

## **The Greensboro Transit Authority HEAT Program The First Five Years (through 2010-2011)**

### **1. Introduction**

In August 2006, the Greensboro Transit Authority (GTA) instituted HEAT, a college and university pass program involving six local area colleges. HEAT is an acronym for Higher Education Area Transit. This report describes the results of the first five years of operation.

GTA originally brought together six colleges and universities in Greensboro to discuss the idea, including:

- Bennett College, a small, private, college for women;
- Greensboro College, a small private college;
- Guilford College, a small private college;
- Guilford Technical Community College (GTCC), a large public community college;
- North Carolina A&T State University (NC A&T), a large public university;
- The University of North Carolina at Greensboro (UNCG), a large public university.

Elon University School of Law, which opened its doors to its first class in 2006 in downtown Greensboro, eventually became the seventh partner.

The Greensboro experience is unique because it involved multiple colleges and universities and new services that, wherever possible, entered the campuses instead of stopping on adjacent streets. The new services included:

- East-west routes that connect the campuses, downtown Greensboro, and shopping (with the exception of the existing GTCC Jamestown campus, all the campuses and Friendly Center lie on an east-west line through the city);
- An inner circulator route, a shorter version of the east-west routes, that provides additional service to the major universities (UNCG and NC A&T);
- Shuttle routes to bring students living off-campus to UNCG and NC A&T;
- Additional direct service to the Jamestown and Greensboro campuses of GTCC;
- Late-night service until 3 a.m. on Thursday, Friday, and Saturday.
- Express routes connecting the campuses to two Wal-Mart locations and Four Seasons Town Centre. These express routes were introduced in 2010-11 in response to student requests for direct access to these locations.

HEAT service operates 39 weeks a year between August and May.

For the first three years, the HEAT program was a partnership with seven colleges and universities in and around Greensboro, with 80 percent of operating funds provided by a three-year Congestion Mitigation and Air Quality (CMAQ) Federal grant and 20 percent contributed by the colleges and universities. When the CMAQ grant ended in August 2009, Greensboro Technical Community College (GTCC) and Greensboro College left the program. GTCC and

the GTA Board worked out an arrangement at the request of City Council, under which GTCC pays for (a) restoration of six daily trips on Route 74 (which had been discontinued) to the Jamestown campus, (b) extension of six trips on Route 70 to the Greensboro campus, and (c) one-way passes to get students from their homes to the Depot in the morning and back home in the afternoon. In exchange, GTA provides GTCC with HEAT passes valid ONLY on Routes 70 and 74. This agreement went into effect in September 2009, resulting in GTCC involvement but not full participation in the HEAT program. Greensboro College rejoined the HEAT program as a full partner in August 2010.

The two new express routes introduced in 2010-11 were funded through unused money in the CMAQ grant. These new routes have been heavily utilized.

The tables in this report include totals for the current and previous years for all schools and for the five fully participating schools. The latter total is referred to as the “same school” total and excludes GTCC and Greensboro College.

## 2. Ridership

Table 1 presents ridership data for the 2010-11 academic year compared with previous years. A total of over 680,000 trips were taken by students using a HEAT pass (either their college/university ID card or a semester pass). This represents a 37 percent increase compared with HEAT boardings in 2010-11. Same-school ridership also increased by 37 percent.

Figure 1 graphically displays ridership by school. Same-school ridership rose at all schools except Elon University School of Law. UNCG students accounted for the greatest number of boardings, followed by NC A&T students.

**Table 1**  
**Student Ridership, 2010-11 vs. Previous Years**

College/ University	Boardings with HEAT Pass					
	2010-11	2009-10	% change	2008-09	2007-08	2006-07
UNCG	294,202	197,061	49%	137,276	96,198	93,337
NC A&T	263,193	202,169	30%	143,485	69,052	24,030
Bennett College	79,216	65,073	22%	43,175	50,974	28,754
Guilford College	24,993	17,533	43%	11,726	8,307	9,114
GTCC	21,060	16,236	30%	353,796	268,564	204,270
Greensboro College	1,645	0	NA	3,232	2,761	2,684
Elon University School of Law	19	28	-72%	101	173	9
Total	684,328	498,100	37%	692,791	496,029	362,198
Same-school Total	661,623	481,864	38%	335,763	224,704	155,244

Note: NC A&T 2007-08 data missing August through mid-October

**Figure 1**  
**Student Ridership Trends by School**

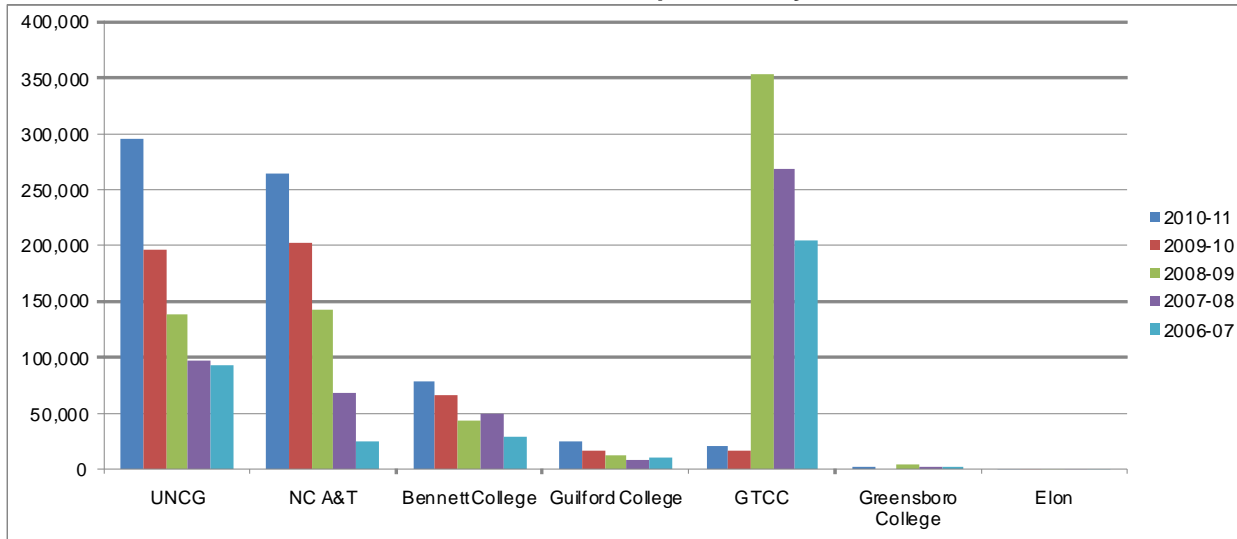


Figure 2 presents overall and same-school ridership trends. Total ridership and same-school ridership were both 37 percent higher in 2010-11 than in 2010-11.

**Figure 2**  
**Student Ridership Trends: Total and Same-School Total**

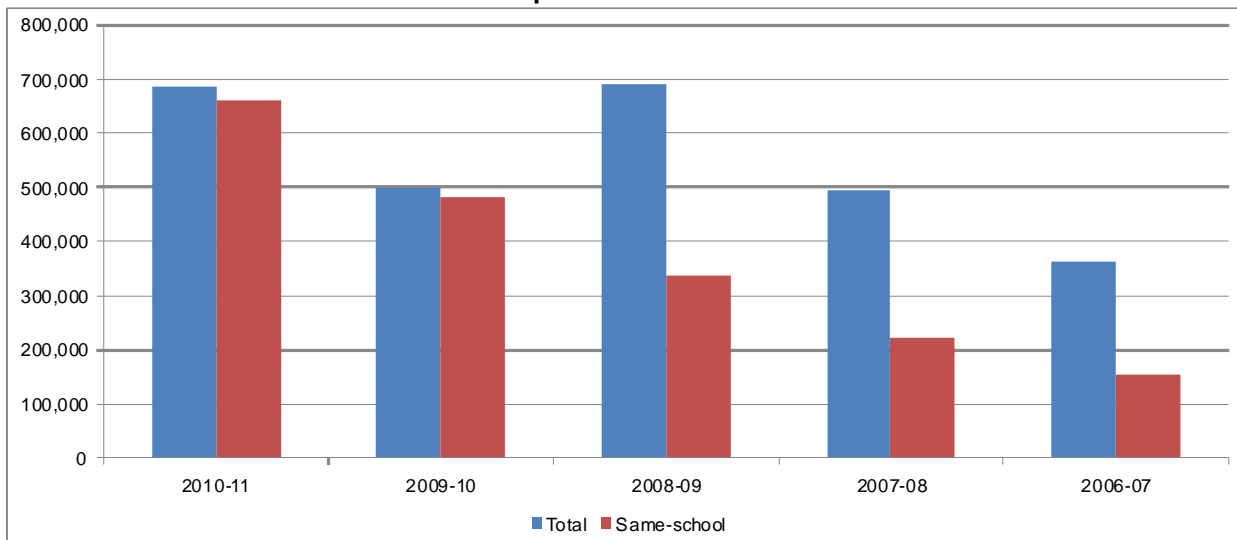


Figure 3 shows the percentage of HEAT riders by school. Over 80 percent of all trips were taken by students at UNCG (43 percent) and NC A&T (38 percent) in 2010-11.

**Figure 3  
Student Ridership by School, 2010-11**

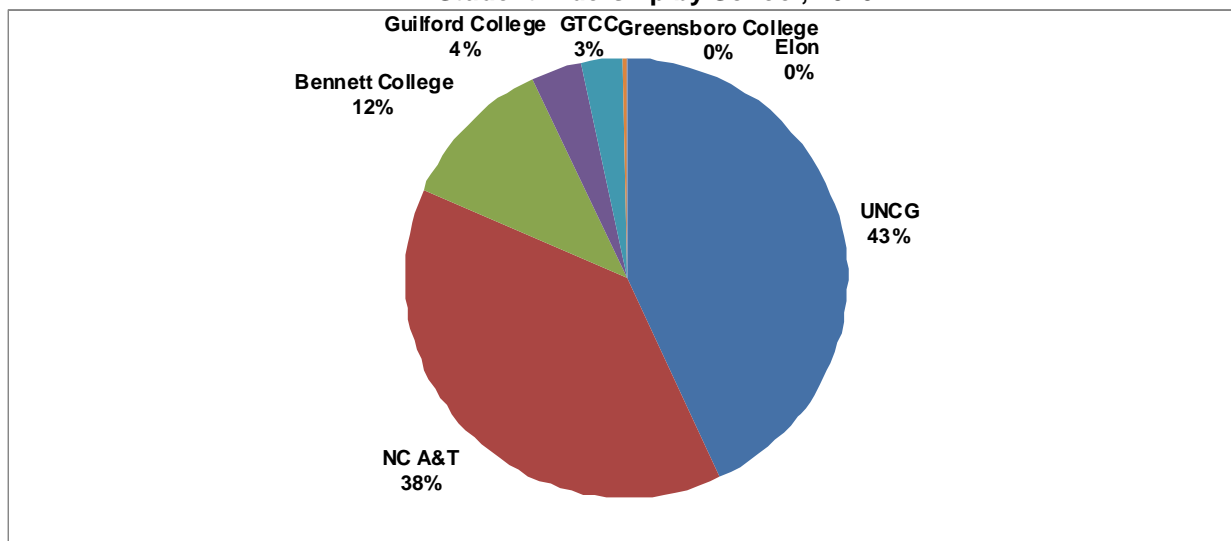


Table 2 shows the breakdown of student ridership on HEAT routes and on regular GTA routes. The percentage of all boardings with HEAT passes that occur on regular GTA routes remained constant over the first three years of the program but decreased to 61 percent in 2009-10 and to 53 percent in 2010-11. The apparent decrease in 2009-10 was caused by program changes for GTCC students who could no longer ride GTA routes; same-school usage of GTA routes rose during this year from 56 to 63 percent.

The 2010-11 decrease is attributable to the introduction of the Express HEAT routes, which encouraged additional ridership. The Express HEAT routes also reversed the same-school trend of continued migration to GTA routes over time. The assumption at the outset of the program, that students would migrate toward the regular GTA routes as they became more familiar with transit in Greensboro, would have in all likelihood continued to hold true in the absence of these new HEAT routes.

**Table 2  
Student Ridership by HEAT and Regular GTA Routes  
2010-11 and Previous Years**

Route Type	All Students with HEAT Pass				
	2010-11	2009-10	2008-09	2007-08	2006-07
GTA Routes – All	53%	61%	73%	74%	73%
GTA Routes Same-School only	54%	63%	56%	55%	53%

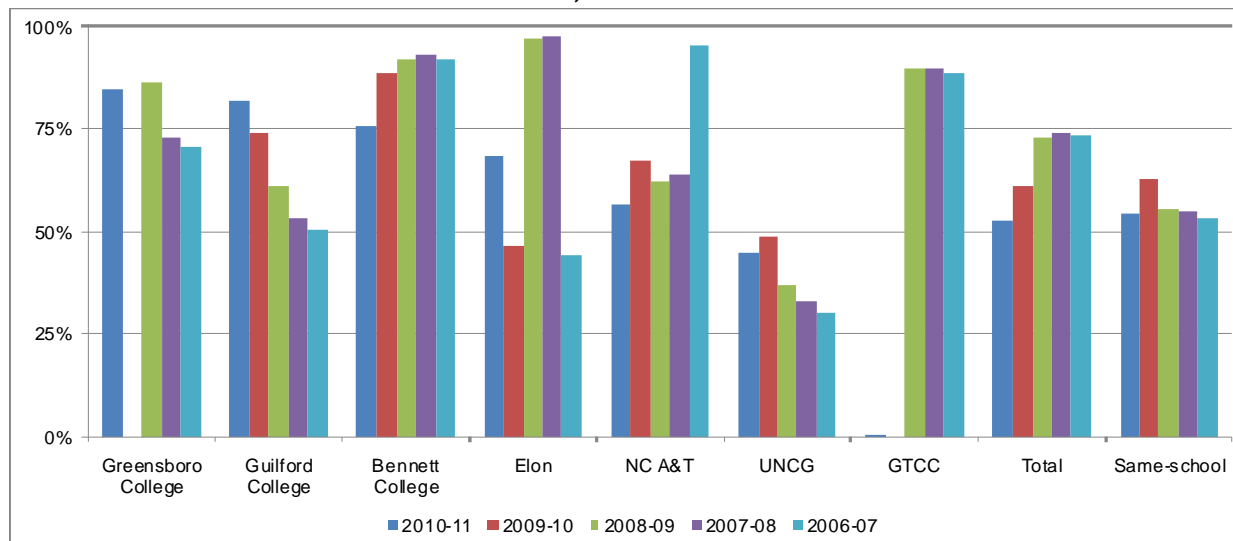
Table 3 examines student ridership on HEAT and GTA routes by school. Greensboro College has the highest proportion of student ridership on GTA routes with 85 percent. UNCG is the only school with a minority of riders on GTA routes, owing largely to the popularity of HEAT Route 73 serving student residences west of campus. GTCC students can only ride designated HEAT routes. Figure 4 presents these results in graphic format, including data from past years. Guilford College and Elon University School of Law were the only schools to experience an increase in the percentage of students riding GTA. The new express HEAT routes do not serve Elon directly, and HEAT express Route 78 went to Guilford College only on every other trip. Thus, the new express HEAT routes had less of an impact at these campuses.

**Table 3**  
**Student Ridership on GTA Routes as a Percentage of**  
**Total Ridership at Each School, 2010-11**

College/University	Student Boardings	
	Total	Percent on GTA Routes
Greensboro	1,645	85%
Guilford	24,993	82%
Bennett	79,216	76%
Elon	19	68%
NC A&T	263,193	56%
UNCG	294,202	45%
GTCC	21,060	0%
Total	684,328	53%
Same-school Total	661,623	54%

The relative frequency of using GTA by school is logical. GTCC students can only use HEAT routes. UNCG and NC A&T have the most HEAT service. Bennett College students continue to use GTA routes heavily; GTA Route 5 has always stopped at the main entrance to campus and operates more frequently than HEAT routes serving the Bennett campus. Guilford College students have a choice of HEAT Route 71, which operates hourly, and GTA Route 7, which operates every 30 minutes. HEAT routes do not serve the heart of the Greensboro College campus due to neighborhood opposition.

**Figure 4**  
**Students Riding GTA as a Percentage of Total Ridership at Each School, 2010-11 and Previous Years**



Almost all riders on HEAT buses are students, as shown in Table 4. During 2010-11, only seven percent of HEAT boardings were by non-students. This represents a decrease from eight percent in 2009-10.

**Table 4**  
**HEAT Ridership by Student/Non-student, 2010-11**

Category	Boardings	Percent
Student	322,751	93%
Other	25,569	7%
Total	348,320	100%

Table 5 shows HEAT ridership by route over the last four years. The totals in Table 5 include all boardings on HEAT routes, while previous tables included only student boardings. Routes connecting the largest universities with student neighborhoods or the Depot experienced ridership increases. On the other hand, ridership declined on Route 70 – East HEAT, Route 71 – West HEAT, and Route 72 – City HEAT and on the weekend HEAT route. This decline was related to the new express HEAT services, which provided direct access to major retail locations and replaced the former pattern of riding a HEAT route to the Depot and transferring.

Route 73 – UNCG HEAT continues to lead all HEAT routes in ridership. Route 76 – Express HEAT East attracted many more riders than Route 78 – Express HEAT West. Ridership on other daytime HEAT routes ranges between 17,000 and 38,000 riders in 2010-11. Late night HEAT ridership, while still low, increased by 26 percent over 2009-10.

**Table 5**  
**Ridership and Productivity by HEAT Route, 2010-2011 and Previous Years**

Route	Boardings				Productivity			
	2010-11	2009-10	2008-09	2007-08	2010-11	2009-10	2008-09	2007-08
73 – UNCG HEAT	91,349	68,369	54,800	45,027	30.2	24.2	21.4	17.6
76 – Express HEAT East	70,514	--	590	--	21.7	--	3.5	--
78 – Express HEAT West	37,997	--	--	--	11.6	--	--	--
75 – NC A&T HEAT	37,191	32,705	25,092	17,590	12.5	11.6	9.8	6.9
74 – Tech HEAT	31,008	19,977	26,121	23,103	28.8	27.1	20.1	17.8
72 – City HEAT	26,376	26,510	28,800	14,249	10.2	10.1	12.9	6.4
71 – West HEAT	25,816	27,454	25,825	22,701	8.5	9.6	8.4	7.4
70 – East HEAT	17,322	24,141	25,653	20,856	6.2	5.8	9.1	7.4
70/71 – Weekend HEAT	6,771	8,250	9,378	8,035	9.4	11.2	13.1	11.2
70/71 - Late Night HEAT	3,990	3,156	3,172	2,591	7.6	5.8	6.0	4.9
Total	348,320	210,582	199,431	154,152	15.0	12.2	12.5	9.8

Table 5 also includes productivity, measured by boardings per scheduled revenue hour of service, for the HEAT routes. Productivity increased in 2010-11, due mostly to the new express HEAT Route 76 and continued strong ridership on campus-oriented routes. Overall HEAT productivity is 15.0 boardings per revenue hour and continues to exceed the goal for HEAT service of 10 boardings per scheduled revenue hour.

Table 6 presents annual HEAT boardings per eligible student by school for all routes. The number of eligible students was updated from enrollment information on the schools' websites and/or direct contact. The number of eligible students at GTCC is 8,000, the number of passes provided for distribution. In developing a broad ridership estimate for the HEAT program when it began, the project team estimated an annual ridership equal to seven trips per student. In 2010-11, the total number of boardings per student was 16.3, up from 13.0 in 2009-10. Same-school boardings per eligible student averaged 19.7, an increase from 15.8 in 2009-10. HEAT ridership continues to exceed expectations.

Bennett College students use transit most intensively, with over 100 boardings per eligible student, followed by NC A&T (24.5) and UNCG (15.3). All schools except Guilford College, whose enrollment numbers were adjusted upward to reflect total enrollment, showed an increase in boardings per eligible student in 2010-11.

**Table 6**  
**Annual HEAT Boardings per Eligible Student at Each School,**  
**2010-11 and Previous Years**

College/University	Boardings per Eligible Student				
	2010-11	2009-10	2008-09	2007-08	2006-07
Bennett College	113.2	85.0	64.6	86.3	47.4
NC A&T	24.5	19.5	13.8	6.6	NA
UNCG	15.3	11.3	8.0	6.4	6.7
Guilford College	9.3	11.9	8.4	5.7	4.6
Greensboro College	3.5	--	2.5	2.1	2.1
GTCC	2.6	2.0	44.2	33.6	25.5
Elon School of Law	0.1	0.1	0.3	0.8	0.1
Total	16.0	13.0	17.7	13.3	13.0
Same-school Total	19.3	15.8	11.2	8.1	9.3

#### 4. Detailed Analysis

GFI farebox reports provide detailed information on transit use on HEAT and regular GTA buses by student. The available data allowed GTA to analyze ridership patterns in terms of routes and times and to detect unusual patterns (such as students with at high monthly boardings who never board or alight near their college or university). Results from 2010-11 indicate unusual usage patterns for 35 student ID cards. The low level of possibly fraudulent use is attributed to the importance of the student ID card; unlike passes, the ID card cannot be sold or transferred because it is needed for many activities on campus.

GTCC and Elon University School of Law distributed semester HEAT passes to their students in the fall and spring semesters. It was not possible to monitor usage per student throughout the year for these schools. Thus, the detailed analysis in this section focuses on trends in spring semester usage and ridership from 2007 to 2011.



The detailed analysis produced several interesting findings. Figure 5 shows the percentage of eligible students by school who used a HEAT pass in the spring semester of 2011 compared to previous spring semesters. Over 80 percent of all Bennett College students tried transit during the spring semester 2011, the highest percentage of any school. Overall, 23 percent of eligible students boarded either HEAT or GTA buses at least once in spring 2011, up from 20 percent in spring 2010. The same-school percentage of students who rode HEAT in spring 2010 was 27 percent. This percentage increased or stayed the same as in 2010 for all schools except Guilford College and GTCC.

**Figure 5**  
**Percentage of Eligible Students Who Used a HEAT Pass by School,**  
**Spring 2011 vs. Previous Years**

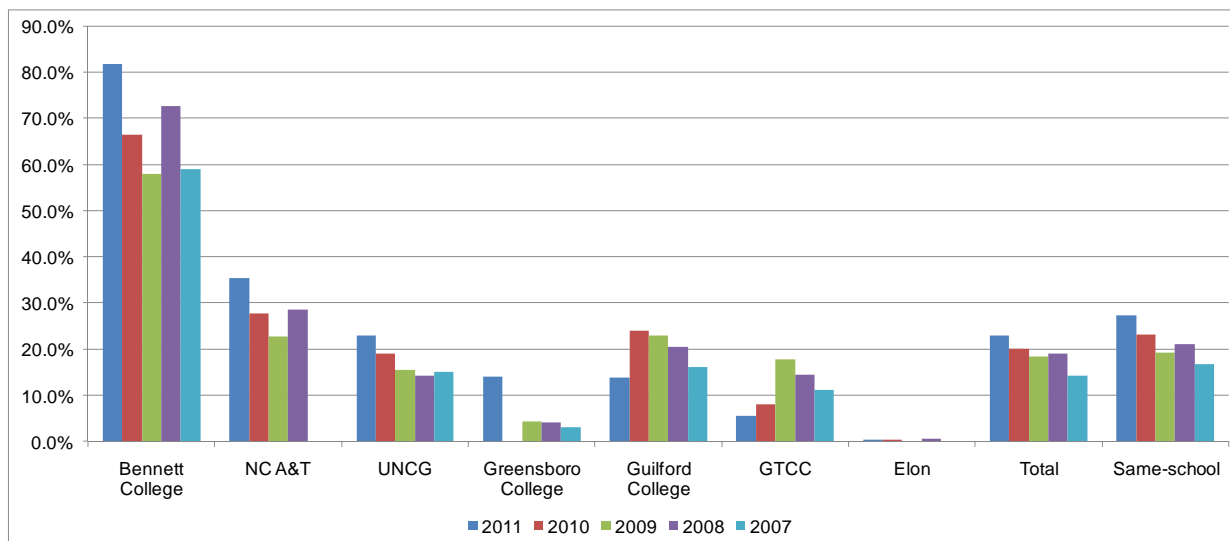


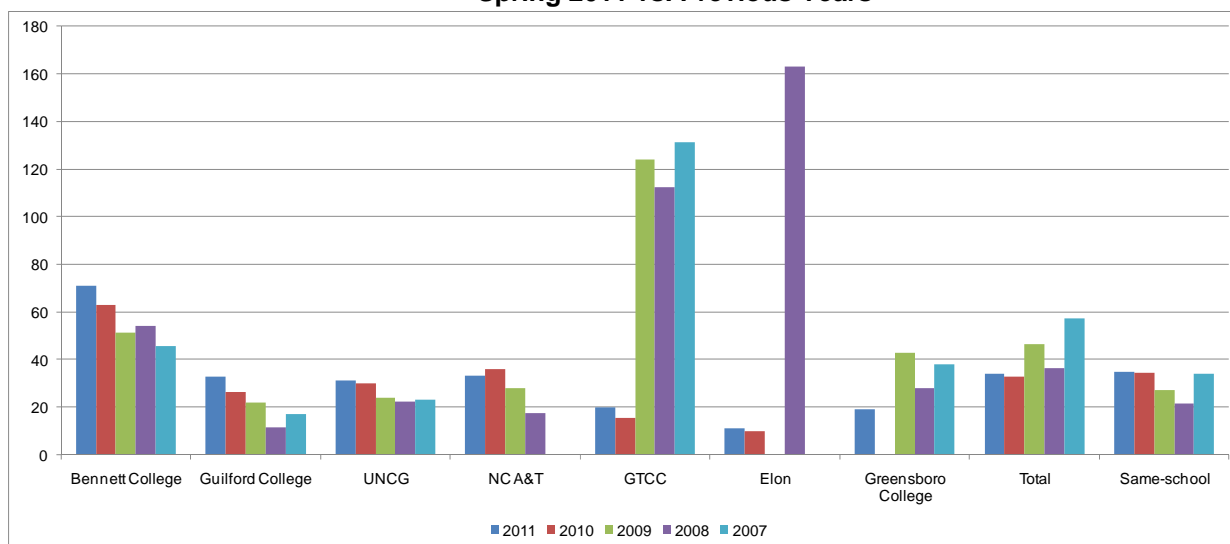
Table 7 presents the number of students who used transit in spring 2011 and previous spring semesters. The number of students who swiped their HEAT passes at least once increased by 25 percent overall in spring 2011 versus 2010. Students riding transit can be considered “active” students. There were over 9,600 active students in spring 2011, compared to approximately 7,700 in the previous spring. Same-school number of active students increased from 7,000 in spring 2010 to over 9,100 in spring 2011, an increase of 30 percent.

**Table 7**  
**Students Using Transit at Each School,**  
**Spring 2011 vs. Previous Years**

College/University	Students Using Transit				
	2011	2010	2009	2008	2007
UNCG	4,401	3,313	2,659	2,159	2,100
NC A&T	3,782	2,870	2,361	2,987	NA
Bennett College	572	509	387	429	358
GTCC	442	636	1,421	1,156	880
Guilford College	374	354	321	298	320
Greensboro College	66	--	54	53	39
Elon School of Law	1	1	0	1	0
Total	9,638	7,683	7,203	7,083	3,697
Same-school Total	9,130	7,047	5,728	5,874	2,778

Figure 6 shows the average number of boardings per active student by school for the spring semesters in 2011 and previous years. This measures the intensity of transit use by students who are transit riders. An increase suggests greater reliance on transit, while a decrease can be caused by more students trying transit but not riding frequently. The overall average was 33.9 boardings per active student (a slight increase from 32.9 in spring 2010). Same-school average was 34.6 boardings per active student, virtually identical to 34.5 in spring 2010.

**Figure 6**  
**Boardings per "Active" Student by School,**  
**Spring 2011 vs. Previous Years**



The average by school among active schools ranged from 11 at Elon University School of Law to 71 among active Bennett College students. All schools except NC A&T saw this measure increase slightly in 2011.

## 5. Summary of 2010-2011

Findings and conclusions based on analysis of the HEAT program for the academic year 2010-11 include the following:

- Student ridership for 2010-11 totaled 684,000, an increase of 37 percent from 2009-10. Ridership increased at all schools except Elon University School of Law, with UNCG and Guilford College experiencing increases of over 40 percent. Students from UNCG and NC A&T account for 84 percent of all ridership.
- Fifty-three (53) percent of all boardings using a HEAT pass occurred on existing GTA routes. This was a decrease from 61 percent in 2009-10, due to the institution of very popular express HEAT routes to major malls and shopping areas. This reversed an ongoing increase in use of GTA routes by students as they became more familiar with transit in Greensboro.
- UNCG students continue to take the majority (55 percent) of their transit trips on HEAT routes. Ridership on HEAT Route 73 UNCG HEAT is the highest among all HEAT routes and continues to increase. The new Express HEAT Route 78 to Four Seasons and the Wendover retail area encouraged added use of HEAT routes among UNCG students. The next-highest total is for NC A&T students, with 44 percent of their transit trips on HEAT routes.
- Only seven percent of all riders on HEAT routes are not HEAT-eligible students. These riders pay with cash or a GTA pass.
- The HEAT routes with the highest ridership and productivity are those that bring students to and from major campuses (Route 73 UNCG HEAT, Route 75 NC A&T HEAT, Route 74 Tech HEAT). Overall productivity of HEAT service is 15.0 boardings per revenue hour, an increase of 23 percent from 12.2 in 2009-10. HEAT productivity is comparable to the productivity of GTA Connector routes and exceeds the goal of 10 boardings per revenue hour for the Connector routes.
- Student ridership continues to exceed the pre-implementation ridership estimate. The estimate, based on experiences at other schools with similar programs, was seven riders per eligible student per year. For 2010-11, the transit usage rate among students was 16.3 boardings per eligible student overall and 19.7 among same-school students.
- The percentage of eligible students who took at least one trip on transit in spring 2011 increased to 22.9 percent from 20.0 percent in spring 2010. The percentage of eligible students using transit was 27.2 percent among same-school students. All of the five fully participating schools except Guilford College, whose total enrollment was adjusted upward, experienced an increase in the proportion of students trying transit. The average number of boardings per active student rose slightly to 33.9 from 32.9 in spring 2010. Among same-school students, this average held steady at 34.6 compared to 34.5 in spring 2010.
- Bennett College students have the highest number of boardings per eligible student. Detailed analysis at the student level reveals a combination of high participation and fairly intensive use for Bennett students.

- The HEAT program continues to be a major success. Both ridership and the number of students riding continue to increase. In FY 2010-11, student ridership was 684,000, 37 percent higher than in FY 2009-10. During the spring 2011 semester, 9,638 students used their HEAT pass at least once, an increase of 25 percent from spring 2010.

As GTA looks forward to the sixth year of HEAT, GTA and its partners continue to strategize regarding potential service improvements and a renewal of three-year contracts at the end of the academic year 2011-12. Guilford College has announced that it will drop out of the program in the coming year, providing an opportunity to rationalize and streamline HEAT routes formerly serving the college.