Transportation Information Management System

2006-2007
TIMS Service Indicators Report

System Status and Overview

July 2007

ITRE
Institute for Transportation Research & Education
North Carolina State University

Public Schools of North Carolina

UNC Charlotte URBAN INSTITUTE
UNCCHARLOTTE

PUBLIC SCHOOLS OF NORTH CAROLINA
STATE BOARD OF EDUCATION Howard N. Lee, *Chairman*
DEPARTMENT OF PUBLIC INSTRUCTION June St. Clair Atkinson, Ed.D., *State Superintendent*
WWW.NCPUBLICSCHOOLS.ORG

July 25, 2007

Twenty years ago, two North Carolina school districts began the 1987-88 school year using data from the Transportation Information Management System (TIMS). Cumberland County Schools and Durham Public Schools paved the way for a statewide implementation (effective September 1, 1992) of this important transportation management and optimization system. Since that time, LEAs have used TIMS not only to manage day-to-day school bus routes, but also to provide data for important boundary planning and redistricting projects, for the transportation of students attending remediation classes and for transporting children with special needs.

As North Carolina public schools finish fifteen years of statewide implementation, there is a wealth of data available to assist local policy makers in present and future transportation planning. The purpose of this report is to provide a broad overview of the statewide transportation system of routes and schedules. Further, the results of the transportation funding study commissioned by the General Assembly included a recommendation that service indicators be published in order to provide LEAs with additional information to help shape transportation policies. This document contains important data to accomplish that goal.

We want to express particular appreciation to the TIMS coordinators and data managers statewide that have provided these data as part of their annual data submissions. Further, the TIMS support staff at ITRE and UNC Charlotte are to be commended for their coordination, not only for this particular data compilation (spearheaded and designed by Rob Hamby), but also for their service to school districts in the past twenty years.

Ben Matthews, Director
School Support Division

Derek Graham, Section Chief
Transportation Services

DIVISION OF SCHOOL SUPPORT
Benjamin J. Matthews, Ph.D., Director | bmatthew@dpi.state.nc.us
6319 Mail Service Center, Raleigh, North Carolina 27699-6319 | (919) 807-3500 | Fax (919) 807-3502

TIMS SERVICE INDICATORS REPORT
Contents

Figures

Section 1. TIMS and Service Indicators

The Transportation Information Management System (TIMS) is a systems initiative of the North Carolina Department of Public Instruction (through a contract with Education Logistics, Inc.). TIMS (or an equivalent approved system) is required to be used by all local education agencies (LEAs). General Statute 115C-240(d) required implementation effective September 1, 1992. TIMS provides a basis for managing student locations, bus stops and routes and includes important optimization tools that can be used to improve the efficiency of student transportation.

As a result of the TIMS program in North Carolina, data are now available that provide some of the most detailed statewide pupil transportation information in the country.

In this document, operational data for all LEAs in North Carolina have been organized into summary information as a planning tool.

North Carolina public school districts respond to a large variety of circumstances and challenges in their daily operations. The area that a district serves may be large or relatively small. There are large and growing urban areas as well as very rural districts. Geographic factors have a large impact on the provision of pupil transportation service.

In addition to issues such as geography, policy decisions made by LEAs are another key component that affect the experience of students every day in their travel to and from school.

The data on the following pages reflect a combination of physical realities and policy decisions made by LEAs.

Student Ride Time

Definitions

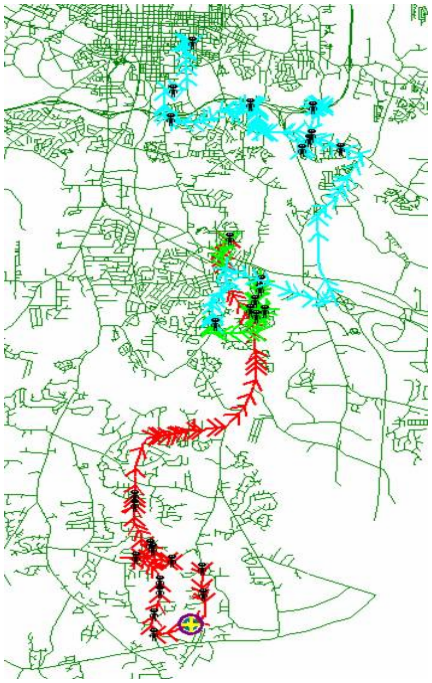
Average Morning Ride Time: Average of all bus riders' AM travel time to school.
Average Distance to School: Average distance from home to school for bus riders is shown to place the average bus ride time in context. The average distance to school for ALL students enrolled is shown for comparison to the average distance for bus riders.

State-wide Averages

Average Morning Ride Time: 25 minutes.
Average Distance to School (riders only): 4.33 miles.
TIMS calculates a student's distance to school by finding the shortest path along the street network. The state-wide figures are recalculated from base data with equal weight given to every student's time and distance, so this is an average of all students in the state, not an average of LEA averages. Only bus-riding students are considered in these calculations.
Average Distance to School (all students): 4.19 miles.
This allows for comparison of distance between riders and non-riders by LEA.

About Service

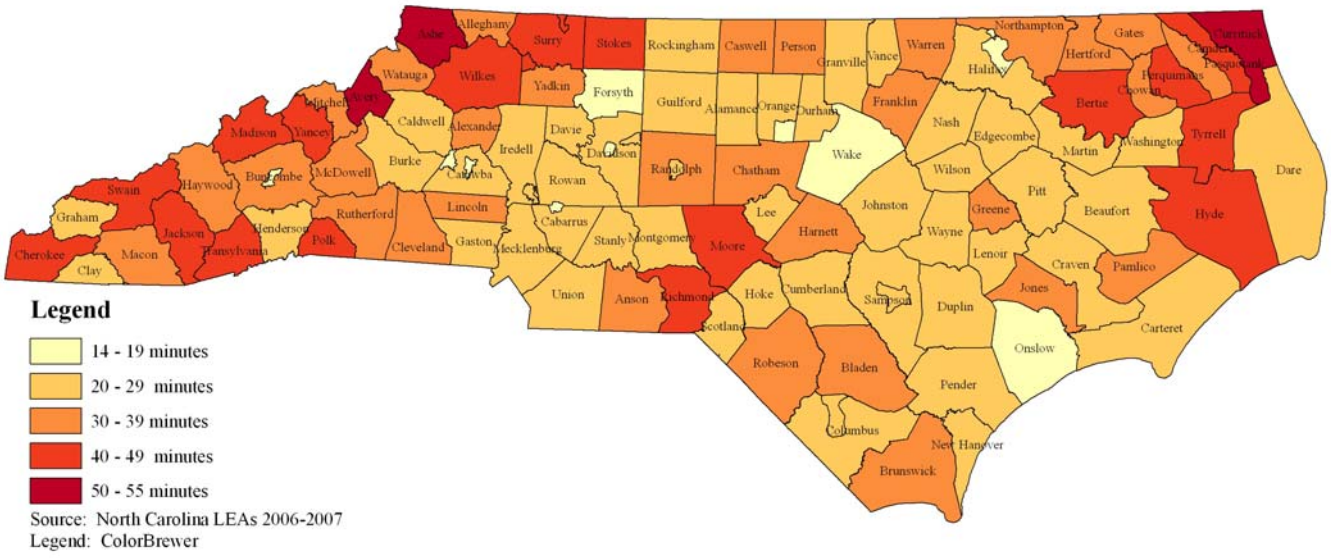
Everything else being equal, a child's ride time should correspond roughly to the distance from his or her home to school. Correspondence between distance and travel time is affected by anything that alters the speed of the bus or causes the bus to depart from the shortest path. LEA policies and site-specific conditions that are beyond the LEA's control impact student ride time. LEA policies that can result in longer ride times (especially when compared to the student's distance to school) include the placement of programs for exceptional children and the use of fewer, larger buses. The frequency and location of school bus stops also has a significant impact. For instance, locating school bus stops in private subdivisions and routing buses on short dead-end roads takes additional time and results in longer rides. Low student population density, traffic congestion, and speed limits are conditions over which the LEA has little control.



TIMS provides detailed information about each student's riding time using GIS technology.

Figure 1-1

TIMS 2006-2007 Service Indicators: ***Average Morning Ride Time***



TIMS 2006-07 Service Indicators: ***Student Ride Time***

Figure 1-2

District Name	Avg. Ride Time AM	Avg. Distance to School: Riders Only	Avg. Distance to School: All Stu.	District Name	Avg. Ride Time AM	Avg. Distance to School: Riders Only	Avg. Distance to School: All Stu.	District Name	Avg. Ride Time AM	Avg. Distance to School: Riders Only	Avg. Distance to School: All Stu.
Alamance-Burlington	22	3.87	3.48	Edgecombe	26	5.22	4.55	Chapel Hill-Carrboro	14	2.86	2.59
Alexander	36	4.24	3.91	W-S/Forsyth	18	3.62	3.68	Pamlico	30	7.41	7.10
Alleghany	30	5.16	5.32	Franklin	36	5.49	5.67	Pasquotank	31	4.65	4.08
Anson	31	5.86	5.61	Gaston	26	2.91	3.03	Pender	29	6.26	6.07
Ashe	51	8.17	7.50	Gates	36	7.11	7.03	Perquimans	40	6.99	6.68
Avery	54	4.25	2.80	Graham	22	6.36	4.98	Person	31	5.15	5.17
Beaufort	26	6.34	6.14	Granville	27	5.18	5.16	Pitt	25	4.25	3.69
Bertie	42	8.66	8.26	Greene	36	7.50	7.16	Polk	48	6.28	5.74
Bladen	37	7.84	7.39	Guilford	20	3.75	3.44	Randolph	36	4.92	5.31
Brunswick	39	7.16	7.13	Halifax	26	6.11	6.63	Asheboro City	21	2.02	1.95
Buncombe	30	3.94	4.01	Roanoke Rapids	15	1.56	1.19	Richmond	41	3.70	2.79
Asheville City	19	2.78	3.07	Weldon City	19	3.60	3.53	Robeson	30	4.13	3.87
Burke	22	4.14	4.28	Harnett	31	5.22	5.05	Rockingham	28	4.71	4.67
Cabarrus	21	3.84	3.87	Haywood	30	4.46	4.47	Rowan-Salisbury	25	N/A	N/A
Kannapolis City	18	1.89	1.87	Henderson	27	4.06	4.05	Rutherford	30	4.51	3.86
Caldwell	27	4.26	4.29	Hertford	34	6.77	6.21	Sampson	29	6.30	6.00
Camden	43	8.81	8.22	Hoke	20	5.39	4.82	Clinton City*			
Carteret	22	5.35	5.22	Hyde	44	12.76	12.39	Scotland	24	4.84	4.53
Caswell	37	9.18	9.14	Iredell-Statesville	27	4.40	4.53	Stanly	27	3.80	3.58
Catawba	22	4.42	4.32	Mooresville	20	2.61	2.50	Stokes	43	6.01	5.14
Hickory City	18	2.79	2.34	Jackson	48	5.92	4.69	Surry	42	4.64	4.22
Newton-Conover	17	3.05	2.68	Johnston	23	4.38	4.25	Elkin City*			
Chatham	33	4.98	4.75	Jones	32	7.66	7.19	Mount Airy City*			
Cherokee	45	5.45	5.26	Lee	26	4.46	4.45	Swain	41	5.48	5.21
Edenton/Chowan	34	8.62	8.00	Lenoir	24	4.53	4.60	Transylvania	46	4.74	4.41
Clay	29	5.58	4.31	Lincoln	31	4.76	4.54	Tyrell	41	5.94	5.16
Cleveland	33	4.96	4.72	Macon	34	5.34	4.92	Union	20	4.06	4.08
Columbus	29	5.74	5.64	Madison	44	8.82	8.53	Vance	29	4.15	3.98
Whiteville City*				Martin	28	4.33	3.90	Wake	19	4.38	4.17
Craven	29	5.39	5.08	McDowell	33	3.88	3.49	Warren	35	7.45	6.92
Cumberland	20	3.00	2.97	Charlotte-Meck.	22	3.74	3.84	Washington	28	5.67	5.25
Currituck	55	8.19	8.01	Mitchell	34	5.30	5.20	Watauga	30	5.14	4.92
Dare	24	5.11	4.52	Montgomery	24	4.86	5.07	Wayne	27	4.14	4.42
Davidson	28	4.54	4.56	Moore	40	5.14	5.16	Wilkes	45	4.97	4.57
Lexington City	17	1.98	2.03	Nash-Rocky Mount	24	5.29	4.66	Wilson	28	3.97	3.50
Thomasville City	20	1.78	2.05	New Hanover	22	3.54	3.36	Yadkin	35	4.06	4.02
Davie	28	5.43	5.53	Northampton	34	6.47	6.64	Yancey	43	5.88	5.40
Duplin	28	5.48	5.42	Onslow	19	4.53	4.50				
Durham	23	3.45	3.67	Orange	26	5.81	5.67	**State Average:**	**25**	**4.33**	**4.19**

Source:
NC Local Education Agencies (LEAs)
2006-07 TIMS Data

Notes:
Average Ride Time AM : Average of all bus riders' morning travel time to school.
Average Distance to School: Average mileage calculated along shortest path between student home location and school. Average distances to school of bus riders only and all students (riders and non-riders) is shown for comparison.
* City Districts (LEAs) that share common TIMS datasets with county.

Fleet Use

Definitions

Route: Activity for a school bus over the course of a day. Morning and afternoon portions of routes can be analyzed separately. Afternoon portions are examined here.
Runs: Individual trips made by school buses during the course of their daily routes. Each time a bus unloads all students, it is considered to have completed a run.
Average Number of Afternoon Runs per Route: The average number of separate runs (trips) each bus makes during the afternoon. This gives an indication of how many times a district uses its buses to transport students.
Percent Routes with more than one Run: The percentage of buses making more than one trip in the afternoon.
Percentage of Routes with Multiple Afternoon Runs to the Same School: The percentage of routes (buses) making multiple trips from the same school in the afternoon. The calculation treats each bus with multiple runs once whether it visits the school two or more times.

State-wide Averages

Avg. Number of PM Runs per Route: **1.59**
Percentage of Routes with more than one PM Run: **54.63**
Percentage of Routes with Multiple PM Runs to the Same School : **6.68**

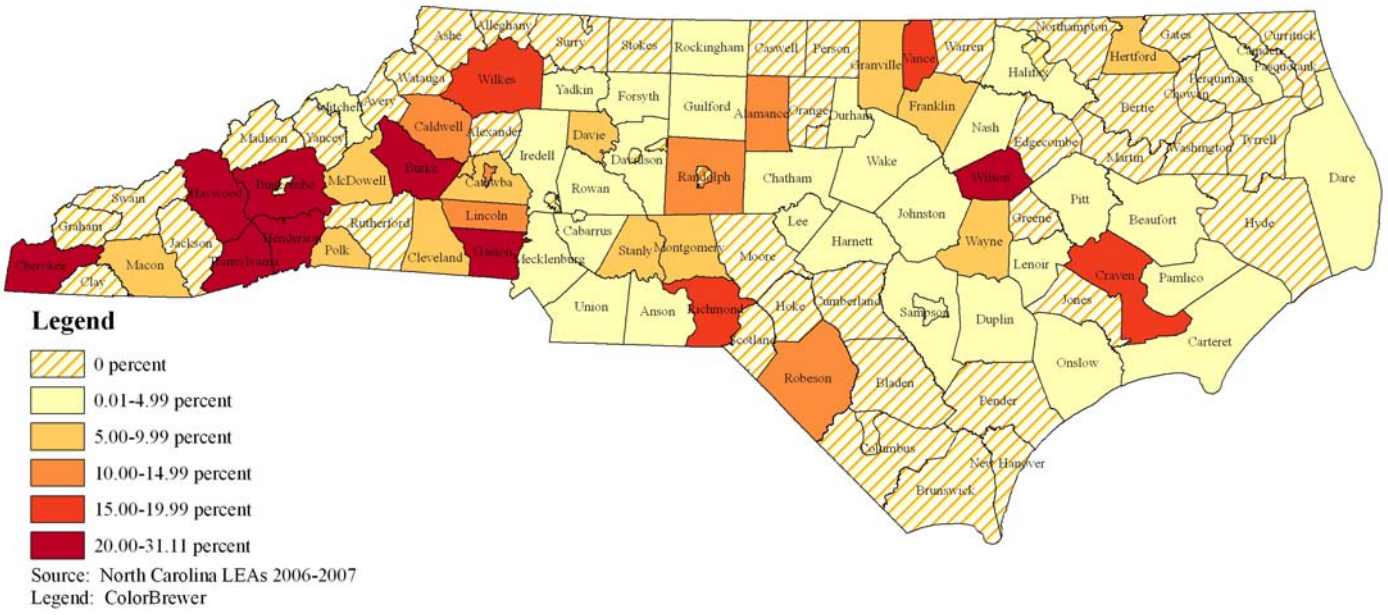
TIMS route timeline shows how individual bus runs are paired through the morning or afternoon.

About Service

High numbers of runs per route usually indicate a higher level of fleet utilization where staggered school starting times allow buses to be shared among schools. This also tends to indicate shorter bus trips for students overall. Multiple runs from the same school always involve the second and/or third set of students waiting at the school in the afternoon. This is often unproductive time for students and the staff members charged with their supervision.

Figure 1-3

TIMS 2006-2007 Service Indicators: ***Percentage of Routes with Multiple Afternoon Runs to the Same School***



TIMS 2006-07 Service Indicators: ***Fleet Use***

Figure 1-4

District Name	Avg. Runs per Rte.	% of Rtes. >1 Run	% Multi Runs PM	District Name	Avg. Runs per Rte	% of Rtes. >1 Run	% Multi Runs PM	District Name	Avg. Runs per Rte	% of Rtes. >1 Run	% Multi Runs PM
Alamance-Burlington	1.54	49.00	13.79	Edgecombe	1.08	6.36	0	Chapel Hill-Carrboro	2.70	96.30	0
Alexander	1.00	0	0	W-S/Forsyth	2.65	93.17	0.62	Pamlico	1.03	3.45	3.33
Alleghany	1.00	0	0	Franklin	1.23	20.59	7.2	Pasquotank	1.38	36.0	1.45
Anson	1.23	23.38	2.11	Gaston	1.69	55.77	25.28	Pender	1.15	15.46	0
Ashe	1.04	4.00	0	Gates	1.00	0	0	Perquimans	1.00	0	0
Avery	1.21	21.21	0	Graham	1.00	0	0	Person	1.09	9.21	0
Beaufort	1.14	13.73	4.31	Granville	1.27	25.93	7.30	Pitt	1.46	44.29	0.98
Bertie	1.00	0	0	Greene	1.04	3.51	0	Polk	1.06	6.45	6.06
Bladen	1.00	0	0	Guilford	2.10	86.15	2.99	Randolph	1.14	13.87	14.21
Brunswick	1.00	0	0	Halifax	1.02	1.65	1.63	Asheboro City	2.00	100.00	0
Buncombe	1.52	46.92	25.57	Roanoke Rapids	2.25	83.33	3.70	Richmond	1.24	23.91	19.30
Asheville City	2.00	90.00	3.33	Weldon City	1.73	60.00	0	Robeson	1.25	24.71	14.55
Burke	1.38	36.70	28.67	Harnett	1.11	11.16	1.93	Rockingham	1.29	27.14	2.21
Cabarrus	2.04	85.99	0.71	Haywood	1.35	33.77	23.08	Rowan-Salisbury	1.49	45.51	2.26
Kannapolis City	2.69	93.10	2.56	Henderson	1.31	29.13	22.22	Rutherford	1.00	0	0
Caldwell	1.56	53.33	12.83	Hertford	1.08	8.45	7.79	Sampson	1.09	8.02	1.14
Camden	1.00	0	0	Hoke	1.93	92.59	0	Clinton City*			
Carteret	1.05	5.15	0.98	Hyde	1.00	0	0	Scotland	2.04	75.00	0
Caswell	1.00	0	0	Iredell-Statesville	1.58	56.61	1.01	Stanly	1.30	28.16	8.21
Catawba	1.35	34.39	7.42	Mooresville	2.00	100.00	0	Stokes	1.22	22.34	0
Hickory City	2.30	95.65	7.55	Jackson	1.00	0	0	Surry	1.14	14.4	0
Newton-Conover	1.65	64.51	11.76	Johnston	1.35	33.04	1.76	Elkin City*			
Chatham	1.06	6.12	4.85	Jones	1.00	0	0	Mount Airy City*			
Cherokee	1.17	14.89	20.00	Lee	1.19	17.17	0.85	Swain	1.00	0	0
Edenton/Chowan	1.00	0	0	Lenoir	1.22	20.81	1.10	Transylvania	1.29	28.57	31.11
Clay	1.00	0	0	Lincoln	1.18	16.22	12.21	Tyrell	1.00	0	0
Cleveland	1.09	8.99	8.76	Macon	1.08	8.16	5.66	Union	2.07	93.21	3.64
Columbus	1.03	3.17	0	Madison	1.00	0	0	Vance	1.23	23.25	16.98
Whiteville City*				Martin	1.00	0	0	Wake	2.62	90.88	1.92
Craven	1.23	22.15	16.30	McDowell	1.06	5.80	5.48	Warren	1.07	7.02	0
Cumberland	1.56	55.56	0	Charlotte-Meck.	2.33	92.65	0.07	Washington	1.00	0	0
Currituck	N/A	N/A	N/A	Mitchell	1.33	33.33	2.08	Watauga	1.43	43.48	0
Dare	1.21	20.93	1.92	Montgomery	1.10	10.17	6.15	Wayne	1.42	39.35	7.19
Davidson	1.28	27.96	0.84	Moore	1.00	0	0	Wilkes	1.20	20.00	16.67
Lexington City	2.68	90.90	0	Nash-Rocky Mount	1.33	28.64	3.64	Wilson	1.40	37.90	23.56
Thomasville City	1.93	92.86	0	New Hanover	1.81	77.96	0	Yadkin	1.02	1.54	1.52
Davie	1.12	11.59	9.09	Northampton	1.00	0	0	Yancey	1.00	0	0
Duplin	1.02	1.69	0.83	Onslow	1.73	60.00	1.76				
Durham	2.38	97.76	0.57	Orange	1.69	67.19	0	**State Average:**	**1.59**	**54.63**	**6.68**

Source:
NC LEAs 2006-07 TIMS Data

Notes:
Average Runs per Route: The average number of separate runs (trips) each bus makes in the afternoon.
Percentage of Routes with more than one Afternoon Run: The percentage of buses making more than one trip in the afternoon.
Percentage of Routes with Multiple PM Runs to the Same School: The percentage of buses making multiple trips from the same school in the afternoon.
* City Districts (LEAs) that share common TIMS datasets with county.

Morning Pickup Times

Definitions

Earliest Morning Pickup Time: Reflects the earliest bus stop time on an active route. If multiple stops have the same early time, the pickup with the longest ride time is shown. There may be more than one student associated with any given pickup.

Destination Time: The time the students boarding at the earliest pickup time arrive at school.

State-wide Averages

This indicator highlights the experiences of individual students within each district, so state-wide averages are not included.

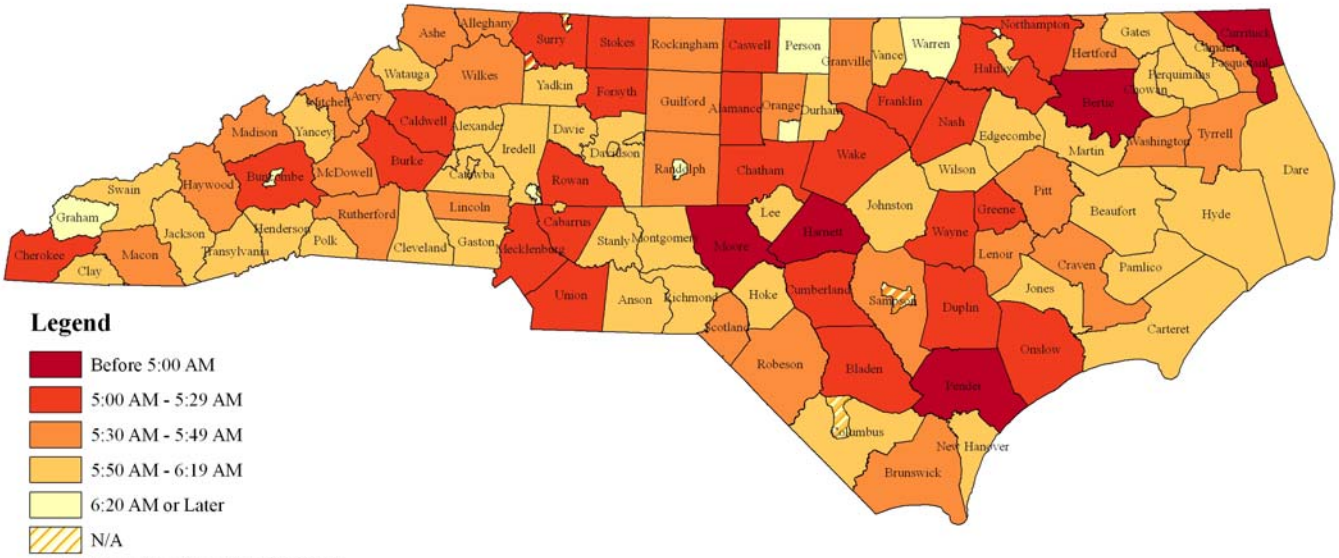
About Service

Very early pickup times for students may be influenced by several things. Use of early bell times is one, so that is shown. Extremely early pickup times are obviously, in themselves, an issue of service. In the case of very early pickups accompanied by a long ride, the experience of the student is particularly challenging.

These data represent one or more students at one stop, not the overall average. The ride time averages (page 4-5) yield a better understanding of how these specific cases relate to the overall operation in any specific district.

Figure 1-5

TIMS 2006-2007 Service Indicators: ***Earliest Morning Pickup Time***



Notes:
Earliest pickup time reflects earliest regular or special needs, stop time on an active route.

Figure 1-6

TIMS 2006-07 Service Indicators: ***Morning Pickup Times***

District Name	*Dest. Time*	*Earliest Pickup AM*	*District Name*	*Dest. Time*	*Earliest Pickup AM*	*District Name*	*Dest. Time*	*Earliest Pickup AM*
Alamance-Burlington	7:40	5:28	Edgecombe	7:06	6:01	Chapel Hill-Carrboro	7:35	6:37
Alexander	7:45	6:02	W-S/Forsyth	7:05	5:29	Pamlico	7:52	6:18
Alleghany	7:43	5:40	Franklin	7:15	5:18	Pasquotank	8:00	6:03
Anson	7:00	5:54	Gaston	7:19	6:02	Pender	7:16	4:53
Ashe	7:47	5:36	Gates	8:00	6:07	Perquimans	7:35	5:53
Avery	8:05	5:34	Graham	7:35	6:29	Person	7:55	6:21
Beaufort	7:40	5:54	Granville	7:20	5:40	Pitt	8:10	5:33
Bertie	7:45	4:58	Greene	7:21	5:29	Polk	7:45	6:00
Bladen	7:33	5:06	Guilford	7:30	5:46	Randolph	7:30	5:43
Brunswick	7:45	5:33	Halifax	7:40	5:07	Asheboro City	8:00	6:44
Buncombe	7:45	5:10	Roanoke Rapids	7:03	6:35	Richmond	8:00	6:00
Asheville City	7:20	6:30	Weldon City	7:38	6:16	Robeson	7:40	5:35
Burke	7:45	5:00	Harnett	7:45	4:49	Rockingham	7:57	5:32
Cabarrus	7:15	5:24	Haywood	7:45	5:38	Rowan-Salisbury	7:37	5:13
Kannapolis City	7:15	6:02	Henderson	8:00	6:06	Rutherford	8:25	5:49
Caldwell	6:57	5:10	Hertford	7:49	5:31	Sampson	7:42	5:44
Camden	8:00	5:43	Hoke	7:30	6:00	Clinton City*		
Carteret	7:40	5:55	Hyde	7:50	6:02	Scotland	7:30	5:36
Caswell	7:40	5:19	Iredell-Statesville	7:25	5:57	Stanly	7:23	6:05
Catawba	8:30	6:16	Mooresville	7:07	6:22	Stokes	7:30	5:06
Hickory City	8:10	5:53	Jackson	8:17	6:00	Surry	8:15	5:05
Newton-Conover	7:50	6:16	Johnston	7:17	5:51	Elkin City*		
Chatham	7:50	5:11	Jones	7:40	5:52	Mount Airy City*		
Cherokee	7:40	5:04	Lee	7:30	6:01	Swain	8:10	6:05
Edenton/Chowan	7:50	6:11	Lenoir	7:10	5:39	Transylvania	7:49	6:17
Clay	7:55	6:10	Lincoln	7:42	5:42	Tyrell	7:45	5:36
Cleveland	845	6:03	Macon	8:05	5:45	Union	8:30	5:12
Columbus	750	6:02	Madison	7:52	5:44	Vance	8:05	6:00
Whiteville City*			Martin	7:21	5:59	Wake	7:19	5:07
Craven	7:30	5:43	McDowell	7:56	5:36	Warren	7:55	6:31
Cumberland	7:38	5:05	Charlotte-Meck.	7:45	5:00	Washington	7:45	5:46
Currituck	8:00	4:31	Mitchell	7:45	5:34	Watauga	7:25	6:00
Dare	7:06	6:12	Montgomery	7:40	5:54	Wayne	7:55	5:20
Davidson	8:10	6:01	Moore	7:40	4:41	Wilkes	7:38	5:30
Lexington City	7:50	5:50	Nash-Rocky Mount	7:25	5:24	Wilson	8:18	6:05
Thomasville City	7:35	6:17	New Hanover	8:10	6:00	Yadkin	8:10	5:54
Davie	7:55	6:14	Northampton	7:25	5:16	Yancey	7:55	5:54
Duplin	7:40	5:29	Onslow	6:33	5:15			
Durham	7:10	5:57	Orange	7:25	5:46			

Source:
NC LEAs 2006-07 TIMS Data

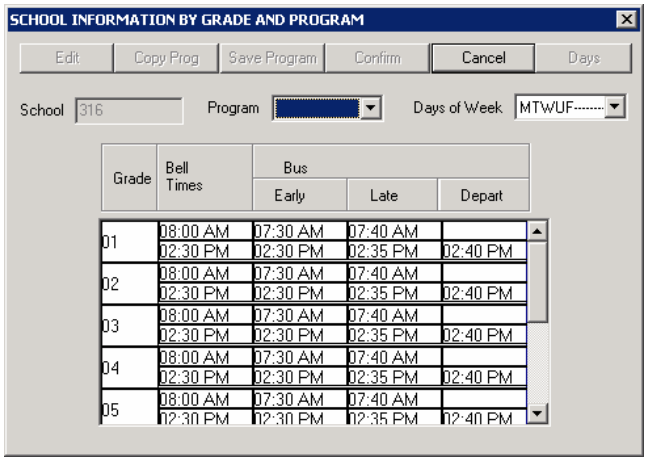
Notes:
Destination Time: The drop off time at school associated with the earliest pickup.
Earliest Morning Pickup Time: Reflects earliest bus stop time on an active route.
* City Districts (LEAs) that share common TIMS datasets with county.

School Bell Times

Definition

First Morning Bell Time: Earliest AM school bell time.
Last Morning Bell Time: Latest AM school bell time.
Range of Morning Bell Times: Time in minutes from earliest bell time to latest bell time.

Zero minutes difference indicates that all morning bell times are the same throughout the district.



TIMS maintains bell time information for every school.

State-wide Averages

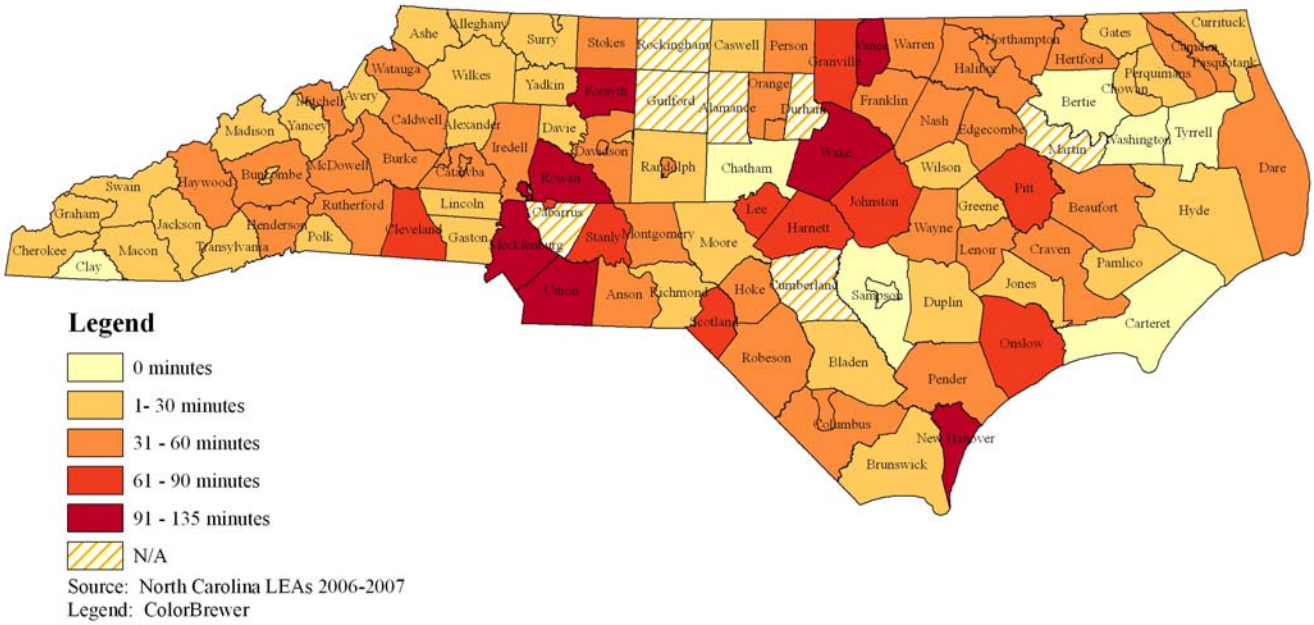
Average Range of Morning Bell Times: 41.8 minutes. This represents the average of the range of LEAs in the state. This figure omits LEAs with data that did not produce a valid range. This was based on the use of separate school records for programs with times outside the expected range for this item.

About Service

A large difference in bell times allows for multiple bus runs or trips to different schools, but could require that some students wait as school after their AM and/or before their PM run. With little difference between early and late bell times, fewer multiple runs can be utilized. This tends to result in simpler, more convenient school schedules, but also results in the need for more school buses and, often, longer ride times for students.

Figure 1-7

TIMS 2006-2007 Service Indicators: ***Range of Morning School Bell Times***



TIMS 2006-07 Service Indicators: ***School Bell Times***

Figure 1-8

District Name	School Start Times First AM	Last AM+	Range	District Name	School Start Times First AM	Last AM+	Range	District Name	School Start Times First AM	Last AM+	Range
Alamance-Burlington	7:40	N/A	N/A	Edgecombe	7:45	8:30	45	Chapel Hill-Carrboro	7:55	8:45	50
Alexander	7:45	8:15	30	W-S/Forsyth	7:25	9:00	95	Pamlico	7:55	8:00	5
Alleghany	7:45	8:10	25	Franklin	7:44	8:15	31	Pasquotank	7:50	8:25	35
Anson	7:30	8:25	55	Gaston	7:45	8:10	25	Pender	7:30	8:20	50
Ashe	7:50	8:00	10	Gates	8:00	8:05	5	Perquimans	8:00	8:10	10
Avery	8:00	8:15	15	Graham	7:50	8:00	10	Person	7:50	8:30	40
Beaufort	7:20	8:20	60	Granville	7:25	8:45	80	Pitt	7:20	8:30	70
Bertie	7:50	7:50	0	Greene	7:45	8:00	15	Polk	7:50	8:10	20
Bladen	7:55	8:15	20	Guilford	7:40	N/A	N/A	Randolph	7:50	8:10	20
Brunswick	8:00	8:05	5	Halifax	7:40	8:15	35	Asheboro City	7:55	8:30	35
Buncombe	7:45	8:45	60	Roanoke Rapids	7:35	8:30	55	Richmond	8:00	8:30	30
Asheville City	8:00	8:30	30	Weldon City	7:45	8:30	45	Robeson	7:30	8:25	55
Burke	7:40	8:25	45	Harnett	7:35	8:45	70	Rockingham	7:45	N/A	N/A
Cabarrus	7:30	N/A	N/A	Haywood	8:00	9:00	60	Rowan-Salisbury	7:20	9:15	115
Kannapolis City	7:30	8:40	70	Henderson	7:55	8:30	35	Rutherford	7:30	8:30	60
Caldwell	7:50	8:30	40	Hertford	7:45	8:20	35	Sampson	9:30	9:30	0
Camden	7:55	8:50	55	Hoke	7:55	8:45	50	Clinton City*			
Carteret	9:30	9:30	0	Hyde	7:45	7:55	10	Scotland	7:15	8:30	75
Caswell	8:00	8:30	30	Iredell-Statesville	7:30	8:30	60	Stanly	7:50	9:00	70
Catawba	7:15	7:50	35	Mooresville	7:00	8:45	105	Stokes	7:30	8:10	40
Hickory City	7:30	8:15	45	Jackson	7:50	8:10	20	Surry	7:50	8:20	30
Newton-Conover	7:15	7:50	35	Johnston	7:20	8:35	75	Elkin City*			
Chatham	9:30	9:30	0	Jones	7:45	8:00	15	Mount Airy City*			
Cherokee	7:52	8;20	28	Lee	7:40	9:00	80	Swain	7:40	8:05	25
Edenton/Chowan	7:50	7:55	5	Lenoir	7:45	8:30	45	Transylvania	8:00	8:10	10
Clay	8:00	8:00	0	Lincoln	7:50	8:00	10	Tyrell	7:50	7:50	0
Cleveland	7:40	9:00	80	Macon	7:30	8:00	30	Union	7:15	9:00	105
Columbus	7:50	8:40	50	Madison	8:00	8:20	20	Vance	7:50	9:30	100
Whiteville City*				Martin	9:30	N/A	N/A	Wake	7:25	9:15	110
Craven	7:35	8:35	60	McDowell	7:50	8:30	40	Warren	8:00	8:45	45
Cumberland	7:05	N/A	N/A	Charlotte-Meck.	7:00	9:15	135	Washington	8:00	8:00	0
Currituck	7:45	8:15	30	Mitchell	7:30	8:15	45	Watauga	7:35	8:30	55
Dare	7:50	8:30	40	Montgomery	7:45	8:30	45	Wayne	7:30	8:30	60
Davidson	7:40	8:30	50	Moore	7:50	8:10	20	Wilkes	7:45	8:15	30
Lexington City	7:15	7:55	40	Nash-Rocky Mount	6:31	7:30	59	Wilson	8:00	8:20	20
Thomasville City	7:15	7:45	30	New Hanover	7:30	9:35	125	Yadkin	8:00	8:05	5
Davie	8:05	8:15	10	Northampton	7:30	8:01	31	Yancey	7:55	8:00	5
Duplin	7:35	8:05	30	Onslow	7:15	8:30	75				
Durham	7:05	N/A	N/A	Orange	7:55	8:45	50	**State Average**			**41.8**

Source:
NC LEAs 2006-07 TIMS Data

Notes:
First AM Bell Time: Earliest morning school bell time.
Last AM Bell Time: Latest morning school bell time.
Range of Morning Bell Times: Time in minutes from earliest bell time to latest bell time..
* City Districts (LEAs) that share common TIMS datasets with county.
+ Times shown as N/A indicate start times for special programs resulting in a range that is invalid for this analysis.

Section 2. TIMS Software and System Use

Implementation of TIMS in the early 1990's coincided with a change in the method of state funding for pupil transportation in North Carolina. The "New" funding formula provided incentives for LEAs to spend fewer dollars and to operate fewer buses. TIMS provided the tools by which to achieve those two goals. As a result, the number of buses operated statewide dropped dramatically. This was accomplished without increasing the miles operated per student enrolled (see Figures 2-1 and 2-2).

Important statewide data are now available providing key elements of transportation funding calculations and the bases for statewide comparison of data such as those presented in this report.

The TIMS process consists of five major activities: (i) maintaining the street network (geocoding), (ii) maintaining transportation information, (iii) maintaining student data, locations, and stop assignments, (iv) system utilization, and (v) optimization – utilizing the system to analyze potential routing and scheduling improvements.

Optimization

Optimization is where the most powerful benefits of TIMS are realized. Districts wishing to use the optimization module to look at "what if?" situations often meet with LEA TIMS personnel to discuss their objectives. Through the use of geographical displays and statistical reports, acceptable alternatives may be found. This method of keeping local personnel involved at every step ensures acceptable bus routes for all involved.

Run optimization, the most-used portion of the TIMS optimization module, involves assigning bus stops to bus runs. Existing bus runs are dissolved and the stops are allowed to be regrouped in an efficient manner. The TIMS data manager has full control to modify system-generated solutions to reflect the reality of area circumstances. The changes may reduce not only mileage, but also result in reduced fuel consumption, reduced student ride times and a reduction in total driver hours.

Figure 2-1—Efficiency Impact of TIMS, Buses

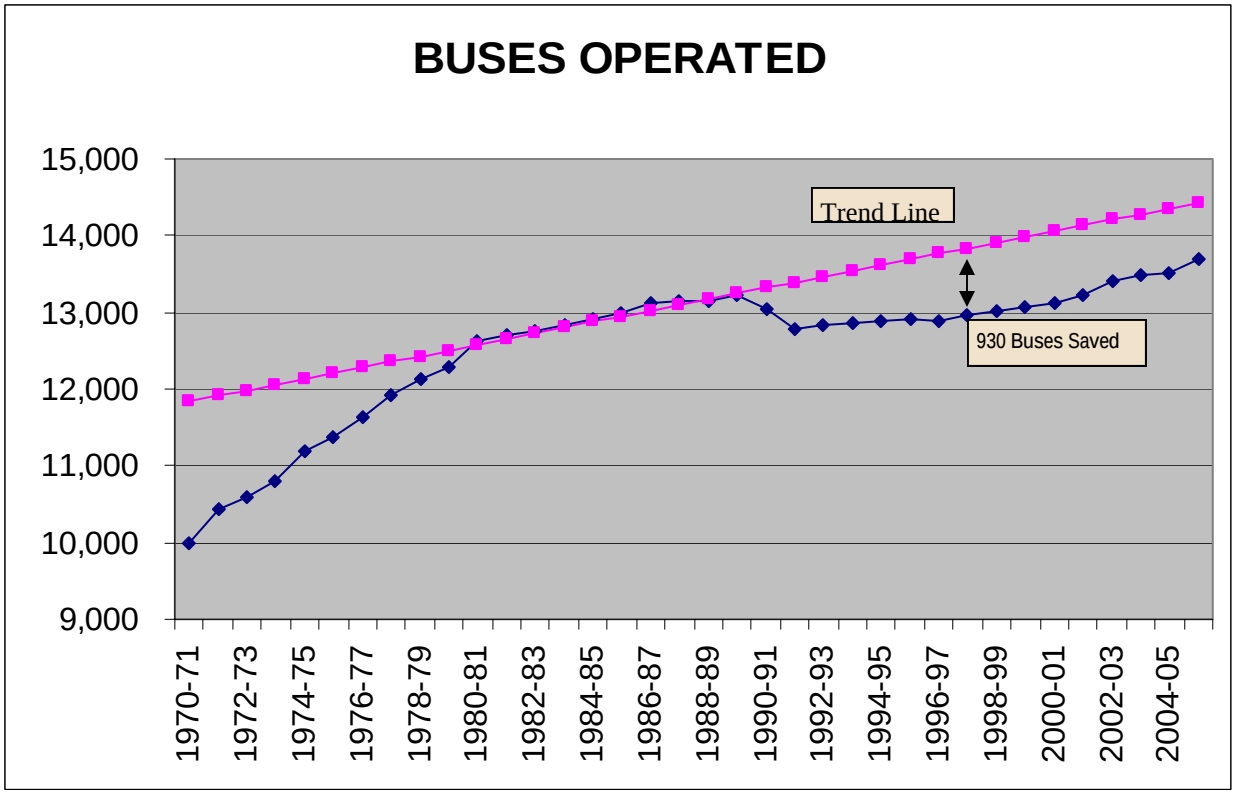
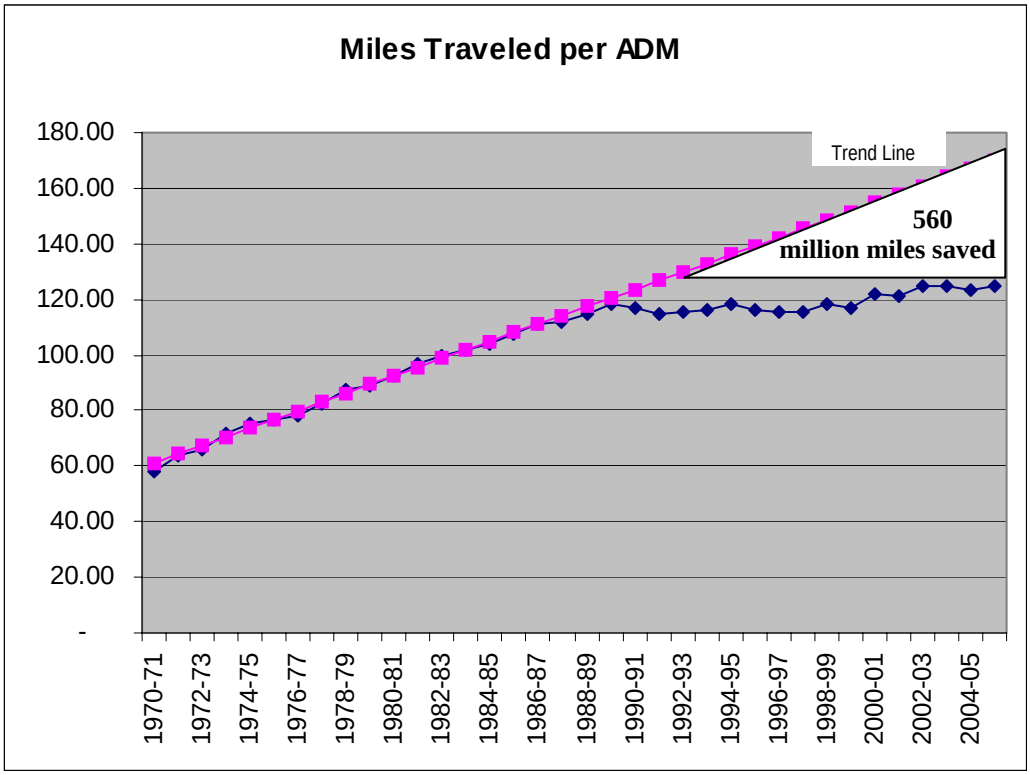


Figure 2-2—Efficiency Impact of TIMS, Miles



A route is the combined activity for a bus for the entire day. This could be only one run in the morning or as much as three or four runs in the morning and another three or four runs in the afternoon. Route optimization looks at the possibility of combining existing runs so that they may be serviced by fewer buses. Route optimization allows the TIMS data manager the opportunity to test options for staggering school opening times in order to serve several schools' runs with a single bus. This can reduce the bus fleet requirements significantly. Furthermore, as drivers have multiple trips in the morning and the afternoon, they may become eligible for employment benefits, which often improves their reliability and commitment to their job.

The route timeline shown on page 6 indicates the times that each bus is on the road. Note that a shift in a school's bell time would cause all runs for that school to re-adjust to that new time. This would cause more 'whitespace', shifting those runs so that they may be more easily paired with runs from other schools. This also shows where very short or very long runs occur so that they may be reviewed in an attempt to achieve a reduction in student ride time or for better equipment utilization.

LEA TIMS Staff

While software and hardware are without question key elements to successful implementation, it is the TIMS coordinators and data managers who have "made it happen." Successful implementation of TIMS requires a team effort at the local level. In most LEAs, this group includes not only the TIMS coordinator and TIMS Data Manager, but also the transportation director and SIMS/NCWISE coordinator. In larger districts, there may also be regional transportation supervisors and other TIMS staff to handle the large volume of daily changes made in transportation. Often school administrative staff and bus drivers provide key input to allow the system to function as needed.

Critical issues that must be handled by the transportation staff annually include: updating the transportation plan for the beginning of school, planning for summer school, or implementing new routing changes resulting from key policy decisions (such as staggering school times or a need to improve transportation efficiency by optimized bus routing).

Statewide Training and Support

North Carolina LEAs are the only school districts in the country with an in-state support staff provided by the state, through contractual relationships with the Institute for Transportation Research & Education (ITRE) at NC State University and the UNC-Charlotte Urban Institute. This has provided many advantages for the State and for the LEAs. ITRE and the UNC Charlotte Urban Institute routinely conduct programs of technical assistance and training and have more experience in computerized routing, scheduling and pupil transportation than any other organization in North Carolina

TIMS project leaders work with the local TIMS coordinator and TIMS Data Manager as they manage the day to day system operations. These people are the initial points of contact for help desk/telephone support at the state level. Each LEA continues to work with a project leader throughout the year as key TIMS tasks are conducted.

Advancements in computer technology, software, and internet connectivity have transformed TIMS from a student transportation module into an undisputed source for analyzing transportation services, efficiency, and funding. Technology improvements have also created new avenues whereby TIMS data can be accessed by multiple operators, supervisors, and coordinators from nearly any location. This also allows a project leader to connect remotely with LEA sites and to provide unparalleled support, training and information sharing.

The project leaders are also responsible for the year's training activities, working with Edulog, the TIMS software provider, to identify needed enhancements, performing software upgrades and coordinating the updating of geocodes for each of the 100 counties in North Carolina. **The six current staff members have a combined 90 years of experience working with TIMS.**

Classroom and Individual Training

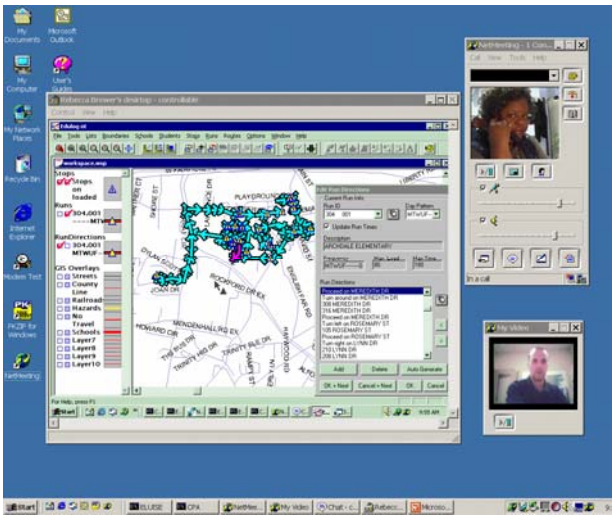
Providing training and technical support in the use of the TIMS software is one of the primary staff functions at ITRE and The UNC Charlotte Urban Institute. TIMS Data Managers, Coordinators and local TIMS users receive a combination of on-site instruction and classroom training, consisting of hands-on and lecture sessions. Each classroom training session, usually classified as Beginner, Intermediate or Advanced, covers one or two modules per training day. As more staff members from each LEA access the different modules within TIMS, an increasing array of training is necessary. With upgrades and continuing improvements to the TIMS software, ongoing training becomes more important than ever.

Jody Pressley of UNC Charlotte Urban Institute at the TIMS training lab with Amanda Pennington of Caldwell and Kim Fox of Iredell-Statesville.

On-site training is tailored to the needs of the school district. When utilizing Optimization for the first time, local staff may request that a TIMS project leader work with them to perform the analysis. The experience of the project leader in using the software combined with the local knowledge of the LEA staff enable a thorough and useful study to take place.

Remote Training and Support

"Terminal Services" remote access connectivity now allows the TIMS staff an efficient means of technical support. Real-time access to the LEA's TIMS servers allows support staff to quickly address problems or training needs. This on-line support is often a very efficient substitute for a visit or a lengthy phone conversation to guide LEA personnel through software issues.



Remote support allows "virtual" help sessions with TIMS staff. Although this graphic shows live video, most sessions do not actually use that feature. Network security dictates that the actual process for doing these sessions are regularly updated.

Consulting

TIMS project leaders often combine consulting with training during on-site sessions. This environment provides an opportunity for the project leader to apply his or her expertise with the software to the unique applications of the school district. Consulting may deal with bell time adjustments, run/route optimization schemes, scenarios for resolving unusual transportation situations, etc.

Telephone Help Desk

In addition to these specialized training activities, a telephone 'help desk' is operated from the offices at ITRE and The UNC Charlotte Urban Institute. This support is invaluable as the local LEA staff learn and apply the system. The help desk is used to provide assistance on more advanced issues to experienced operators as well as a wide range of assistance to newly hired operators. The phone support combined with the remote access to the district machines allows training and troubleshooting in real time, to either expand user knowledge of system functions or to resolve current problems.

SUMMARY

TIMS is valuable not only for the management of detailed routing and scheduling data, but also to achieve the objectives of the user. The LEA staff can use the system to improve efficiency, enhance student service levels or, hopefully, both. While service and efficiency are sometimes conflicting objectives, the system provides important tools so that each LEA can strike an appropriate balance as dictated by its geography, school locations and board of education policies. The statewide data in this document should be used by LEAs to evaluate their service levels and policies and to analyze their transportation program in light of peer operations statewide.

Contact Information

North Carolina Department of Public Instruction **919.807.3750**
Philip Price, *Associate State Superintendent*
Financial and Business Services
Ben Matthews, *Director, School Support Division*
Derek Graham, *Section Chief, Transportation Services*

Institute for Transportation Research and Education **919.515.9999**
North Carolina State University
Nagui Rouphail, *Director*
Jeff Tsai, *Pupil Transportation Program Director*
Mickey Michael, *TIMS Program Manager, ITRE*
Marc Perez, *Computer Support Analyst*
Bonnie Sluder, *Computer Support Technician*

UNC Charlotte Urban Institute **704.687.2763**
Jeff Michael , *Director*
John Chesser, *Director of School Services*
Rob Hamby, *Computer Applications Analyst*
Jody Pressley, *Computer Support Analyst*
Charlynn Burd, *Research Associate*