

Secondary Science Education Library Resources for New England's Teacher Education Programs

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This paper describes the results of a survey of libraries serving pre-service and graduate level teacher education programs in New England relative to their general education, and science education holdings.

In general, serious deficiencies are found to exist at both pre-service and graduate student programs. The patterns of holdings are described and suggestions and implications for educators and librarians are presented.

INTRODUCTION

During the 1970's, the National Science Foundation (NSF) sponsored three major status studies concerning various aspects of science; Helgeson, Blosser, and Howe [3] conducted a literature search from 1955-75; Stake and Easley [5] collected in-depth case studies at several school systems throughout the nation; and Weiss [7] conducted a comprehensive survey of teachers, school administrators, and curriculum coordinators. These studies found that a large percentage of science classrooms relied more heavily on textbooks, recitations, and teacher-directed activities than on inquiry strategies, and raised concerns about the way preservice teachers were prepared and how they utilized resources.

Boyer [2] described the college library as the central learning resource which is too often neglected. For example, he reported that one-half of all undergraduates spent fewer than two hours per week in the library. He recommended that every undergraduate student should become aware of all resources available on the campus, and he recommended that students spend at least as much time in the library as they spend in class.

PROCEDURES

The purpose of this study was to compare secondary science education library resources of graduate and non-graduate teacher education institutions in New England. A 72-item survey [1] with cover letter and self-addressed stamped envelope was sent to library directors during April, 1985. Two weeks later all non-respondents received a follow-up letter, survey, and self-addressed stamped envelope. There was a 75% return rate from the 56 teacher education institutions in New England that had certified secondary education programs. The majority of the 42 respondents were serving predominantly rural

areas of New England. Of the 42 responding institutions, 19 (45.7%) had graduate education programs.

Prepared programs, FREQUENCY and ONE-WAY, from the *Statistical Package for the Social Sciences* [4] were utilized for data analysis.

RESULTS

Differences were found in library holdings between graduate and non-graduate institutions. For examples, more than 80% of the responding graduate institutions had *Education Index*, *CIE*, *Resources in Education*, *ERIC microfiche*, *Dissertations Abstracts*, and computer search capabilities available, while only *Education Index* and *Resources in Education* were available at more than 75% of the non-graduate institutions. Similarly, more than 60% of the graduate institutions had *Applied Science and Technology Index*, *Biological Abstracts*, *Chemical Abstracts*, and *General Science Index*, while only *General Science Index* was available at more than 60% of the non-graduate institutions.

American Biology Teacher, *Journal of Chemical Education*, *Journal of Research in Science Education*, and *Science Teacher* were the only science education journals available at more than 75% of the graduate institutions. *American Biology Teacher*, *Journal of Chemical Education*, *Physics Teacher*, *Physics Today*, and *Science Teacher* were the only science education journals at 60% of the non-graduate institutions. Similar discrepancies existed for science journals and non-science education journals (Table 1).

Library resources available for preservice secondary science education programs appear to range from inadequate to not available, with the exception of science reference books, at many New England institutions preparing secondary science teachers, both at the graduate and non-graduate levels. Both graduate and non-graduate institutions were severely lacking in science instruction computer software (Table 2).

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TABLE 1
Indexes, Science Education Journals, Science Journals, and Non-Science Education Journals
Available at New England Graduate and Non-Graduate Teacher Education Institutions

	Graduate Program		Non-Graduate Program		No Response	
	n	%	n	%	n	%
Indexes						
Education						
<i>Education Index</i>	17	89.5	22	100.0	1	2.4
<i>CIJE</i>	17	89.5	13	68.4	4	9.6
<i>Resources in Education</i>	16	84.2	17	85.0	3	7.2
<i>ERIC microfiche</i>	17	89.5	6	33.3	5	12.0
<i>Dissertation Abstracts</i>	16	84.2	15	71.4	2	4.8
Computer search capabilities	15	78.9	13	68.4	8	19.2
Science						
<i>Applied Science and Index</i>	16	84.2	11	57.9	4	9.6
<i>Biological Abstracts</i>	15	78.9	11	57.9	4	9.6
<i>Biological and Agriculture Index</i>	11	57.9	8	42.1	4	9.6
<i>Biology Digest</i>	8	42.1	4	21.1	4	9.6
<i>Chemical Abstracts</i>	14	73.7	9	47.4	4	9.6
<i>Environmental Index</i>	9	47.4	5	26.3	4	9.6
<i>General Science Index</i>	13	68.4	15	71.4	2	4.8
<i>Physics Abstracts</i>	10	52.6	6	31.6	4	9.6
Journals						
Science Education						
<i>American Biology Teacher</i>	18	94.7	14	63.6	1	2.4
<i>Current: Journal of Marine Education</i>	3	15.8	1	5.0	3	7.2
<i>Geotimes</i>	10	52.6	6	30.0	3	7.2
<i>Journal of Biological Education</i>	5	26.3	2	10.0	3	7.2
<i>Journal of Chemical Education</i>	17	89.5	18	85.7	2	4.8
<i>Journal of Computers in Math / Science Teaching</i>	8	42.1	1	5.0	3	7.2
<i>Journal of Environmental Education</i>	11	57.9	6	30.0	3	7.2
<i>Journal of Geological Education</i>	10	52.6	6	30.0	3	7.2
<i>Journal of Research in Science Teaching</i>	15	83.3	5	25.5	4	9.6
<i>Physics Teacher</i>	17	89.5	12	60.0	3	7.2
<i>Physics Today</i>	15	78.9	16	80.0	3	7.2
<i>School Science and Math</i>	18	94.7	12	57.1	2	4.8
<i>Science Activities</i>	6	33.3	2	9.5	3	7.2
<i>Science Education</i>	18	94.7	7	35.0	3	7.2
<i>Science Teacher</i>	19	100.0	14	64.7	2	4.8
Science						
<i>American Scientist</i>	16	84.2	13	65.0	3	7.2
<i>Chemical and Engineering News</i>	14	73.7	14	66.7	2	4.8
<i>Discover</i>	11	57.9	7	33.3	2	4.8
<i>Man / Society / Technology</i>	8	42.1	0	0.0	3	7.2
<i>National Geographic</i>	17	89.5	22	100.0	1	2.4
<i>National Wildlife</i>	11	57.9	13	59.1	1	2.4
<i>Omni</i>	5	26.3	9	45.0	3	7.2
<i>Science</i>	18	94.7	21	95.5	1	2.4
<i>Science 85</i>	10	55.6	12	54.5	2	4.8
<i>Science Digest</i>	15	78.9	15	71.4	2	4.8
<i>Science News</i>	18	94.7	18	81.8	1	2.4
<i>Scientific American</i>	18	94.7	22	100.0	1	2.4
<i>Sky and Telescope</i>	17	89.5	15	75.0	3	7.2

TABLE 1—Continued.

	Graduate Program		Non-Graduate Program		No Response	
	n	%	n	%	n	%
<i>Smithsonian</i>	17	89.5	20	90.9	1	2.4
<i>Weatherwise</i>	13	68.4	6	30.0	3	7.2
Non-Science Education						
<i>Clearing House</i>	18	94.7	11	52.4	2	4.8
<i>English Education</i>	8	42.1	2	10.0	3	7.2
<i>Forecast for Home Economics</i>	6	31.6	2	10.0	3	7.2
<i>Health Education</i>	17	89.5	6	30.0	3	7.2
<i>High School Journal</i>	12	63.2	9	45.0	3	7.2
<i>History Teacher</i>	11	57.9	12	54.5	1	2.4
<i>Journal of Business Education</i>	12	63.2	5	23.8	2	4.8
<i>Journal of Counseling and Development</i>	12	63.2	12	54.5	1	2.4
<i>Journal of Industrial Teacher Education</i>	4	21.1	0	0.0	3	7.2
<i>Journal of Learning Disabilities</i>	18	94.7	16	72.7	1	2.4
<i>Journal of Physical Education Recreation and Dance</i>	16	84.2	14	70.0	3	7.2
<i>Journal of Reading</i>	17	89.5	14	63.3	1	2.4
<i>Journal of Research in Reading</i>	17	89.5	14	63.6	1	2.4
<i>Journal of School Health</i>	16	88.9	10	47.6	3	7.2
<i>Journal of Special Education</i>	16	84.2	12	54.5	1	2.4
<i>Language Arts</i>	18	94.7	16	72.7	1	2.4
<i>Library Journal</i>	18	94.7	21	94.4	1	2.4
<i>Mathematics Teacher</i>	18	94.7	19	84.4	1	2.4
<i>Middle School Teacher</i>	0	0.0	0	0.0	3	7.2
<i>Scholastic Coach</i>	15	89.5	15	68.2	1	2.4
<i>Social Education</i>	17	89.5	15	68.2	1	2.4
<i>Social Studies</i>	18	94.7	8	38.1	2	4.8
<i>Today's Education</i>	18	94.7	19	90.5	2	4.8

TABLE 2

Librarians' Perceived Adequacies of Resources at New England's Graduate and Non-Graduate Teacher Education Institutions

	More than Adequate		Adequate		Inadequate		Not Available	
	n	%	n	%	n	%	n	%
Secondary Science Textbooks								
Graduate	3	16.7	5	27.8	4	22.2	6	33.3
Non-Graduate	2	10.0	8	40.0	5	25.0	5	25.0
Resources File on current science topics								
Graduate	1	5.3	6	31.6	5	26.3	7	36.8
Non-Graduate	1	5.3	7	36.8	7	36.8	4	21.1
Science reference books								
Graduate	8	42.1	8	42.1	2	10.5	1	5.3
Non-Graduate	10	47.6	9	42.9	2	9.5	0	0.0
Audio-visual materials for science								
Graduate	2	11.8	4	23.5	9	52.9	2	11.8
Non-Graduate	2	10.5	9	47.4	5	26.3	3	15.8
Computer software for science								
Graduate	0	0.0	2	12.5	4	25.0	10	62.5
Non-Graduate	4	21.1	1	5.3	4	21.1	10	52.6

DISCUSSION

Since there is a lack of published data on science education library resources, it is difficult to determine whether the preservice secondary science resources available to New England's science teachers are typical or atypical.

The lack of science education and non-science education journals could reflect the priority given to education and/or educational research at these responding institutions. Another concern is the implicit low priority given to education and science indexes at many institutions of higher education. Consequently, many graduates are unacquainted with the current resources that could be utilized to improve their teaching skills and update their content information.

Additional studies should be undertaken to determine the quality of graduate education at institutions which fail to provide ERIC microfiche, *Resources in Education*, *Dissertation Abstracts International*, and computer search capabilities. Aren't these resources essential if graduate students and faculty are to be active participants in research? It is unfortunate that only slightly more than half (54%) of the respondents have *Journal of Research in Science Teaching* available to their libraries. About 1/3 of the non-graduate institutions fail to have *The Science Teacher* available for their preservice science teachers. With the renewed interest in science, it is discouraging to note that only about half of the institutions receive *Discover*, *Omni*, or *Science 85*. The wide diversity in responses to the non-science education journals could be due to emphasis on specialization of secondary education at responding institutions. Overall, the availability of specialty journals in science education and other areas of education is low at both graduate and non-graduate institutions. This limitation discourages preservice students from utilizing libraries as resources.

Librarians responding were aware of the need to improve science education holdings at their respective institutions. In response to an open-ended question about their top five priorities, the respondents identified computer software, audio-visual aids and curricular aids as the top three priorities, all potentially facilitating secondary science education (Table 3).

Campus libraries at institutions of higher education are an important resource for students. Since New England is a large geographical area with many regions of low population density there often are limited resources available to K-12 teachers. Area teachers and campus libraries need to cooperate to provide additional resources for science teachers to keep them abreast of new developments. Typically, rural area schools will provide generic inservice training which is frequently perceived as of little value by science teachers [6]. It will take time for science teachers to develop the habit of visiting area campus libraries. Unfortunately, initial negative reactions will not facilitate continued use. If desired journals are unavailable, expanded interlibrary loans can serve to expand resource accessibility at minimal cost. Possibly having accounts with campus libraries would allow teachers easier access.

TABLE 3

Composite Rating of Top Five Concerns for Libraries

<i>Concern</i>	<i>Frequency</i>
Computer software	17
Audiovisual	11
Curricular aids for science	11
Current editions of secondary science textbooks	5
Additional science/science education journals	5
Science curriculum guides	3
Campus-wide resources	2
Computer search capabilities	2
Additional computer terminals	1
Interfacing computers and media	1
Additional science indexes	1
Additional history of science resources	1
Equipment for making transparencies, masters, etc.	1

This study suggests that New England higher education institutions need to improve their holdings of education indexes, science indexes, science education journals, and non-science education journals if they are to adequately meet the needs of preservice and secondary school science teachers. Teacher educators should systematically ascertain the quality of their library's resources. If required resources are lacking, they should be requested, thereby facilitating the preparation of future secondary teachers.

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