Florida Community College Library Collection Assessment

February 10, 1999

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Executive Summary

LINCC Collection Assessment provides detailed data for bibliographic records of monographs in the LINCC database of library/learning resource (L/LRC) collections of Florida's 28 public community colleges. Data were analyzed by five broad subject groupings and 47 individual subject disciplines for the time period 1970-1998, nearly 30 years. The data were analyzed from three perspectives: the statewide aggregated database, three peer groups arranged by enrollment size, and each individual college collection. The major findings of the study:

- The overall median age of monographs recorded in the LINCC database is 23.6 years. Humanities materials have the highest median age at 26.44 years; Sciences and Technologies the lowest median ages at 19 years and 21 years respectively. The Social Sciences have a median age of 23 years.

- Over one-third of the bibliographic records in LINCC are for materials more than 30 years old, while only 23 percent of the records are for materials published in the 1990s. In the Sciences, 40 percent of the total number of records are for materials published prior to 1970. In Technologies, fully 62 percent of the materials are prior to 1980.

- The LINCC aggregated resources database and the majority of the individual L/LRC's show a decline in the number of bibliographic records for materials published in each five year period from 1970 to the present, suggesting a decline in acquisitions. In many cases the decline is a straight line downward for each five-year period in the study. In most collections the decline has been much steeper since the late 1980s.

- Within the general decline in number in acquisitions, the total number of records in the database for Humanities monographs has declined by 9 percentage points in three decades. The number of records for the Social Sciences has increased by 8 percentage points and the Sciences have increased by 10 percentage points. Thus the Humanities have declined in percentage share and the Social Sciences and Sciences have increased in percentage share of total collections.

- The proportions of the total in LINCC for each of the major broad subject categories and selected subject disciplines correspond to national collecting patterns in academic libraries and trends in book production.

- The ratio of numbers of monographs as shown by bibliographic records to full-time equivalent (FTE) students exhibits a wide range across the 28 colleges, from a low of 4.95 to a high of 37 books per student. The smallest libraries have the highest number of books per student. The lowest ratios concentrate in the larger libraries with the medium-sized libraries in the middle range.

- By peer group, the median ages do not differ markedly from the LINCC median ages by broad subject categories. The large college peer group medians most closely correspond to the LINCC medians. The medium and small college peer groups both have higher overall median ages than LINCC and the large-size group.

- A continual update model is recommended for future collection management—proposing the addition of 5 percent new materials and the withdrawal of 5 percent outdated materials annually.

LINCC Library Assessment Collection

Report

Background

A research group for the LINCC Library Collection Assessment project was formed in fall 1994. The collaborators in this endeavor were members of the administration from the College Center for Library Automation (CCLA, which operates LINCC) and two researchers, one from each of the schools of information science education in Florida. The study conducted by this group was the first statewide collection analysis of community college monograph collections drawn totally from machine-readable data. The results of the first collection analysis project were presented at a *Library Research Seminar I*, "Partners and Paradigms," held in Tallahassee, Florida, November 1-2, 1996.[1]

This 1996 study analyzed the statewide LINCC database as a whole. The major finding of the analysis by imprint year was that the monographic resources of Florida community colleges are significantly out of date. The analysis further revealed that in the 1990s, the number of older materials had increased in percentage share to that of current materials. The analysis by subject divisions revealed that outdated materials are prevalent in all major subject divisions including the sciences and technology, in which currency of materials is imperative. The profile by age obtained for the aggregated resources database and three individual library/learning resource centers (L/LRCs) suggested that more in-depth quantitative analysis was called for.

In 1996, W. Lee Hisle was commissioned by the Florida Division of Community Colleges (DCC) to conduct a formal program review of the community college L/LRCs in Florida. Hisle's qualitative study complemented the CCLA LINCC study, finding dissatisfaction with the state of the resources in the L/LRC's. The results of the LINCC study were cited in the Hisle report.[2] Reacting to the findings of the two studies, the DCC included a line for a one-time appropriation addressing the need for remedial funding for the L/LRC's collections in its formal budget request to the 1998 Legislature. This request was not funded, and the issue of collection upgrades is again addressed in the DCC's 1999 legislative budget request.

Also in 1996, the Learning Resources Standing Committee of the Division of Community Colleges requested a proposal from the researchers of the initial LINCC study to conduct an assessment of all 28 Florida community college L/LRC's individually as well as examining the aggregate database. Subsequent to this request, the administration of CCLA retained Dr. Anna Perrault to continue the collection assessment and complete the analysis for the 28 community colleges.

Research Design

The data for the initial study had been extracted from LINCC in March 1996. For the 1998 study, data extraction took place during the period May-June, 1998. The study has two main

components—the analysis of monographic bibliographic records as a whole, and separate analyses for each of the 28 community colleges.

Five broad subject groupings and 47 individual subject categories were defined for the study. These subject divisions and the Library of Congress class letters used to construct them can be found in a table in Appendix A.

Four main analyses are employed in this report:

1. Median Age
2. Subjects as a proportion of total resources
3. Proportions of subject by time interval
4. Monographic records to full-time equivalent students (FTE) ratio

Organization of this Report

The first section of this report covers the analysis of the aggregate LINCC database as a whole. This section is often referred to as the "LINCC report." The narrative interprets the data presented in a series of tables and figures. The tables for the report are numbered in roman numerals. The tables within the narrative are numbered in arabic numerals. The Table I series and Figure 1 series display the aggregate data for LINCC as a whole by median age of monographs by the five broad subject divisions and 47 individual subject disciplines defined for the study. The Table II series displays the data calculated by percentage share of total within the time periods defined for the study. Table III and Figures 2-6 calculate the percentage share of each subject area by the time intervals. Table IV contains data on number of monographic bibliographic records in ratio to student FTEs.

In addition to the data analysis for the LINCC aggregated resources base, the three groupings of Florida community colleges by size of enrollment are analyzed as peer groups. Tables and figures with the same numbering scheme are produced for the peer groups. The peer group analysis is included with the statewide LINCC report and referred to in the individual institution reports.

Each community college's total monographic resources are analyzed in a separate report. Each institution has received a copy of the full LINCC report and an individualized report for that community college L/LRC. The data are at the institutional level; campuses or satellite collections are not individually analyzed. Although the LINCC report and the college report are separate, the optimum interpretation will be obtained by using the two reports together.

Interpretation of Results

Rationale

The assessment of the state of the collections in the 28 Florida community colleges rests upon a concept of the mission and purposes of community college collections. In light of existing standards and Southern Association of Colleges and Schools criteria, the assumption

is that community college L\LRC collections should be regarded as primarily for reference service and support of the instructional curricula of the institution. It follows that these collections are not being developed for retrospective research strengths, but to serve the current informational and instructional needs of the students and others affiliated with the institution. It is recognized that retrospective depth may be desirable in the literary and historically oriented scholarly disciplines and that standard texts do not become outdated. With these exceptions, community college collections in all fields should emphasize up-to-date, accurate information and current critical theory where appropriate. The evaluative comments in this report are based upon this rationale.

The data in this report are for numbers of monographic bibliographic records by imprint year. The evaluative comments are focused on the monographic collections, which are only one component of the resources provided by community college libraries. Besides printed monographs and serials, libraries are now devoting funds to the purchase or licensing of electronic information products. The expanded set of resources in multiple formats affects budget allocation decisions, which may mean less funding devoted to the purchase of monographs. The budgetary allocations and how they affect the development of the monograph collections are beyond the scope of this collection assessment project. It is assumed these considerations will enter into the interpretation of the data at the local level.

The Aggregate LINCC Resources Database

The LINCC database reflects the aggregated resources of all 28 community college L/LRC collections in Florida. The holdings in LINCC are the combined universe of monographic publications available in the Florida community college system for resource sharing. The LINCC system facilitates free resource sharing among all the colleges.

The data analysis concentrates on the distribution of publications by subject and age. The first and most striking analysis is the calculation of median age for the aggregated resources according to five broad subject groupings and 47 individual disciplines and fields defined for the study.

Median Age (Table I)

Summary Table 1 below, Table I, and Figure 1 display median age data for the LINCC database. In the calculations for median age, all pre-1970 titles are counted as 1970 because individual title ages prior to that date are not available in the study data. Thus the median age calculation uses 1970 as a base year. The maximum median age is 28 years because of the base year of 1970. Actual median age of the collections would be older if median age were calculated on an individual title basis. Likewise, the calculation is performed using the number of titles for the five-year periods. Actual median age might differ slightly if the calculations were made using a number of titles for each individual year in the analysis. The median ages for the LINCC aggregated resources database are calculated on data extracted for LINCC as a whole. The calculations for the tier groupings by enrollment size of institution were performed by adding together data for each of the individual colleges. That is, the absolute numbers were added to make tier group totals and the median age data for the group by subjects was calculated from one total. Thus, the data are truly “aggregated” and

there are slight discrepancies between the peer group averages and the LINCC medians. These discrepancies occur because of the procedure necessary to obtain the median age calculations by the size tiers.

Subject	Year Reached 50 Percent	Median Age in Years
General	1970	27.76
Humanities	1971	26.44
Soc. Sciences	1975	22.97
Sciences	1978	19.19
Technologies	1976	21.31
LINCC Total	1974	23.59

Table 1: Median Age of Monographs Represented by Bibliographic Records in LINCC

For the LINCC database the overall median age is close to 24 years. Half of the titles were published prior to 1974 and half after 1974. Median age ranges from a low of 19 years for the Sciences to a high of 28 years in the General category. The median ages of publication dates for all categories are in the 1970s. While a 26-year median age may not be cause for concern in the Humanities, 23 years is high for the Social Sciences, which include business, psychology, education, political science and law.

The Sciences have a median age of 19 years, but Technologies have a median age of 21 years. While many older standard texts in the basic sciences may still be useful, the materials in the applied engineering and technological fields should be current for those fields. Although the Sciences and Technology have lower median ages than the Humanities and Social Sciences, the median ages for all of the broad subject groupings are high. Fully half of the material is in titles published prior to 1974. If material is to be considered "current," median age should be closer to the mid 1980s—in which case approximately half of the titles would be less than 15 years old.

Further interpretation of the median age data is problematic. In order to adjust median ages there needs to be some idea of the rate at which materials become obsolescent. Median age will be lower for disciplines or fields which have higher obsolescence rates. Rates of weeding and acquisitions are also factors affecting median age interpretation. Withdrawing older materials lowers the median age of a category. Conversely, not weeding older materials raises the median age unless acquisitions of newer materials increase to offset the "weight" of the older materials.

From the 1940s through the early 1980s, studies were conducted on the obsolescence of literature in a variety of disciplines. The landmark study of the effects of age on use was that of Fussler and Simon who found that use dropped off continuously, more rapidly in the earlier years after publication and then more slowly.[3] There are no hard and fast obsolescence rates established for the monographic literature of various fields. The majority of the research has

concentrated on the journal literature and many of the use patterns found in older studies may not pertain today.

A study related to median age consideration was conducted by Hodowanec at the University of Akron in the early 1980s.[4] He sought to develop a Priority Weighting Formula for book budget allocation. The formula was based upon determining annual book obsolescence rates for individual instructional departments within a university. The obsolescence rates were calculated through defining periods of "peak use" which revealed the "immediacy" of user need, and the magnitude of peak use which reveals the "intensity" of user need. These factors were used to calculate the percent of annual decline in use by four broad divisions and more specific subject categories. The study found a range in obsolescence rates by subject discipline from a low of 2.27 percent a year in foreign languages to a high of 8.50 percent in the business collection. For the major divisions the percentage obsolescence rates were:

- Fine arts and humanities, 4.27 percent
- Life science, 4.36 percent
- Pure and applied sciences, 4.38 percent
- Social and behavioral sciences, 4.69 percent

The overall average library obsolescence rate was 4.64 percent a year.[5] Thus, close to 5 percent of a collection becomes obsolete each year. From his findings Hodowanec formed several conclusions that are relevant to consideration of currency in library materials by discipline. He observed that

> *...substantial growth and expansion of theory, research, and publication in a particular instructional field (e.g., business) seem to result in a higher annual rate of book obsolescence for that field's curriculum-supporting collection. ...Moreover, academic fields which are in a developmental or redevelopmental state, undergoing refinements in methodology and technology of their informational domain (e.g., industrial education, home economics, and computer science) tend likewise, to demonstrate higher than average rates of obsolescence in their collections. Conversely, academic fields that rely upon revised versions or new editions of already existing materials (e.g., English) tend to amass collections with below average annual obsolescence rates. Finally, certain instructional fields and certain curriculum offerings are primarily textbook oriented. When these fields and courses do not exhibit rapid expansion of theory, research, and publication, their curriculum-supporting collections tend to have below average annual use and obsolescence.*[6]

The interpretations of the data for the community college collections in the LINCC study are congruent with these observations by Hodowanec. While the percentage rates of obsolescence per year in his study were derived from one case study on a medium-sized, four-year institution, the findings can be employed to suggest that an average withdrawal rate

of 5 percent a year is reasonable for any collection in which currency of information is a priority. The withdrawal of older materials would in turn lower the median ages according to the patterns of currency and obsolescence in various disciplines.

Because community colleges are not building research collections, the expectation would be for a lower median age than found in the LINCC study. This topic will be taken up again later in this report.

Subjects as a Proportion of Total Resources (Table II)

Patterns of collection development over time can be traced by analyzing the percentage share of total for subject groupings within the same time interval and comparing the changes in these percentages moving forward in time. Table 2 below shows the percentage shares of total within the time periods defined for the study for the five broad subject groupings.

Publication Date Interval	Pre'70	70-74	75-79	80-84	85-89	90-94	95-98	All Pub Dates
General	0.50	0.22	0.29	0.27	0.32	0.42	0.35	0.36
Humanities	44.73	34.12	31.01	30.13	31.01	27.36	25.16	35.82
Soc. Sci.	40.59	47.20	46.66	44.90	44.02	47.37	48.64	44.21
Sciences	10.09	11.52	13.58	17.11	18.39	19.45	20.94	13.71
Technology	4.10	6.93	8.47	7.60	6.26	5.39	5.01	5.90
Total	100	100	100	100	100	100	100	100

Table 2: Broad Subject Categories as a Percentage of All Titles (LINCC) by Time Period

Reading vertically down the pre-'70 column, it can be seen that the Humanities make up 45 percent of the total number of titles in the pre-'70 time period. The Social Sciences comprise 41 percent of all titles in the pre-'70 time period, etc. Table 2 clearly shows the shift in percentage share of the five broad subject divisions from the formative days of collection building in the 1960s and 1970s to the present. The Humanities have steadily declined as a percentage share of the total collective resources database. With a 45 percent share in titles published prior to 1970, the Humanities now comprise only 36 percent of the collective resources database, a decline of 9 percentage points in three decades. Furthermore, the two time periods in the 1990s show a sharp decline from the average 30 percent share the Humanities held in the 1970s and 1980s. This pattern of decline of percentage share of total follows the same trend as the collections of four-year academic institutions, although the decrease is somewhat steeper here.[7]

The change in percentage share of total for the Social Sciences displays a more even pattern than that of the Humanities. The Social Sciences were 41 percent of total in pre-1970 titles, rising to 47 percent of total in the 1970s, and up to 48 percent of total in the 1990s. The Social Sciences have increased their share of total by 8 percentage points over the past three decades.

The most dramatic shift in percentage of total occurs in the Sciences. While only 10 percent of total for pre-'70 imprints, the Sciences comprise 20 percent of total in the 1990s, a full 10 percentage point gain. For the collective resources database as a whole, the Sciences comprise nearly 14 percent of total titles. The lower overall percentage share of the LINCC database for the Sciences is caused by the number of older imprints in the Sciences.

Materials in Technology are only 4 percent of total for pre-1970 imprints. The applied fields in Technology are not subjects in which a large number of monographs are published. Since these are areas in which current materials are most important, the lower percentage share in older materials is appropriate. Through the 1970s these fields gained in percentage share of total, then began to lose share again in the 1980s, such that Technology's share of total in the 1990s is 5 percent. The lower percentage share of total may not be cause for concern, but many computer science titles do classify in technology. With the increased emphasis on applied technology in the curricula, it would seem that acquisitions in Technology would have increased as a percent of total share in the late 1980s and in the 1990s. The higher percentage share of total in the middle years of the 1970s and early 1980s may be an indication that the collections are holding larger numbers of materials for these imprint years which are now outdated information.

To put these percentage shares by subject division into a broader perspective, data for LINCC can be compared with book production statistics, data on *Choice* reviews and data for other library peer groups. These data are shown in Table 3.

The shifts in percentage share by broad subject groupings and professional fields are similar to the shifting in percentage shares by subject in book production. Book production has risen every year since 1980, but the percentage shares by subject have not risen equally. In the ten year period from 1979/80 to 1989/90, the average increase in book production was 40 percent for the 10-year period. The fields of business, medicine, law, history, engineering, general sciences and technology, literature, mathematics and computer science, and the military/naval sciences were all above the average. The fields of mathematics and computer science had an increase of 140 percent. Up until the mid 1970s, the fields of biography, education, literature/drama, and history made up the bulk of monographic publication. After 1970, the humanities and certain social science fields declined as a proportion of total publication. The largest decline was in the literature/drama category which prior to 1970 had a 17.2 percentage share of total publication but by 1981 was down to a 9 percent share. The declines in the humanities were counter-balanced by increases in book production in professional and applied fields with a shift of 9 percentage points into business, law, medicine and technology.[8] These trends in the increase in book production and shifts to the professional and science/technology applied fields have continued through the 1990s.

Table 3 contains data for percentage share by the broad subject divisions from a number of different data sources. The first two columns are for book production and *Choice* reviews. The data in columns 3-5 are from a 1996 OCLC/AMIGOS Collection Analysis CD (CACD) product for the years 1985-1994 and are averages by different size groupings of libraries for that 10-year period. Column 5 labeled "All" is an average for the entire CACD database

which contains the holdings of approximately 2,500 libraries. The CACD database includes community colleges and public libraries, although these are not included in the standard peer groups which come with the product.

For all sources of data in Table 3, the proportions for the broad subject groupings are similar. In column 1, book production, in the 1990s, Humanities titles are approximately 32 percent of new titles published annually, Social Sciences 40 percent, and Science and Technology 19 percent.

	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6
Data set Used	**Book Production**	***Choice* Reviews**	**OCLC-AMIGOS CACD College**	**OCLC-AMIGOS CACD Research**	**OCLC-AMIGOS CACD All**	**LINCC**
Humanities	32 %	30%	34%	38%	38%	36%
Soc. Sci.	40%	40%	38%	42%	44%	44%
Sci/Tech	19%	15%	26%	18%	19%	20%

Table 3: Comparison of Percentage Shares of Broad Subject Groupings from Six Collection Data Sets

Choice reviews 6,000 books annually. All three broad divisions have lower percentages in *Choice* because reference titles are separated out from the broad subject divisions. Even with this difference, the proportions of reviews in *Choice* closely correspond to the universe of publication by broad subject grouping displayed in column 1: General and Reference (10 percent), Humanities (30 percent), Social Sciences (40 percent), and Science and Technology (15 percent).[9]

In the AMIGOS study for the ten-year period 1985-1994, for four-year colleges, shown in column 3, the Humanities had a consistent 34 percent share of total and the Social Sciences, 38 percent. The Sci/Tech classifications averaged 26 percent of total share. Research libraries (column 4) had slightly different proportions with Humanities at 38 percent, Social Sciences at 42 percent, and the Sci/Tech fields at 18 percent.[10]

The data for the ten years in the CACD show larger percentage shares for the Humanities as these disciplines have materials continuously added over a longer span of time. From these data it can be seen that the Social Sciences have been the dominant category in monographs in those academic libraries since the mid-1980s. The percentage share in the 17 Sci/Tech fields has risen along with the Social Sciences and the percentage share for the Humanities has declined. These are national collecting patterns.

The proportions for the LINCC aggregated resources database correspond more closely to the CACD 2,500 libraries in column 5, than to the college peer group in column 3. As can be seen from Table 3, the Florida community college aggregated collection profile does correspond to national collecting patterns.

The shifts in proportions over time for the broad subject groupings in LINCC are most probably a reflection of changing emphases in curricula in higher education over the last thirty years. These collecting patterns follow shifts in book production and are similar to the collecting patterns of other groups of academic libraries. The Sciences and Technologies categories reflect the increase in courses in the health sciences and computer technology fields. The decline in the percentage to total of titles in the Humanities is in line with a shift away from studies in those scholarly disciplines into the applied fields in all of higher education. Tables 4 and 5 below examine collecting patterns in LINCC for specific disciplines.

Publication Date Time Interval	**Pre'70**	**70-74**	**76-79**	**80-84**	**85-89**	**90-94**	**96-98**	**Total LINCC (All Time Periods)**
Business	4.30	6.10	7.54	8.71	8.42	9.10	9.08	6.56
Education	3.16	5.10	4.39	4.05	4.08	5.02	6.05	4.11
Elec. Eng.	0.53	0.72	0.90	1.11	0.94	0.88	1.45	1.64
Law	1.34	2.48	2.86	2.84	3.00	3.24	3.15	2.31
Health care	1.34	3.23	5.37	7.44	9.01	10.30	11.68	4.88
Building	1.88	3.10	3.74	2.00	1.75	1.66	1.09	2.68

Table 4: Shifts in Collecting Patterns in Professional Fields As Percentage Share of Total in LINCC by Publication Date Time Period

The data in Table 4 are read horizontally. If the assumption is that withdrawals of outdated materials have not been made in large numbers, the percentage share by time period for each of the professional fields can be regarded as the rate of acquisitions during those time periods. Interpreting the data in this way creates a finding of an increase in share of total for each of the professional fields over the past three decades. The health sciences and business have large increases in percentage share of the total collective resources database. Education and law also increase in share. Only the areas in building construction do not show an increase in share, but these are subjects in which there is a very small amount of publication compared to the larger professional fields.

With such a large increase in share of total by time period for the professional and technical fields, it would logically follow that there would be a corresponding decrease in the rate of acquisitions for titles in the traditional scholarly disciplines. Table 5 displays data for six scholarly subject fields.

With the exception of sociology and mathematics, all of the disciplines in Table 5 show a decline in percentage share of total from the earliest period to the present. The slight increase in mathematics may be attributable to the titles in computer science which classify in the QA's. Sociology, which has a close relationship to the applied social sciences, increases dramatically over the thirty years as a proportion of total. In Table II, Sociology has one of the largest shares of total in the last decade, ranking fourth after business, American literature, and medicine.

As was observed earlier with the Humanities, the language and literature categories exhibit a pattern of declining share of total through the past three decades. Philosophy, religions, and history also decline in percentage share of all subject fields. Older imprints are still viable in all of these disciplines which may have larger shares of older materials because libraries continue to add "new" acquisitions in these areas across a long time span. The physical sciences categories also have a smaller share of total in the last decade than in earlier years.

Publication Date Time Interval	Pre'70	70-74	76-79	80-84	85-89	90-94	96-98	Total LINCC, all Time Periods
Phil. & Rel.	5.63	3.85	3.45	3.17	3.19	3.29	3.23	4.22
Lang. & Lit	32.01	23.11	20.21	20.40	21.85	19.09	17.64	24.93
History	18.40	14.94	11.32	10.16	10.63	11.63	10.50	14.25
Mathematics	1.53	1.26	1.31	2.63	2.53	2.48	2.43	1.81
Phy. Sci.	2.56	2.14	2.05	2.36	2.08	1.95	1.75	2.27
Sociology	3.16	6.77	7.66	7.07	6.99	7.92	9.95	5.87

Table 5: Shifts in Collecting Patterns in Selected Scholarly Fields As Percentage Share of Total in LINCC by Publication Date Time Period

If percentage share of total is used as an indication of acquisitions rates, Tables 4 and 5 clearly show the fields which have been receiving emphasis in the rate of acquisitions in the community colleges. Nearly all of the professional fields and sociology show increases in the rate of acquisitions. These increases in proportion of total do seem to follow changes in curricula emphases and shifts in book production.

Proportions of Subjects by Time Period (Table III and Figures 2-6)

Median age gives one reference point for age of collections. Another analysis for age is to view each subject category by the distribution of the number of records within that category across the thirty years in the study. For LINCC, more detailed analysis of collection age by subject can be derived from the calculations performed in Table III. The percentage share by time period within the individual subject categories and for the five broad subject groupings is calculated in Table III. Figures 2 through 6 assist in interpreting the data presented in Table III. Figure 2 displays the proportions of titles by the five-year periods in pie charts. The center pie chart shows the proportions for all LINCC monographic bibliographic records. The surrounding pie charts show the proportions for the same time periods for each of the broad subject groupings defined in the study. Figures 3 through 6 graph the individual subject categories within the five broad subject groupings.

In Table III, each line can be read independently to focus on the percentage of records by time interval. The percentage share by time interval of one subject area can be traced by moving toward the present. In this analysis, areas which might contain large numbers of outdated materials can be identified. Reading the "Total" line in Table III horizontally from left to right, it can be seen that, for the LINCC database, 36 percent of the holdings are in pre-1970 imprints. This means that as we rapidly approach the year 2000, over one-third of the collective resources are over thirty years old. Advancing toward the present across the bottom

of the table, each five-year period in the analysis comprises a smaller percentage share of the total for the entire database. While it may be cause for concern that over one third of the titles in the collective resources database are imprints over thirty years old, 29 percent are in the 1970s, with another 11 percent prior to 1985. Thus, only 23 percent of the titles in the collective resources database are less than 13 years old. While it is desirable to have retrospective strength in some scholarly disciplines, for community colleges in which the curricula emphases are on current applied and technological fields, the collective resources show an alarming decline in numbers of new titles added in the last decade.

The General category (A-AZ) has 49.56 percent of total in pre-1970 imprints. This category contains encyclopedias, almanacs, and general reference materials not classified in a specific subject area. It also contains a miscellany of other works which do not fit elsewhere in the LC classification. Because the majority of reference works classify in specific subject areas, it is not possible to derive separate data specifically for reference materials. In the 1995-98 time period, only 216 titles were added in the General category. This seems to be a small number in comparison with the large numbers of titles in earlier time periods. Without examining individual titles, it is difficult to judge if recent acquisitions have been lacking, or if the problem for the General category may lie more in the large number of older imprints. Withdrawing outdated titles would reduce the percentage share of total occupied by older materials. It will not, however, solve the problem of too few new additions.

In the previous analysis from Table II, the Humanities show a clear pattern of decline in percentage of imprints from the 1970s to present. While retrospective depth is desirable in the humanities, with classical texts in all fields continuing to be read, new critical and reference apparatus are necessary for current teaching in any field. Table III shows that over 45 percent of Humanities materials are older than thirty years and that less than 10 percent of titles in the Humanities are 1990s imprints. The Humanities rank last of the broad subject groupings in the percentage of current titles.

The decline in acquisitions in the Humanities may be reflecting changing priorities. It is possible that Humanities subjects are no longer as high a priority in the instructional programs of the community colleges as they were 20 to 30 years ago and that enrollment may now be concentrating in the allied health and technical fields. The data in Tables II and III show a decline in library support for the primarily monographic disciplines of the Humanities.

From Table III, it can be seen that the Social Sciences grouping has the largest number of titles among the five broad subject groupings. In the pre-1970 time period, the Social Sciences have fewer titles than the Humanities with one-third of total in that time span. The same pattern of decline in numbers from the 1970s to the present is seen in the Social Sciences, although 36 percent of the titles were published after 1980. The number of 1990s imprints is nearly 14 percent of the total number of Social Sciences titles, a higher proportion than are the Humanities.

In the LINCC database, the Sciences seem to have fared the best over the years. While 26.76 percent of the Science collections are in the pre-1970 time period, nearly 19 percent of the Science titles are in 1990 imprints. The years between 1970 and 1990 may be in need of examination. With 26 percent in 1970s imprints and another 28 percent in 1980s imprints,

there is the possibility that the Science collections are still retaining many books with outdated scientific information. Looking specifically at the figures for Medicine, it can be seen that while only 10 percent of total is in pre-1970 imprints, 26 percent concentrates in the 1970s, with 17 percent in 1980-84, and 19 percent of total in 1985-89. The acquisitions rate for the 20 years 1970-1989 appears to have been adequate, but many of the applied materials from that time span would now be outdated, especially those before 1985, now more than thirteen years old.

The General, Physical, and Life Sciences all have over 40 percent of total in pre-1970 imprints with mathematics at 30 percent and oceanography at 35 percent. The latter two subject areas display a more erratic acquisitions pattern over time, increasing share of total in some years and decreasing in others. In the 1990s the positions of the subject areas in the Sciences are somewhat reversed from earlier decades, with the health sciences fields occupying larger proportions of total and the basic sciences declining in share of total. To reiterate, the Sciences have fared better in acquisitions numbers overall than the Humanities and Social Sciences. The main problem is in the number of older imprints which could contain inaccurate information and should be examined for deselection.

Technology does not follow the same pattern as the Sciences. One reason for the differences may be that the universe of monographic publications in these fields is smaller than in the basic sciences and allied health fields. The practical nature of the education and training in the technological fields makes them less library-oriented. With 25 percent of total in pre-1970 imprints, this subject grouping may need concentrated deselection attention.

Computer science titles classify in several different call numbers—QA, TK, and in the H's. It is especially alarming that the math (QA) and electrical engineering (TK) lines do not show a more current age or rate of acquisitions pattern.

As with the other broad subject groupings, percentage share of total for the technological fields does decline moving forward in time. While the Sciences have 19 percent of total share in 1990s imprints, the highest of the broad subject groupings, Technology has a 12 percent share of total in 1990s imprints. Only the Humanities have a lower share of total (10 percent) in current materials. Mechanical engineering has the highest percentage of materials in the 1980-1998 time frame, but it still has over 50 percent of titles in the pre-1980 time frame. In fact, fully 62 percent of titles in Technology are pre-1980s imprints.

Again, numbers of older imprints are occupying a larger share of total than more recent years. Business, education, law, and electrical engineering have larger percentages of older imprints with decreasing percentages of the total number of titles in more current years. Medicine and nursing have an opposite pattern with larger numbers of titles in more recent years and smaller percentages of titles in older materials. In fact, Table III shows that the health sciences categories, the lines for medicine, therapeutics and pharmacology, nursing, and "other systems of medicine," have the highest percentages of total in the LINCC database of all subjects in the 1990s. With acquisitions slowing in the last 25 years, there are probably materials which contain outdated information. Many areas may need newer editions of basic, standard material.

There are no guides in the literature of library and information science to assist in plotting a desirable age pattern by decade for community college collections. As stated in the rationale at the beginning of this report, the assumption upon which the analysis is based is that the collections be comprised of materials that are intellectually viable and contain accurate, current information. It is useful to ponder what a percentage share of total for the broad subject groupings would look like if a hypothetical collection were to be designed to follow the rationale underlying the age analysis in this report. The model contained in the table below is included to illustrate how a collection could look if an effort were made to achieve a balance of more recent books to older materials. It reads horizontally and illustrates a see-saw pattern. The science/technology fields are light on the older side and heavier on the current end. The scholarly disciplines are tipped toward the older end, although they have a higher percentage of share in recent materials than the patterns now found in LINCC. The table is constructed taking the differences in scholarship between the broad subject groupings into consideration. It is a hypothetical look at the percentage share of total with an emphasis on current materials.

Publication Date Time Interval	**Pre-1970**	**1970s**	**1980-1984**	**1985-1989**	**1990-1994**	**1995-1999**
Humanities	37%	23%	12%	11%	9%	8%
Soc. Sciences	25%	16%	13%	13%	15%	18%
Sciences	19%	13%	10%	15%	19%	24%
Technology	5%	10%	11%	10%	25%	27%

Table 6: Hypothetical Share of Subject Groupings by Time Period
*(This table does **not** contain actual data.)*

It is simple mathematics to deduce that if median age of collections is in the 1980s, at least 50 percent of titles must have been published after 1980. The above hypothetical spread would result in median age of the 1970s for the Humanities, in the mid-1980s for the Social Sciences, the late 1980s for Sciences and the early 1990s for Technology. While the percentage shares could be adjusted endlessly in this exercise, the percentages in the table do allow for differences in the production and use of knowledge in the broad groupings. The Humanities have the highest percentage in retrospective materials. The Social Sciences have one-fourth in older materials to allow for the historical nature of their scholarly disciplines. The Sciences and Technologies are concentrated in the present decade.

Up to this point in the report, the analysis has been concentrated on the LINCC aggregated resources database. In the next section, the aggregated resources are arranged in three peer groups of the Florida community colleges by size of enrollment. The aggregated resources of these three groupings are compared with the total LINCC resources database.

Peer Groups

The 28 Florida community colleges are customarily divided into three tiers or peer groups by size of enrollment. Because there is a wide range of size of institutions among the 28, using peer groupings affords an individual institution more realistic benchmarks for judging the adequacy of resources. Peer group averages were constructed by adding together data from

the individual colleges in the grouping. Summary tables were constructed for each peer group showing the peer group averages for median age and percentage share of total by the broad subject groupings and selected subject fields.

Median age for the peer groups was calculated by adding together data from each of the individual colleges. Thus, the medians for the tier groups are aggregated data. The median for the broad subject groupings are not an average of the medians for the individual subjects. The medians for the broad subject groupings are calculated on the raw data for all of the titles in the broad subject grouping. Thus, individual subject areas with a small number of titles do not influence the median for the broad subject grouping. If the individual subject groupings had been added and then averaged, each individual subject category would have had equal weight. Using the raw data for the broad subject grouping medians gives each title equal weight no matter what the individual subject classification. Table 1 does highlight the differences in the median ages of the smaller subject categories and show differences between the individual subjects.

Large-size Group

The large size grouping of the Florida community colleges is composed of nine institutions: Miami-Dade, Florida at Jacksonville, Broward, Valencia, Daytona Beach, St. Petersburg, Hillsborough, Palm Beach, and Indian River. The institutions in the large size tier are among the oldest of the Florida community colleges and the majority of them are located in the large urban population centers of the state. The range of the number of monographic bibliographic records is from 44,500 to 221,900. The range in the ranking by collection size is from 1st to 21st.

Median Age (Table I and Figure 1)

The median ages by the broad subject categories for the large tier differ only slightly from the medians for the entire LINCC database. These libraries, with a few exceptions, do have the largest collections of the 28 community colleges, and thus are contributing the most records to the LINCC database. Hence, their holdings to a great extent determine the profile of the LINCC database. The large-college group medians are very slightly below the median ages for the total database in the General, Humanities, and Social Sciences categories. The medians for Science and Technology are slightly higher than the medians for the total LINCC database.

By individual library, Valencia Community College has the lowest overall median age of the large college group at 20 years. Valencia is six years lower than both peer group and total LINCC medians in the Humanities; two years lower in the Social Sciences; one year lower in the Sciences and Technology. Broward, Daytona Beach, St. Petersburg and Hillsborough all have overall medians lower than the peer group and LINCC total. Miami-Dade, Florida at Jacksonville, Palm Beach, and Indian River all have overall average median ages higher than the tier group and LINCC total.

Daytona Beach has four of five broad subject groupings with medians of less than 20 years, Humanities being the only category above 20 with 27 years as a median age. St. Petersburg has one of the lowest median ages of all 28 Florida community colleges in the Sciences with 16 years and 19 years in Technology. Hillsborough is also at or

below the tier group and LINCC total median ages in all five subject categories. The other colleges are over the LINCC total and tier group medians in most respects.

Bibliographic records/FTE ratio (Table IV)
The range for the number of titles per FTE student enrollment for the large-size group is from 4.95 to 14.64. This ratio indicates how many monographs there are to each student enrolled. The nine institutions in the large group rank from 19th through 28th in records/FTE ratios. In other words, the "best" ratio out of the group is 19th among the 28 community colleges. A number of institutions which have experienced rapid growth and have among the highest enrollments also have the lowest titles per student. There can be some justification for a lower books per student ratio with a large collection, because the larger collections contain a more diversified universe of materials for an individual user to select from. The institutions in the large group, however, do have the fewest books per student. The ratio is but one additional measure in the assessment of collections. It can be used in conjunction with the other assessment measures of median age, subjects as a proportion of total resources, and proportions of subjects by time period.

Medium-size Group
The medium-size community college group is composed of nine institutions: Brevard, Santa Fe, Pensacola, Seminole, Tallahassee, Edison, Manatee, Central Florida, and Okaloosa-Walton. These institutions are located in or near population centers or major state universities. These collections are "in the middle" on several measures. The number of monographic bibliographic records for the community colleges in this tier range from 49,307 to 125,472. The institutions in the medium-size group rank in collection size from 5th to 19th. The range for the number of titles per FTE student enrollment is from 8.64 to 16.38 Neither the lowest nor the highest title-per-student ratios are held by institutions in the medium-size grouping. The proximity of most of these institutions to large public and university libraries allows for their students and faculty to have access to a wider range of resources than just those provided by the community college collections.

Median Age (Table I and Figure 1)
The median age for the medium-sized group is slightly higher than the LINCC overall median. The General, Humanities, and Social Sciences broad subject groupings all have median ages above the medians for LINCC as a whole. Sciences and Technology are slightly below the LINCC medians, but there is less than a one year difference. Brevard, Santa Fe, Edison, Manatee, and Central Florida all have overall median ages below those of the tier group and LINCC. Okaloosa-Walton, Pensacola, Seminole, and Tallahassee have overall median ages above the tier and LINCC averages.

Santa Fe is below the average median ages of both groups in all five broad subject categories. The overall median age for Santa Fe is 15.29. In fact, the only category Santa Fe has with over 20 years for a median age is General. It has the lowest median age of the 28 community colleges in the Sciences at 14.14, Technology at 14.53 and Social Sciences at 13.92 years.

Manatee has a lower overall median age and lower median ages in the four major subject divisions than the peer group and the whole of LINCC. Manatee has one of the lowest median ages of the 28 community colleges in the Sciences at 15 years. Brevard has all four major broad subject groupings with median ages lower than the tier group and LINCC. It also has one of the lowest median ages in the Sciences at 17.73. Central Florida also has lower median ages than the averages in all four major broad subject groupings with a 17.81 in the Sciences. Edison has lower medians in the Social Sciences, Sciences, and Technology and a lower overall mean than LINCC and the tier group. The other colleges in the tier group, by and large, are above the median age average for LINCC and the medium tier group.

Monographic bibliographic records/Student FTE ratio (Table IV)
By bibliographic records/FTE ratio, the medium-size colleges rank from 7th to 21st. The college with the best ratio in the medium-size group is Okaloosa-Walton with 16.86 books per student, ranking 7th of all the community colleges in Florida. Brevard ranks 8th in records/FTE ratio and 5th in size of collection of the 28 community colleges. Gulf Coast is ranked 9th in records/FTE ratio, but 17th in collection size. The remaining colleges in the medium-sized tier rank from 11th to 22nd in records/FTE ratios. The size of collection ranking for the group is from 5th to 19th.

Small-size Group
The third peer grouping of Florida community colleges is composed of ten institutions: Gulf Coast, Polk, Pasco-Hernando, South Florida, St. Johns River, Lake City, Chipola, Lake-Sumter, North Florida, Florida Keys. These institutions are not located in as close proximity to major population centers as the institutions in the large and medium tiers. The range in the number of monographic bibliographic records is from 24,000 to 69,200.

Median Age (Table I and Figure 1)
As has been seen in the foregoing analysis, the averages by LINCC as a whole and peer grouping for median age have shown that there is a rather small range between the median ages both by broad subject grouping and peer group. The small college group medians are higher than the medians for LINCC as a whole in all of the broad subject groupings and in the overall total median. The small group medians are also higher than the other two size tiers. Thus, the higher median ages are in the smallest collections.

Individual colleges in the small tier do have medians lower than the average. The college with the lowest median ages, lower than the small college tier average in all categories, is Pasco-Hernando. It is also the last community college founded in Florida (1972), a probable factor in the youth of the collection. South Florida is also below the small tier median age in all categories and below the LINCC-wide median age in Sciences and Technology. North Florida is below the tier group median age in the Sciences and Technology but above the median in the other broad subject groupings and the overall median age. The other colleges are above both the small tier and LINCC median ages in nearly all categories.

Monographic Bibliographic Records/Student FTE Ratio (Table IV)

The range in monographs to student FTE enrollment is from 14.63 to 37. Thus the smallest institutions by both enrollment and collection size have among the highest ratios of student FTE to number of monographic bibliographic records.

The institution which has the highest FTE/title ratio of all 28 community colleges is Lake-Sumter at 37 monographs per student. The college with the largest collection by number of monographic bibliographic records in this group is Polk which also ranks eleventh overall in size and fourth overall in the enrollment to records ratio.

Four of the institutions in the small group are in the top six in rankings among the community colleges for the best bibliographic records to FTE ratios. Those are Florida Keys, 2nd; North Florida, 3rd; Chipola, 5th; and St Johns River, 6th. The remaining colleges in this tier rank 12th (Lake City), 14th (Pasco-Hernando), and 16th (South Florida). When it is considered that these institutions also tend to be located farther from large public or university libraries, it would seem that strictly on an title/FTE ratio basis, these institutions are providing adequate numbers of monographic resources.

Recommendations

The analysis and interpretation of data in this study have demonstrated that the monographic collections of the community colleges in Florida are heavily weighted in older materials in all subject areas. The two major factors that have resulted in the current age profile are the intense collection building in the founding years and the decline in funding in the last two decades. One approach to the problem of age-heavy collections is to propose a collection management model based upon systematic additions and withdrawals—a continual update model.

The model being proposed here is similar to a no-growth model which was posited at a conference in Chicago in 1975. At that meeting Trueswell defined the no-growth collection as a static size collection to which new additions would still be made.[11] The "optimal collection size" theory was explicated by Daniel Gore in a research paper added to the proceedings of the conference, "Farewell to Alexandria: Solutions to Space, Growth, and Performance Problems of Libraries."[12]

Gore attempted to answer the question "How large should a library be?" His answer was that a collection should be large enough to produce the "performance (satisfaction) rate" desired by the institution. Gore emphasized that an optimum "performance rate" could be achieved with smaller but more judiciously selected collections. His rationale was based upon making the collection smaller to provide more and better service which he termed "acceptable performance rate," which in turn was based upon "availability rate" of materials the library owned. Gore's argument was that a new building would never be needed if the number of volumes required to maintain any specified performance rate also remained constant. While the titles held by a library will change from year to year, the total number remains constant. The outflow rate of withdrawn materials will match the intake rate of new volumes. The withdrawals would be selected by the Trueswell criterion of weeding by last circulation date.[13]

Gore based the explication for "optimal collection size" on a hypothetical collection of one million volumes. The theoretical model was not found to be practical. The no-growth concept was very controversial and not accepted in the research library arena.

Continual Update Model

An approach similar to the "optimal collection size" theory is being suggested here. In order to achieve a collection which is not heavily weighted with older imprints, a suggested model for a collection profile by age is included in this report in Figure 7. The suggested model for collection management is to add 5 percent new titles a year at the same time withdrawing 5 percent older materials. While the model suggested here resembles the "optimal collection size" theory, it does not require the calculation of performance rates or availability rates. It is not based on a pre-determined or optimal collection size, but on a dynamic collection of continued additions and withdrawals.

The 5 percent withdrawal on an annual basis is consistent with the *ACRL/AECT Standards*[14] which assume a 3-5 percent withdrawal rate in the suggested figures for collection size. In the section of this report on median age, it has been shown that research by Hodowonec established an overall library obsolescence rate of 5 percent per year.

Figure 7 shows a "Recommended Collection Profile," using data in the LINCC study. The 1990-1994 time period, which is the last complete data interval in the study, is used to calculate a projection for the LINCC database through the year 2004. The graph assumes 5 percent additions and withdrawals on a moving five year scale. The bars in the main graph in Figure 7 show the distribution of the existing resources according to the time periods utilized in the study. The line (shaded area) shows what the distribution by imprint date would look like had the suggested model been in practice since 1970. Just the "Recommended Pattern" is shown in the smaller inset graph. Withdrawals would naturally be spread over the entire collection, more heavily in some fields than others, but the effect of a *systematic* process of addition and withdrawal would produce a profile similar to the shaded area in Figure 7.

Collections in which the Continual Update Model is practiced would have an age profile almost directly the opposite of the present profile of the LINCC database. Over the span of nearly thirty years, the collective resources by imprint year would have had a substantially different age composition. As new materials are added and older, outdated materials withdrawn, the percentage of older materials diminishes in proportion to current imprints. The median age in this hypothetical collection would have been an overall ***11*** years instead of the actual LINCC median age of approximately 24 years.

The point of this model is not to save space, although that is one effect. The point is to maintain collections at a current level while at the same time, retaining the intellectually viable titles in the collections, but discarding superceded and just plain wrong information. Literary texts, basic science texts, and any other materials still intellectually viable could remain or be replaced with newer editions which would be more attractive to the user. Classics no longer in print could be retained to be supplemented with newer critical or explicative apparatus. The net effect of such a policy is to keep collections current in areas in which currency is paramount and at the same time maintaining breadth and depth in areas in which historical material is desirable. Such collections impress the user as fresh and up-to-date. Such collections impart to the user a confidence that the L/LRC's are adequately supported by the institution and that the professionals are knowledgeable and capable of assisting them in the educational process.

The suggested "Continual Update" collection management model requires that new additions to the collection be sustained at the level of at least 5 percent per year. The adoption of such a model could be the impetus for a long-range funding plan for the community college collections as implementation requires the addition of, at a minimum, 5 percent new materials a year.

Conclusions

From the data in this study, it appears there is a relationship between median age of collections, level of funding, and founding date. The majority of the community colleges were founded in the 1960s. Start up funding was adequate or more than adequate for this time period. By the 1980s higher education in general was beginning to experience reduced funding or at least reduced purchasing power. In many institutions, the L/LRC's were simply not supported as well as other components. For these and a variety of other reasons, the collections of the community colleges experienced declining growth beginning in the latter 1970s from the earlier peak funding periods. As we move forward in time the majority of subject areas in the study decline in acquisitions numbers resulting in median collection ages in the 1970s. The median age of the collective resources database by broad subject category probably reflects the aggregated funding pattern for the community college L/LRC's. The profiles of the community colleges and the collective resources database reflect an uneven pattern of support for the collections which has resulted in high median ages and serious deficiencies in current materials.

The report has concentrated on the distribution of the number of monographic bibliographic records by subject and by time period. Throughout the literature there are few quantitative benchmarks to use as guideposts for the evaluation of library/learning resources programs. The volume count by enrollment benchmarks in the 1990 *Standards for Community, Junior, and Technical College Learning Resources Programs* are too general to use in evaluating library collections. The data in this report are the first such detailed analysis of the aggregated monographic resources of all community colleges in a state. The analysis establishes that the aggregated monographic resources of LINCC and the Florida community colleges do closely correspond to national collecting patterns by broad division of knowledge. It is probable that other collecting patterns, such as those by subject and age, also closely correspond to general collecting patterns in community colleges. With the absence of published or available detailed data similar to the data in this report, the study of collecting patterns in Florida community college collections may provide benchmark data for others to use.

LINCC is a recent development in the history of the Florida community colleges. This report provides profiles of the collective resources of the Florida community college L/LRC's. The institutional reports aggregate the resources for each community college so that the whole is analyzed rather than the parts. This report enables all to "see" the aggregated resources rather than discrete and separate collections. In addition to the analysis of existing collections, a Continual Update Model has been posited to place the collections on a systematic collection management plan which would assure the addition of new materials and the withdrawal of older, outdated materials.

This report and the individual institutional reports have been provided in order that the staff in Florida community college L/LRC's will have local and comparative data for collection management. This is the first time such data have been made available and analyzed. The reports should be useful in accreditation studies, funding requests, and long range planning activities. As we move into the 21st century the collective resources and services available through LINCC will play an ever-larger role in the local delivery of information and services to the students and faculty in community colleges in Florida.

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