

# The Validation of One Parental Involvement Measurement in Virtual Schooling

Feng Liu, Erik Black, James Algina, Cathy Cavanaugh, and Kara Dawson  
*University of Florida*

---

## Abstract

Parental involvement has been recognized as an important factor for student achievement in traditional school settings. The lack of research regarding the effect of parental involvement on student achievement in virtual schooling is, in part, due to the absence of a valid and reliable instrument to measure this construct. This paper provides an overview of parental involvement in traditional education, discusses its role in K-12 virtual schooling, and describes a study that validates a parental involvement assessment with a virtual school population. The results of this study show the instrument is overall a valid and reliable measurement for parental involvement in the virtual school environment. Implications for research in virtual schooling are addressed, and suggestions were given to modify this instrument for use in future studies.

---

## Introduction

The U.S has experienced an astonishing growth in online education during past decade. In 2002, more than 1.6 million students took at least one course online at the higher education level (Allen & Seaman, 2006). By the end of 2006, this number increased to 3.5 million (Allen & Seaman, 2007). The growth rate of online enrollments was projected to reach 19.8% annually though this growth rate could decrease as more courses are offered online (Allen & Seaman, 2006). At present, more than 96% of large higher education institutions offer courses online (Allen & Seaman, 2006). Figure 1 shows the increase of online enrollment at the higher education level from 2002 to 2006 (Allen & Seaman, 2006; Allen & Seaman, 2007).

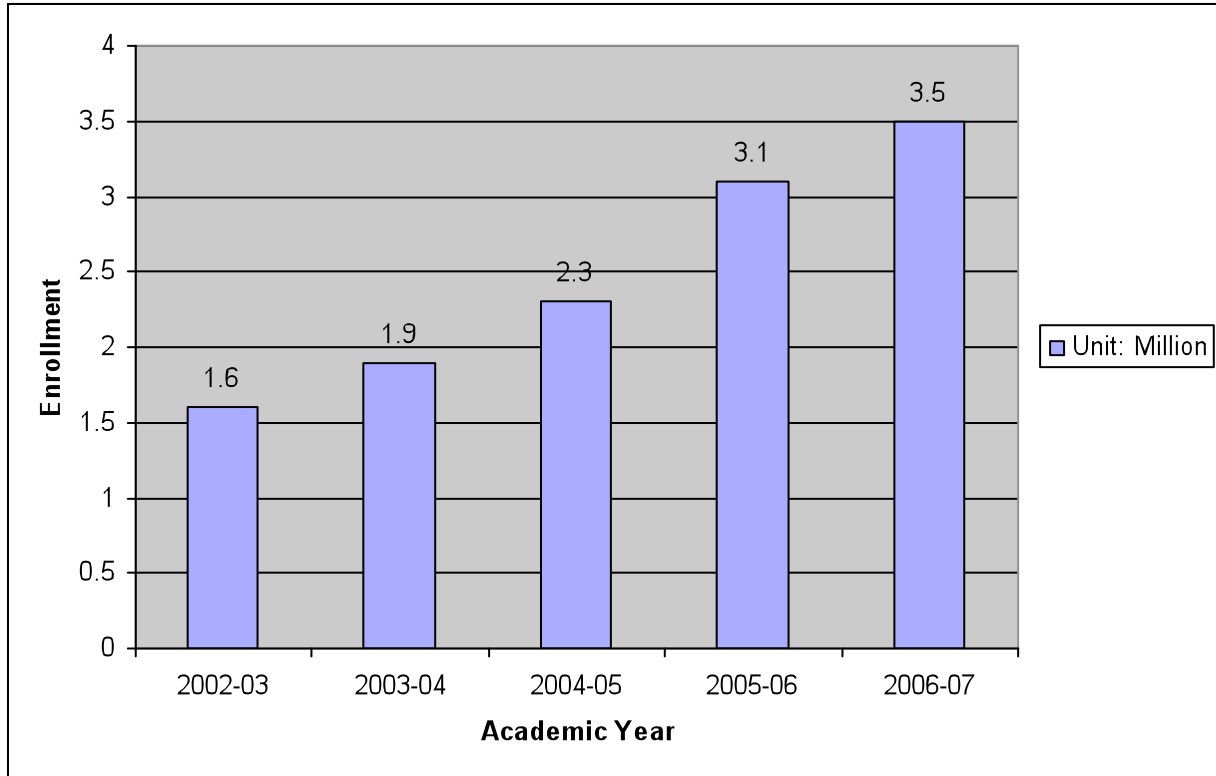


Figure 1. Online Students in Higher Education

At the K-12 level, online education also went through a rapid development since its emergence in late 1990s. Thousands of students were attracted to online education because of the advantages it brings such as flexible and expanded learning time, more educational opportunities, and increased access to resources (Cavanaugh et al., 2004). Figure 2 shows the dramatic increase of K-12 online enrollment between 2001 and 2008 (Clark, 2001; Glass, 2009; Newman, Stein, & Trask, 2003; Peak Group 2002; Picciano & Seaman, 2009; Picciano & Seaman, 2007; Setzer & Lewis, 2005; Tucker 2007; Zandberg, Lewis, & Greene, 2008). By 2016, this number is anticipated to reach 5-6 million and will keep growing in the future (Picciano & Seaman, 2009). Only public school students were included in these figures; the number will be higher if all other students are included, such as those in private schools and home-schools (Picciano & Seaman, 2009).

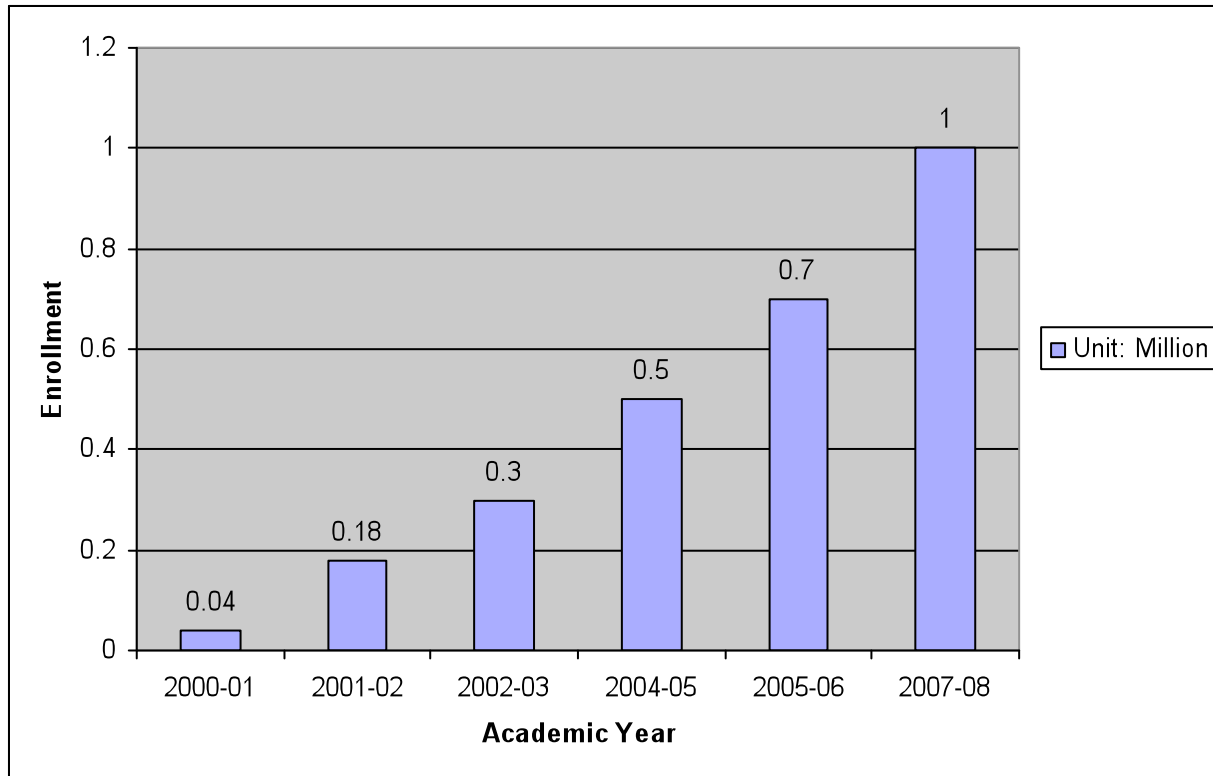


Figure 2. Online Students at K-12 Level

While virtual schooling at the K-12 level has grown in popularity, research-based investigations into successful teaching, learning and student support processes are limited (Cavanaugh, Gillan, Kromrey, Hess, & Blomeyer, 2004). One specific area of research that has not received adequate attention is the effect of parental involvement on student achievement in virtual schools. The lack of research is exacerbated by a fundamental shortage of assessments validated with K-12 virtual school populations. Black, Ferdig and Dipietro (2008) discuss this shortage by calling for the use of systematically- and empirically-validated assessments from traditional schooling to be applied to virtual schooling. This paper first provides an overview of parental involvement in traditional education. Then it discusses the role of parental involvement in K-12 virtual schooling. And finally, it describes the assessment examined in this study and reports results of the empirical validation of this parental involvement assessment with a virtual school population.

### Parental Involvement

Parental involvement has been recognized as an intangible ideal that can be connected to a large number of activities that focus on a relationship between the home and the school (Sy, Rowley & Schulenberg, 2007). Parental participation in student learning in traditional schooling environments has a positive relationship with student achievement, attendance and pro-social behaviors (Anderson et al., 1985; Cotton & Reed-Wikelund, 1989; Edwards, 2004; Henderson, 1981, 1987). This relationship is appealing to school administrators, politicians, parents and students. Thus, a considerable body of research has explored the role of parents and the effects of their involvement on student academic achievement (Christenson, Rounds & Gorney, 1992; Epstein, 1991; Keith, 1991; National Center for Education Statistics [NCES], 1997).

Parental involvement has been associated with many positive student academic outcomes (Anderson & Minke, 2007; Chavkin, 1993; Epstein, 1994; Fan, 2001; Hess & Holloway, 1984; Hoover-Dempsey & Sandler, 1995; Hoover-Dempsey et al., 2005; Kim, 2002; U.S. Department of Education, 1994). These outcomes include increased grade point average (G.P.A.) (Deslandes et al., 1999; Gutman & Midley, 2000; Henderson & Mapp, 2002; Sui-Chu & Willms, 1996), increased mathematics achievement (Izzo et al., 1999), improved writing skill (Epstein, Simon, & Salinas, 1997), and enhanced reading skill (Senechal & LeFevre, 2002). Parental involvement also has been positively associated with additional academic benefits or behavior outcomes, including lower drop-out rates (Barnard, 2004; Marcon, 1999; Rumberger, 1995; Trusty, 1999), more positive attitude toward school (Trusty, 1996), increase in time spent on homework (Comer & Haynes, 1991; Henderson & Mapp, 2002; Keith et al., 1986; Trusty, 1996), and improvement of self-regulatory ability (Brody, Flor, & Gibson, 1999). Russell (2004) believed the role of parental involvement in virtual schooling could be more important than it is in traditional schooling.

Parental involvement is a key component of both traditional and non-traditional forms of face-to-face education, including public schools, charter schools and home schooling (Bulkley & Fisler, 2003; Green & Hoover-Dempsey, 2007). The physical presence afforded by the teachers and the classroom has critical impact on the development and shaping of the academic success factors identified by Roblyer and Marhsall (2003) such as self-control ability, technological skills, self-esteem, learning motivation, and time-management skills (Harter, 1996). Given the lack of physical presence of the teacher inherent to online learning, it remains to be determined how to best provide the support to keep online learners focused on assigned tasks. Some studies (e.g., Cavanaugh et al., 2004; Ferdig, DiPietro, & Papanastasiou, 2005; McConnell, 2000; Mills, 2003) also show that online learning has its own unique characteristics although it also shares some academic success factors with traditional schooling. In light of the proximity issue associated with online learning, and the relative uncertainty regarding face-to-face educational practices that transfer into an online learning environment, the assumption cannot be made that the effects of parental involvement on student achievement in online learning will be similar to those found in tradition schooling.

### **Parental Involvement Mechanisms Model**

The original Hoover-Dempsey and Sandler model of the parental involvement process (1995, 1997), explores parental involvement by investigating the mechanisms of influence parents will engage in when they are involved. This model was established in traditional learning environments. These mechanisms that constitute the psychological antecedents of activities and behaviors engaged in by involved parents (Hoover-Dempsey & Sandler, 2005) were utilized “by parents during involvement activities that likely account for involvement’s influence on student outcomes” (Hoover-Dempsey & Sandler, 2005, p. 8); these mechanisms include parental encouragement, parental modeling, parental reinforcement, and parental instruction. The four scales measuring these four mechanisms in the Hoover-Dempsey and Sandler’s model were proved to be reliable and valid measurements (Hoover-Dempsey & Sandler, 2005). These four scales were adapted from the instrument in Martinez-Pons’s (1996) study, which demonstrated the internal consistency of this instrument (Martinez-Pons, 1996). These evidences provide the support for the validation process of this parental involvement model in the virtual learning environment in this study in order to develop one reliable and valid online parental involvement measurement. In 2009, Black used this instrument to evaluate the influence of parental

involvement on student achievement in a K-12 virtual schooling environment. See Appendix A for the scales used in this study.

**Parental encouragement.** Parents' explicit affective support for engaging students in school- or learning-related activities is the focus of parental encouragement (Hoover-Dempsey & Sandler, 2005). Martinez-Pons (1996) stated that, when facing the failure of self-regulation to engage in school activities, a child who is encouraged to persist to do so will be more likely to succeed in engaging in school work than a child who is not. The scale used in Hoover-Dempsey and Sandler's model to measure parental encouragement includes 13 items. These 13 items focus on "explicit parental support and encouragement for the student's interest in school and learning, self-efficacy for learning, and varied learning strategies" (e.g., "We encourage this child when he or she doesn't feel like doing schoolwork.") (p. 23). The alpha reliability of the scale in Hoover-Dempsey and Sandler's study was .92.

**Parental modeling.** Parental modeling (Hoover-Dempsey & Sandler, 2005) is related to the learning students can derive from parents' modeling pro-social behavior. Students' view of parental modeling in learning can help them evaluate their own academic capabilities and performance (Adunyarittigum, 1997). Students can learn by observing their parents' models (Bandura, 1997; Schunk, 1989), and they will become motivated to learn when they observe their parents are actively interested in school (Gonzalez-DeHass, Willems, & Holbein, 2005). When parents and children engage in mutual interactions related to educational activities, particularly those interactions involving cognition and behaviors related to learning, parental involvement influences student achievement outcomes through parental modeling (Hoover-Dempsey & Sandler, 2005). The scale to measure parental encouragement includes 10 items (e.g., "We show this child we like to learn new things.") and achieved an alpha reliability of .94 (Hoover-Dempsey & Sandler, 2005).

**Parental Reinforcement.** Parental reinforcement focuses on parents' "reinforcing behaviors that act to develop and maintain student attributes associated with positive learning outcomes" (Hoover-Dempsey & Sandler, 2005, p. 24). It echoes the behaviorist learning principles that emphasize the importance of consequences that will occur after a behavior, which, in turn, help the formation of specific behavior patterns (Skinner, 1989). When applied to students' learning, reinforcement theories suggest that children will repeat behaviors (or learned patterns of behaviors) when they are consistently associated with positive reinforcement (Hoover-Dempsey & Sandler, 2005). They further encourage reinforcing behaviors that promote and maintain student attributes associated with positive achievement or learning results. The scale used in Hoover-Dempsey and Sandler's model to measure parental reinforcement includes 13 items. These 13 items focused on the assessment of reinforcement that "related to the student learning attributes of primary interest" (e.g., "We show this child we like it when he or she understands how to solve problems.") (Hoover-Dempsey & Sandler, 2005, p. 24). The alpha reliability of this scale was .96 (Hoover-Dempsey & Sandler, 2005).

**Parental Instruction.** Parental instruction materializes in social interactions between parent and child during involvement activities as parties engage in shared thinking related to learning strategies, processes, outcomes, and engage in educational strategies (Hoover-Dempsey & Sandler, 2005). The scale to measure parental instruction includes 15 items (e.g., "We teach this child how to find out more about the things that interest him or her.") and achieved an alpha reliability of .92 (Hoover-Dempsey & Sandler, 2005).

In virtual schooling, these four parental involvement mechanisms have their unique implications for learning process and outcomes. Parental encouragement can be an important

addition to teacher encouragement for students who are motivated by the immediacy of face-to-face interaction and might help to keep motivation levels high during the learning process. Student-teacher interaction has been identified as one of the key factors that influence student academic achievement in online learning (Blomeyer, 2002; Cavanaugh, 2001; Cavanaugh, 2007; Cavanaugh et al., 2005; Hughes et al., 2005; NACOL, 2006; Swan, 2002; Swan, 2003; Tallent-Runnels et al., 2006; Zhao et al., 2004; Zucker, 2005). Parental encouragement can be a mechanism for valuable interactions between students and their online teachers. Parental encouragement can also be an important force for elongated student participation and engagement in academic activities, which has been considered an important success factor for online learning (Cavanaugh, 2007; Dickson, 2005; O' Dwyer et al., 2007; Wang & Newlin, 2000).

Compared to traditional classrooms, online teachers lack regular cues such as facial expressions and body positions to discern students' confusion or frustration in virtual learning environments. Parental modeling and reinforcement could play an important role in motivating students to take more learning responsibility and persevere to achieve learning goals. By demonstrating their high interest in school and the high value of education, parents can be role models who inspire students to stick with their learning tasks and be determined to solve any problems they may have during the learning process. Parental reinforcement could lend the support for the establishment of good learning habits during the online learning process such as high focus and persistence. Parental instruction can help students obtain effective educational strategies during the online learning process via the communication between students and parents. This is specifically important for virtual schooling because of the lack of physical presence of teachers in the virtual learning environment.

The Parental Involvement Mechanism Model under investigation in this study includes these four factors/latent variables and 51 items. These 51 items, considered as the observed variables, tend to measure the four latent variables. Within these 51 observed variables, v1-v13 measure parental encouragement, v14-v23 measure parent modeling, v24-v36 measure parental reinforcement, and v37-v51 measure parental instruction. The path diagram of the model is illustrated in Figure 3.

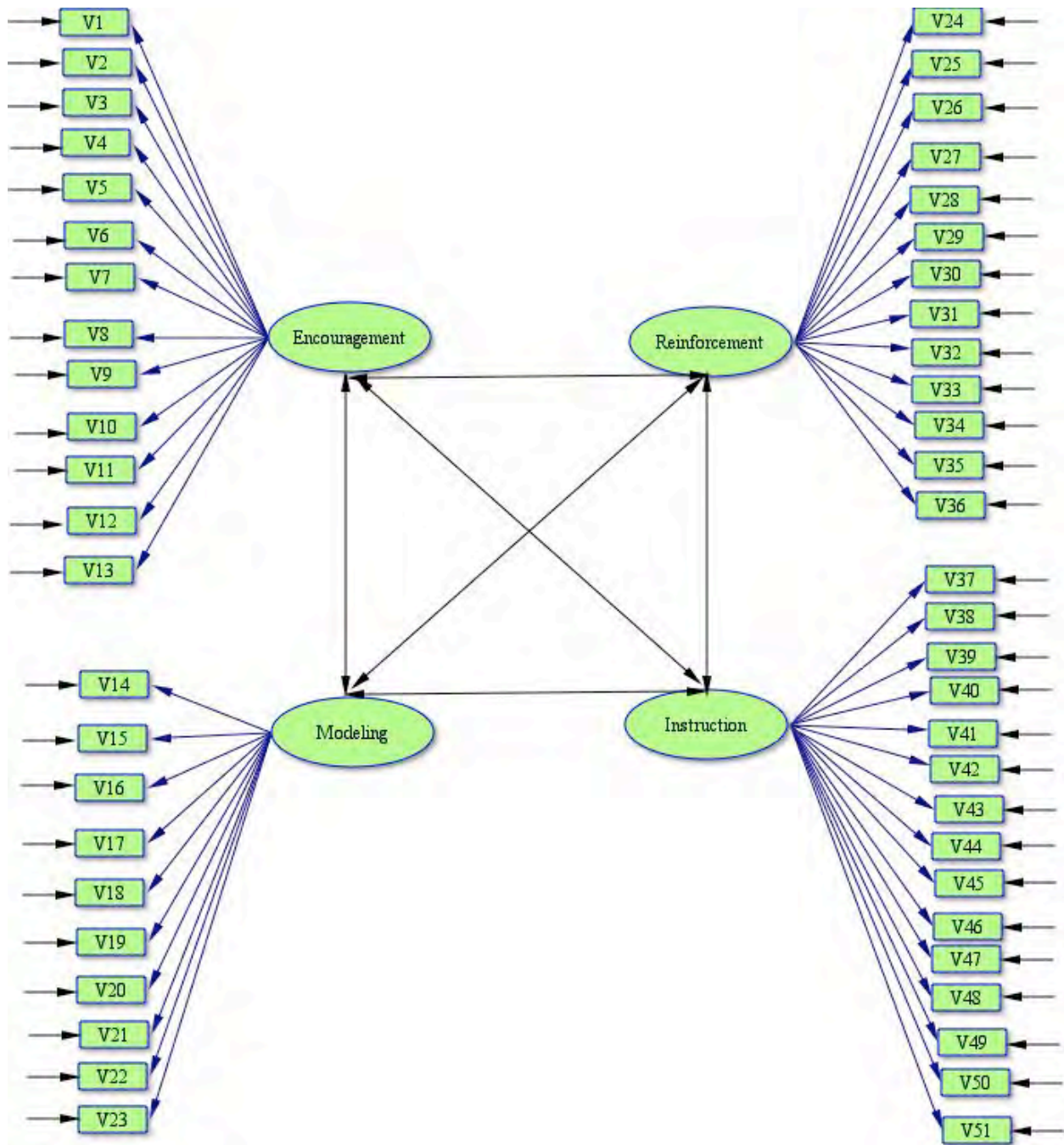


Figure 3. Partial Involvement Mechanisms Model.

### Significance of this Study

As mentioned before, the Parental Involvement Mechanisms Model in Hoover-Dempsey and Sandler's study was established in the traditional learning environment. Its reliability and validity need to be verified in the virtual learning environment in order for researchers to use this model in online education practice. At present, there is no published work utilizing structural equation modeling to validate the Parental Involvement Mechanisms Model even though the reliability coefficient (Cronbach's  $\alpha$ ) of the four sub-scales have been reported in Hoover-Dempsey and Sandler's study. Martinez-Pons (1996) conducted a confirmatory factor analysis to

report the four measures of parental modeling, encouragement, facilitation, and rewarding of the students' self-regulation loaded on a factor that is related to student academic achievement. The present study is using structural equation modeling to validate the Parental Involvement Mechanisms Model's relevance in the virtual learning environment. It will help promote more research on the influence of parental involvement on student academic achievement in online learning environments for the better practice and implementation of K-12 virtual schooling.

## Method

### Participants and Data Collection

This study employed an online survey using an instrument adapted from research by Hoover-Dempsey and Sandler (2005). Data were collected from a population of virtual school students and their parents in a two-tiered fashion. Tier one targeted parents of virtual school students. Tier two targeted the child enrolled in the virtual school related to a responding parent. Responses were analyzed and achievement data, in the form of a semester grade for the course (or average grade for the courses) in which the child was enrolled during the summer 2007, fall 2007 and spring 2008 semesters, were collected and evaluated in relation to the surveys.

The virtual school surveyed in this study is a state-level institution located in the Southeastern U.S., meaning its central administering agency is a state department of education and primary means of funding is through state-level funds. The school describes itself as a supplementary online educational program created to serve public, private and home school study student populations from across the state. Online courses are provided within the traditional agrarian school calendar. These courses consist of 78 core curriculum offerings, AP and elective courses. Virtual school students are primarily high school students, though there is a limited set of courses available to middle school students. The virtual school offers both state-funded and tuition-funded seats to students. Local school districts are responsible for establishing the policy regarding the number of state-funded course enrollments in which a student may participate at a given time.

The state-led virtual school participating in this study has established data infrastructures that allow access to parent email, address and phone number information and student achievement data. Given the ease and speed by which Internet-based surveys can be conducted and the validity of the data collection medium when compared to traditional means, utilizing the Internet to obtain student and parent responses was optimal (Chang & Krosnick, 2002).

Participants were recruited from a listing of parents whose children were enrolled in grades 9-12 virtual school courses. Demographic information indicates that the virtual school population consists of a racially diverse student body; while not completely representative of the state's face-to-face school population, the population compares favorably with other state virtual schools in terms of the ratio of virtual school to statewide enrollment percentages for minority students (Clark & Blomeyer, 2007).

Course content was not taken into account when recruiting students since the composition of the student population limits the ability to build a substantive sample population within a specific content area. Evidence for this is provided through analysis of the virtual school's enrollment data for spring 2007. These data indicate a mean enrollment of 15 students ( $SD = 9.7$ ) in 181 courses in eight course content areas. This diversity would hinder the composition of a sample of substantive size and statistical relevance. Additionally, research indicates that



intrastate virtual school populations are relatively homogeneous (Zucker & Kozma, 2003), which may serve as a potential confound, though it represents an opportunity for future analysis.

The sample used in this study consisted of 938 parents. The respondents were asked to provide demographic information including information related to gender, employment, income, and average time spent at work and education. See Table 1 in Appendix B for this information. The sample can be described as primarily white, female, upper-middle class, well-educated, who are employed in full-time professional occupations. The sample can be described as primarily White, upper-middle class, well educated females who are employed in full-time professional occupations. Of those providing employment information, the largest segment (27%) of the sample described the nature of their employment as professional or executive, followed by teacher (18%) and unemployed, retired, student or disabled (11%). Only 6% of the sample reported annual household incomes of less than \$30,000, while 51% of respondents disclosed household incomes greater than \$60,000 annually.

A majority of respondents reported working more than 20 hours during the average week, with 41% of respondents indicating that they worked more than 41 hours during the average week. With the exception of 3 respondents, the sample consisted of high school graduates. Forty-six percent (46%) of respondents had obtained a bachelors degree, and 27% of respondents had post-baccalaureate educational experience at the graduate level.

## Measures

The instrument used in this study includes 51 items that were adapted from the Hoover-Dempsey and Sandler (2005) study to measure the four parental mechanisms. Hoover-Dempsey and Sandler's survey was revised by excluding questions from the parent survey that were only relevant to face-to-face school involvement. Two factors influenced the reduction of the Hoover-Dempsey and Sandler items: geography and existing research. Given that virtual schools do not have a physical location, there are specific limits to a parent's ability to self-involve specific to the virtual school. The refined survey was then subjected to a content review by three subject-matter experts. Through this process, the survey was made more appropriate for use with an online learning population.

The refined instrument employs a six-point Likert-type response scale: 1 = not at all true, 2 = a little bit true, 3 = somewhat true, 4 = often true, 5 = mostly true, 6 = completely true. The ordinal measurement level of the observations determined the input of a raw data matrix during data analysis (see Appendix A for this instrument). It is hypothesized that these 51 items measure four latent variables: parental encouragement, parent modeling, parental reinforcement, and parental instruction. Within these 51 observed variables, v1-v13 measure parental encouragement, v14-v23 measure parent modeling, v24-v36 measure parental reinforcement, and v37-v51 measure parental instruction. The path diagram of the model is illustrated in Figure 3.

## Analysis

Excluding demographic information, missing data accounted for as little as .003% of responses to a question and as many as 13% responses to a question. Data were analyzed using Mplus, Version 5.1 (Muthen & Muthen, 2007). Diagonally weighted least square was utilized for parameter estimation. The goodness of fit chi-square was a Satorra-Bentler chi-square. Indices of fit provided by Mplus-PC used to assess the goodness of fit of the models were the ratio of chi-square to the number of freedom, the Tucker-Lewis index (TLI), and Comparative fit index (CFI).

## Results

Responses by 938 individuals to the 51 items of the parental involvement mechanisms were analyzed at the item level using Confirmatory Factor Analysis (CFA). The chi-square of goodness-of-fit test for the hypothesized four-factor model consisting of parental encouragement, parent modeling, parental reinforcement, and parental instruction was significant,  $\chi^2$  (1218,  $N=938$ ) = 11064.904,  $p < .001$ , which, in part, could be due to the large sample size ( $N=938$ ). However, other goodness-of-fit indices showed the model fit the data well, such as CFI = .973, TLI = .972, both exceeding .95, the proposed value by Hu and Bentler (1999) for these two fit indices as a reasonable minimum for model acceptance. The reliability coefficient (Cronbach's  $\alpha$ ) of these four scales were .91, .88, .90 and .93 for parent report of encouragement, parent report of modeling, parent report of reinforcement and parent report of instruction, respectively. The items' squared multiple correlation coefficients, residual variances and standardized factor loadings for the four-factor model are shown in Table 2. All factor loadings were statistically significant with  $p = .001$ . The factor loadings for item 37 and 38, .429 and .452 respectively, were comparatively weak. The latent variable, associated with these two items, parent instruction, focuses on the interactions between parent and child when the two parties "engage in shared thinking related to learning strategies and processes" (Hoover-Dempsey & Sandler, 2005, p. 24), and "collaborate on learning skills, tasks, strategies" (Hoover-Dempsey & Sandler, 2005, p. 24). However, item 37 and 38 concern more about the general strategies employed to facilitate children doing schoolwork (see Table 2), not necessarily associated with learning occurrence and cognition change which is the area that parent instruction concerns. Therefore, the indicator of the association between the item and latent variable in factor analysis: factor loading, was not strong for item 37 and 38.

Table 2

*Items and Factor Loadings for Parental Involvement Mechanisms Model with an Ordinal Measurement Scale*

Item	Factors				Squared multiple Correlation (R <sup>2</sup> )	Residual Variance	P- Value
	Encouragement	Modeling	Reinforcement	Instruction			
We encourage this child							
1. ... when he or she doesn't feel like doing schoolwork.	.760				.578	.422	.000
2. ... when he or she has trouble organizing schoolwork.	.784				.615	.385	.000
3. ... to try new ways to do schoolwork when he or she is having a hard time.	.778				.605	.395	.000
4. ... to be aware of how he or she is doing with schoolwork.	.783				.613	.387	.000
5. ... when he or she has trouble doing schoolwork.	.801				.642	.358	.000
6. ... to look for more information about school subjects.	.722				.521	.479	.000
7. ... to develop an interest in schoolwork.	.740				.547	.453	.000
8. ... to believe that he/she can do well in school.	.879				.772	.228	.000
9. ... to stick with problems until he/she solves it.	.918				.843	.157	.000

10.	... to believe that he/she can learn new things.	.715	.511	.489	.000
11.	... to ask other people for help when a problem is hard to solve.	.684	.468	.532	.000
12.	... to explain what he/she thinks to the teacher.	.674	.455	.545	.000
13.	... to follow the teacher's directions.	.841	.707	.293	.000
We show this child that we					
14.	... like to learn new things.	.786	.617	.383	.000
15.	... know how to solve problems.	.780	.608	.392	.000
16.	... enjoy figuring things out.	.803	.645	.355	.000
17.	... do not give up when things get hard.	.818	.670	.330	.000
18.	... ask others for help when a problem is hard to solve.	.754	.568	.432	.000
19.	... can explain what we think to others.	.758	.574	.426	.000
20.	... can learn new things.	.859	.738	.262	.000
21.	... want to learn as much as possible.	.824	.679	.321	.000
22.	... like to solve problems.	.800	.639	.361	.000
23.	... try different ways to solve a problem when things get hard.	.866	.750	.250	.000

---

 We show this child we like it when he or she

24.	... wants to learn new things.	.903	.815	.185	.000
25.	... tries to learn as much as possible.	.911	.830	.170	.000
26.	... has a good attitude about doing his or her homework.	.889	.790	.210	.000
27.	... keeps working on homework even when he or she doesn't feel like it.	.823	.677	.323	.000
28.	... asks the teacher for help.	.837	.701	.299	.000
29.	... explains what he or she thinks to the teacher.	.794	.630	.370	.000
30.	... explains to us what he or she thinks about school.	.810	.657	.343	.000
31.	... works hard on homework.	.847	.717	.283	.000
32.	... understands how to solve problems.	.867	.751	.249	.000
33.	... sticks with a problem until he or she solves it.	.866	.750	.250	.000
34.	... organizes his or her schoolwork.	.819	.671	.329	.000
35.	... checks his or her work.	.802	.644	.356	.000
36.	... finds new ways to do schoolwork when he or she gets stuck.	.864	.747	.253	.000

---

 We teach this child

37.	... to go at his or her own pace while doing schoolwork .	.421	.177	.823	.000
38.	... to take a break from his or her work when he or she gets frustrated.	.402	.162	.838	.000
39.	... how to check homework as he or she goes along.	.622	.387	.613	.000
40.	... how to get along with others in his or her class.	.690	.477	.523	.000
41.	... to follow the teacher's directions.	.728	.530	.470	.000
42.	... how to make his or her homework fun.	.588	.346	.654	.000
43.	... how to find out more about the things that interest him or her.	.767	.588	.412	.000
44.	... to try the problems that help him or her learn the most.	.709	.502	.498	.000
45.	... to have a good attitude about his or her homework.	.800	.640	.360	.000
46.	... to keep trying when he or she gets stuck.	.825	.680	.320	.000
47.	... to stick with his or her homework until he or she finishes it.	.754	.569	.431	.000
48.	... to work hard.	.833	.694	.306	.000

---

49.	... to communicate with the teacher when he or she has questions.	.815	.664	.336	.000
50.	... to ask questions when he or she doesn't understand something.	.873	.762	.238	.000
51.	... to make sure he or she understands one part before going onto the next.	.731	.534	.466	.000

---

The correlations among the four factors shown in Table 3 provide evidence of strong interrelationships amongst the four factors. The high correlations among them, to some degree, indicate the items that tend to overlap with each other, despite the fact that they measure different factors.

Table 3

*CFA Factor Correlations*

Factor	1	2	3	4
1	1.000			
2	0.755	1.000		
3	0.755	0.804	1.000	
4	0.772	0.736	0.777	1.000

### Discussion

In virtual learning environments, parental involvement in student academic activities are especially important for student academic achievement considering the lack of physical presence of teachers and the chunk of time students spend on learning at home. This makes it important to develop one reliable and valid measurement for parental involvement for research in student academic achievement in the virtual learning environment. The large standardized factor loadings of items 1-13 in table 2 show that these 13 items are valid indicators of the parental encouragement construct. The large reliability coefficient of the parental encouragement scale composed of items 1-13, .91, tells us this scale is a reliable instrument. These demonstrate the reliability and validity of the parental encouragement scale. In virtual learning environments, researchers could use this scale as a measure of parental encouragement. The parental encouragement mechanism could be integrated into online course design and the teaching process to promote high levels of student-teacher interaction, student's self-confidence and self-discipline ability.

For the parental modeling construct, the large standardized factor loadings (items 14-23) in table 2 and the large reliability coefficient of the parental modeling scale, .88, tell us this scale is a reliable and valid instrument. Similarly, for the parental reinforcement construct, the large standardized factor loadings (items 24-36) and the large reliability coefficient of the parental reinforcement scale, .90, tell us this scale is a reliable and valid instrument. In virtual learning environments, parental modeling and parental reinforcement mechanisms can be employed to promote students' self-learning responsibilities and perseverance during the learning process. They can also help promote student-teacher interaction and good learning attitude for students. These are all very important attributes conducive to online success, given the lack of face-to-face meeting between student and teacher in virtual learning environments. For the parental instruction construct, the large standardized factor loadings (items 39-51) and the large reliability



coefficient of the parental instruction scale, .93, tell us this scale is overall a reliable and valid instrument though the two items 37 and 38 potentially overlap with other items in this scale. In virtual learning environments the parental instruction mechanism can be employed to help students grasp effective learning strategies and encourage different forms of interaction including student-student, student-teacher and student-content.

The reliability coefficients of the four scales, .91, .88, .90 and .93, show this instrument as a whole is a reliable measurement for the four parental involvement mechanisms: parental encouragement, parent modeling, parental reinforcement, and parental instruction. The chi-square of goodness-of-fit test for the hypothesized four-factor model, 11064.904, was significant ( $p < .001$ ). This, in part, could be due to the large sample size ( $N=938$ ). The goodness-of-fit indices, CFI=.973, TLI=.972, all exceeded .95, which is the proposed value by Hu and Bentler (1999) for these two fit indices as a reasonable minimum for model acceptance. This showed the model fit the data quite well. The large standardized factor loadings of all items except 37 and 38 shown in table 2 tell us the instrument utilized in Hoover-Dempsey and Sandler's (2005) model to measure the four parental involvement mechanisms is valid with respect to the relationship between the items/indicators and the corresponding mechanisms/latent variables the items tend to measure.

The validation of the parental involvement instrument in a virtual learning environment conducted in this study will be beneficial for the practice of virtual schooling. It can promote more research on the influence of parental involvement in online learning, which could lead to the better management of K-12 virtual schooling. For example, researchers could use this instrument as the measurement for parental involvements to investigate its impact on student academic performance and student satisfaction with their online learning experience. The researchers could also use this instrument to examine the interaction between parental involvement and student age, grade, subject matter, and demographics with respect to their effects on student academic achievement in virtual learning environments. This could contribute to the investigation of online success factors in K-12 virtual schooling.

### **Conclusion and Future Study**

In this study, Hoover-Dempsey and Sandler's Parental Involvement Mechanisms Instrument including the four factors – parent reinforcement, parent modeling, parent encouragement, and parent instruction – was analyzed using Confirmatory Factor Analysis (CFA) with data collected from a state-led virtual school. The results show this instrument is overall a valid and reliable measurement of parental involvement in virtual learning environments. Given the dearth of studies on academic achievement in virtual learning environments in comparison with that in traditional learning environments (Smith, Clark, & Blomeyer, 2005), this study will be beneficial to educators, researchers, online program administrators, and society at large. It could shed light on the process of the design and development of a reliable and valid instrument in online learning research. It also called for more validation studies with instruments in online learning environments. This study provides the evidence for the establishment of a quantitative model during the online learning process and will help promote more rigorous quantitative research in online education in general and the virtual school learning environment in specific. It also has practical implications for virtual school teachers who can make good use of parental involvement mechanisms during the design and

development of academic activities, such as the development of learning materials and implementation of instructional strategies.

The results of this study also indicated the need for more research. The strong relationship between the parental modeling and parental reinforcement factors, .804, called for further study of the reorganization of the 23 items (items 14-23 for parental modeling, items 24-36 for parental reinforcement) to better measure the corresponding mechanisms. CFA was the only factor analysis method used in this study to measure the goodness of fit for this instrument. In future study, Exploratory Factor Analysis (EFA) could be used as the analysis method for this instrument for richer understanding of the relationship between the items/indicators and their corresponding factors/mechanisms. Further study can also be conducted to compare the role of parental involvement in improving academic achievement among different groups of virtual school students distinguished by the location where they spent the majority of the time learning, i.e. purely online or partly at home and partly at school (blended/hybrid).

## References

- Adunyarittigun, D. (1997). *Effects of the Parent Volunteer Program Upon Students' Self-Perception as a Reader*, ERIC Document Reproduction Service No. ED404617, University of Maryland, College Park, MD.
- Allen, I.E. & Seaman, J. (2006). *Making the Grade: Online Education in the United States*. Needham, MA: Sloan Consortium. Retrieved from [http://www.sloan-c.org/publications/survey/pdf/Making\\_the\\_Grade.pdf](http://www.sloan-c.org/publications/survey/pdf/Making_the_Grade.pdf)
- Allen, I.E. & Seaman, J. (2007). *Online Nation: Five Years of Growth in Online Learning*. Needham, MA: Sloan Consortium. Retrieved from [http://www.sloan-c.org/publications/survey/pdf/online\\_nation.pdf](http://www.sloan-c.org/publications/survey/pdf/online_nation.pdf)
- Anderson, K., & Minke, K. (2007). Parent involvement in education: Toward an understanding of parents' decision making. *The Journal of Educational Research*, 100 (5).
- Anderson, R.C., Hiebert, E., Scott, J.A. & Wilkinson, I.A.G. (1985). *Becoming a nation of readers: The report of the commission on reading*. Washington, DC: The National Institute of Education. Retrieved from <http://www.eric.ed.gov/PDFS/ED253865.pdf>
- Barnard, W. M. (2004). Parent involvement in elementary school and educational attainment. *Child and Youth Services Review*, 26, 39–62.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.
- Black, E. W. (2009). An evaluation of family involvements' influence on student achievement in K-12 virtual schooling. (Unpublished dissertation). The University of Florida, Gainesville, FL.
- Black, E.W., Ferdig, R.E. & DiPietro, M. (2008). An overview of evaluative instrumentation for virtual high schools. *The American Journal of Distance Education*, 22(1), 24-45.
- Blomeyer, R. (2002). Online learning for K-12 students: What do we know now? North Central Regional Educational Laboratory. Retrieved from <http://www.ncrel.org/tech/elearn/synthesis.pdf>
- Brody, G. H., Flor, D. L., & Gibson, N. M. (1999). Linking maternal efficacy beliefs, developmental goals, parenting practices and child competence in rural single-parent African American families. *Child Development*, 70, 1197–1208.
- Bulkley, K., & Fidler, J. (2003). A decade of charter schools: From theory to practice. *Educational Policy* 17 (3): 317–42.
- Cavanaugh, C. (2001). The effectiveness of interactive distance education technologies in K-12 learning: A meta-analysis. *International Journal of Educational Telecommunications* 7(1): 73-88.
- Cavanaugh, C. (2007). Students achievement in elementary and high school. In *Handbook of distance education*, ed. M. G. Moore, 157-168. Mahwah, NJ: Lawrence Erlbaum Associates.
- Cavanaugh, C., Gillan, K. J., Bosnick, J., Hess, M., & Scott, H. (2005). *Succeeding at the gateway: Secondary algebra learning in the virtual school*. Jacksonville, FL: University of North Florida.

- Cavanaugh, C., Gillan, K. J., Kromrey, J., Hess, M., & Blomeyer, R. (2004). The effects of distance education on k-12 student outcomes: A meta-analysis. Naperville, IL: Learning Point Associates.
- Chavkin, N. F. (Ed.). (1993). *Families and schools in a pluralistic society*. Albany, NY: State University of New York Press.
- Christenson, S.L., Rounds, T., and Gorney, D. (1992). Family factors and student achievement: An avenue to increase students' success. *School Psychology Quarterly*, 7, 178-206.
- Clark, T. (2001). Virtual schools: Trends and issues. Phoenix, AZ: WestEd/Distance Learning Resource Network. Retrieved from [http://www.wested.org/online\\_pubs/virtualschools.pdf](http://www.wested.org/online_pubs/virtualschools.pdf)
- Clark, T. & Blomeyer, B. (2007). Georgia virtual school evaluation: Final report. Submitted to K. Clements, Georgia Department of Education. 72 manuscript pages.
- Comer, P. J., & Haynes, N. M. (1991). Parent involvement in schools: An ecological approach. *Elementary School Journal*, 91, 271–277.
- Cotton, K., & Reed-Wikelund, K. (1989). *Parent involvement in education*. NWREL, Retrieved from Education Northwest | Creating Strong Schools and Communities website: [<http://www.nwrel.org/scpd/sirs/3/cu6.html>]
- Deslandes, R., Royer, E., Potvin, P., & Leclerc, D. (1999). Patterns of home and school partnership for general and special education students at the secondary level. *Exceptional Children*, 65(4), 496–506.
- Dickson, W. P. (2005). *Toward a deeper understanding of student performance in virtual high school courses: Using quantitative analyses and data visualization to inform decision making*. Naperville, IL: Learning Point Associates. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.125.3064&rep=rep1&type=pdf>
- Edwards, P.A. (2004). *Children's literacy development: Making it happen through school, family, and community involvement*. Boston: Pearson.
- Espstein, J.L. (1991). Paths to partnership. *Phi Delta Kappan*, 72(5), 344-350.
- Epstein, J. L. (1994). Perspectives and previews on research and policy for school, family, and community partnerships. Paper presented at the National Symposium, Family-School Links: How Do They Effect Educational Outcomes? Pennsylvania State University.
- Epstein, J. L., Simon, B. S., & Salinas, K. C. (1997). Involving parents in homework in the middle grades. *Research Bulletin* (No.18). Bloomington, IN: Phi Delta Kappan/Center for Evaluation, Development and Research.
- Fan, V. (2001). Parental involvement and students' academic achievement: A growth modeling analysis. *Journal of Experimental Education*, 70, 27–61.
- Ferdig, R. E., DiPietro, M., & Papanastasiou, E. (2005). Teaching and learning in collaborative virtual high schools. Naperville, IL: Learning Point Associates.
- Glass, V. G. (2009). The realities of K-12 virtual education. Boulder and Tempe: Education and the Public Interest Center & Education Policy Research Unit. Retrieved from The Realities of K-12 Virtual Education | Education and Public Interest Center website: <http://epicpolicy.org/files/PB-Glass-VIRTUAL.pdf>

- Gonzalez-DeHass, A., Willems, P., & Holbein, M. (2005). Examining the relationship between parental involvement and student motivation. *Educational Psychology Review, 17*, 99-123.
- Green, C.L. & Hoover-Dempsey, K. (2007). Why do parents homeschool? A systematic examination of parental involvement. *Education and Urban Society, 39*(2), 264-285.
- Gutman, L. M., & Midgley, C. (2000). The role of protective factors in supporting the academic achievement of poor African American students during the middle school transition. *Journal of Youth and Adolescence, 29*, 233–248.
- Harter, S. (1996). Teacher and classmate influences on scholastic motivation, self-esteem, and level of voice in adolescents. In J. Juvonen & K. Wentzel (Eds.), *Social Motivation: Understanding Children's School Adjustment* (pp. 11–42). New York: Cambridge Univ. Press
- Henderson, A. (1987). *The evidence continues to grow: Parental involvement improves school achievement*. Columbia, MD: National Committee for Citizens in Education. (ERIC Document Reproduction Service No. ED315199)
- Henderson, A. (Ed.). (1981). *Parent participation-student achievement: The evidence grows*. [occasional paper]. Columbia, MD: National Committee for Citizens in Education. (ERIC Document Reproduction Service No. ED206963).
- Henderson, A. T., & Mapp, K. L. (2002). *A new wave of evidence: The impact of school, family, and community connections on student achievement*. Austin, TX: Southwest Educational Development Laboratory.
- Hess, R. D., & Holloway, S. D. (1984). Family and school as educational institutions. In R. D. Parke (Ed.), *Review of child development research: Vol. 7. The family* (pp. 179-222). Chicago: University Chicago Press.
- Hoover-Dempsey, K. V., & Sandler, H. M. (1995). Parental involvement in children's education: Why does it make a difference? *Teachers College Record, 95*, 310-331. Retrieved from [http://www.vanderbilt.edu/peabody/family-school/papers/childrens\\_education.pdf](http://www.vanderbilt.edu/peabody/family-school/papers/childrens_education.pdf)
- Hoover-Dempsey, K.V., & Sandler, H. M. (2005). *Final Performance Report for OERI grant # R305T010673: The Social context of parental involvement: A path to enhanced achievement*. Paper presented to Project Monitor, Institute of Education Sciences, U.S. Department of Education.
- Hoover-Dempsey, K. V., Walker, J. M. T., Sandler, H. M., Whetsel, D., Green, C. L., Wilkins, A. S., et al. (2005). Why do parents become involved? Research findings and implications. *Elementary School Journal, 106*(2), 105-130.
- Hughes, J. E., McLeod, S., Brown, R., Maeda, Y., & Choi, J. (2005). Staff development and student perceptions of the learning environment in virtual and traditional secondary schools. Naperville, IL: North Central Regional Educational Laboratory, Learning Point Associates.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

- Izzo, C. V., Weissberg, R. P., Kasprow, W. J., & Fendrich, M. (1999). Longitudinal assessment of teacher perceptions of parent involvement in children's education and school performance. *American Journal of Community Psychology, 27*, 817–839.
- Keith, T.Z. (1991). Parent involvement and achievement in high schools. In S. Silvern (Ed.), *Advances in Reading/Language Research: Literacy Through Family, Community, and School Interaction (Vol. 5)*, Greenwich, CT: JAI Press.
- Keith, T. Z., Reimers, T. M., Fehrmann, P. G., Pottebaum, S. M., and Aubey, L. W. (1986). Parental involvement, homework, and TV time: Direct and indirect effects on high school achievement. *J. Educ. Psychol. 78*(5): 373–380.
- Kim, E. (2002). The relationship between parental involvement and children's educational achievement in the Korean Immigrant Family. *Journal of Comparative Family Studies, 33*(4), 529–543.
- Marcon, R. A. (1999). Positive relationships between parent school involvement and public school inner-city preschoolers' development and academic performance. *School Psychology Review, 28*(3), 395–412.
- Martinez-Pons, M. (1996). Test of a model of parental inducement of academic self-regulation. *Journal of Experimental Education, 64*(3), 312–227.
- McConnell, D. (2000). *Implementing computer supported cooperative learning*. London: Kogan Page Limited.
- Mills, S. (2003). Implementing Online Secondary Education: An Evaluation of a Virtual High School. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2003* (pp. 444–451). Chesapeake, VA: AACE. Retrieved from <http://www.editlib.org/p/17933>
- National Center for Education Statistics (NCES). (1997). Father's involvement in their children's schools. Washington, DC: U.S. Department of Education
- Newman, A., Stein, M., & Trask, E. (2003). What can virtual learning do for your school? Boston, MA: Eduventures.
- North American Council for Online Learning. (2006). National Standards for Quality Online Teaching. Retrieved from <http://www.inacol.org/resources/nationalstandards/NACOL%20Standards%20Quality%20Online%20Teaching.pdf>
- O'Dwyer, L., Carey, R. & Kleiman, G. (2007). A study of the effectiveness of the Louisiana Algebra I online course. *Journal of Research on Technology in Education, 39*(3), 289–306
- Peak Group. (2002). Virtual schools across America. Los Altos, CA: Author.
- Picciano A. G., & Seaman, J. (2007). K–12 Online Learning: A Survey of U.S. School District Administrators. Needham, MA: Sloan Consortium. Retrieved from: [http://www.sloanconsortium.org/sites/default/files/K-12\\_Online\\_Learning\\_1.pdf](http://www.sloanconsortium.org/sites/default/files/K-12_Online_Learning_1.pdf)
- Picciano A. G., & Seaman, J. (2009). K–12 Online Learning: A 2008 Follow-up of the Survey of U.S. School District Administrators. Needham, MA: Sloan Consortium. Retrieved from: [http://www.sloanconsortium.org/publications/survey/pdf/k-12\\_online\\_learning\\_2008.pdf](http://www.sloanconsortium.org/publications/survey/pdf/k-12_online_learning_2008.pdf)
- Roblyer, M. D., & Marshall, J. C. (2003). Predicting the success of virtual high school students: Preliminary results from an educational success prediction instrument. *Journal of Research on Technology in Education 35*(2): 241–256.

- Rumberger, R. W. (1995). Dropping out of middle school: A multilevel analysis of students and schools. *American Educational Research Journal*, 32, 583–625.
- Russell, G. (2004). Virtual schools: A critical view. In C. Cavanaugh (Ed.), *Development and management of virtual schools: Issues and trends* (pp. 1–25). Hershey, PA: Idea Group.
- Schunk, D. H. (1989). Social cognitive theory and self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement* (pp.83-110). New York, NY: Springer-Verlag.
- Senechal, M., & LeFevre, J. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development*, 73, 445–460.
- Setzer, C. J., & Lewis, L. (2005). Distance education courses for public elementary and secondary school students: 2002–2003 (No. NCES 2005-010). Washington, DC: National Center for Education Statistics.
- Skinner, B. F. (1989). The origins of cognitive thought. *American Psychologist*, 44, 13-18.
- Smith, R., Clark, T., & Blomeyer, R. (2005). A synthesis of new research on K–12 online learning. Naperville, IL: Learning Point Associates.
- Sui-Chu, E. H., & Willms, J. D. (1996). Effects of parent involvement on eighth-grade achievement. *Sociological Quarterly*, 69(2), 126–141.
- Swan, K. (2002). Building communities in online courses: the importance of interaction. *Education, Communication and Information*, 2 (1), 23-49.
- Swan, K. (2003). Learning effectiveness: what the research tells us. In J. Bourne & J. C. Moore (Eds) *Elements of Quality Online Education, Practice and Direction*. Needham, MA: Sloan Center for Online Education, 13-45.
- Sy, S. R., Rowley, S. J. & Schulenberg, J. E. (2007). Predictors of parent involvement across contexts in Asian American and European American families. *Journal of Comparative Family Studies*, 38(1), pp.1-29.
- Tallent-Runnels, M. K., Thomas, J. A., Lan, W. Y., Cooper, S., Ahern, T. C., Shaw, S. M., & Liu, X. (2006). Teaching courses online: A review of the research. *Review of Educational Research*, 76(1), 93–135.
- Trusty, J. (1996). Relationship of parental involvement in teens' career development to teens' attitudes, perceptions and behavior. *J. Res. Dev. Educ.* 30(1): 63–69.
- Trusty, J. (1999). Effects of eighth-grade parental involvement on late adolescents' educational experiences. *Journal of Research and Development in Education*, 32(4), 224–233.
- Tucker, B. (2007). Laboratories of reform: Virtual high schools and innovation in public education. Education Sector Reports. Retrieved from [http://www.educationsector.org/usr\\_doc/Virtual\\_Schools.pdf](http://www.educationsector.org/usr_doc/Virtual_Schools.pdf)
- U.S. Department of Education. (1994). *Strongfamilies. strong schools: Building community partnerships for learning*. Washington, DC: Author.
- Wang, A. Y., & Newlin, M. H. (2000). Characteristics of students who enroll and succeed in psychology web-based classes. *Journal of Educational Psychology*, 92(1) 137-143.
- Watson, J., Gemin, B. & Ryan, J. (2008). Keeping pace with k-12 online learning: A review of state level policy and practice. Naperville, IL: North Central Regional Educational Laboratory.

- Zandberg, I., Lewis, L., & Greene, B. (2008). Technology-Based Distance Education Courses for Public Elementary and Secondary Schools Students: 2002-03 and 2004-05. National Center for Education Statistics, U.S. Department of Education. Retrieved from: <http://nces.ed.gov/pubs2008/2008008.pdf>
- Zhao, Y., Lei, J., Yan, B., & Tan, S. (2004). What makes the difference? A practical analysis of research on the effectiveness of distance education. Retrieved from <http://ott.educ.msu.edu/literature/report.pdf>
- Zucker, A. (2005). *A study of student interaction and collaboration in the Virtual High School*. Naperville, IL: Learning Point Associates.
- Zucker, A. A., Kozma, R. (2003). *Virtual high school: Teaching generation X*. Teachers College Press, New York, NY.



## Appendix A

### Instrument: Parental Involvement Mechanisms Measurement

The instrument to measure the four variables employs a six-point Likert-type response scale:

1 = not at all true, 2 = a little bit true, 3 = somewhat true, 4 = often true, 5 = mostly true,  
6 = completely true.

The following are the items that tend to measure the corresponding variables:

We encourage this child ... (parental encouragement)

1. ... when he or she doesn't feel like doing schoolwork.
2. ... when he or she has trouble organizing schoolwork.
3. ... to try new ways to do schoolwork when he or she is having a hard time.
4. ... to be aware of how he or she is doing with schoolwork.
5. ... when he or she has trouble doing schoolwork.
6. ... to look for more information about school subjects.
7. ... to develop an interest in schoolwork.
8. ... to believe that he/she can do well in school.
9. ... to stick with problems until he/she solves it.
10. ... to believe that he/she can learn new things.
11. ... to ask other people for help when a problem is hard to solve.
12. ... to explain what he/she thinks to the teacher.
13. ... to follow the teacher's directions.

We show this child that we ... (parental modeling)

14. ... like to learn new things.
15. ... know how to solve problems.
16. ... enjoy figuring things out.
17. ... do not give up when things get hard.
18. ... ask others for help when a problem is hard to solve.
19. ... can explain what we think to others.
20. ... can learn new things.
21. ... want to learn as much as possible.
22. ... like to solve problems.
23. ... try different ways to solve a problem when things get hard.

We show this child we like it when he or she ... (parental reinforcement)

24. ... wants to learn new things.
25. ... tries to learn as much as possible.
26. ... has a good attitude about doing his or her homework.
27. ... keeps working on homework even when he or she doesn't feel like it.
28. ... asks the teacher for help.
29. ... explains what he or she thinks to the teacher.
30. ... explains to us what he or she thinks about school.
31. ... works hard on homework.
32. ... understands how to solve problems.
33. ... sticks with a problem until he or she solves it.
34. ... organizes his or her schoolwork.
35. ... checks his or her work.
36. ... finds new ways to do schoolwork when he or she gets stuck.

We teach this child ... (parental instruction)

37. ... to go at his or her own pace while doing schoolwork.
38. ... to take a break from his or her work when he or she gets frustrated.
39. ... how to check homework as he or she goes along.
40. ... how to get along with others in his or her class.
41. ... to follow the teacher's directions.
42. ... how to make his or her homework fun.
43. ... how to find out more about the things that interest him or her.
44. ... to try the problems that help him or her learn the most.
45. ... to have a good attitude about his or her homework.
46. ... to keep trying when he or she gets stuck.
47. ... to stick with his or her homework until he or she finishes it.
48. ... to work hard.
49. ... to communicate with the teacher when he or she has questions.
50. ... to ask questions when he or she doesn't understand something.
51. ... to make sure he or she understands one part before going onto the next.

## Appendix B

Table 1. Parent group demographics

Gender	Male	135	14%
	Female	674	72%
	Missing	131	14%
Ethnicity	Asian/Asian-American	21	2%
	Black/African-American	172	18%
	Hispanic/Hispanic-American	20	2%
	White/Caucasian	561	60%
	Other	21	2%
	Missing	145	15%
Employment	Unemployed, retired, student, disabled	103	11%
	Labor, custodial, maintenance	7	0%
	Factory worker, construction	9	1%
	Driver (taxi, delivery, bus, truck)	8	1%
	Food service, restaurant	4	0%
	Skilled craftsman (plumber, etc)	13	1%
	Retail sales, customer service	32	3%
	Service technician (cars, appliances, etc)	4	0%
	Accounting, bookkeeping	64	7%
	Creative arts (writer, musician)	13	1%
	Sales (real estate, commodity goods, etc)	27	3%
	Social services, public services	78	8%
	Teacher	171	18%
Professional, executive	253	27%	
Missing	154	16%	
Household Income	Lower (< \$30,000)	53	6%
	Middle (\$30,000-\$60,000)	167	18%
	Upper (> \$60,000)	469	51%
	Missing	225	25%
Average Hours Worked During the Week	0-5	92	10%
	6-20	72	8%
	21-40	252	27%
	41-50	292	31%
	50 or more	94	10%
Missing	138	15%	

Parent's Educational Attainment	Less than high school	3	0%
	High school or GED	82	9%
	Some college, 2-year college/vocational	292	31%
	Bachelor's degree	179	19%
	Some graduate work	54	6%
	Master's degree	163	17%
	Doctoral degree	40	4%
	Missing	127	14%