CORRELATES OF ACHIEVEMENT DATA-BASED INDICATOR SYSTEM FOR DELAWARE'S MIDDLE SCHOOLS

INSTRUMENTATION UPDATE

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INTRODUCTION

In June 2004, we released the *Correlates of Achievement Data-based Indicator System for Delaware's Middle Schools Instrumentation Report* where we discussed progress that had been made on the system. In this report, we provide an update on the progress made during July and August on its development. We will discuss in detail the results of the past two months' data collection efforts and the current status of the indicator system.

As was indicated in the *Data Sources* section of the last report, we are working toward the development of a standard indicator system model that can be used by schools and districts statewide to inform their decision making about issues related to closing the achievement gap. Consequently, to move toward this statewide system, in cooperation with the Delaware Department of Education, we plan to utilize the framework and data included in the state's Data Warehouse system and supplement it with local school level data that we collect from the pilot school. At this point in time, we are building a prototype based on these two primary data sources following the Correlates of Achievement model outlined in the previous report. During the past two months we have had meetings with DOE personnel and school district/school administrators to become more acquainted with their data systems.

DELAWARE DEPARTMENT OF EDUCATION DATA WAREHOUSE

During July and August we had the opportunity to meet with members of the Delaware Department of Education Assessment and Accountability Branch, Technology Management and Design Work group, to learn about the state's Data Warehouse system and how it can interface with this initiative.

To better understand what a data warehouse is and how Delaware's is configured, Dr. Tommy Tao shared the following information derived from presentations that he has made in September 2002 and February 2004 about the Warehouse. In his presentations he describes a data warehouse as a data structure with the following characteristics:

- Subject- oriented: organized for analysts rather than for database managers;

- Integrated: a single source of information;

- Non-volatile: stable information that does not change each time an operation is executed;

- Time-variant: both historical and current information; and,

- Accessible: user friendly for both decision makers and researchers.

The Delaware Data Warehouse makes it possible to integrate and query data from many of Delaware's state data systems including:

- Delaware Student Testing Program (DSTP),

- Delaware Student Information System (DELSIS),

- Pupil Accounting System (PAS), and,

- PHRST.

The DOE Data Warehouse enables the state to move beyond a traditional database system that is used primarily for storing data for retrieval and reporting purposes. The current system allows for analytical queries and much more powerful reporting and analyses across and among the various data sources mentioned above. Through the query process, one can generate multidimensional cross tabulations, such as being able to examine three variables such as gender, school, and race with one query. These multidimensional "cubes" allow for browsing data in many ways, i.e., slicing, drill down, drill up, dicing, and drill through. For example, one could query the system and answer questions such as: In 2003-04, what was the average full-time teacher salary by county and gender? Numerous other variables could be explored in regards to this query as well, such as teachers' age distribution, education level, experience, and race.

The DOE approach to developing the Data Warehouse is very similar to our views of the development of the Correlates of Achievement Indicator System.

- Start small and simple,

- Start with existing and quality data,

- Start with low budget and small team,

- In-house development as much as possible, and

- Roll out in small steps for DOE to districts and to schools.

The DOE Data Warehouse provides an excellent framework for, and basis of, the Correlates of Achievement Indicator System. It is already established on an SQL server housed within the Department of Education; it includes Cognos PowerPlay, a web-enabled user interface for accessing the warehouse; it is linked to most of the necessary data sources across the state; and it is managed by capable members of the DOE Technology Management and Design Work Group. However, to fully utilize this system to answer the questions inherent to the Correlates of Achievement framework, that is, the classroom-level, teacher-level, and school-level questions, we need to supplement the data found in the state's Data Warehouse with school-specific data.

PILOT MIDDLE SCHOOL DATA

The first stage just described enabled us to gain an understanding of how the DOE Data Warehouse works and what data can be accessed through it. We then determined that much of the school level data, i.e., teacher and student class assignments, discipline data, and technology usage information, could only be accessed directly from the school itself. Additional meetings with school level administrators and school staff generated teacher assignment and class enrollment lists.

Since we are utilizing the middle school pilot as a prototype, our initial goal is to generate data for each of the Correlates at Level I, as described in the earlier report. The prototype is being built on data from the 2004-05 academic year. Therefore, some data points, such as discipline, will be set up for entry but will need to be updated later in the year. Beyond Level I data, when appropriate, we will create "dummy variables" which will represent how the data could be configured. In addition, we will be providing recommendations on how the data at Levels II and III could be generated. See Appendix A for an illustration of the dummy variables and the connections of data sources that support the indicator system.
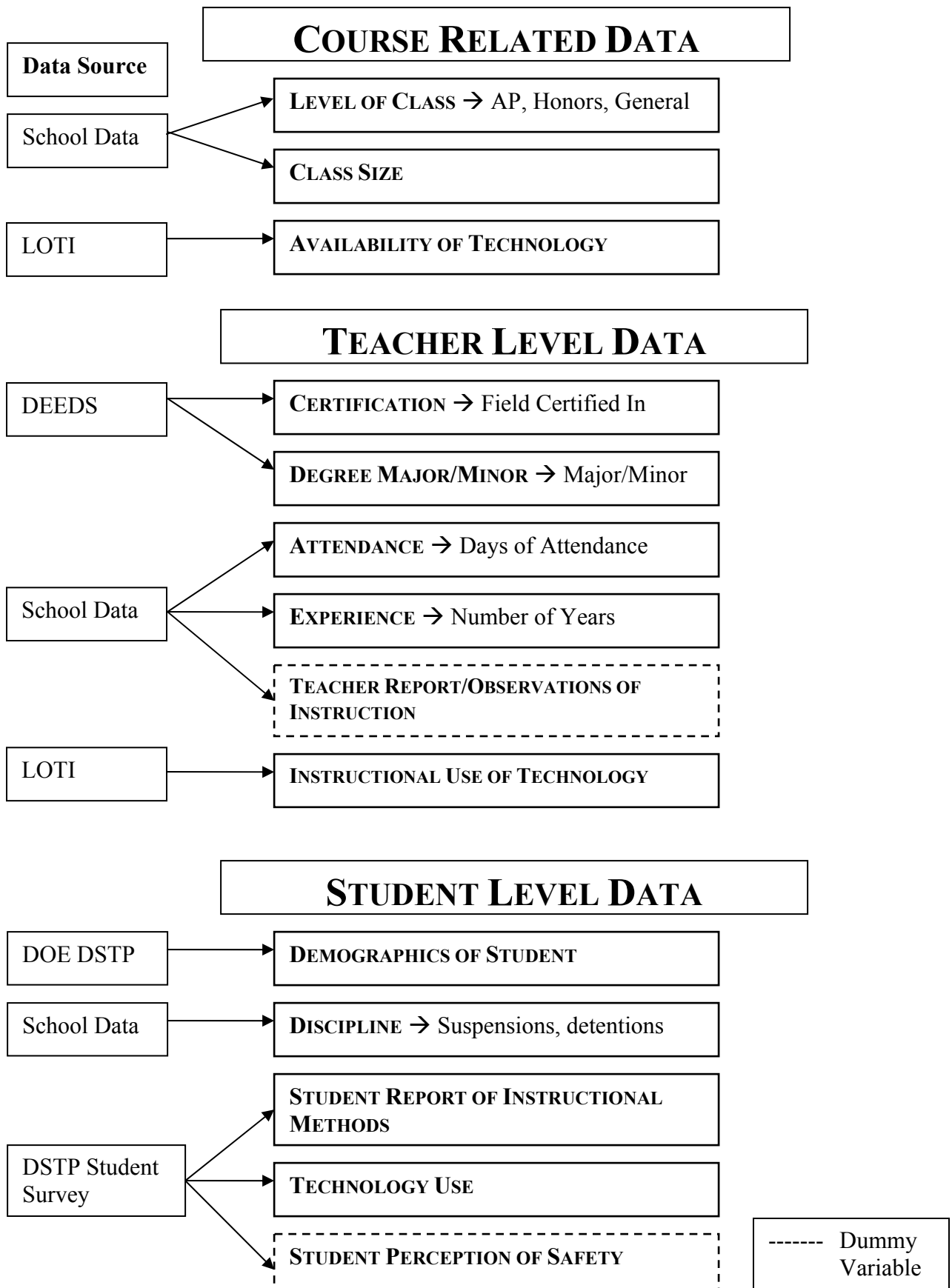
CURRENT STATUS

Now that data have been obtained at the school level from the pilot middle school, we are in the processing of working with Dr. Tao at DOE to create the prototype of the Correlates of Achievement Indicator System based on the Data Warehouse platform and expanded by the school-level data that we collected from the pilot middle school. Next steps include:

1. Development of a middle school data cube on the DOE SQL server that will effectively interface with the state's other data marts;
2. Entry of school level data into ACCESS that will expand the cube to include school level data;
3. Gather feedback from school and district administrators in regards to:
    a. classifying course levels, i.e., college-prep, general, remedial, that will be informed by local and state practices and research conducted by NCES on course classification; and,
    b. rating technology use in classroom instruction in ways beyond what LOTI currently assesses;
4. Seeking participation of other Delaware middle schools; and,
5. Further discussion and collaboration with the Delaware Academy for School leadership (DASL) and the Southern Regional Education Board (SREB) regarding professional development based on the Correlates of Achievement Indicator System.

We anticipate that Steps 1, 2, and 3 above should be completed no later than the end of September 2004.   At that time, we should have made significant progress and will be ready to present our prototype to the State Board and/or the Achievement Gap Action Group.

APPENDIX A: CORRELATES OF ACHIEVEMENT CUBE

Upon examination of the DOE Data Warehouse, we explored the various levels of the Correlates' data needs and developed the following graphic to illustrate the possible connections between different data, both state and local, and their potential sources. We saw that in some cases, data either does not yet exist or are not stored at either the state or local levels, e.g., school safety data. In these cases, for the prototype, we are creating dummy variables at this point in time so that the full capacity of the system can be seen, even though complete data are not as yet available.

COURSE RELATED DATA

Data Source

School Data → **LEVEL OF CLASS** → AP, Honors, General

CLASS SIZE

LOTI → **AVAILABILITY OF TECHNOLOGY**

TEACHER LEVEL DATA

DEEDS → **CERTIFICATION** → Field Certified In

DEGREE MAJOR/MINOR → Major/Minor

School Data → **ATTENDANCE** → Days of Attendance

EXPERIENCE → Number of Years

TEACHER REPORT/OBSERVATIONS OF INSTRUCTION

LOTI → **INSTRUCTIONAL USE OF TECHNOLOGY**

STUDENT LEVEL DATA

DOE DSTP → **DEMOGRAPHICS OF STUDENT**

School Data → **DISCIPLINE** → Suspensions, detentions

DSTP Student Survey → **STUDENT REPORT OF INSTRUCTIONAL METHODS**

TECHNOLOGY USE

STUDENT PERCEPTION OF SAFETY

------- Dummy Variable

Potential Dummy Variables

In the prototype developed, it will be necessary to create two dummy variables to represent the potential information that could be collected for the dimensions. These would be obtained from school data records and the DSTP Student Survey. The variables for each dimension are as follows. Potential scoring methods are also suggested.

Teacher Report/Observations of Instruction[1]

Variable 1: D-Engagement- Does the teacher effectively engage students with important ideas related to the focus of the lesson?
Score:
> 2-Close to Ideal
> 1-Getting a good Start
> 0-Not Even Close

Variable 2: D-Time-Does the teacher provide adequate time and structure for investigation and exploration?
Score:
> 2-Close to Ideal
> 1-Getting a good Start
> 0-Not Even Close

Variable 3: C-Significance- Is the content significant and worthwhile, not trivial?
Score:
> 2-Close to Ideal
> 1-Getting a good Start
> 0-Not Even Close

Variable 4: C-Challenge- Is the content challenging and developmentally appropriate?
Score:
> 2-Close to Ideal
> 1-Getting a good Start
> 0-Not Even Close

Variable 5: CL-Participation- Is active participation of all expected and valued?
Score:
> 2-Close to Ideal
> 1-Getting a good Start
> 0-Not Even Close

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[1] Source: This excerpt is taken from instrumentation developed by the state DEMCI project (UD Math & Science Education Resource Center & UD Education Research & Development Center) and funded by the National Science Foundation as part of the research being conducted on the state's middle school mathematics initiative.

<u>Variable 6:</u> CL-Respect- Is there a climate of respect for students' ideas, questions, and contributions?
Score:

        2-Close to Ideal
        1-Getting a good Start
        0-Not Even Close

Student Perception of Safety

Potential questions that could be included in the DSTP Student Survey Section follow.

<u>Variable 1</u>: Yes or No- Have you been involved in or witnessed a peer being bullied at your school?

<u>Variable 2</u>: Yes or No- Have you been involved in or witnessed a fight at your school?

<u>Variable 3</u>: Yes or No- Overall, do you feel safe in your school?