언변인으로서의 학생의 자발적 참여에 관한 연구

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학생의 학습은 교사만의 일방적인 전달이 아닌 학생과의 상호작용을 통해 성공적으로 이루어질 수 있다는 점에서 학생의 자발적 참여의식 혹은 관심이 학습을 성공하는 결정적인 요인이 간주된다. 최근 미국의 교육개혁에서 학생의 자발적 참여의 중요성은 더욱 강조되고 있으며, 선행연구에서도 자발적인 참여도가 높은 학생들이 학교에서 학습에 대한 열의도 높고 학습한 내용을 내면화하는 경향이 크다고 한다. 이상적인 학습상태에 도달하기 위해 수업에서의 학생의 자발적 참여의 중요성이 강조됨에도 불구하고, 자발적 참여와 그 효과에 관한 연구는 아직 미미한 실정이다. 이에 이 연구에서는 자발적 참여가 학생의 학업성취를 예측해낼 수 있는지 실증적으로 밝혀내고자 한다. 연구방법으로는 학생의 자발적 참여를 1수준에서의 예측변인으로 두고 교사변인을 2수준의 변인으로 상정하는 위계적 선형모형을 사용하였다.

분석 결과에 따르면, 학생의 성별, 사회경제적 지위, 인종을 고려한 후에도 학생의 자발적 참여는 학생의 학업성취도 항상에 긍정적인 영향을 미치는 것으로 밝혀졌다. 이는 자발적 참여가 높은 학생들이 그럴지 않은 학생에 비해 더 많이 학습한다는 기존의 연구결과와도 일관성을 지니는 것이다. 교사변인 중에서는 경력변인이 학생 학업성취를 정적으로 예언하였다. 이와 같은 연구를 토대로 학생의 자발적 참여가 학생의 학습에 있어서도 중요한 의미를 지니다는 것을 밝혀낼 수 있었으며 교사의 경력은 보상받을 만한 가치가 있는 것으로 해석할 수 있다.

주요어: 자발적 참여, 학업성취, 위계적 선형모형
2004년도 '한국교육' 게재 논문 공모 안내

한국교육개발원의 학술지 '한국교육'은 2000년 9월 한국학술진흥재단의 학술지평가에서 전문학술지 등급 학술지로 등재된 데 이어 2001년 12월에는 "국내학술지 등급부여 조사 연구"에서 국제적 수준의 A등급 학술지로 선정된 바 있습니다. 앞으로 '한국교육'에 게재되는 논문은 연구실적으로 인정받을 수 있음을 알려드리며, '한국교육' 제31권에 게재할 우수한 논문을 다음과 같이 공모하오니 많은 응모 바랍니다.

□ 학술지 발행 목적
○ 한국 교육의 발전에 기여
○ 교육정책 관련 지식과 정보의 발전 및 교류 촉진
○ 한국 교육정책 개발에 기여할 지적 기반의 확보

□ 관행물명
○ '한국교육' 제31권 제1호 ~ 제4호

□ 권호별 발행 예정일 및 논문 공모 마감일

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□ 게재 논문 편수
○ 논문 공모 주제에 부합되고, 심사결과 최종 게재가로 판정된 논문 15편 내외

□ 공모 주제
○ 교육정책의 이론, 이념, 역사, 연구 방법 등에 관한 논문
○ 한국 교육정책의 분석, 평가, 해석과 관련된 논문
○ 교육정책 입안의 기초가 되는 자료의 수집과 분석에 관한 논문
○ 기타 한국 교육의 발전에 의미 있는 기여를 할 수 있거나 교육정책에 대한 이해를
넓힐 수 있는 논문
※ 상기 주제(교육정책 관련)에 부합되지 않는 경우 심사대상에서 제외될 수 있음.

논문 형태
논문 투고 시 투고자가 논문형태를 영시할 수 있으며, 영시되지 않은 논문에 대해서는 편 집위원회에서 논문형태를 정할 수 있음.
◦ “학술 논문” : 학술논문에 요구되는 형식과 체계를 갖춘 작성된 연구 논문
◦ “관점과 주장” : 특정한 관점과 뚜렷한 논리에 기초한 비교적 자유로운 형식으로 교육정책 관련 관점이나 주장, 비평, 정책적 쟁점 등에 관한 논문

투고 자격
◦ 교육학 및 교육학 관련 전공자

게재 논문 심사
◦ 논문 공모 주제에 부합되는 논문을 대상으로 투고 논문 심사 기준에 의거 해당 전공분야 심사위원 3인의 심사 결과를 근거로 편집위원회의 최종 심의를 거쳐 선정합니다.

논문 심사료 및 게재료
◦ 학술지에 논문을 투고하는 자는 논문 심사료 100,000원(심사위원 3인 논문 심사료)을 납부하여야 합니다.
◦ 논문 게재료는 논문 심사 결과 최종 게재가로 판정된 논문에 한하여 편당 100,000원, 연구지원비를 받아 수행된 논문은 편당 300,000원을 납부하여야 합니다.
◦ 단, 소정의 논문 분량(편지 기준 20쪽)을 초과하는 경우에는 쪽당 20,000원씩 추가 게재료를 납부하여야 합니다.
◈ 납부 은행 계좌번호 : (외환은행) 296-11-00101-9(예금주 : 한국교육개발원)

논문 제출 및 문의
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◦ 전화 : (02) 3460-0409
학술지 '한국교육' 발행 지침

제 1조(목적) 이 지침은 학술지 '한국교육' (이하 학술지라 한다) 발행의 기획, 논문 투고, 편집 및 발간에 관한 세부 사항을 정하여 학술지를 효율적으로 발행하는데 목적이 있다.

제 2조(학술지 발행 목적) 학술지는 다음 각 호의 목적을 달성하기 위하여 발행한다.
1. 한국 교육의 발전에 기여
2. 교육정책 관련 지식과 정보의 발전 및 교류 촉진
3. 한국 교육정책 개발에 기여할 지적 기반의 확보

제 3조(발행 횟수 및 발행일) 발행 횟수는 연간 4회로 하고, 발행일은 매년 4월 30일, 7월 31일, 10월 31일, 12월 31일로 한다.

제 4조(게재 논문 편수) 1회 게재 논문 편수는 논문 공모 주제에 부합되고 심사결과 최종 게재가로 판정된 논문 15편 내외로 한다.

제 5조(게재 논문 공모 주제) 논문 공모 주제는 다음 각 호와 같다.
1. 교육정책의 이론, 이념, 역사, 연구 방법 등에 관한 논문
2. 한국 교육정책의 분석, 평가, 해석과 관련된 논문
3. 교육정책 입안의 기초가 되는 자료의 수집과 분석에 관한 논문
4. 기타 한국 교육의 발전에 의미 있는 기여를 할 수 있거나 교육정책에 대한 이해를 넓힐 수 있는 논문

제 6조(논문 형태) 논문 형태는 다음 각 호의 '학술 논문', '관점과 주장'으로 하며, 다른 학술지 또는 간행물에 발표되지 않은 독창적인 것이어야 한다.
1. '학술 논문'이라 함은 학술 논문에 요구되는 형식과 체계를 갖춰 작성된 연구 논문을 말한다.
2. '관점과 주장'이라 함은 특정한 관점과 뚜렷한 논리에 기초한 비교적 자유로운 형식으로 교육정책 관련 관점이나 주장, 비평, 정책적 쟁점 등에 관한 것을 말한다.

제 7조(논문 투고 자격) 논문 투고 자격은 교육학 및 교육학 관련 전공자로 한다.

제 8조(게재 논문 심사 절차) 게재 논문의 심사 절차는 다음과 같다.
1. 편집위원회는 학술지 '한국교육'의 공모주제에 부합하는지에 따라 심사대상논문
문 또는 심사제외(반려)논문을 결정한다.
2. 심사대상논문으로 선정된 논문에 대해서는 해당 전공의 편집위원이 논문심사자 3인을 추천하고 편집위원회를 통해서 심사자를 최종확정한다. 단, 편집위원이 논문을 투고할 경우, 당해 투고논문의 심사위원 선정과정에 참여할 수 없다.
3. 투고 논문은 3인의 심사위원에 의해 비밀심사(심사위원에게는 논문저자의 이름을 비밀로 하고 논문저자에게는 심사위원의 이름을 비밀로 하는 심사방법) 를 받는다.
4. 논문심사자는 심사의뢰를 받은 후 30일 이내에 심사총평과 함께 심사결과를 게재가, 수정게재가, 수정후재심사, 게재불가 중에서 하나를 선택하여 제출하여야 하며, 수정게재가 또는 수정후 재심사의 경우에는 수정·보완요구서를 제출하여야 한다.(별지 서식)
5. 1차 심사결과 동일한 논문에 대하여 게재가와 게재불가의 판정이 동시에 있을 경우 편집위원회는 제3자에게 논문심사를 의뢰할 수 있다.
6. 수정게재가의 경우 논문투고자는 수정 이행사항을 서면으로 제출하고 편집위원회는 이를 확인하여 게재여부를 확정하며, 수정후 재심사의 경우 수정사항을 서면으로 제출하면 1차 심사위원이 재심사를 실시한다.(별지 서식)
7. 심사결과 심사위원 3인중 2인이 게재가로 판정한 논문 중 편집위원회의 심의를 거쳐 게재 여부를 최종 결정한다.
제 9조(논문 심사 기준) 게재 논문의 심사기준은 다음과 같다.
1. 설정된 연구문제와 연구목적의 타당성
2. 연구목적 달성을 위해 선정된 연구내용(또는 문헌조사)의 적절성
3. 연구방법(표집, 자료수집 방법 및 절차, 통계분석 등)의 적절성
4. 기술된 연구의 결론, 재연의 객관성 및 공정성
5. 연구결과의 기여도(학문적, 사회적 기여도)
6. 기술된 논문의 논리성, 객관성 정도
7. 제시된 목차, 인용, 각주, 참고문헌 등의 정확성
제 10조(논문 심사료 및 게재료 납부) ① 학술지에 논문을 투고하는 자는 논문 심사료 100,000원을 납부하여야 한다.
② 논문 게재료는 논문 심사 결과 최종 게재가로 판정된 논문에 한하여 편당 100,000원, 연구지원비를 받아 수행된 논문은 편당 300,000원을 납부하여야 한다.
단, 소정의 논문 분량(편집 기준 20쪽)을 초과하는 경우에는 쪽당 20,000원씩 추가 계재료를 납부하여야 한다.

제 11조(편집위원회) 학술지 발행의 기획, 논문 투고, 편집 및 발간에 관한 세부 사항을 주관하는 편집위원회(이하 위원회라 한다)를 둔다.

제 12조(편집위원회 기능) 위원회는 다음 각 호의 사항을 심의한다.
1. 학술지 발행의 기획, 논문 투고, 편집 및 발간에 관한 기본 계획의 수립에 관한 사항
2. 투고 논문의 심사를 위하여 논문주제에 따른 해당 전공분야 심사위원의 추천 및 선정에 관한 사항
3. 투고 논문에 대한 심사위원 3인의 심사결과를 근거로 최종 게재여부 판정에 관한 사항
4. 게재여부 결정에 관한 사항
5. 기타 위원장이 중요하다고 인정하는 사항

제 13조(편집위원회 구성 및 임기) ① 위원회는 원내외 인사로 구성되며, 위원장, 부위원장은 포함하여 9명 이내의 위원과 1인의 간사로 구성한다.
② 위원회 위원장, 부위원장, 위원은 원장이 임명하고, 간사는 해당 업무 담당 팀장이 된다.
③ 위원의 임기는 3년으로 한다.

제 14조(위원장의 직무) ① 위원장은 회무를 통리한다.
② 위원장 유고시에는 부위원장이 그 직무를 대행한다.

제 15조(회의) ① 위원회 회의는 위원장이 필요하다고 판단할 때 또는 편집위원의 과반수 이상의 요구가 있을 때 위원장이 소집하며, 위원장은 그 의장이 된다.
② 위원회 회의는 회의의 과반수 이상의 출석과 과반수 이상의 찬성으로 의결한다. 위원장은 표결권을 가지며, 가부 동수일 경우에는 결정권을 갖는다.

제 16조(결과보고) 간사는 위원회의 심의 사항을 원장에게 보고하여야 한다.

제 17조(간사의 직무) 간사는 위원장의 명을 받아 위원회의 사무 일체를 처리한다.

제 18조(투고 논문 작성 지침 및 제출) 학술지에 투고하는 논문의 작성 및 제출은 별지 서식에 따른다.

제 19조(시행일) 이 지침은 2004년 1월 1일부터 시행한다.
『한국교육』투고 논문 작성 요령

1. 논문 작성
   ◦ 논문은 한글 사용을 원칙으로 하되, 의미에 혼동 가능성이 있는 경우에 한하여 漢字로 표시하거나 ( ) 속에 原語를 써넣는다.
   ◦ 논문 투고자의 성명은 한글로 표시하고, 외국인의 성명은 원어 그대로 쓴다.
   ◦ 논문 내용을 요약한 국문요약(가로 50~55자, 세로 10행 이내)을 논문 제목, 논문 투고자 명(소속기관, 직위) 다음(주제어 앞)에 제시한다.
   ◦ 공동저작일 경우 제1저자를 먼저 제시한다. 제1저자의 구분이 없는 경우 그 사항을 명기하여 제출한다.
   ◦ 주제어 명시: 논문의 편리한 검색을 위하여 반드시 논문 주제어를 국문요약 다음(문단 내용 앞)에 명시한다.
   ◦ 영문초록은 1,000단어 이내로 작성하여 참고문헌 바로 뒤에 명시한다.
   ◦ 논문 분량: 논문 편집 기준으로 20쪽 이내(참고문헌 포함)를 원칙으로 하되, 필요시 초과할 수 있으나 최대 25쪽을 초과할 수 없다.

2. 논문 제출
   ◦ 투고 논문은 한글 97 이상 워드프로세서 프로그램을 이용하여 작성하며, 논문 제출시 출력물을 3부와 디스켓을 함께 제출하여야 한다. 단, 이는 전자우편으로 대체 가능하다. (전자우편: 전지영<jjy@kedi.re.kr>)
   ◦ 투고 논문은 논문제목, 성명, 소속기관 및 직위, 국문요약, 주제어 명시, 본문 내용, 참고문헌, 영문초록의 내용 배열 순서로 작성·편집하여 제출하되, 이와 함께 응모자의 연락처(일반전화 및 핸드폰 번호, e-mail 주소)를 반드시 기재하여야 한다.

3. 논문 편집 기준
   ◦ 글 자 체: 한글 신명조체
   ◦ 줄 간 격: 180%(도표안은 150%)
4. 제목의 번호 체계
   ◦ 1단계 : I, II, III ...
   ◦ 2단계 : 1, 2, 3 ...
   ◦ 3단계 : 가, 나, 다 ...
   ◦ 4단계 : 1), 2), 3) ...
   ◦ 5단계 : 가), 나), 다) ...

5. 인용
   ◦ 논문 작성시 인용하는 내용이 짧은 경우에는 본문 속에 기술하고, 긴 경우(3행 이상)에는 본문에서 따로 평가기 기술한다. 따로 기술하는 경우에는 인용 부분의 아래위를 본문에서 한 줄씩 비우고 좌우로 각각 3글자씩 들여 쓴다.

6. 본문 내의 인용
   ◦ 인용하는 저서나 저자명이 본문에 나타나는 경우에는 괄호 속에 발행 연도 또는 발행연도와 해당 면을 표시한다.
   ◦ 인용 저서나 저자명이 본문에 없는 경우에는 해당 부분 앞에 괄호를 치고 그 숫자 저자명과 발행 연도를 표시한다. 문헌들 사이에 쌍반점(;)으로 가른다.
     한 연구(홍길동, 1992 ; Anderson, 1990)에 의하면…
   ◦ 저자가 다수일 경우 3인까지는 모두 표시하되, 4인 이상은 첫 번째 저자만 나타내고 그 다음은 국문의 경우 ‘○○○외’, 영문의 경우는 ‘et al.’로 나타낸다.
     홍길동 외(1992), Wittrock et al.(1966)

7. 참고문헌 작성
   ◦ 논문의 말미에 아래와 같은 요령으로 제시한다. 여러 나라 문헌을 참고했을 경우 한국어, 영어, 일본어 순으로 열거한다. 여기에 예시한 이외의 서양 참고 문헌의 작성법은 대체로 APA 양식을 따른다.
     ◦ 단행본의 경우
○ 정기간행물 속의 논문의 경우(반드시 해당 페이지를 밝힐 것)
○ 학위 논문의 경우
○ 영문 참고 문헌 작성시 유의 사항
  ① 책명은 이탤릭체로 할 것.
  ② 논문 제목은 첫 단어만 대문자로 표기하고, 나머지는 모두 소문자로 쓸 것(단행본의 경우도 동일). 단, 정기간행물의 책명은 각 단어를 대문자로 표기할 것.
○ 인터넷 자료를 인용한 경우
○ 신문기사 자료
  ④ ○○신문 2000. 7. 6일자 4면(종합) 기사: 미국 유학비자 받기 까다로워진다.
  ④ ○○일보 2000. 7. 30일자 25면(기획) 기사: 환경교육은 어릴적부터

8. 표와 그림
○ 표와 그림에는 일련번호를 붙이되, 표에는 < >, 그림에는 [ ]과 같은 괄호를 사용하여 표의 제목은 상단에, 그림 제목은 하단에 제시한다.
  ④ <표 1>, [그림 1]
○ 표 및 그림은 원본 그대로 복사 인쇄할 수 있도록 투고자가 완벽하게 그러서 제출한다.
제31권 제3호

한국교육

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본 논문 내용의 무단 복제를 금함