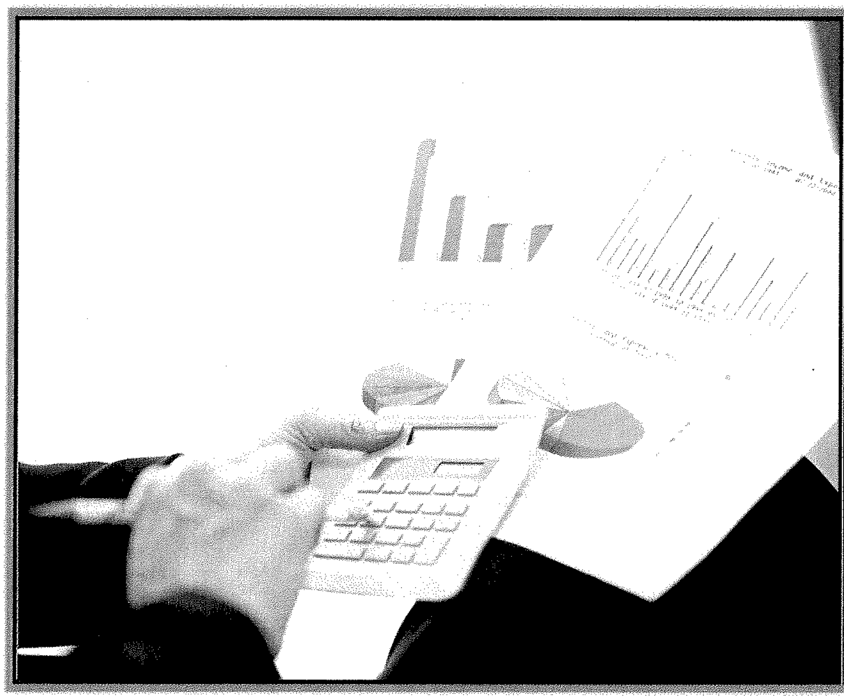

Higher Education Enrollment Forecasting: An Analysis Containing Recommendations for Process Improvements

As Required by Ch. 2007-217, Laws of Florida

Office of Economic and Demographic Research
Florida Legislature
February 1, 2008

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INTRODUCTION

The Office of Economic and Demographic Research (EDR) was directed to study higher education enrollment forecasting models by CS/HB 7147 (Ch. 2007-217, *Laws of Florida*). Section 1 of the bill states:

> The Office of Economic and Demographic Research shall conduct a study of the higher education enrollment forecasting models currently used in the state. The study must analyze the current models and provide options for improvements. The review shall specifically examine ways to include Florida's changing demographics in the forecasts. A final report with recommendations shall be submitted to the President of the Senate and the Speaker of the House of Representatives by February 1, 2008.

Higher education for the purposes of this study is defined as attendance at both public and private community colleges, four-year colleges and universities. At legislative direction, the study also includes adult vocational education, excluding adult general education. Adult vocational education is represented by enrollment in vocational technical centers operated by school districts and by the continuing workforce education programs offered at community colleges.

To accomplish the purpose of this study, EDR employed a variety of strategies. These include a brief review of some historical efforts to forecast higher education enrollment, as well as a detailed description of the models currently used in Florida. To gain additional perspective, selected models in use in other states are also reviewed.

The study is organized around several research areas that are central to the development of the analysis. The specific research questions addressed are:

1. What are the current demographic patterns of higher education enrollment in Florida;
2. How is enrollment currently forecasted in Florida;
3. Are the current models responsive to Florida's changing demographics; and
4. How accurate and appropriate for use are Florida's current forecasting models?

SECTION 1
Overview of Higher Education Enrollment in Florida

Current forecasting models used for higher education in this state are geared to enrollment issues. While enrollment is measured by headcount (that is, how many students are attending), public higher education funding in Florida is generally based on the concept of a full-time-equivalent (FTE) student. Full-time is defined by the number of hours of instruction taken by each student. For example, if a full-time student is defined as 40 credit hours per year, four students taking 10 hours per year each will combine to produce one FTE. In institutions where there are more students attending part-time, the FTE count will diverge from the headcount. Thus, FTE counts can be impacted by the mix of full-time and part-time students, trends in course loads, retention and graduation rates, and also by the definition itself. For example, defining an FTE based on 30 credit hours per year will produce more FTE than a definition based on 40 credit hours per year, although the same number of students generates the total number of credit hours in both cases. Because demographic information is only available on the individual student, our analysis uses headcount enrollment.

FY 2005-06 is the most recent year for which all sectors have data on enrollment. Consequently, that year will be used to illustrate current enrollment in higher education in Florida. Information from the Integrated Postsecondary Education Data System (IPEDS) based on Fall 2005 enrollment is the source for the charts and graphs that follow.[1]

Essentially, higher education in Florida is comprised of two sectors (public and private) and five delivery systems (state university system, public community colleges, school district postsecondary, private not-for-profit institutions, and private for-profit institutions). Looking at higher education by sector and delivery system, the largest share is held by public community colleges with just over 42% of all enrollment. The public sector as a whole accounts for 73% of enrollment. However, the largest percentage of students attend public and private four year institutions, enrolling 52% of all students. The chart below shows the relative shares of headcount enrollment in Fall 2005.[2]

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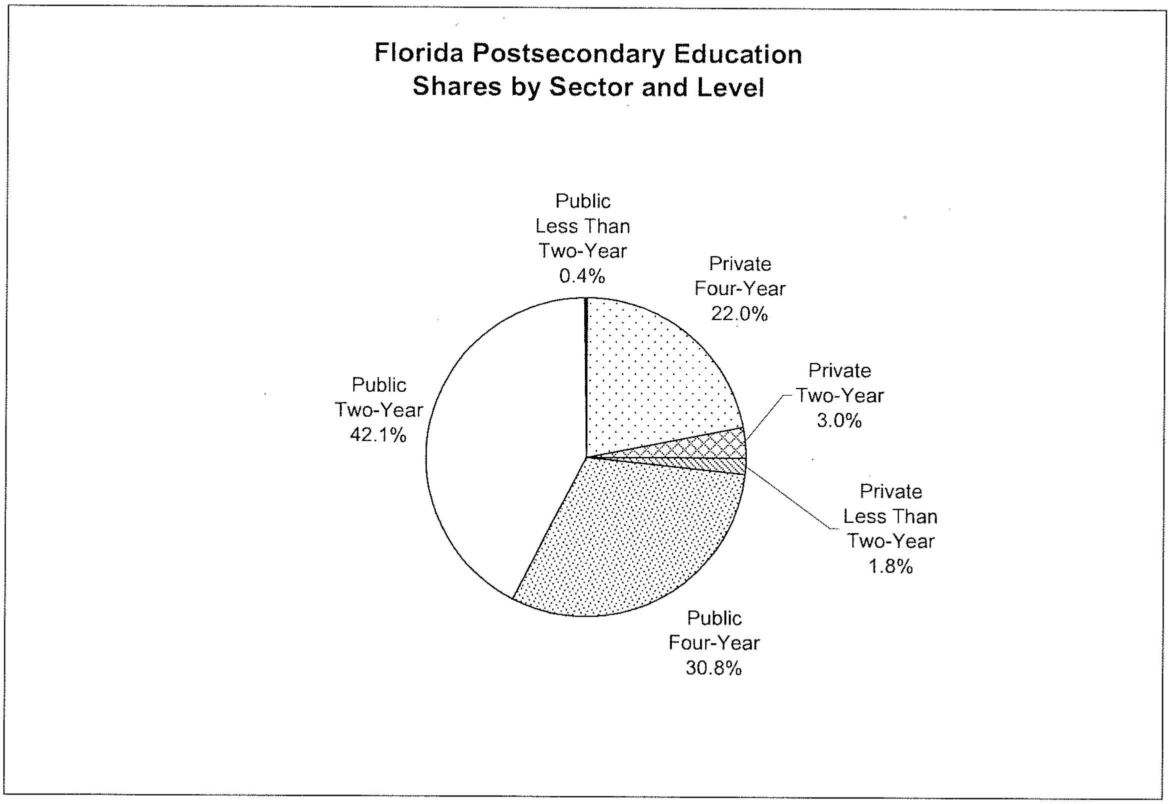
[1] The IPEDS data is adjusted to show Chipola College, Miami-Dade College, Okaloosa-Walton College and St. Petersburg College as Public 2-Year Institutions to correspond to Florida's community college system. Since these colleges offer some Bachelor's Degrees, IPEDS classifies them with Public 4-Year Institutions.

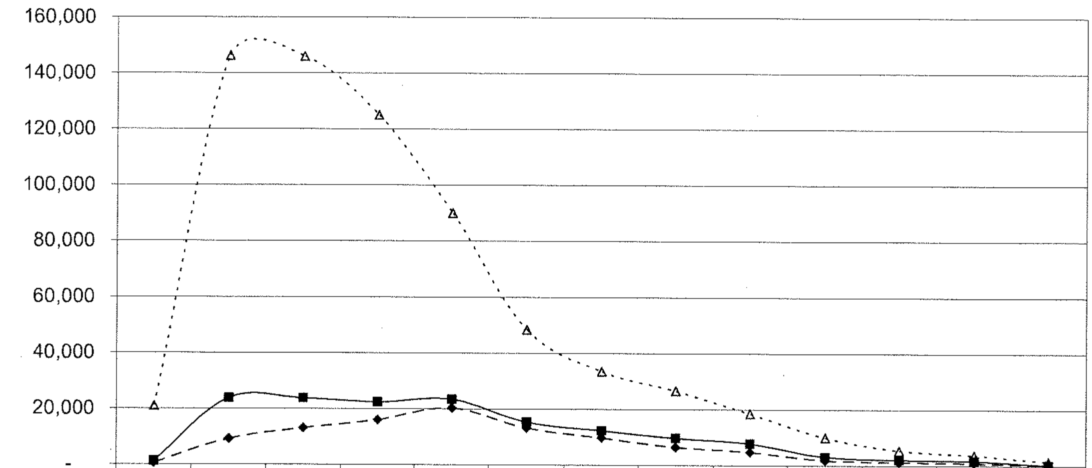
[2] Source: IPEDS (Integrated Postsecondary Education Data System), Fall 2005.



Distribution of enrollment by age is displayed on the two graphs on the following page.[3] The first graph shows the relative number of students enrolled within each age group. The second graph shows the distribution of age-group shares within each sector. The sum of percents adds to 100% within each sector.

[3] Source: IPEDS, Fall 2005.

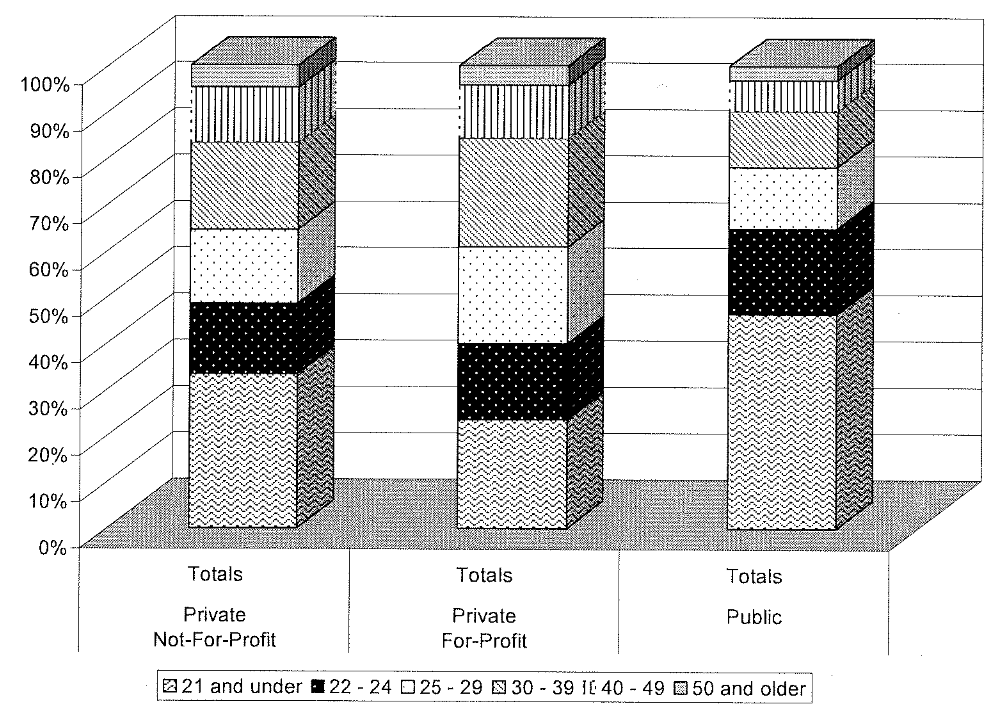
Florida Postsecondary Education Enrollment, Fall 2005: Age Distribution by Sector



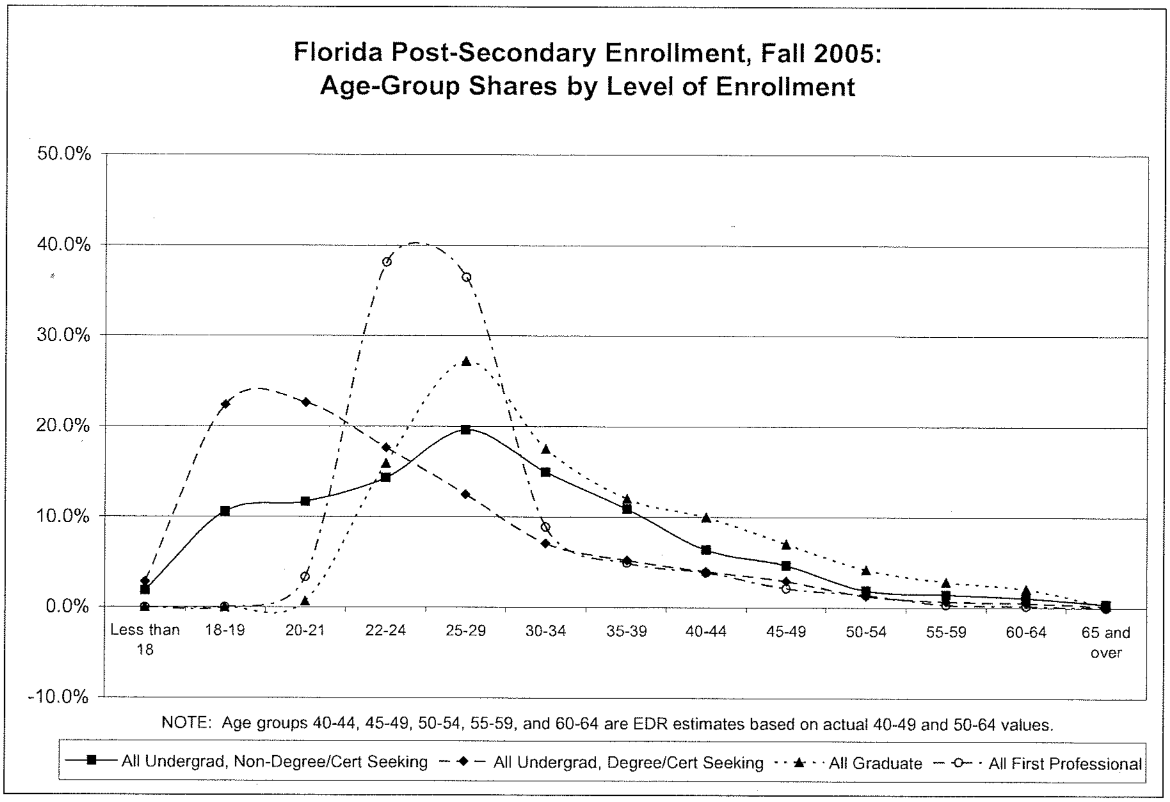
	Less than 18	18-19	20-21	22-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65 and over
Private Not-For-Profit	1,214	23,853	23,769	22,357	23,385	15,347	12,302	9,703	7,778	3,148	2,066	1,656	212
Private For-Profit	554	9,171	13,057	16,039	20,275	13,177	9,698	6,419	4,724	1,852	1,203	886	164
Public	20,939	146,225	145,948	125,003	90,036	48,337	33,493	26,609	18,438	9,992	5,365	3,717	1,418

NOTE: Age groups 40-44, 45-49, 50-54, 55-59 and 60-64 are EDR estimates based on actual 40-49 and 50-64 values.

Post-secondary Age Group Share by Sector

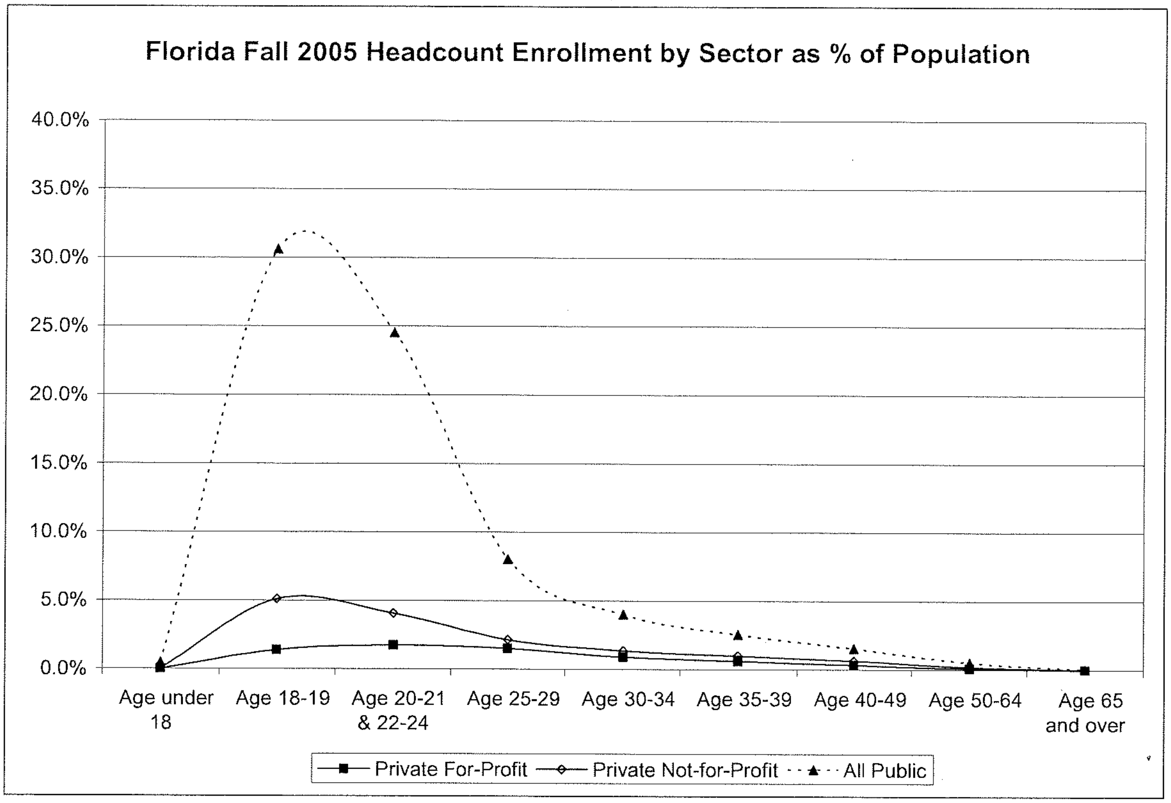


Age-group shares vary more by level (undergraduate, graduate, etc.) than by sector, as the following graph illustrates.



Looking at higher education enrollment as a percent of Florida's total population, higher education students represent only 4.8%. However, within age-group shares, 37% of Florida's population ages 18 and 19 are enrolled in higher education. The lowest enrollment rate is less than ½ of 1% for persons over 65 years old.

Persons between 18 and 29 years old account for nearly 72% of the total enrollment. Among the sectors, the 18-29 age group accounts for about 63% of private not-for-profit institution enrollment, 59% of private for-profit institution enrollment, and 75% of public institution enrollment. Population shares by age group are shown on the following graph.

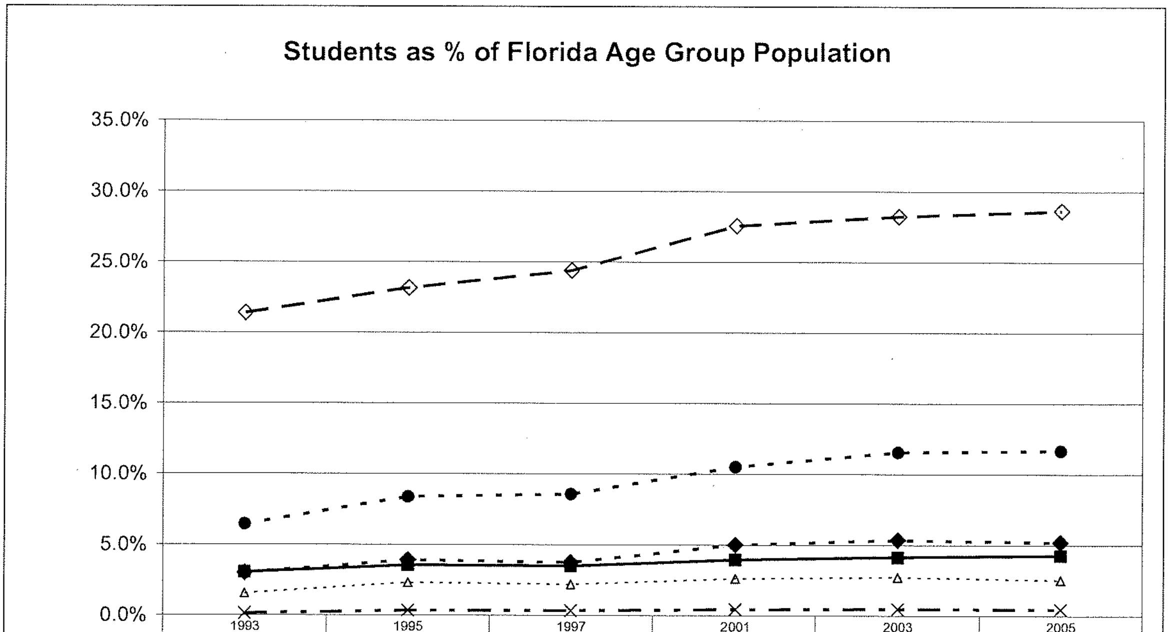


The ethnic mix of students enrolled in higher education in Florida is illustrated in the following charts. Overall, the ethnic mix of headcount enrollment diverges somewhat from that found in Florida's total population. The table below illustrates the differences.[4]

Ethnicity	Florida Population Ages 18-34, Oct 1 2005	Public Higher Education Enrollment, Fall 2005	Private Not-For-Profit Higher Education Enrollment, Fall 2005	Private For-Profit Higher Education Enrollment, Fall 2005
Black Non-Hispanic	750,225 (19.6%)	108,586 (16.6%)	28,077 (19.9%)	22,664 (23.5%)
Hispanic	928,241 (24.3%)	122,233 (18.7%)	20,310 (14.4%)	23,749 (24.6%)
White Non-Hispanic	2,027,482 (53.1%)	382,035 (58.4%)	75,357 (53.5%)	33,708 (35.0%)
All Other	118,131 (3.1%)	41,365 (6.3%)	17,225 (12.2%)	16,310 (16.9%)
Total	3,820,753 (100.0%)	654,219 (100.0%)	140,969 (100.0%)	96,431 (100.0%)
	Fla. Pop. 18-34	IPEDS all	IPEDS all	IPEDS all

[4] Sources: IPEDS, Fall 2005, and Florida Population as of October 1, 2005 for ages 13-34, Demographic Estimating Conference October 2006.

Changes in Florida Population Shares Over Time. Viewing postsecondary enrollment over time, population shares have increased in all age groups. The chart below shows historical population shares based on IPEDS enrollment data and Florida population estimates by age group.[5]



	1993	1995	1997	2001	2003	2005
Under 20	3.0%	3.5%	3.5%	4.0%	4.2%	4.3%
20 - 24	21.4%	23.2%	24.4%	27.6%	28.2%	28.6%
25 - 29	6.5%	8.4%	8.6%	10.5%	11.6%	11.7%
30- 39	3.0%	3.9%	3.8%	5.0%	5.4%	5.2%
40 - 49	1.6%	2.3%	2.2%	2.6%	2.7%	2.5%
50 and over	0.1%	0.3%	0.4%	0.4%	0.5%	0.5%

As a whole, enrollment in higher education has grown from 3.3% of the total Florida population in 1993 to 4.8% in 2005. The table below compares the average annual rate of growth for Florida's population and for higher education enrollment by age group.[6]

Average Annual Rate of Growth, 1993 to 2005		
Age Groups	Florida Population	Florida Enrollment in Higher Education
Under 20	2.1%	5.0%
20 - 24	2.5%	5.0%
25 - 29	0.7%	5.8%
30 - 39	0.3%	5.0%
40 - 49	3.6%	7.8%
50 and over	2.9%	13.5%
Total Population	2.3%	5.5%

[5] Sources: IPEDS, Fall of 1993, 1995, 1997, 2001, 2003 and 2005. Fall of 1999 is not available for Florida. Florida Population as of October 1 for the same years from the Florida Demographic Estimating Conference, October 2006.
[6] Ibid.

Comparing the two average annual rates of growth, enrollment in public higher education in Florida has increased at a greater rate, by age group, than the underlying growth in population. At the same time, the ratio of out-of-state students to total public enrollment of in-state and out-of-state students has declined in recent years.[7] The table below shows the percentage of out-of-state students enrolled in Florida public community colleges and universities by year, together with out-of-state enrollment in the private Independent Colleges and Universities of Florida (ICUF) institutions and the University of Miami.[8]

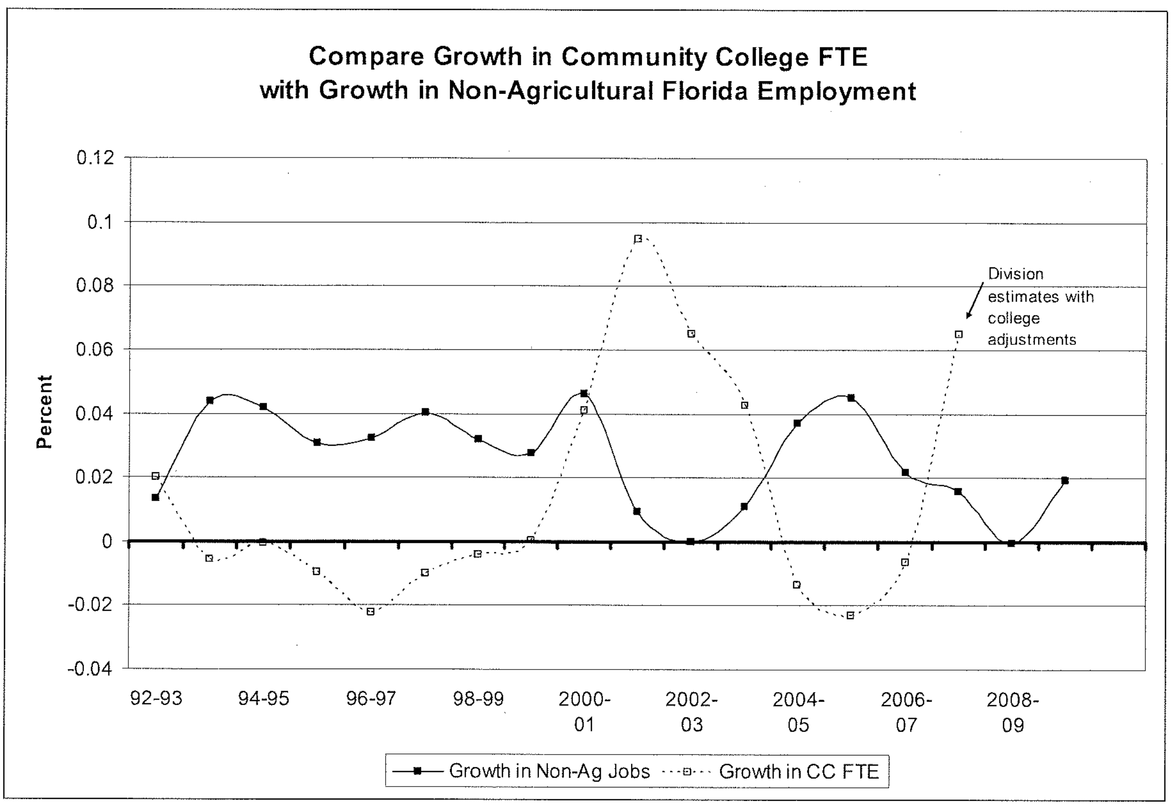
	All Students, State University			Degree-Seeking Students, State Community College			Private Students, ICUF and University of Miami		
Fall of	Out-of-State Head-count	Total Head-count	% Out-of-State	Out-of-State Head-count	Total Head-count	% Out-of-State	Out-of-State Head-count	Total Head-count	% Out-of-State
1999	24,410	234,016	10.4%	14,237	327,874	4.3%	34,904	91,479	38.2%
2000	25,457	241,772	10.5%	14,155	335,823	4.2%	35,654	95,797	37.2%
2001	27,672	253,010	10.9%	14,907	354,300	4.2%	42,100	101,041	41.7%
2002	27,435	263,454	10.4%	14,819	370,229	4.0%	43,924	106,728	41.2%
2003	26,536	271,337	9.8%	15,114	386,337	3.9%	47,436	113,207	41.9%
2004	26,040	277,582	9.4%	15,994	382,192	4.2%	50,895	117,606	43.3%
2005	25,216	287,374	8.8%	14,583	373,974	3.9%	52,799	120,981	43.6%
2006	25,261	294,016	8.6%	14,032	374,033	3.8%	54,301	122,225	44.4%

[7] Based on State University System and Community College Fall enrollment data for the years 1996 through 2006.

[8] From the Independent Colleges and Universities of Florida (ICUF) Accountability Report for years shown. Out-of-state headcount derived by subtracting Florida resident headcount from total headcount reported.

SECTION 2
Current Enrollment Forecasting in Florida

Factors Impacting Higher Education Enrollment Forecasting. Higher education enrollment forecasting presents distinct challenges. Public K-12 school enrollment forecasts a population that is entitled to services up to age 16. Further, absence from school before age 16 is sanctioned as truancy. Conversely, higher education choices (private, public, four-year, two-year, vocational) are voluntary and interdependent. Constraints in one sector can result in over-subscription in another sector. Constraints on all of the sectors can also occur at the same time. Additionally, Florida residents may choose to exit Florida to receive services, and residents from other states may chose to receive services in Florida. Moreover, it has long been observed that when job growth slows, enrollment in Florida's community college system expands. In at least that sector, enrollment is countercyclical to economic expansion and contraction.



In addition, the availability of financial aid and the relative cost of attending each sector are factors influencing students' choices.

Enrollment in higher education at four-year public institutions is typically planned enrollment. The process is relatively straightforward. Prospective students apply for admission. The entering class is selected for admission based on various criteria (SAT tests, grade-point average, essays, first-in-family to attend college, etc.). Since funding is based on a specific FTE count, public four-year institutions attempt to meet but not exceed the funded FTE. Universities estimate the number of admitted students who will actually enroll based on "show rate" ratios observed in the past. Future retention rates for those students are usually based on observed ratios from past years.

Enrollment at private two-year and four-year colleges and universities and at vocational institutions, both not-for-profit and for-profit, is controlled by the institution. Private institutions may select from among the pool of applicants, using selection criteria that vary according to each institution's mission. Admission of Florida resident students can be affected by the amount of financial aid available and by the tuition charged by the institution.

Enrollment in higher education at two-year public institutions is open to all post-secondary students. Since funding is based on the previous year's FTE, enrollment estimates made in the fall and spring incorporate actual enrollment for the year. The first estimate for the fiscal year is produced by the Department of Education's Division of Community Colleges and Workforce Education (DCCWE). This estimate uses a model based on prior year historical relationships. The results of the model are submitted to each community college president for review. Colleges may request adjustments to the model output, but must provide justification for such requests. Subsequent estimates, produced for the Governor's Budget and the Legislature's Appropriations Act, use Summer End-of-Term, Fall Beginning-of Term, Fall End-of-Term, and Winter/Spring Beginning-of-Term FTE counts as available throughout the year. In each case, the DCCWE's enrollment model output is submitted to colleges for their review and suggested adjustments.

Enrollment in public vocational-technical education is also open to all post-secondary students. Course offerings in this area are typically more market-driven and responsive to local employment opportunities. Monitoring of and input from the local job market is used to tailor offerings. Spot-checking of daily enrollment may be used to identify early trends and changes in demand.

History of Forecasting Models. In past years, Education Enrollment Estimating Conferences produced full-time-equivalent (FTE) estimates for state universities, community colleges, and adult education. ***Adult education forecasts*** were produced until FY 1996-97 as part of the Public Schools Enrollment Estimating Conference. As with other public school FTE, estimates were produced for the up-coming budget year, based on current year enrollment and estimated population growth in ages 18-44. Districts could request adjustments to the conference estimates.

Until the fall of 2001, a ***State University System (SUS) Conference*** was held; it also produced estimates for the up-coming fiscal year. The SUS Conference enrollment was "planned enrollment" based upon estimates for various components of enrollment. For example, an estimate for First-Time-In-College enrollment was based on projections of high school graduates and historical percentages of high school graduates who enroll in the SUS. Other inflows, such as community college transfers with Associate of Arts degrees, were estimated separately. In most cases, the SUS incorporated policy goals into the planned enrollment, such as increasing the percent of high school graduates who enroll to match long-range plans for the SUS. At the September 2001 conference, total enrollment in the SUS was expected to increase by 31,047 FTE from 2000-01 to 2005-06. In fact, total state fundable FTE increased by 34,662 FTE during that period.[9] The conference did not adopt out-year forecasts, although certain policies intended to phase in enrollment over time were incorporated into each year's estimate based on an adopted long-range plan.

The ***Community College Enrollment Estimating Conference*** continues to provide FTE estimates for the planning and budgeting process. Enrollment estimating conferences are held at least twice annually to produce current-year estimates for the up-coming fiscal year in the Governor's budget recommendations and for the Legislature's Appropriations Act. Community College funding is largely based on the prior year's enrollment. Given this relationship, the Conference does not adopt out-year FTE forecasts.

1997 Enrollment Projection Model. In addition to enrollment estimates from Estimating Conferences, there was at least one recent attempt to generate long-run estimates for public and private sector colleges and universities. In 1997, the Florida Postsecondary Education Planning Commission (PEPC) made projections for college credit enrollment in public and private community colleges and public and private colleges and universities. At that time, only not-for-profit private institutions were considered. Neither for-profit private institutions nor postsecondary adult education were included in the model. The model produced headcount college-credit projections to the year 2010 and offered 2010 projected totals for undergraduate, graduate and professional (law and medicine). The PEPC models did not divide these projections by setting (public universities, public community colleges, private college and universities).

The PEPC model projected that total college-credit headcount enrollment for 2005 would fall within the range of 768,732 and 835,053. The actual 2005 headcount for students in public or private not-for-profit institutions, using IPEDS data, was 823,616. This total was comprised of 676,131 in all public institutions and 147,485 in all private not-for-profit institutions.

Population Shares Model. Since 1997, the Office of Economic and Demographic Research (EDR) has periodically produced long-run forecasts for headcount enrollment in the State University System, public community colleges and adult education. These forecasts rely on the Demographic Estimating Conference's population projections for Florida, and on the most recent fall enrollment in the SUS, community colleges and adult education (adult vocational and adult general education). Fall enrollment is broken into age groups. Each age group's percentage of the total Florida population in that age group is computed. Future years are then projected using the same percentage of the population, by age group, as the most recent year. This method produces a conservative estimate of enrollment growth and assumes no changes in practices such as recruitment or retention.

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[9] Source: Florida Board of Governor's website at www.flbog.org/factbook/credit_hours.asp for FTE totals.

The table below shows population shares for Fall 2005 enrollment for the SUS, community colleges, and adult vocational education.[10]

Fall 2005 Age Ranges	SUS Undergrad	SUS Graduate	CC Degree/Cert	CC Workforce	Adult Vocational
Less than 18 years	0.04%	0.00%	0.5%	0.0%	0.0%
18-19 years	13.17%	0.00%	17.8%	0.2%	1.5%
20-24 years	10.64%	1.12%	11.1%	0.4%	1.3%
25-29 years	2.05%	1.66%	4.5%	0.6%	0.9%
30-34 years	0.74%	0.80%	2.5%	0.6%	0.6%
35-39 years	0.41%	0.43%	1.8%	0.6%	0.5%
40-44 years	0.27%	0.26%	1.3%	0.6%	0.4%
45-49 years	0.19%	0.23%	0.9%	0.5%	0.3%
50-54 years	0.12%	0.18%	0.6%	0.4%	0.2%
Greater than 54 years	0.02%	0.04%	0.1%	0.1%	0.1%
Share of TOTAL FLA Pop	1.28%	0.31%	2.1%	0.3%	0.3%

Population shares in the public sector have remained quite stable from 1996 through 2005, except for SUS undergraduate students ages 18 through 24. The 18-19 age group is the most noticeable exception. In Fall 1996, SUS undergraduates aged 18-19 comprised 10.4% of the age group. By Fall 2005, these students made up almost 13.2% of the Florida population ages 18-19. Students ages 20 through 24 were 9.3% of Florida population aged 20-24 in Fall 1996. By Fall 2005, this group made up about 10.7% of the population.

Current Models in Use. An official methodology for short-term and long-term FTE projections is currently deployed for community colleges.

Community Colleges. Current year enrollment for community colleges is calculated from the most recent FTE reports from the colleges. Funding for the subsequent fiscal year is largely based on the actual FTE from the current year. (Some funding is based on performance measures.) FTE are reported three times per year. The estimating process uses three-year ratios to estimate annual FTE by program area for credit courses. For non-credit courses, the actual prior year FTE becomes the current year estimate. For purposes of the constitutionally required Long-Range Financial Outlook, out-year projections are based on population shares. Production of these estimates involves a three-step process. First, the Division of Community Colleges and Workforce Education (DCCWE) generates an FTE estimate based on historical data and on the most recent actual reported enrollment. Second, the Division estimates are provided to each community college, and colleges can review and submit adjustments to the Division forecast, based on local information. Third, the Division estimates with

[10] Source: Florida Department of Education and Florida Board of Governors' enrollment data for Fall 2005.

college adjustments are presented to the Enrollment Estimating Conference for consideration. The conference may elect to accept or reject any college adjustments, and ultimately adopts a new FTE enrollment estimate by consensus.

Over time, the community college FTE enrollment estimates have been reasonably accurate. Error rates for DCCWE estimates and college-adjusted estimates, by type of enrollment, are illustrated in the following graphs. Of particular interest, individual colleges' error rates have varied widely around the system-wide error. Estimates for college credit courses are more accurate than estimates for non-credit courses.

In the graphs on the next page, DIV-1 Estimates are the Division's *total* FTE estimates, summed across all colleges, from the fall conference that produces estimates for the Governor's budget. DIV-1 HIGH is the Division's *individual college* FTE estimate that is the most over estimate, compared to the actual FTE for that college for that year. DIV-1 LOW, on the opposite extreme, is the Division's *individual college* FTE estimate that is the most under estimate, compared to the actual FTE for that college for that year. While the Division's individual college estimates deviate from the actual enrollment, summing across all the colleges produces a better estimate. Similarly, the COLL-1 Estimates include the colleges' adjustments to the Division's *total* FTE estimate for the fall conference. COLL-1 HIGH and COLL-1 LOW are *individual colleges'* estimates that are the most over and under estimate, respectively. For the purpose of this analysis, College Credit FTE enrollment estimates are shown, as these represent the largest share of total FTE.[11]

Comparing the two charts, it is clear that the colleges' adjustments produce a more accurate forecast of the current year. A perfect forecast would fall on the zero line of the graph. The system total forecast is shown as a dashed line, with solid lines above and below to show the error range of the individual colleges. The college-adjusted forecasts produce both a smaller error for the system total, and a smaller range of errors among the colleges.

Looking at a similar set of comparisons for all non-adult FTE in a second set of graphs, both the system total error and the range among colleges is wider. It is more difficult to forecast vocational and workforce FTE, as these programs are more responsive to economic conditions and local industry demands.

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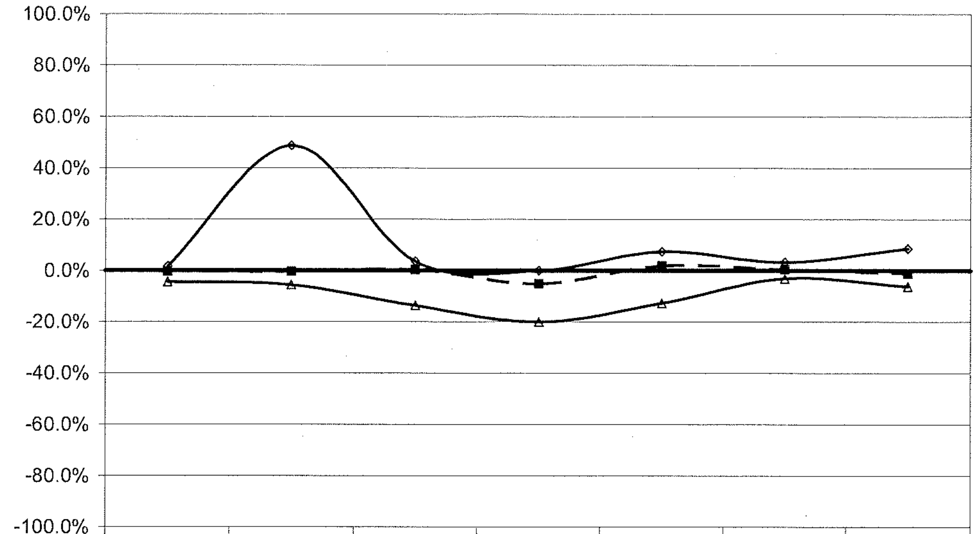
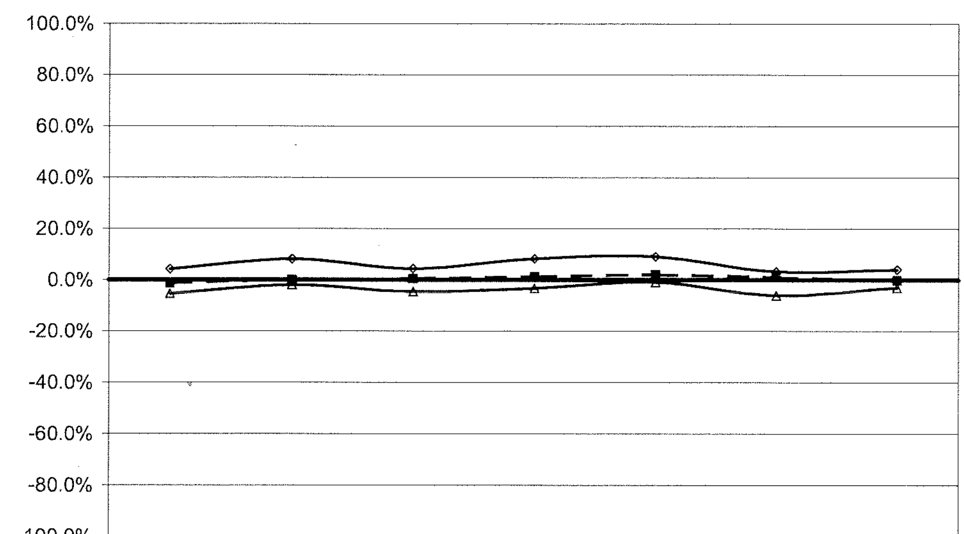
[11] Headcount by program is not available. FTE for college-credit programs represented 86.1% of FTE in FY 2006-07, with Vocational-Workforce share at 9.7% of FTE in that fiscal year. Adult Education made up 4.2% of total FTE. College-credit enrollment includes Advanced and Professional, College Prep, Educator Preparation Institute and Postsecondary Vocational programs. Non-college-credit FTE include Postsecondary Adult Vocational, Continuing Workforce Education, Apprenticeship and Vocational Prep programs.

Division Term 1 Estimates for College Credit Courses - Error Range (%)



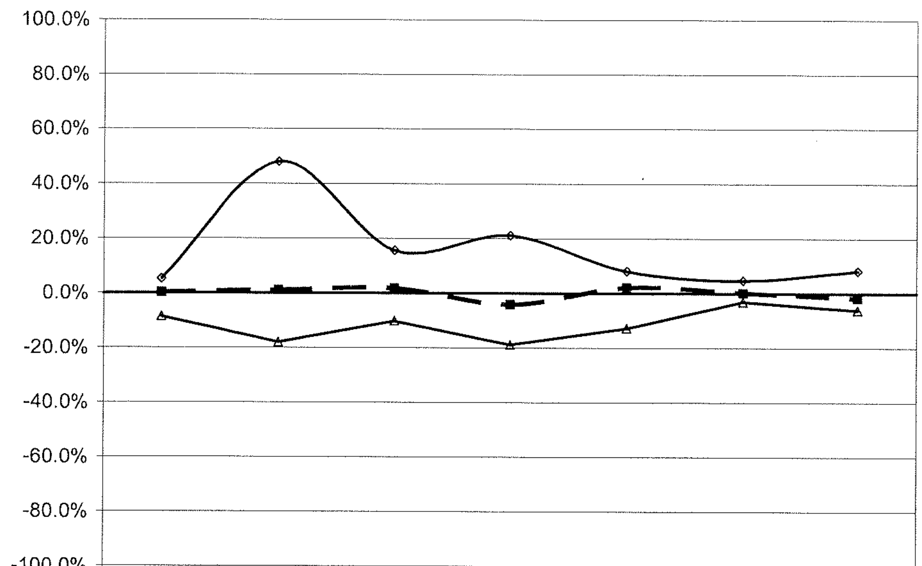
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
DIV-1 Ests. (Coll. Credit)	-0.3%	-0.4%	0.4%	-5.1%	1.9%	0.5%	-1.2%
DIV-1 HIGH	1.7%	48.7%	3.6%	0.0%	7.4%	3.3%	8.6%
DIV-1 LOW	-4.4%	-5.6%	-13.6%	-20.0%	-12.7%	-3.0%	-6.2%

College-Adjusted Term 1 Estimates for College Credit Courses - Error Range (%)



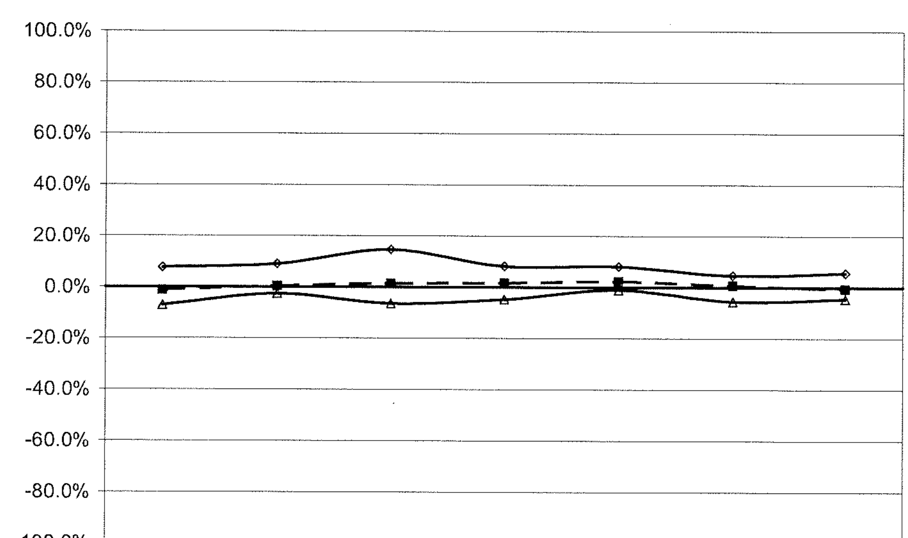
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
COLL-1 Ests. (Coll. Credit)	-1.3%	0.0%	0.6%	1.3%	2.1%	1.0%	-0.2%
COLL-1 HIGH	4.2%	8.2%	4.4%	8.3%	9.1%	3.3%	4.0%
COLL-1 LOW	-5.4%	-2.0%	-4.6%	-3.3%	-0.8%	-6.0%	-3.0%

Division Estimates for All NON-ADULT FTE, Term 1 - Error Range (%)



	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
DIV-1 Ests. (NON-ADULT FTE)	0.3%	1.1%	1.8%	-4.1%	2.1%	0.1%	-1.8%
DIV-1 HIGH	5.2%	48.0%	15.6%	21.1%	8.1%	4.7%	8.2%
DIV-1 LOW	-8.6%	-18.0%	-10.2%	-18.9%	-12.8%	-3.1%	-6.1%

College-Adjusted Term 1 NON-ADULT FTE Estimates - Error Range (%)



	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
COLL-1 Ests. (NON-ADULT FTE)	-1.2%	0.4%	1.4%	1.7%	2.3%	0.7%	-0.6%
COLL-1 HIGH	7.6%	9.0%	14.6%	8.2%	8.1%	4.7%	5.6%
COLL-1 LOW	-7.0%	-2.6%	-6.4%	-4.8%	-1.0%	-5.6%	-4.5%

Generally, the community colleges use informed contextual judgment to adjust the Division's model. (See the discussion in Section 4 on the role of judgment in modeling.) Some colleges incorporate college goals and policies in their adjustments. Some control for bias with a high-level review process.

Universities. Turning to current methods of enrollment modeling in universities, in recent years the State University System planned enrollment was based on individual universities' enrollment plans. Plans were submitted to the Board of Governors and summed to get a total system planned enrollment. However, a different approach has been used for the FY 2008-09 budget request. The Board of Governors (BOG) has now elected to utilize a high-level, system-wide projection, based on a model developed by BOG staff. The BOG staff model is constructed using the most recent headcount enrollment data, progression and retention ratios, and headcount to FTE ratios. Discretionary inputs include the growth in new students at each level. In terms of levers, retention ratios can be adjusted, as can growth in new students, to yield varying projections of headcount/FTE students.

Reviewing enrollment modeling processes currently in use by the individual state universities, the most common method is a trend-line extrapolation with added causal factors using informed contextual judgment. Most models utilize a planned first-time-in-college (FTIC) admissions value, based on the university's policies, goals and existing capacity. In this regard, none of the models have an unconstrained demand model for FTICs. Constraint is especially appropriate at the older universities where demand far outstrips capacity. Several universities have specifically taken account of the effect that students entering with college credit (from advanced placement courses, for example) have on estimating lower and upper class enrollment. Some students may spend only one term classified as lower level, moving more rapidly to upper level than in the past.

Almost all universities track how well their projections are matching actual enrollment. Some have a very robust tracking process, with very frequent assessments. Virtually all use feedback on model performance to enhance future projections and estimates. Most can compensate for anomalous events that impact historical data, such as unexpectedly high acceptance rates for entering classes, natural disasters and funding constraints. Some models are more amenable to incorporating adjustments than others; models that are heavily quantitative allow for parameter adjustments, while heavily judgmental models can alter assumptions and policies to reflect changes.

All universities use a collaborative process that incorporates both quantitative and qualitative information to plan enrollment. Input is sought from various levels and offices within the system. Some roll up from the department to the dean to the campus. Others apply an overall review at the highest level after information is accumulated.

Overall, the current process taking place at the universities appears to be appropriate and reliable, within each university's set of policies, goals and objectives. What may be missing is a more robust state-level review that is able to look across universities for areas where universities' assumptions overlap to ensure their consistent treatment.

Postsecondary Vocational Enrollment. Enrollment in postsecondary vocational courses is divided between school districts and community colleges in the public sector. In the public school districts, enrollment is a much more market-driven, real-time and responsive process than the planned enrollment at universities or the current year estimate process at the community colleges. Each of the reviewed model processes uses information from the Workforce Estimating Conference to identify both areas where additional offerings may be needed and areas where enrollment can be expected to decline. Tracking of actual enrollment is ongoing; one process looks at how daily enrollment compares to prior year enrollment for the same day. This enables forecasters to find areas where significant changes are occurring, allowing for a rapid response to changing industry and economic conditions. Each of the districts has industry partners who are an integral part of the process.

Informed judgment is relied upon heavily in forecasting enrollment. At the state level, there is no formal estimating process. Funding is calculated as a "base plus" process, with the base year being the last actual year of FTE information. Effectively, this means that funding for the upcoming fiscal year is based on data that is two years old. (Funding for FY 2008-09 would be based on actual FTE for FY 2006-07.) Performance funding accounts for about 2% of total funding.

Postsecondary Student Financial Aid Estimating Conference. Established by law in 1998, the Postsecondary Student Financial Aid Estimating Conference has produced estimates for various state-funded financial aid programs. The Bright Futures Scholarship program which began in FY 1997-98 has been part of the conference since its inception. This program is funded from Lottery revenue.

Beginning with the inception of the conference, EDR developed a cohort-survival model for the Bright Futures program. The EDR model begins with high school graduate estimates from the Department of Education. For each year, the EDR model uses observed relationships between the number of initial Bright Futures awards and the number of high school graduates in the previous school year to generate an initial cohort. Continuing awards from prior years are divided into cohorts based on each student's year of graduation from high school. Each cohort is then carried forward year by year based on prior year survival percentages. The EDR model disaggregates the awards into two four by two matrices for the four Bright Futures programs (Academic Scholar, Top Scholar, Medallion Scholar and Gold Seal Vocational Scholar) and the two types (Initial or Renewal). Survival rates are calculated for each program by year. This model enables policymakers to get a sense of future demand for the program. Each year, survival percentages are updated. Until the passage of the constitutional amendment requiring a Long-Range Financial Outlook, official consensus estimates were produced only for the upcoming fiscal year for the Governor's Budget and the Appropriations Act.

The Bright Futures estimating model currently in use by the Department of Education's Office of Student Financial Aid (OSFA) relies upon prior year relationships to estimate the upcoming fiscal year. In effect, the model is a straight-line function. To get initial awards each year, the OSFA model also uses the past relationship between high school graduates and initial Bright Futures awards. The OSFA straight-line model and the EDR cohort survival model are probably equally accurate for one year ahead estimates. Recently, the conference has used the EDR model for required long-run estimates.

Enrollment Estimates in Other States. Higher education enrollment estimates are produced in other states. Generally, estimates are produced by higher education governing boards for the state university or community college system as a whole. Some produce estimates disaggregated by individual campuses. In these states, estimates are generally reviewed with individual institutions before being finalized. In some states, specific research units are responsible for an estimate. Most states rely upon state population projections, projections of high school graduates and historical persistence or progression rates to produce enrollment projections. Some states project enrollment for both public and private sectors. Examples are shown in the table on the following page.

Enrollment Forecasting Features: Selected States

State	Forecasting Entity	Forecast Scope	Forecast Factors	Top-down / Bottom-up	Funding / Planning	Comments
California	Demographic Research Unit, California Department of Finance	Public High School Graduates, Community College and University Enrollment	K-12 and HS grads: Actual & projected births for entering cohorts and grade progression ratios for each grade. State Univ. and U. of California: Demographic and enrollment trends and policy guidelines (see Comments)	Top-down projections based on current participation rates and population projections	Estimates inform but do not drive budget decisions and are used for planning purposes	State University and University of California forecasts use guidelines in 2004 HIGHER EDUCATION COMPACT between Governor, University of California, and State University of California
Georgia	Board of Regents of the University System of Georgia, Office of Research & Policy Analysis	University System of Georgia (includes universities, colleges, and community colleges)	Public and private HS grads projections from the Western Interstate Commission for Higher Education (WICHE), previous year's headcount enrollment; Box Jenkins autoregression model	Top-down	Planning purposes	Periodic report created ad hoc; most recent Oct 2006 with projections to 2018
North Carolina	The University of North Carolina Board of Governors	University of North Carolina (16 institutions)	Population by age group, historic attendance rates, and continuation rates for currently enrolled students	Projections are produced for each campus and summed. Projections are based on shares of total population by age group.	Planning purposes	No projections for public community colleges or for independent colleges and universities

Enrollment Forecasting Features: Selected States

State	Forecasting Entity	Forecast Scope	Forecast Factors	Top-down / Bottom-up	Funding / Planning	Comments
Oregon	Oregon University System	Seven campuses and various centers of the Oregon University System	Retention rates (term-to-term and year-to-year), historical patterns of enrollment, high school graduate projections, enrollment impact of program and policy changes	Prepared by Oregon University System staff, submitted to universities, changes are incorporated.	Planning purposes / part of funding request	Projections produced yearly as part of Fact Book.
Texas	Texas Higher Education Coordinating Board	Public Universities, Public Two-Year Colleges, and Independent Senior Colleges and Universities	Applies past enrollment-to-population ratios by geographic location, age, and race/ethnicity to future population projections.	Top-down by population, customized by each institution's participation rate and adjusted by local conditions	Planning purposes	Projections produced biennially since 1979. Based on Texas State Data Center/Office of the State Demographer population estimates.
Virginia	State Council of Higher Education for Virginia (SCHEV)	Public Universities and Public Community Colleges	Based on current rates of participation and retention.	Universities produce "enrollment targets" in consultation with SCHEV. Community Colleges do not have targeted enrollment, but demand projections are provided by SCHEV based on demographics.	SCHEV projections are used for planning purposes by Governor and Legislature, who also have input into the process of producing projections.	Projections are characterized as "Enrollment Demand" and are produced on a regular schedule.

Enrollment Forecasting Features: Selected States

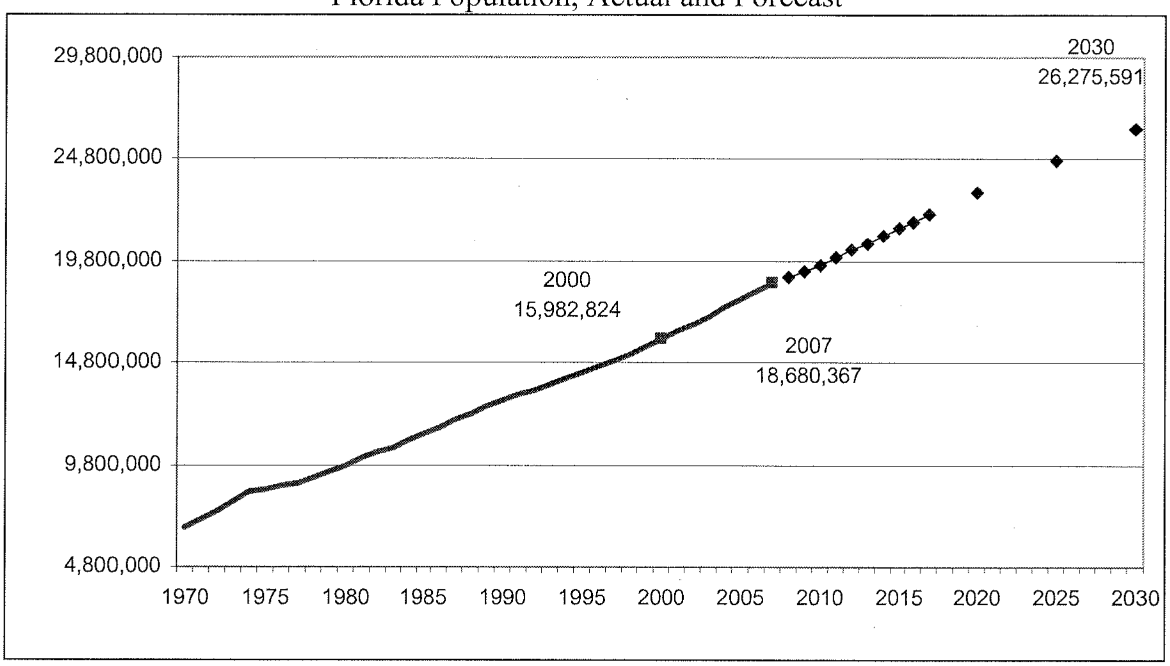
State	Forecasting Entity	Forecast Scope	Forecast Factors	Top-down / Bottom-up	Funding / Planning	Comments
Washington	Washington (State) Office of Financial Management	Public 2-Year and Public 4-Year FTE	Based on current rates of participation	Top-down projections based on current participation rates and population projections	Biennial budget establishes funded FTEs. Projections used for planning purposes.	Projections are part of the unit's normal workload and are produced on a regular schedule.

SECTION 3
Florida's Changing Demographics

Changes in Florida's underlying demographic structure and mix will impact postsecondary enrollment. At the most elementary level, enrollment will be affected by the size of cohorts entering the prime postsecondary consumption years. The impact to each delivery system (public community college, state university, private for-profit and not-for-profit colleges and universities, school district postsecondary) will be mediated by policy decisions at both the state and institutional level, financial constraints on both the systems and the individual student, and conditions in the larger Florida economy.

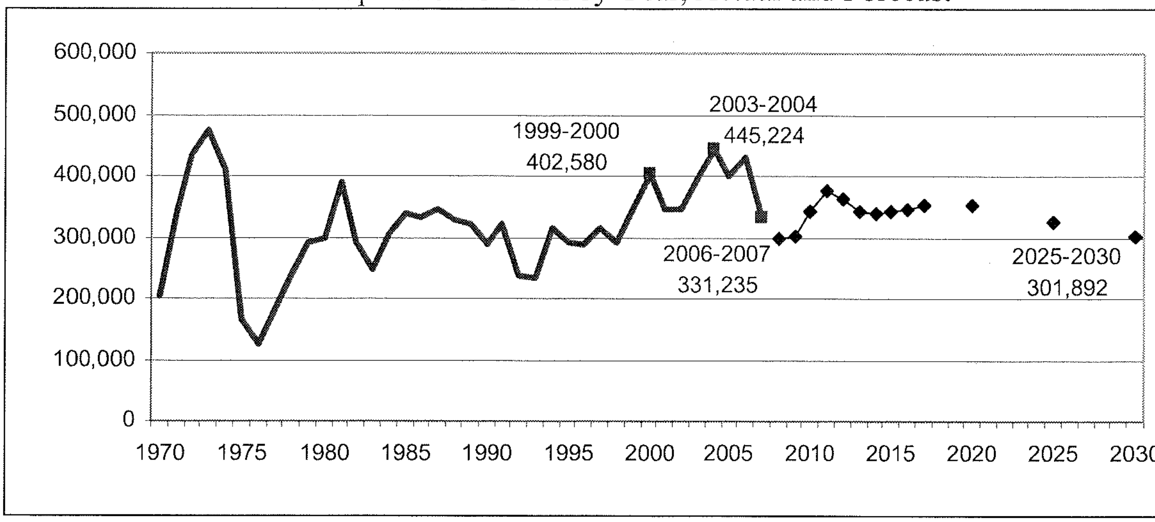
Florida's Population Trends. Florida's overall population growth has hovered between 2.0% and 2.6% since the mid 1990's, but it slowed to 1.8% in 2007. Over the forecast horizon, population growth will further slow – averaging just 1.2% between 2025 and 2030. However, Florida is still on track to break the 20 million mark during 2011, thereby surpassing New York to become the third most populous state.

Florida Population, Actual and Forecast



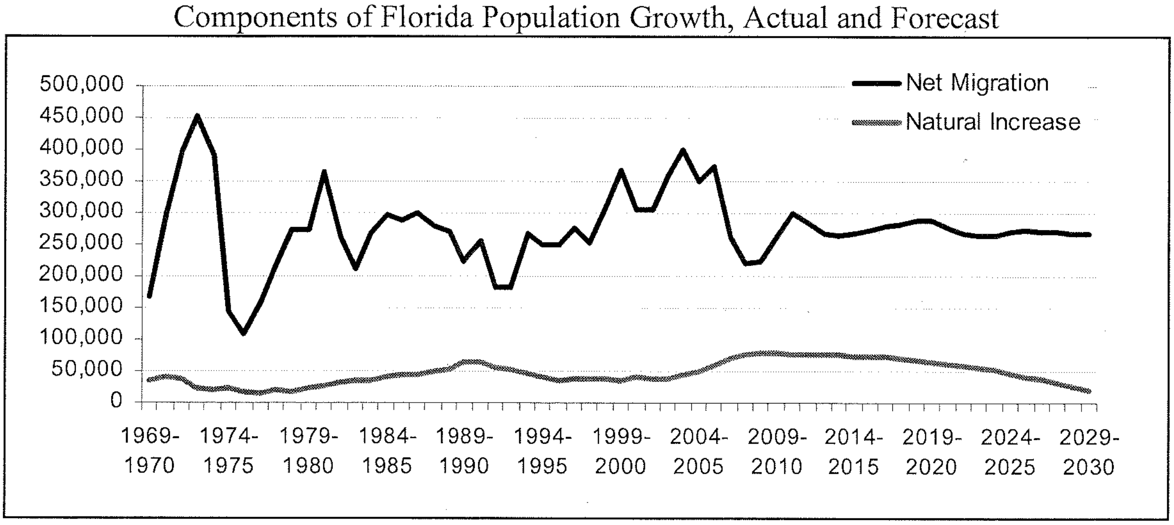
While population projections are continuing to grow as shown above, the increment added each year will diminish.

Florida Population Growth by Year, Actual and Forecast



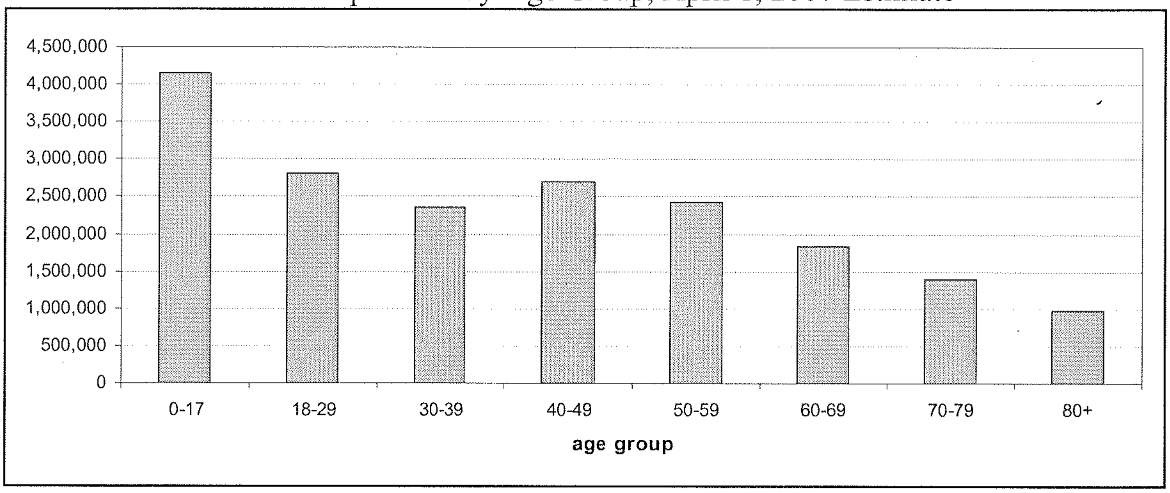
Population growth can come from two sources: net migration (the number of people moving into the state minus those leaving) and natural increases (the number of births minus deaths). Most of Florida's population growth is from net migration. Between 2006 and 2007, this represented about 79% of Florida's population growth. By 2030, it will represent 92.5% percent of Florida's growth.

Components of Florida Population Growth, Actual and Forecast



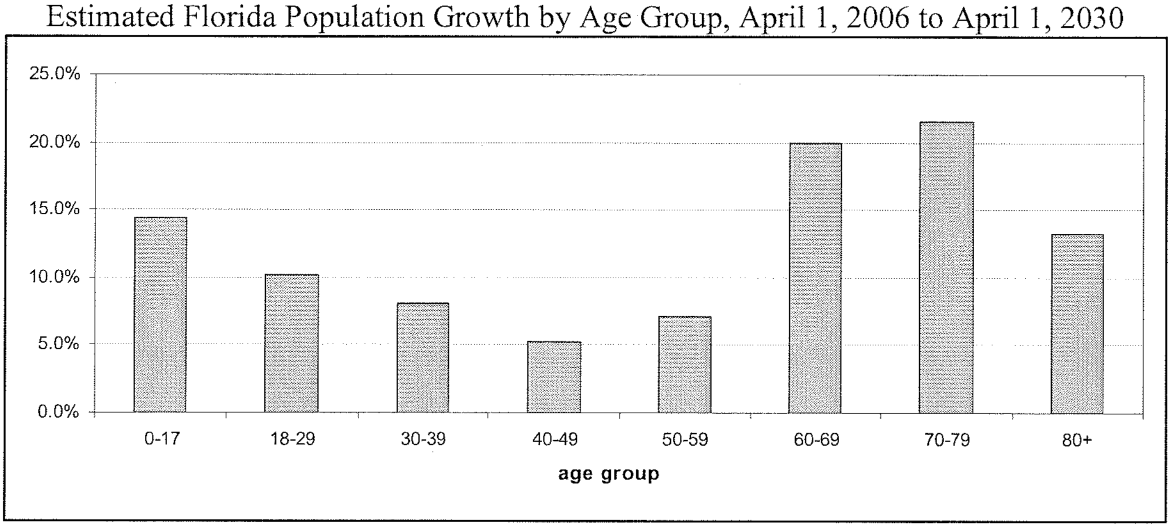
The graph below shows Florida's population by age group as of April 1, 2007.

Florida Population by Age Group, April 1, 2007 Estimate

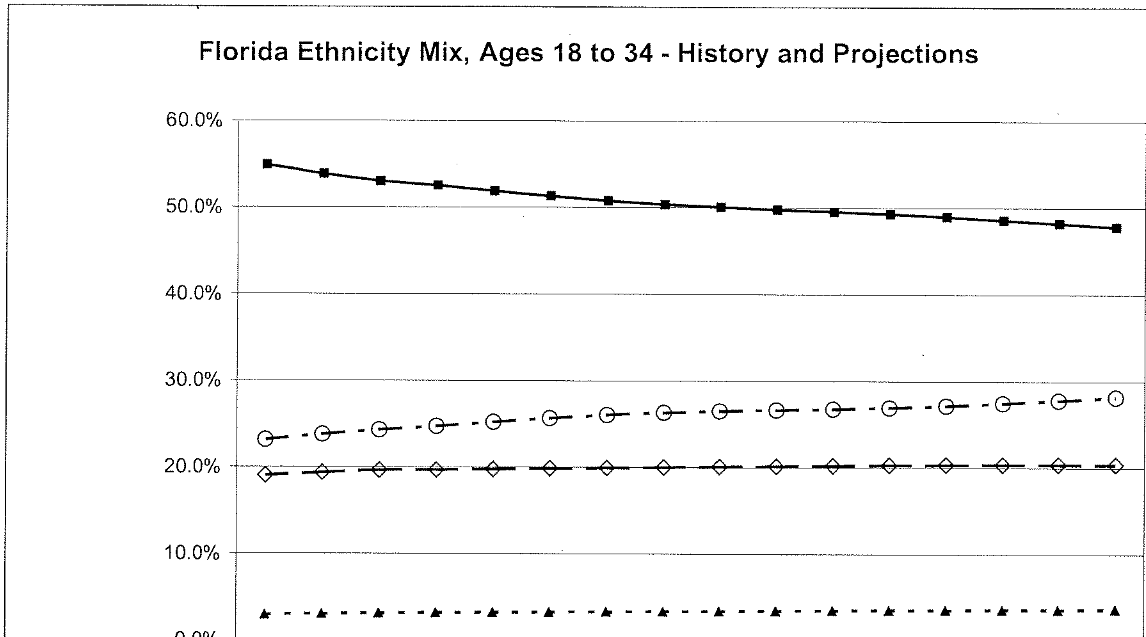


Florida's population age groups are expected to have different rates of growth from 2006 to 2030. Florida's older population (age 60 and older) will account for most of Florida's future population growth (54.8% of the gains), but the state's younger population will continue to grow as well (14.4% of the gains for ages 0 to 17, and 10% for ages 18 to 29).

Estimated Florida Population Growth by Age Group, April 1, 2006 to April 1, 2030



Florida's Ethnic Mix. Florida's ethnic mix has changed over time. These changes are mirrored in the ethnic mix of students at public universities and community colleges. Future population projections for the 18-34 age group show increases for all categories except White Non-Hispanic, as illustrated in the graph on the following page.



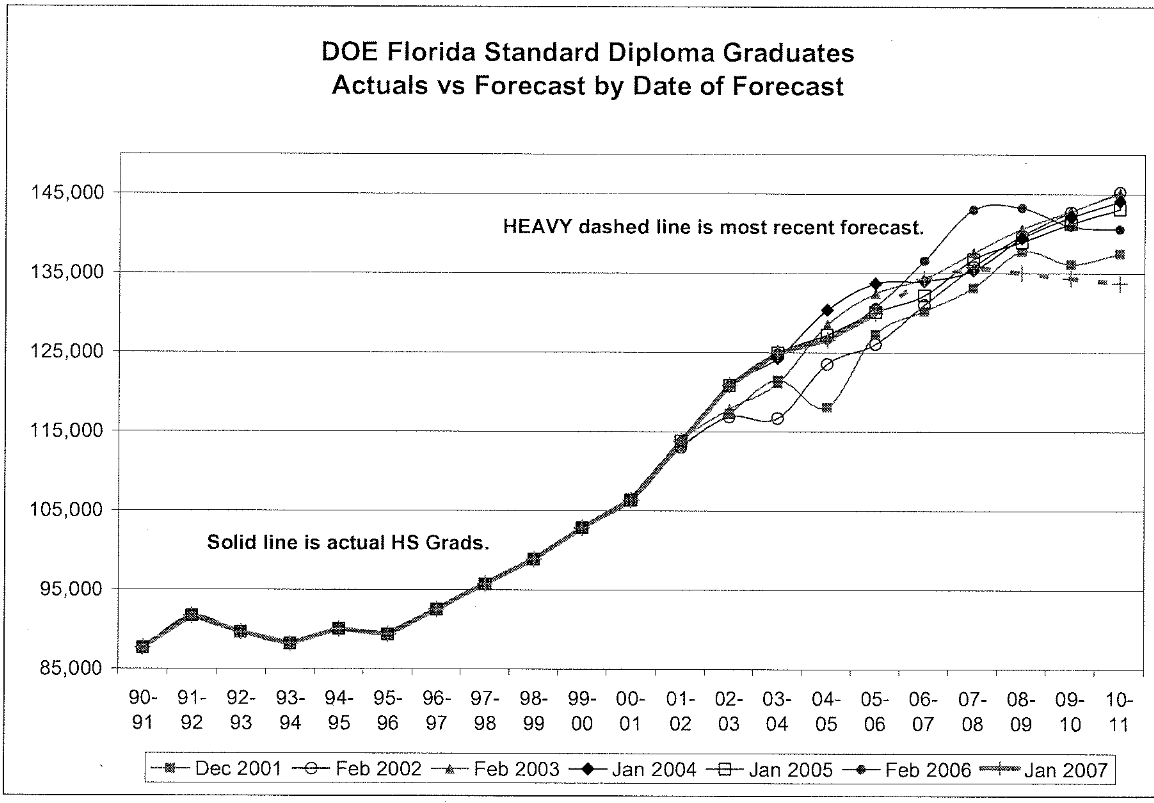
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
White Nonhispanic	54.9%	53.9%	53.0%	52.5%	51.9%	51.3%	50.8%	50.4%	50.1%	49.8%	49.6%	49.3%	49.0%	48.6%	48.2%	47.8%
Black Nonhispanic	19.0%	19.3%	19.6%	19.6%	19.7%	19.8%	19.9%	20.0%	20.1%	20.1%	20.2%	20.3%	20.3%	20.4%	20.4%	20.4%
Other Nonhispanic	2.9%	3.0%	3.1%	3.1%	3.2%	3.2%	3.3%	3.3%	3.4%	3.4%	3.5%	3.5%	3.5%	3.6%	3.6%	3.6%
Hispanic	23.2%	23.8%	24.3%	24.7%	25.2%	25.6%	26.0%	26.3%	26.5%	26.6%	26.8%	26.9%	27.1%	27.5%	27.8%	28.2%

Historically, white non-Hispanic students enroll at a higher rate than students of other ethnicities. With this pool expected to decline, rates of postsecondary enrollment for black non-Hispanics and other ethnicities might be expected to rise.

High School Graduates in Florida. Public high school graduate projections are produced by the Department of Education. These projections inform the planning processes at community colleges, state universities, and postsecondary vocational education, and feed into Bright Futures estimates as well. The high school graduate projections are consistent with the consensus estimates from the Public Schools Enrollment Estimating Conference. Long-run by-grade projections are produced by this conference.

Estimates of public high school graduates with standard diplomas are more accurate in the short run. The table below shows the actual number of public high school graduates with standard diplomas (solid dark line) compared to projections made at various dates (thinner lines). Older estimates have tended to under-estimate, while later estimates have tended to over-estimate the number of graduates. For example, the December 2001 forecast for FY 2005-06 of 127,320 was about 2.1% short of the actual number of graduates, 129,943. By contrast, the January 2005 forecast was 130,124 (just over 0.1% high).

The December 2001 forecast predicted growth of 8% in high school graduates between FY 2005-06 and 2010-11. In the most recent official projections from January 2007, a growth of a little less than 3% is projected. Generally, a flattening and downturn was projected in the growth and number of high school graduates in this most recent forecast.



The chart below illustrates the recent relationship between prior year public high school graduates with standard diplomas and first-time enrollment at state universities and community colleges.[12] Note that these percentages have been decreasing in recent years.

	Prior Year High School Graduates	SUS First-Time-In-College	CC First-Term-First-Year	Total First-Timers	First-Timers as % of HS Grads
1996-97	89,397	16,284	49,172	65,456	73.2%
1997-98	92,531	17,887	54,270	72,157	78.0%
1998-99	95,739	20,063	51,929	71,992	75.2%
1999-00	98,892	21,504	52,663	74,167	75.0%
2000-01	102,835	23,284	55,818	79,102	76.9%
2001-02	106,374	24,256	59,305	83,561	78.6%
2002-03	113,813	25,498	63,646	89,144	78.3%
2003-04	120,847	26,813	66,021	92,834	76.8%
2004-05	124,992	27,254	66,921	94,175	75.3%
2005-06	126,648	27,746	65,376	93,122	73.5%
2006-07	129,943	26,788	67,537	94,325	72.6%

[12] First-time enrollment from State University System Factbooks and Community College Factbooks. High school graduates from the Department of Education.

At the same time, the ethnic mix of public high school graduates with a standard diploma has changed. In FY 1995-96, white graduates comprised 61.2% of all graduates; this group's share had dropped to 57.0% by FY 2005-06. Hispanic graduates' share over this same period increased from 14.8% to 19.5%, while African-American graduates' share declined from 21.1% to 18.7%.[13]

[13] Department of Education report at http://www.flboe.org/evaluation/xls/hsstuddips.xls, EDR calculations.

SECTION 4
Standards for Florida's Postsecondary Education Enrollment Forecasting Processes

PART 1. Introduction

Focus. Since postsecondary enrollment forecasts are important inputs into the state planning process, accuracy of the forecasts and ability to compare various policy scenarios are extremely important qualities of postsecondary enrollment forecasting methods. The qualities of low cost to implement and ease of maintenance are of lesser importance since the potential decisions derived from these forecasts justify the use of more resources in obtaining them. This section of the study focuses on those standards relating to forecast accuracy and policy analysis.

Overview of Forecasting Methods. Forecasting methods can be divided into quantitative (numerical, data-driven) and judgmental (expert opinion, intentions survey, etc.) methods. Both types can incorporate information about the nature of the area that is being forecast. Many processes use both types of forecasting methods and combine the information into a single forecast. In this regard, quantitative methods are not free from judgment since the specification of models involves the judgment of the forecaster.

Quantitative models can be either univariate or multivariate:

- A univariate model, such as a time series model, uses only the previous values of a series to predict future values. Such models are also called extrapolation or naïve models and are useful either when information about the relationships of the series being forecast with other relevant data are not available or when the expected change for the future is similar to changes that have occurred in the past.
- Multivariate models use one or more variables to predict future values of the series that is being forecasted. These other variables are called predictor or explanatory variables. Multivariate models are also called explanatory or causal models. Univariate linear regression that has one predictor variable that is not "time" is a multivariate model along with other more complex models such a multivariate (many predictor variables) regression model and systems of equations such as complex econometric models.

Qualitative models involve subjective integration of information through structured or unstructured processes. They may involve the opinion of only one expert or involve the combination of subjective information from many individuals.

PART 2. Standards and Discussion

1. Structuring the Process: Fit of Process to Decision-Making Level

1.1. A combination of a top-down approach and a bottom-up approach is used.

Forecasts can be done top-down or bottom up. The top-down approach forecasts at the highest level and then disaggregates the forecast among segments such as geographical areas, stores, or products. A top-down approach is critical to test and align assumptions across the system, to guard against potential lower-level biases, and to tailor the forecasts to the decisions that will be made (Armstrong 2001a).

In many instances forecasts done at the lowest level and then aggregated to the highest level are more accurate than forecasts done at the highest level and then spread among the lower level (Allen and Fildes). Contextual knowledge (information about the explanatory variables) is best introduced at the lowest level through modeling or judgmental adjustment, especially when policies and factors can be expected to affect sectors differentially. However, if the lower-level forecasts are made by forecasters at that level, then there is a potential for bias when predicting the success of new initiatives. Research has shown that individuals are overoptimistic when predicting their performance (Harvey).

The optimal process would be a top-down consensus of initial forecasts and appropriate assumptions coupled with a detailed bottom-up forecast that is reviewed and analyzed at the highest level. The final detailed forecast, reworked if the review deems it necessary, becomes the forecast.

2. Structuring the Problem: Decomposing and Disaggregating Enrollment into Components

2.1. Decomposition into components is done when it is expected to improve accuracy.
2.2. Decomposition into components is done when it assists policy analysis and formulation.

Decomposition in forecasting is the process of breaking down a series into sub series, forecasting the sub series and recombining the sub series to get the overall series. Decompositions can be multiplicative or additive depending on whether the forecasts of the sub series (components) are multiplied or added together to get the overall series forecast. An example of a multiplicative decomposition is the forecast of first-time-in-college students which is decomposed to a forecast of the number of high school graduates multiplied by a forecast of the proportion of those graduates who would enter the college. An additive decomposition example is the total enrollment forecast decomposed into forecasts of each type of student which are summed to get the total enrollment forecast.

Decomposition should be used only when the decomposed components can be forecast with more accuracy than the composite series. In situations in which the composite series can be forecast with high accuracy, then decomposition does not generally improve accuracy and can even worsen it. (Armstrong, Adya and Collogy, Harvey; MacGregor).

Decomposition is important when the causal factors have conflicting effects on the components. (Armstrong, Adya, & Collpy). Decomposition may allow more accurate forecasts if the differential effects of a policy on the various components are included in the model. In this situation, decomposition allows better understanding of the effect of factors and provides information useful for policy formulation.

There is extensive research that decomposition of the problem generally improves judgmental forecasts over unaided or holistic judgments. Research by Diehl and Sternan (1995) noted that human judgmental modeling was deficient when the task was complex involving side effects, feedback loops and delays. Decomposing the problem into several sub problems aids human judgment in forecasting complex series. A review of the research over four decades summarized by MacGregor concluded that decomposition aided judgmental forecasts over holistic judgment even when the decomposition used was not the best.

3. Selecting Methods and Models

3.1. The appropriate types of model are used for each enrollment component and forecast horizon.
3.2. Causal models are used instead of naïve models, when appropriate.
3.3. The simplest models that are appropriate are used.
3.4. Domain knowledge rather than "fit" statistics are used to select the models and variables.
3.5. Judgmental models are structured to reduce bias.
3.6. Forecasts are combined when there is much uncertainty about which method is best or about the situation to be forecast.
3.7. Formal procedures are used to combine forecasts.

The modeling process has to be appropriate to the situation. There is not one best forecasting process that is optimal for all situations. Qualitative (judgmental) methods should be considered when the future trends are expected to deviate from past trends or when little data are available. Quantitative methods should be considered if the future can be predicted adequately from the past and there is a large amount of data available (Armstrong, 2001c). Many forecasting processes involve a mixture of quantitative and qualitative methods. The various enrollment components may differ as to optimal model.

The choice of quantitative models depends on the amount of information known about the relevant relationships, the amount of change that may be expected, and the forecast horizon. Research indicates that simple models sometimes work as well as causal models in the short range, but are likely to be less accurate than causal models as the time horizon increases (Armstrong 2001c; Armstrong, Adya, and Collopy).

Development of a quantitative model should be based on domain knowledge and theory rather than "fit" statistics. The "fit" of the model to historical data is an imperfect indicator of the model's ability to forecast the future level of the series due to the common occurrence of spurious relationships (Armstrong, 2001c).

Judgmental methods can be structured or unstructured. Structured methods are more likely to give consistent forecasts. Research has shown the following processes improve judgments when extrapolating time series data:

1. Display data in graphical form rather than tabular especially when there is a trend (Harvey).
2. Provide a best-fitting line through the data displayed graphically (Harvey).
3. Decompose the series to be forecast. (MacGregor).
4. Obtain forecasts from more than one expert. Research indicates that it is not desirable to try to achieve consensus among experts. Instead the differences can be incorporated into a combined opinion through averaging. Averaging judgmental forecasts can average out unsystematic errors, but not systematic biases. (Alburg, MacGregor, Stewart)
5. Require justification of forecasts, especially in situations where uncertainty is high (Stewart).

4. Obtaining Quality Data

4.1. Unbiased and systemic procedures are used to collect data.

4.2. Data are adjusted for unsystematic past events.

Data series collected systematically and without error over time are crucial for forecasting. The definition of data elements must be consistent over time. Changes in definitions, policy initiations and the effects of extreme historical events, such as hurricanes, should be noted and require either an adjustment to the data or a control for the change when modeling. Adjusting the data can consist of modifying the data to remove the effect or eliminating certain data points (outliers). (Armstrong 2001b).

5. Adjusting the Statistical Model

5.1. Adjustments are made for events expected in the future.

5.2. Adjustments are made in a manner that is expected to reduce bias.

5.3. Subjective adjustment of quantitative forecasts is limited to situations in which domain knowledge that is independent of the model is available.

The process should be cautious in allowing for adjustments since adjustments to a statistical forecast, like all judgmental information, can introduce bias. Adjustments should be based on domain knowledge and done by persons who have no stake in the outcome. The person(s) responsible for implementing a program should not be the person(s) forecasting the probability of the program's success (Harvey; Sanders & Ritzman).

6. Evaluating the Process: Measuring and Improving Accuracy

6.1. Forecast accuracy is tracked and appropriately measured.
6.2. Records of alternative forecasting methods are tracked and compared.

Measuring accuracy of the forecasting methods' output is done to select the best model, to improve a given model and to assess uncertainty. Feedback about forecast accuracy provides information that can be used for improvement of the process and models. Records should be kept on all facets of the process from the initial forecasts, including both quantitative and qualitative methods, to the final forecast. All judgmental adjustments to the statistical forecast should be recorded and retained for feedback (Armstrong 2001a, Harvey).

Methods should be compared with reasonable alternative methods. If a new method is being considered, the current method should be one of the alternatives compared. (Armstrong 2001a).

There are many error measures available to use in assessing accuracy. The conclusion and ranking of models is dependent on the error measure used. Error measures appropriate for assessing forecast models should be valid for the task and unbiased. They should not be affected by the scale of the series evaluated, not be sensitive to the degree of difficulty of forecasting task, and not highly sensitive to outliers. (Armstrong 2001a).

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SECTION 5
Conclusion

Findings

The postsecondary state-level planning system can be expected to benefit from an interaction of the top-down (*state-to-sector-to-(delivery)system-to-institution*) and bottom-up (*institution-to-(delivery)system-to-sector-to-state*) approaches to forecasting. The top-down approach is needed for testing and aligning assumptions since the institutions are subject to the same state policies and laws and since total postsecondary enrollment is constrained by post-secondary educational choices of the appropriate age-level populations. If institutions differ on assumptions then the assumptions of the composite forecast will be mixed, hard to interpret, and may be conflicting. Differing assumptions may mean that two institutions or delivery systems are planning to enroll the same subset of students. The top-down approach is also needed to ensure that the resulting state-level forecast will be structured to address the appropriate policy issues and to control for bias that may be introduced by the institutions. For example, institutions may have a bias when predicting the success of their new initiatives. The bottom-up approach is especially critical when the effects of various policies on the enrollment are to be considered and the effects can be expected to have differential effects among the sectors, delivery systems, and institutions. Moreover, contextual knowledge (information about the explanatory variables) is best introduced at the institutional level.

Currently, there is no state-level consensus process across all delivery systems to ensure consistency in assumptions and to review for biases at the lower levels. The university process is a bottom-up approach. The community college process is a combined top-down and bottom-up approach for the current year estimates which become the inputs used to determine the next year's funding level. The long range community college enrollment forecast is a top-down model only. The school district postsecondary process does not use a state-level, institution-wide forecast, but relies on actual enrollment from prior years. Top-down guidance is provided only indirectly to the institutions through the output of the Workforce Consensus Estimating Conference. The individual institutions adapt course offerings to short-term local needs.

Enrollment forecasting will generally benefit from decomposition. Postsecondary enrollment forecast models at the college and university levels can be decomposed into the components of First Time in College Students, Transfer Students, and Continuing Students. University enrollment models can be further decomposed into lower level (freshman-sophomore) and upper level (junior-senior) students. Upper level transfer students can be further decomposed into community college transfers and other transfers. Components can then be forecasted using naive or causal quantitative models with informed judgment as appropriate.

Postsecondary enrollment forecasting is heavily influenced by state and institutional policy decisions. This effect suggests that decomposition would provide more accurate forecasts of the total enrollment. Decomposition allows more accurate forecasts when the differential effects of a policy on the various components are included in the model. Decomposition may also allow better understanding of factors influencing enrollment trends and provide information useful for policy formulation.

Choosing the appropriate mixture of methods is essential since the best model choice will differ among the delivery systems (universities, community colleges, and postsecondary workforce schools). The best model for each level is based on the quality and consistency of the data available and the factors affecting the enrollment.

Provision of school district postsecondary instruction is affected more by the current and short-term future needs of the local industry. Short-term future industry needs may have little relationship to past needs. The real-time industry needs data currently obtained is of good quality. The forecasting of postsecondary vocational enrollment is a mostly qualitative method in a collaborative process between the school and its business partners. Because of these characteristics, a formal "bottom-up" conferencing process may not be warranted.

The forecasting of community college and university enrollments should use a combination of qualitative and quantitative methods. The demand for college and university enrollment is driven by decisions of individuals to seek higher education. The decisions of individuals in the future should be closely related to the decisions of individuals in the past. Judgment should be used in those instances when such decisions are expected to deviate from those of the past due to changing demographics, economic conditions or policies.

There is interaction between the enrollments at the university level and at the community college level. Universities can be selective in their admission policies and these admission policies affect community college enrollment in addition to university enrollment. Community colleges cannot be selective and must admit all Florida standard and general education diploma high school graduates who apply. If fewer recent high school graduates are admitted to the universities then the demand for admission to community colleges will likely increase. Forecasts of both the university sector and the community college sector should consider the effect of future university enrollment policies. These effects may be estimated through either qualitative or quantitative methods.

The table on the following pages summarizes current modeling practices for Florida's postsecondary education enrollment forecasting process along the six standards discussed in Section 4.

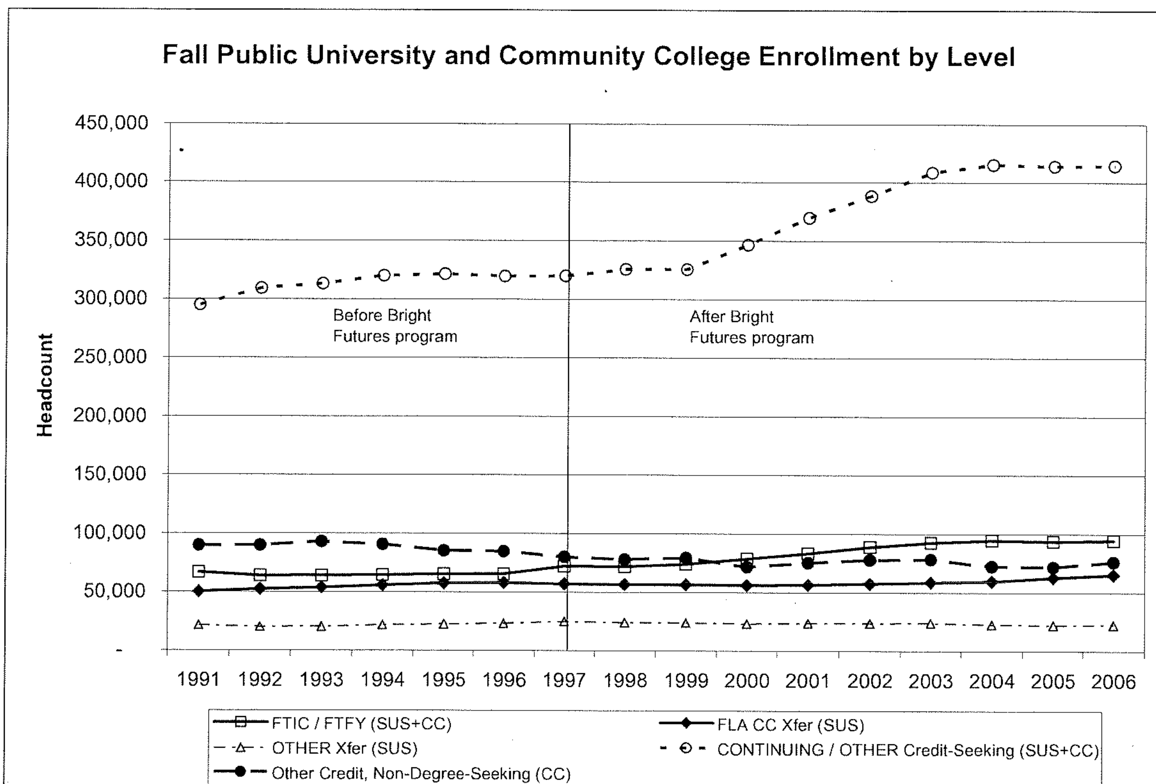
Standard \ Level	State Level	Delivery System Level			Institution Level		
		Public Universities	Public Community Colleges	School District Postsecondary	Public Universities	Public Community Colleges	School District Postsecondary
1. Structure of Process (Fit of process to decision-making level)	No conference across delivery levels to address total postsecondary enrollment.	Bottom-up approach. State-level consensus estimating conference has not met since 2001.	Estimates current year only. Top-down and bottom-up interactive approach. State-level consensus estimating conference meets at least twice each year.	No state-level estimate. Guidance to institutions on targeted occupations from Workforce Estimating Conference.	Varies according to decision-making approach at institution.	Varies according to decision-making approach at institution.	Varies according to decision-making approach at institution.
2. Structure of the Forecast (decomposition into appropriate components)		Top-down model under development, but currently not part of the formal conference process. Adds components from individual institutions.	Additive.	No estimate – uses base year actual (two years in arrears).	Yes.	Yes.	Yes.
3. Data Quality		Good quality data but inconsistencies in data series due to policies and historical	Good quality data with some inconsistencies due to historical events.	Information series under development at this time.	Good quality data but inconsistencies in data series due to policies and historical	Good quality data with some inconsistencies due to historical events.	Good information on current industry needs.

Standard \ Level	State Level	Delivery System Level			Institution Level		
		Public Universities	Public Community Colleges	School District Postsecondary	Public Universities	Public Community Colleges	School District Postsecondary
		events limit application of quantitative modeling.			events limit application of quantitative modeling.		
4. Methods and Models		BOG model under development is highly quantitative.	Quantitative. For current-year estimates, extrapolation of past relationships. For long-run, uses population-shares model from EDR.	Under development.	Quantitative and informed judgment	Informed judgment applied to state forecast.	Informed judgment.
5. Adjustments		Currently, not allowed at this level. BOG model under development may allow adjustments.	Yes – improves model fit. Impact of economic cycles and historical events require judgmental adjustments.	Not at this level	Policy goals incorporated in planned enrollment.	Most use informed judgment for adjustments. A few institutions use policy goals.	Informed judgment.
6. Evaluation		Yes, institutions must explain over-enrollment and are sanctioned for under-enrollment within limits	Yes, review of past year's forecasting accuracy.	Not applicable; no estimates produced.	Varies from minimal to extensive.	Varies from minimal to extensive.	Evaluation more frequent.

Recommendations

Estimating enrollment in a single delivery system fails to account for the interactive nature of postsecondary enrollment. Estimating a state-level demand pool provides a way to control for this interplay among delivery systems.

For example, entry to postsecondary education in both universities and community colleges can begin immediately after graduation. However, entry at the university level is constrained by enrollment "targets", while entry to the community college system is open to all high school graduates and GED certificate holders. When the first-time student completes an associate's degree, the university system is committed to accepting that student into the university system. (However, there is no guarantee of admission to a particular school or course sequence.) Thus, university enrollment policies that limit first-time-in-college enrollment may result, two to three years later, in a larger transfers-from-community-college cohort. Trends in enrollment at public community colleges and universities are shown in the chart below. An example of policy effects may be revealed by the rise of First Time in College students[14] and Continuing students visible from the start of the Bright Futures Scholarship Program in 1997. At both public universities and community colleges, behavior of continuing students is responsible for the largest amount of enrollment.



[14] At public community colleges, the term First-Term-First-Year is used.

To more accurately measure policy impacts on postsecondary education enrollment as a whole requires consistency of assumptions within and across the delivery systems. Policy choices made at any level can, and do, impact all the delivery systems. This is true for policies set at the state level as well as policies developed by each institution.

Moreover, emerging trends can be more easily identified and incorporated at the statewide level. Integration of knowledge gained through other conferences is a particularly important component of this process. Through the official long-range forecasts from other conferences, estimates forming a consistent state picture will emerge. Florida's changing demographics can best be addressed in this manner.

Setting up a process that establishes a preliminary top-down enrollment demand estimate, based on quantitative data, together with a robust review by delivery systems and individual institutions before a final estimate is adopted, will provide a more integrated and policy-driven view of enrollment. The process would begin by determining the total demand for higher education enrollment at a state-level estimating conference. This conference should be formulated in the same manner as the other statutorily created conferences. Inputs to the demand calculations would come from a variety of existing conferences and data. For example, the Florida Demographic Estimating Conference would provide estimates and forecasts of changing demographic trends, age group composition and ethnic mix. The Florida Economic Estimating Conference would provide the job growth forecasts that may impact enrollment. Florida high school graduates including disaggregated data by ethnicity could continue to be reported and forecast by the Department of Education. Out-of-State students are reported by the public sector and by the private not-for-profit sector in reports currently produced.

From the initial demand value, the level of public postsecondary enrollment would be calculated. Leakages from the public sector would include students who do not choose to continue their education, students who choose to attend out-of-state institutions, and students who elect to attend private not-for-profit and private for-profit institutions. Initially, leakages would be estimated based on existing data from prior years; however, data would be developed over the life of the conference that could render these estimates more precise over time.

Once a state level public sector demand has been established, current policies and/or relationships could be used to allocate the demand into the appropriate delivery systems. Policy decisions both within delivery systems and from state-level policymakers could impact this division. For example, if state universities elect to freeze First-Time-in-College enrollment, a larger share might be allocated to community colleges and/or the leakage to the private sector and to out-of-state schools might increase.

When state level estimates have been established, each delivery system would transmit those estimates to the individual institutions for review. Suggested adjustments to the estimates would require justification and explanation. Separate conferences would be held for the state university system and the community colleges to consider adjustments to the base demand estimate. At these conferences, headcount estimates could be converted to FTE estimates, as these conversion factors will vary by institution and program. Since there is no conference process for school district postsecondary technical centers, input from these institutions would be received informally through the Department of Education or a formal conference process could be established in the future.

Finally, the state-level conference would reconvene to adopt a final estimate, based on input from the delivery system conferences. Products of the state-level conference would be consensus on prior year actual enrollment and FTE, on current year enrollment and FTE, and on the constitutionally-required three out-year forecast for each public delivery system. The diagram on the next page illustrates the proposed structure.

Without structural and process changes, adjustments to the specific models used by the various systems will have limited effect. To produce credible and transparent forecasts for the planning and budgeting process, a more significant reform is needed. In this regard, there are four specific recommendations to improve the current process:

1. Creation of a new estimating conference, the *Higher Education Enrollment Estimating Conference.*
2. Development of a system-wide enrollment forecast.
3. Activation of all existing conferences, with slightly revised roles subject to the new *Higher Education Enrollment Estimating Conference.*
4. Production of uniform consensus products by public delivery system:
   a. Prior year actual enrollment and FTE;
   b. Current year enrollment and FTE;
   c. Constitutionally required three out-year forecast.

Enrollment Estimating Conference Process Recommendations