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Research on textbook use in the United States of America

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Abstract

The purpose of this article is to review published research literature on the curriculum role and use of textbooks and other materials in American schools. The contents of books, collected works, reports and journal articles were analysed, and summaries of the contents were then organised chronologically to present a commentary on this topic. The results showed that research indicating that teachers are dependent on textbooks has been accepted in educational circles since the beginning of the twentieth century, but the most recent research studies have challenged this assumption by finding that teachers do not use them with fidelity. Published in 1931, the earliest research study identified that whilst secondary school teachers depended on textbooks, the progressive education movement influenced elementary school teachers into using more diversified methods. A series of research studies published in the 1970s identified moderate to low use of materials produced by projects of the curriculum reform movement and, although these materials influenced the design of textbooks, textbooks continued to be the dominant resource used in schools. A large-scale research study published in 1977 supported evidence from earlier studies that teachers depended on textbooks and other materials, but also highlighted that they used relatively few of the materials available in

the marketplace. In the late 1980s, case studies and ethnographic research on small numbers of teachers and students reported that they varied in their patterns of using materials.

Keywords: curriculum research; educational change; textbook content; textbook research; use studies

Introduction

The textbook has played a critical role in defining the curriculum in American schools because of the absence of effective regulation by a curriculum. The symbiotic relationship, which developed between schooling in the USA and the use of textbooks, can be traced back to the historical role textbooks have played in organising the curriculum. Although the first textbooks published in the seventeenth century were similar in format to modern textbooks, their patterns of use were fundamentally different. Before the mid-nineteenth century, teachers worked with individual children with little formal classroom organisation. For example, one student might work with Noah Webster's *A Grammatical Institute of the English Language*, published at Hartford, Connecticut, in 1783, which introduced American content into textbooks for the first time, whilst another student might use a textbook published in England.

The emergence of mass education in the mid-nineteenth century, requiring trained teachers to work with graded classes of students, led to the widespread use of standardised, graded series of texts. This innovation was associated with the use of a series of graded readers, *McGuffey's Eclectic Readers*, in the common schools established at that time. The Cincinnati publishing company, Truman and Smith, published William H. McGuffey's first and second readers in 1836, followed by the third and fourth readers and a primer in 1837. After the initial compilation, McGuffey's brother, Alexander, compiled a fifth reader in 1843 and a sixth reader in 1857. Within a decade, *McGuffey's Eclectic Readers* had penetrated this market, selling at a rate of two million copies each year, and eventually exceeded sales of over 122 million copies before their use declined in the 1920s. Domination of the marketplace by a small number of textbook publishing companies, popular demands for regulating the prices of textbooks, and the advent of state-level adoption procedures in the late nineteenth century led to greater uniformity in the curriculum arising from the widespread use of a small number of textbooks.

By the 1920s and 1930s, the progressive education movement had affected the dominant role established by the publishing industry in shaping the curriculum in American schools by shifting reliance on textbooks to child-centred activities and basing readers on research about vocabulary development. Although the progressive education movement reduced the use of textbooks, a more pervasive change circumscribed the dominance of textbooks in the 1950s. From 1956 to 1976, the National Science Foundation funded committees of prestigious academics to lead a series of national projects to develop new curriculums for science, mathematics and social studies. Known as the curriculum reform movement, these projects altered the content of materials by favouring the formation of concepts, gave greater prominence to academic scholars in developing materials, and introduced stringent procedures for producing new materials. They employed a typical process for curriculum development characterised by teams of academic scholars mounting ambitious efforts to develop and field-test new materials designed to accomplish the desired goals of the projects, and then disseminating them through workshops providing in-service training for teachers. The materials they developed possessed some common features; few included a basic textbook, but instead used slides, film strips, records, cassettes, films, games, simulations, copies of original documents and primary sources. In spite of the early successes of many of these projects, evidence of low use of the materials they produced emerged in schools. This failure can be attributed to policymakers neglecting to take account of prevailing patterns for disseminating materials, the difficulty of the materials' subject matter and their emphasis on inquiry, and ambivalent attitudes about involving the textbook publishing industry in producing them.

In the 1970s and 1980s, the dominant material used in classrooms continued to be conventional textbooks. However, gradual changes in teaching approaches away from large-group, teacher-centred lectures to small group and individualised forms of instruction led to a greater variety of media being used in classrooms. Textbooks grew in size and aesthetic appeal, but also appeared packaged with ancillary components, such as teacher's guides, workbooks, tests, supplementary materials, and audiovisual and manipulable materials. National reports on American education, published during the excellence debate, gave prominence to the findings of research studies showing how the content of textbooks in various subject areas had changed over time, and their quality had diminished. Prompting policymakers to realise that materials form an important element in any attempt to improve the quality

of education, the excellence debate led to a series of national initiatives to improve the quality of textbooks. However, these initiatives faltered in the 1990s, when the federal government shifted away from this issue as a priority to promote standards-based reform instead. Although the advent of standards-based education has not reinstated this initiative as a central issue of educational policy, standards-based reforms have encouraged state-level adoption states, in particular, to align textbooks to state standards.

Woodward et al. interpreted recent research into the curriculum role and use of textbooks in American schools to be a response to the two main dimensions of the excellence debate. They related the first, initiatives to increase the level of student achievement, to the dependence of students on textbooks, and the second, initiatives to strengthen professional control, to the reliance of teachers on textbooks. Furthermore, Woodward and Elliott (1990) argued that the heavy use and, in many cases, dependence of teachers on textbooks was a central issue in professional practice. The findings of other research, however, have challenged the assumption that teachers follow the curriculum presented in textbooks, teacher's guides and other materials with an unquestioning acceptance. It asserts that variations in the use of materials occur across subject areas, and through personal choices about the content of materials and their use. Consequently, Sosniak and Stodolsky (1993) defined two waves of recent research on the use of textbooks, the first assuming the direct influence of textbooks and other materials on teaching and learning without demonstrating it, and the second emphasising that teachers do not use them with fidelity.

The purpose of this article is to review published research literature on the curriculum role and use of textbooks in American schools. Acknowledging the conclusions of commentators about the nature of the research literature on the curriculum role and use of textbooks, the following reviews cover two main aspects. First, the view that many teachers and students are dependent on textbooks is analysed by reviewing research studies on the use of materials published from the beginning of the twentieth century until the late 1980s. Second, the view that teachers do not use textbooks with fidelity is analysed by reviewing research studies published in the 1990s, emphasising the differential use of materials by teachers and students.

Methodology

The first step in identifying research literature on the curriculum role and use of textbooks in the USA was to consult the bibliography published by Woodward et al. (1988), which provided an annotated list of references. Although major contributions were made to research in studies reported by the National Society for the Study of Education in 1931 and the Educational Products Information Exchange Institute in 1977, other research showing dependence on the use of textbooks was restricted to specific subject areas. Another group of research studies, reported in the 1970s, investigated the use of materials produced by projects of the curriculum reform movement, most focusing on the social studies. These studies were concerned with the use of a wide range of materials in various media, but they also examined how these materials influenced textbooks and why textbooks eventually replaced them. In view of the definition by Sosniak and Stodolsky (1993) of two waves of recent research, the search for additional research literature was extended to another area. Reported in the late 1980s and early 1990s, this group of studies investigated the patterns of textbook use by small numbers of teachers in several subject areas or within a single subject area, showing that there were variances in textbook use between teachers and subject areas.

Information obtained from citations identified from these searches, covered books, collected works, reports, and journal articles. Content analysis method was applied to analyse these documents. Once copies of available documents were obtained from library collections, they were read and summaries prepared. These summaries were then organised chronologically, and incorporated into the following commentary. This commentary, which analyses the most significant literature published on this topic since the early 1930s, treats the two key interpretations of the curriculum role and use of textbooks defined by Sosniak and Stodolsky (1993).

Results

Teacher dependence

Published research studies indicate that the dependence of teachers and students on textbooks has been accepted in educational circles since the beginning of the twentieth century. From an analysis of 12 reported studies of school systems across the USA published between 1898 and 1929, Bagley (1931) found that the earlier studies attributed teachers' dependence on

textbooks to practices of rigid state-level textbook adoption. Reflecting the influence of the progressive education movement, later studies held that the poor quality of teaching was responsible for such dependence. In the same article, Bagley reported a survey, conducted for the National Society for the Study of Education, in which field researchers based in 29 states and the District of Columbia used a checklist to report on different teaching methods used in 539 classrooms. It was found from the use of 20 designated methods that 13.1 percent of 1,014 instances in which these methods were used, involved 'recitation largely reproduction of assignment from a single textbook'. Further analysis showed that the highest use of this method was found in 24.4 percent of instances reported in village high schools and in 18.7 percent of instances reported in city high schools. The frequency of use of this method decreased from 27.3 percent of instances reported for beginning teachers to 11.7 percent of instances reported for teachers with five or more years' experience. When the subjects were asked to judge the degree to which textbooks influenced their method of teaching, beginning teachers reported textbooks influenced them largely or wholly in 55.4 percent of instances. However, teachers with five or more years' experience reported textbooks influenced them largely or wholly in only 34.9 percent of instances. The frequency of use of this method decreased with the increasing extent of teachers' training, although four-year trained college graduates used this method in 17.5 percent of instances, a higher rate than for two- or three-year trained graduates of normal schools and teachers' colleges.

When the subjects were asked to judge the degree to which textbooks influenced their method of teaching, there appeared to be little difference between these two groups. Four-year trained college graduates reported textbooks influenced them largely or wholly in 38.5 percent of instances, whilst two- and three-year trained graduates of normal schools and teachers' colleges reported textbooks influenced them largely or wholly in 39.9 percent of instances. It was also found that dependence on a single textbook was prevalent in all regions of the USA, except for New England and the Pacific Coast states. Bagley concluded that contrary to prevailing views among educationalists that teachers in public schools relied on textbooks, the evidence showed that whilst this was true for high school teachers, it was untrue for elementary school teachers. In elementary schools, teachers used 'socialised recitation and projects' more frequently than a 'formal textbook' method, suggesting that the progressive education movement was a profound influence.

Evidence of the impact of materials produced by projects of the curriculum reform movement emerged from three studies sponsored by the National Science Foundation. In the first study, Weiss (1978) reported the results of a survey of a sample of 11,103 subjects consisting of sub-samples of superintendents, supervisors, principals and teachers. Responses to the survey, received from 79 percent of the sample, referred to nine topics: state and local supervision; course offerings; federally funded curriculum development efforts; textbook use; teaching and learning activities; facilities and equipment; teachers' needs for assistance; information sources; and factors affecting science. Information sources, dissemination, availability and use of materials were covered under federally funded curriculum development efforts. The status of the respondents appeared to be an important factor in determining the sources of information with supervisors indicating preference for external sources, although teachers' main sources were other teachers. Only 14 percent of the states had disseminated information on more than half of the mathematics materials, 36 percent of states had disseminated information on more than half of the social studies materials, and 64 percent of states had disseminated information on more than half of the science materials. The extent of dissemination of information was reflected in respondents' knowledge about the availability of materials with 22 percent being unaware of any science materials, 34 percent being unaware of any mathematics materials, and 38 percent being unaware of any social studies materials. Use of the materials, reported in 1,177 schools, indicated that 40 percent of the schools used federally funded science materials, 18 percent used federally funded mathematics materials, and 17 percent used federally funded social studies materials. From a sample of 4,829 teachers, it was found that 33 percent of science teachers used federally funded materials, 17 percent of social studies teachers used federally funded materials, and 12 percent of mathematics teachers used federally funded materials. Data were also collected from the same respondents about the use of textbooks and ancillary components. It was found that 47 percent used a single social studies textbook, 49 percent used a single science textbook, and 63 percent used a single mathematics textbook. The proportion using multiple textbooks was similar across subject areas, ranging from 32 percent for mathematics, 33 percent for science and 36 percent for social studies. It was reported that 65 percent of mathematics teachers, 54 percent of science teachers and 50 percent of social studies teachers used ancillary components. On the question of preferences, 63 percent of mathematics teachers preferred their current mathematics textbook, 53 percent of science teachers preferred their current

science textbook and 52 percent of social studies teachers preferred their current social studies textbook.

The second study reviewed reports on the use of materials conducted over a twenty-year period from 1955 to 1975 for three subjects. Reporting on studies conducted in science, Helgeson et al. (1977) concluded that the overwhelming majority of teachers in elementary schools based science teaching on a single textbook. This pattern changed in the early 1970s, when the studies showed that approximately 30 percent of students in elementary schools used multimedia materials produced by the curriculum reform projects. During the 1970s, some commercial publishers produced materials, which incorporated physical features of these multimedia materials, and the ideas of Piaget, Gagne and Bruner. The philosophy presented in these materials stressed concepts, processes of science, attitudes towards the sciences and laboratory activities, and greater emphasis was placed on issues of conservation and pollution. However, there was growing concern on the part of some teachers and citizens that knowledge objectives were neglected in these materials. Few data were reported on how the new materials affected the quality of teaching and learning. A similar pattern of heavy use of textbooks prevailed at the secondary level in the 1950s. Materials developed by curriculum reform projects for the secondary level emphasised the concepts and processes of science, but reduced the importance of practical science. Research studies reported limited use of multimedia materials developed by the major curriculum reform projects in science. Approximately 40 percent of students used the Biological Sciences Curriculum Study materials, approximately 30 percent of students used the Chemical Education Material Study materials, and approximately 35 percent of students used the Physical Science Study Committee's materials.

Reporting on studies conducted in mathematics, Suydam and Osborne (1977) concluded that textbooks were the primary determinant of mathematics curricula with a single textbook being used in most classrooms. Whilst variance in topic, approach and design appeared across textbooks for the elementary level, the basic components of the curriculum represented in these textbooks had been standardised. Greater variance occurred at the secondary level, where content was determined by various courses. Whilst programmed instruction featured during the late 1950s and early 1960s, it was rarely discussed in later research studies. Throughout this period, manipulative materials were most frequently used in the primary grades, although such materials appeared to be effective for certain content with all

students of all ages. Computers were used more widely in mathematics classes than in other subjects, but there was a slight decline in their use between 1969 and 1974. The problem-solving mode was widely used, followed by simulation and computer-aided instruction. During the 1970s, calculators became an important feature for computation in mathematics classes, but research into their impact was needed.

Reporting on studies conducted in the social studies, Wiley and Race (1977) concluded from content analysis of materials that very little in the way of trends could be determined across 11 topics. Almost without exception, analysts concluded that there were inadequacies in the treatment of these topics in materials for the social studies. On the other hand, the effectiveness and efficacy of materials for the social studies had not been examined extensively in research studies, except for programmed and audiovisual materials. Although a considerable number of studies on materials, produced by the 'new social studies' projects, were identified, summary and interpretation of these studies had not been attempted. It was determined from anecdotal evidence, however, that the 'new social studies' movement had had an impact on publishers of commercially developed materials, who had incorporated features derived from 'new social studies' materials into their new products. Several studies of 'new social studies' materials reported that the extent of awareness of these materials was fairly high, generally over 50 percent of subjects, but that the extent of their use was somewhat lower, generally less than 50 percent of subjects.

In the third study, Stake and Easley (1978a) reported case studies involving classroom observations in 11 school districts. Stake and Easley (1978b) outlined that the methodology used in these studies involved the three phases of case studies, site visits and surveys. The methodology involved selecting a nationwide quota sample of ten school districts. Between September 1976 and May 1977, each school district was observed by a site observer for factors affecting the science curriculum, and the attitudes held by teachers and students about science in order to determine the status of teaching and learning in science. An eleventh school district was added to the sample to study science education during a crisis involving school closures as a consequence of a heating fuel shortage in the late winter of 1977. Between November 1976 and May 1977, the case study reports were verified by site visits conducted by teams, each consisting of four to six members, at the close of the case study phase. Between August and November of 1977, a nationwide survey was conducted by administering 66 forms of a

questionnaire to eight stratified random sub-samples to provide additional interpretations and information about the extent to which the case study data could be generalised. By interpreting the results derived from an overall response rate of approximately 60 percent, a key finding was identified for each of eight scenarios. Budget cuts had no adverse effect on science programs. Uniformity in the curriculum inhibited the flexibility of educational programs. Greater emphasis was placed on basic skills. Special assistance was required for diagnostic teaching. Socialisation of students was an important aspect of teaching. There was a lack of agreement about the availability of appropriate in-service training and support personnel. Federal funds should be used to develop materials covering controversial topics. Science programs were perceived not to be difficult. The findings of the case studies were discussed under six topics: the aims of science education; the curriculum; pluralism and uniformity; student learning; the teacher in the classroom; and the school and community. It was found that the curriculum for science, mathematics and social studies was dominated by the use of textbooks in each of the 11 school districts. In science, only a few teachers used materials developed by the curriculum reform projects, although teachers considered many textbooks to be inappropriate. In social studies, the use of materials and resource centres varied considerably between the sites. In mathematics, textbooks dominated with little evidence that materials developed by the curriculum reform projects had had an impact in most classrooms.

Three large-scale studies investigated the dissemination, adoption and use of materials produced by the 'new social studies' movement. Hahn (1977) investigated two issues related to the adoption of 22 'new social studies' materials. First, the extent to which the selectors of these materials were familiar with them. Second, whether selectors' perceptions of materials' characteristics in terms of relative advantage over other materials, compatibility with past and present experiences, capability for trial on a small scale, observability by others, and complexity of understanding and use were related to their adoptions of these materials. From surveying selectors of social studies materials in 911 schools in Indiana, Ohio, Florida and Georgia, Hahn found that 55 percent of 495 respondents were familiar with one or more of the materials. The materials most frequently identified by this group were those first published, or those listed on state-adopted lists. The relationship between the respondents' perceptions of these materials and their willingness to adopt them was found to be inconsistent for the five characteristics. A

strong positive correlation was measured for relative advantage over other materials. Capability for trial on a small scale and observability by others produced weak positive correlations. No correlation was measured for compatibility with past and present experiences. A weak negative correlation was measured for complexity of understanding and use. Correlation between selectors' willingness to adopt 'new social studies' materials and actual adoptions was only strongly positive for respondents from Ohio, the only state among the four states limiting adoption to the local level. Hahn concluded that demographic characteristics reflected in differences in familiarity between respondents in urban and rural settings, the presence or absence of state-level adoption policies, and the need for developers to inform selectors about the characteristics of 'new social studies' materials were important factors.

Switzer et al. (1977) investigated the extent to which 252 secondary social studies teachers, who responded to a questionnaire surveying a stratified random sample of 100 schools in Indiana, Wisconsin, Michigan, Illinois and Ohio, were familiar with the materials developed by ten 'new social studies' projects. It was found that the teachers' awareness of a particular project's materials was related to the relevance of their contents to the subject areas they taught, and the range of subject areas they covered. The most important sources of information about the materials were both formal sources, such as professional development resources, and informal sources, such as friends and colleagues. Teachers, who failed to examine a particular project's materials after learning about them, were motivated by the perceived lack of relevance of the materials for their subject area. Similarly, the patterns of use indicated further attrition in the numbers of respondents from those examining projects' materials with 49.6 percent indicating they used none. The patterns of use across the ten projects, which varied from 20.2 percent to 1.2 percent of the respondents, were low. Furthermore, 71 percent of the respondents reported having received no training in the use of the materials from any of the ten projects. Statistical analysis of these patterns against demographic characteristics of the respondents indicated significant relationships for two variables. First, members of the National Council for the Social Studies were more likely to have heard of the materials than were non-members. Second, social studies department chairpersons were more likely to have heard of the materials than were classroom teachers.

Turner and Haley (1977) investigated the extent to which 980 secondary social studies teachers, who responded to a questionnaire surveying a quota sample of 600 schools in California, Colorado, Connecticut and Texas, used

nine 'new social studies' materials. It was found that 41.6 percent of the teachers used one or more of the materials with their use being substantially lower in Texas at 26 percent, since only one of the materials was listed on the state-adopted list. The use of appropriate materials by teachers of particular social studies disciplines ranged from 41 percent to 9 percent. Analyses of these patterns against demographic characteristics of the respondents' memberships of subject associations, professional status, permanency of contract, geographic location and size of school were statistically significant, whilst relationships with respondents' ages and teaching experience were not statistically significant. The perceptions of respondents about the effectiveness of each material, judged across the three dimensions of how well each material worked with students, how well each compared with other social studies materials and the degree to which each was recommended by other teachers, failed to indicate substantial differences in preferences.

Several small-scale studies identified that materials produced by the 'new social studies' movement influenced the design of textbooks, but concluded that the publishing industry reasserted the dominance of traditional patterns of textbook use after the demise of the 'new social studies' movement. Fetsko (1979) analysed United States and world history textbooks to compare the contents of those published from 1955 to 1961, before the advent of the 'new social studies' movement, with those published from 1970 to 1977, after its peak. Judging the texts against 14 criteria accepted as characteristic of the 'new social studies' movement, it was found that 51 percent of the textbooks published in the 1970s met these criteria as opposed to only 6 percent of the textbooks published in the 1950s. Schneider and Van Sickle (1979) reported the results of a survey of 36 publishers of social studies textbooks on their perceptions about current trends in the social studies. The results from the responses of 27 publishers focused on five key findings: textbooks dominated the marketplace textbooks emphasised traditional topics; there was less demand for broadening and humanising the social studies; some frequently advocated content and teaching and learning approaches appeared to be of limited importance in the marketplace; and criticisms of textbooks frequently received widespread publicity. From publishers' views that the social studies were a stable field, Schneider and Van Sickle concluded that there had been retrenchment to more traditional patterns from the reforms brought about by the 'new social studies' movement. Marker (1980) surveyed the staffs of seven schools to determine why the use of three inquiry-oriented textbooks was discontinued. It was found that unrealistic expectations about student

interest and involvement, the departure of an advocate, and the manner of use differing from that intended by the developers were the main factors leading to discontinuance. Agostino and Barone (1985) analysed the content of selected social studies textbooks published in the late 1980s and early 1990s with those published a decade earlier, finding that few of the 'new social studies' innovations of earlier textbooks were found in the later group of textbooks.

At the close of the curriculum reform movement, a nationwide study of the materials most frequently used by teachers and learners, known as the National Survey and Assessment of Instructional Materials, was funded by the Lilly Endowment and conducted by the Educational Products Information Exchange Institute. The principals of a nationwide stratified, weighted sample of 24,381 schools, contacted in August 1974, provided a sample of teachers for further study. Questionnaires mailed during 1974 and 1975 to 39,613 teachers of mathematics, reading, science and social studies yielded responses from 12,389 subjects. Site visits were made to 56 schools in 24 school districts across 13 states in 1975 to interview principals, teachers and students, and to observe the use of materials in classrooms. The Educational Products Information Exchange Institute (1977) reported that the results of this study indicated from responses to the survey, analyses of inventories of materials, and data collected from site visits that from 25 to 30 percent of available materials were used extensively. The proportion of time spent by respondents averaged 63 percent of class time for print materials and 33 percent of class time for non-print materials. The instructional designs of the majority of the most frequently used materials in all four subjects were traditional, although innovative materials were more commonly found in the social studies. Of 9,894 responding teachers, who had received a follow-up questionnaire, 85 percent of the 894 respondents perceived that the materials they most frequently used met the needs of specific learning environments. An analysis of the data from all responding teachers indicated that there was a strong positive correlation between teachers' experience and their perception of students' performance with materials, but a weak positive correlation between teachers' willingness to use particular materials and their perception of students' performance with those materials. In comparing data between teachers who indicated they took part in selecting the materials they used and teachers who played no role in selection, no correlation was found between student learning and teacher participation in the selection process. The overwhelming majority of the 894 respondents to the follow-up

questionnaire reported being aware of the values' systems inherent in the materials they most frequently used. In spite of the conclusive finding of the study showing that a small number of most frequently used materials dominated the marketplace, it was not possible to estimate the proportion of students across the USA using these materials. Compiled by 471 responding teachers, a list of 84 most frequently used materials, which was presented to the other 11,918 respondents, confirmed that 70 of these materials were frequently used.

The Educational Products Information Exchange Institute extended the National Survey and Assessment of Instructional Materials with further research in three areas. A small-scale pilot study, in which 86 teachers reported their assessments of the current material they used and the material it replaced, indicated different assessments for the two materials. This finding led the Educational Products Information Exchange Institute to propose initiating a large-scale study to investigate the variables affecting why teachers valued particular materials and how they discriminated between different materials. The results of another pilot study in one school district indicated that teachers who had been involved in trialling a new material or adopting this material differed in their use and judgments about its effectiveness from teachers who had not been involved in trialling or adopting the material. In January 1976, the Educational Products Information Exchange Institute selected nine school districts to form the nucleus of a national network of 40 to 50 school districts interested in exchanging information on materials. At a second meeting, the participants agreed to use an instrument to evaluate reading materials most used in the network's schools and to measure students' achievement using different materials. The second initiative involved developing a program to train members of local selection committees and teachers to select materials that better matched the learning needs of students. The program aimed at diagnosing teachers' levels of skills in making effective matches, increasing teachers' skills in using product information and analysing materials to meet students' needs, and gathering feedback from students about the effectiveness of materials. In 1980, the Educational Products Information Exchange Institute began the two-year Teacher Information Exchange Project in a dozen elementary and junior high schools in New York City. Its staff worked with teachers through observations, consultations, workshops and meetings to identify issues related to using materials in classrooms. The teachers were provided with in-service training through a set of ten modules developed during the course of

the project, showing how materials could be used more effectively. The third initiative involved extending the research undertaken in the National Survey and Assessment of Instructional Materials. Studies would be conducted into the feasibility of developing appropriate readability estimates, the degree to which materials were mismatched to students' needs, the match between materials and tests, and the influence of the physical design of materials on their match to students' needs.

In a second study funded from 1978 to 1980 by the National Institute of Education, the Educational Products Information Exchange Institute investigated the lack of match between groups of students and the textbooks they used. The study applied a pre-test post-test design to determine what groups of about 300 grades 4 to 10 students from affluent and poor socioeconomic communities in six school districts on Long Island, New York, knew before and after using their textbooks. The Educational Products Information Exchange Institute (1980) reported consistent findings across the two groups, showing that students' achievement gained little from using textbooks. In affluent communities, 60 percent of the students scored 80 percent or higher on a test of the content of their textbooks before they used them, but by the end of the school year they knew the same or slightly more content. In poorer communities, 87 percent of the students scored 38 percent or less on a test of the content of their textbooks before they used them, and 38 percent or less after they used them. These findings suggested that there was a gross mismatch between textbooks and students, which could be addressed by knowing more about what students were taught in the previous year and textbook content, and drawing on a greater range of textbooks to meet student needs. The National Commission on Excellence in Education (1983) cited the findings of this study to support a conclusion highlighted in its report that many textbooks do not challenge students. The Educational Products Information Exchange Institute (1983) argued that this conclusion was based on a misinterpretation of the results of the study to justify a recommendation that textbooks should be upgraded and updated to assure more rigorous content.

The excellence debate produced a single study, which examined the use of materials in schools. From a Study of Schooling, an eight-year project conducted in a representative sample of 38 schools in 13 communities across seven states, Goodlad (1983) found that a wide range of materials was used in English language arts and social studies programs. Teachers in all of the schools and in all grade levels used various materials for teaching English

language arts, including an abundance of graded series at the elementary level and literary texts at the secondary level. A wide range of textbooks and other materials were used in all grade levels in social studies, but few textbook titles were repeated across all of the schools. On the other hand, textbooks dominated mathematics, science, foreign languages, and vocational and career education programs. Materials were not used extensively in only the arts and physical education programs.

Several researchers, reporting on the use of materials in particular subject areas, also identified patterns of dependence. Gross (1952) reported from surveying 100 teachers of American history that 79 percent followed a single textbook closely, and 78 percent had used the same textbook for a decade. Barton and Wilder (1964) reported a study on the sociology of reading conducted by Columbia University in the early 1960s, in which 964 reading experts, 141 elementary school principals, 1,580 elementary school teachers, and a nationwide sample from the general public were interviewed. Classroom observations showed that 98 percent of grade 1 teachers and 92 percent of grades 2 and 3 teachers used basal readers on 'all or most days of the year'. Constituted into two groups of teachers, one from a nationwide random sample of schools and the other from a sample of schools chosen as representing high-quality educational practice, 62 percent of the former and 67 percent of the latter indicated that basal readers were absolutely essential for teaching reading. However, only 40 percent of the principals and 28 percent of the reading experts considered they were absolutely essential. From an analysis of articles on reading research appearing in *Language Arts* and its predecessors, *Elementary English* and *The Elementary English Review*, between 1924 and 1982, Shannon (1982a) found that three themes vied for predominance in research literature published through this period. Analysis of the content of reading materials predominated in the earlier decades, but gave way in importance to arguments concerning appropriate teaching methods and teachers' use of reading materials in later decades. Shannon found that many authors recognised teachers' dependence on reading materials, but avoided investigating why teachers were dependent on them. Therefore, he concluded authors recommended changes to teachers' behaviour without analysing possible causes for their dependence. Shannon (1982b) surveyed 539 classroom teachers, 26 reading teachers and 26 administrators in a Mid-western school district by a questionnaire and interviewed a sub-sample to identify their perceptions about the role of reading materials. From 82 percent of the sample, who responded to the survey, he

found that the latter group believed in the authority of the content of reading materials, whilst the former group relied on them, because of perceived demands by administrators. In testing a model to explain factors contributing to teachers' reliance on reading materials, Shannon (1983) surveyed 539 classroom teachers, 26 reading teachers and 26 administrators in a Mid-western school district. The results showed that the reading program was organised and functioned according to the tenets of formal rationality, was based on the application of reading materials, and this combination forced the alienation of teachers from reading instruction. Formal rationality in the reading program was exemplified in a hierarchy of authority, planning and implementation of the program where separated, standard procedures were used, and monitoring of results was applied. Statistical analysis of the data indicated that the perceptions of administrators, reading teachers and classroom teachers about the scientific validity of reading materials decreased across these groups, causing teachers to rely on these materials because of the perceived demands of administrators and their belief that the materials could teach reading. Although the organisation of the reading program and the reliance on reading materials alienated teachers from reading instruction, evidence from the study failed to confirm that teachers were alienated subjectively. Shannon concluded that the relationship between formal rationality of the reading program and the reliance on reading materials was not causal, but that the two factors reinforced each other, and teachers' alienation did not contribute significantly to this interrelationship. Shannon (1987) argued from an examination of the role of reading materials that reading experts have encouraged the use of reading materials as a way of incorporating scientifically valid procedures and business principles into classroom instruction. The results of four studies were considered to determine the effects of these principles. The findings suggested that the organisation of reading instruction around materials reduced teachers' and students' roles in reading instruction. LaPointe (1986) interpreted data provided by the sample of teachers participating in the 1983-1984 National Assessment of Educational Progress assessments of reading and writing in grade 4. It was found that 95 percent of reading teachers used textbooks almost every day, 90 percent were satisfied with these materials, and 87 percent used tests that accompany their textbooks. From surveying 339 reading teachers, Turner (1988) reported that 85 percent used basal readers and 56 percent of school districts represented by the teacher sample required the readers to be followed strictly.

Teacher independence

Case study and ethnographic research, conducted since the late 1970s, has challenged the assumption that teachers show a uniform pattern in using materials across different subject areas. Stodolsky (1989) argued that the three aspects of topics, actual subject matter contained on the pages in textbooks, and activities in teacher's guides should be considered in analysing textbook use. Researchers have found evidence that textbooks influence teachers' choices of topics covered in lessons, teachers adhere to the actual subject matter contained on the pages of textbooks in reading but not in mathematics, and teachers do not consistently follow suggestions offered in teacher's guides when selecting passages in readers. From observing two groups of grade 5 teachers from 11 school districts in the Chicago area, Stodolsky reported that their preferences, the nature of the materials they used, the context in which they taught, the particular students in their classes, and the subject matter influenced the ways they used materials. One group of six teachers varied considerably in their use of mathematics textbooks, adhering to textbook topics but departing from activities in the textbooks, whilst another group of six teachers covered the topics sequentially as presented in social studies textbooks, but introduced distinct and unrelated topics. Stodolsky concluded that mathematics and social studies teachers behaved differently in their use of materials. For mathematics teachers, textbook content represented the maximal content coverage, but social studies teachers usually supplemented textbooks with other materials.

From interviewing 44 secondary school students about their learning experiences in mathematics, English and history, Sosniak and Perlman (1990) reported that teaching and learning were dominated by the use of textbooks, although they were used in different ways for different subject areas. They concluded that the variance across subject areas was a consequence of publishers' and teachers' views of teaching and learning in different subject areas. From observing nine grade 4 teachers using textbooks in science and social studies, Armbruster et al. (1991) reported that students read more text in social studies than in science. However, few of the teachers' questions were derived from the text, and few questions related directly to the text being read by students. Sosniak and Stodolsky (1993) reported from observing the use of materials by four grade 4 teachers that each teacher used a range of materials in distinctive ways across reading, mathematics and social studies. Patterns of use and thinking about materials were inconsistent across subjects even for a single teacher, materials were valued by teachers

because of their appeal to students, inclusion of valuable content and time-saving aspects, and the conditions of teachers' work influenced their selection and use of materials.

Several researchers reporting on the use of materials in particular subject areas confirmed this pattern. In mathematics, the findings of studies suggest that teachers use different sections in textbooks selectively. Schmidt et al. (1987) interviewed 18 elementary teachers from one school district in Michigan about the influence of nine variables affecting the content of mathematics programs, finding that decision-making assumed four patterns. Six teachers followed only the content defined in textbooks. Six teachers were influenced predominantly by the content of textbooks, but were also influenced by student ability. Three teachers were influenced mainly by district objectives and used a range of materials extensively. Three teachers were influenced mainly by past experiences and personal conceptions of mathematics. Barr (1988) reported through observations and interviews of nine grade 4 teachers from three school districts in the Chicago area on their use of mathematics textbooks. Four teachers followed the content in mathematics textbooks from chapter to chapter, spending a high proportion of time in review activities. Three teachers followed the text sequence closely, altering sequence to combine chapters with similar topics. However, the other two teachers used textbooks flexibly by omitting lessons, reordering chapters and using supplementary materials, thereby spending a higher proportion of time on new subject matter. Freeman and Porter (1989) investigated the styles of textbook use and examined the overlap between content taught and textbook content in mathematics. During the 1979-1980 school year, four grade 4 teachers from three school districts in Michigan kept daily logs of their teaching activities, which were classified along with textbook content and student performances by trained raters. The results showed that each teacher used the adopted textbook differently. One followed it closely, one used it as a resource to focus on basic skills, one used it as a resource to teach basic skills to high and low achieving students, and one used assignments from it to teach minimum competency objectives to high and low achieving students. Analysis of the data supported four key conclusions. Different styles of textbook use led to variances in the teaching of concepts, skills and applications of mathematics. There was a direct relationship between topic emphasis in the textbook and topic emphasis in instruction. In classrooms, in which different content was presented to low- and high-achieving students, low-achieving students spent a higher proportion of time on topics

emphasised in the textbook than did high-achieving students. Differences between teachers in the strength of relationships between topic emphasis in textbooks and topic emphasis in instruction paralleled differences in levels of textbook dependence among teachers.

In reading, the findings suggested a close adherence to text material in that basal reading passages appeared to be used in sequence and generally without omissions. Barr and Sadow (1989) reported through observations and interviews of seven grade 4 teachers from two school districts in the Chicago area on their use of reading materials. The teachers covered topics more consistently in a traditionally designed reading material, but omitted many topics from a more complex material, whilst differing in their reliance on recommendations presented in teacher's guides provided for the materials.

Conclusion

Research studies conducted on the curriculum role of textbooks in American schools have stressed that their use by teachers and students has been one of dependence. Providing the only study conducted at a time when the progressive education movement held sway in American education, Bagley (1931) found that the principles of progressive education had reduced the use of textbooks in elementary schools, where teachers used 'socialised recitation and projects' more frequently than 'formal textbook' method. On the other hand, clear evidence was found that 'formal textbook' method prevailed in secondary schools, being more strongly associated with teachers' lack of training and experience. Other evidence to support the continuation of this pattern throughout the first half of the twentieth century is lacking. Only the small-scale study reported by Gross (1952), confined to a survey of history teachers' use of textbooks in California, confirmed teachers' dependence on textbooks.

Three research studies sponsored by the National Science Foundation to investigate the impact of materials produced by projects of the curriculum reform movement found that textbooks continued to be the dominant resource used in schools. The results of the large-scale survey, reported by Weiss (1977), found that the use in schools of science materials produced by curriculum reform projects was moderate, but the use in schools of mathematics and social studies materials was low. The results also showed that use of textbooks continued to be important in science education, but the dominant resource in mathematics and social studies. These findings were

supported by the synthesis of research studies reported by Helgeson et al. (1977) for science and Suydam and Osborne (1977) for mathematics, and the content analysis of materials reported by Wiley and Race (1977) for social studies. The results of these studies indicated that materials produced by curriculum reform projects in science were used to a moderate extent, but textbooks continued to be used extensively in mathematics. Three research studies sponsored by the Social Science Education Consortium to investigate the dissemination, adoption and use of materials produced by the 'new social studies' movement identified a pattern of attrition between these stages. Hahn (1977) found that selectors' awareness of particular materials was moderate, but the relationship between their perceptions of materials' characteristics and their willingness to adopt them was inconsistent. Switzer et al. (1977) found that teachers' awareness of particular materials was related to their relevance, but patterns of use showed attrition from the level of awareness. Turner and Haley (1977) found that a substantial minority of teachers used the materials. Several small-scale studies identified that materials produced by the 'new social studies' movement influenced the design of textbooks, but textbooks reasserted their dominance in schools after the demise of this movement.

The National Survey and Assessment of Instructional Materials reported by the Educational Products Information Exchange Institute (1977) supported the evidence found from earlier studies that teachers depended on textbooks, but also highlighted that they used relatively few of the materials available in the marketplace. The widespread use of a small number of materials was also associated with their use for a high proportion of time in classrooms. Although the instructional designs of most frequently used materials were traditional, a high proportion of teachers expressed satisfaction that such materials met students' needs. Analysis of the data collected from the study showed that teachers' experience was a significant factor affecting students' performances with materials, but teachers' willingness to use materials or their participation in their selection were not significant factors. The National Survey and Assessment of Instructional Materials led the Educational Products Information Exchange Institute (1980) to report further research into what students knew before and after using textbooks to determine how well their textbooks were matched to their learning needs. The results of this study showed that students from different socioeconomic groups achieved little from using textbooks, suggesting that there was a mismatch between the textbooks and students' learning needs.

Beginning in the late 1980s, case study and ethnographic research reported that small numbers of teachers and students varied in their patterns of using materials. Some studies found that teachers used materials differently across subject areas, but other studies found that individual teachers used the same materials differently or different materials in certain ways within a particular subject area. The findings of these studies suggested that teachers make personal decisions about which parts of the text they use, how they use particular textbooks, and when to supplement them with other resources.

Such conclusions challenge the generalisation that teachers and students use textbooks uniformly without necessarily undermining the finding from earlier research, which held a substantial number of teachers use a relatively small number of the available materials for a high proportion of classroom time. Notwithstanding variations in use depending on subject area, grade level or teacher experience, research findings have reported consistently that textbooks have played a central role in classrooms of American schools. On the other hand, the evidence from these studies has shown that the influence of the progressive education movement of the early decades and the curriculum reform movement of the middle decades of the twentieth century curtailed the dominance of textbooks briefly. However, textbooks soon regained their central role after the influence of these movements had waned. Further research, however, needs to be undertaken into the extent to which standards-based education is affecting the curriculum role of textbooks in classrooms of American schools, particularly with reference to the dependence or independence of teachers.

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