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ABSTRACT

Three types of homework assignments are common in U.S. schools: practice, preparation, and extension. Reasons cited for assigning homework are: (1) Doing homework is useful as an act of intellectual discipline; (2) Homework eases time constraints on the amount of curricular material that can be covered; (3) Homework fosters student initiative, independence, and responsibility; (4) Homework supplements and reinforces work done in school; and (5) Homework brings home and school closer together. Research into the effectiveness of homework is inconclusive. Nevertheless, homework serves as a vital link between home and school. It is essential that classroom teachers make every effort to ensure that assignments are necessary and useful, appropriate to the ability and maturity of students, well explained, and clearly understood by both student and parent. It appears that home study will play an increasingly important role in learning in the next few decades. Teachers will need to base out-of-school assignments on a solid understanding of, and close cooperation with, the home educational environment, which may include cable television, home computers, videotapes and videodiscs, and links to information utilities. Guidelines for homework policy are provided. A total of 118 references are cited. (RH)

What Research Says to the Teacher

THIRD EDITION

Homework

as a Learning Experience

by Mary Anne E. Doyle and Betsy S. Barber

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The Advisory Panel

INTRODUCTION TO THE THIRD EDITION

The purpose of this monograph is to share current, research-based evidence regarding appropriate home study practices. As documented in the previous edition, support for homework for school-age children intensified in the 1980s, a direct result of the nation's educational reform agenda. Homework was advocated to raise academic standards and to ensure effective schooling. Resultantly, a trend of increased homework for American students was reported.

Historically, as discussed in more detail in the following pages, mandates for more homework have been based on social and political pressures rather than on research findings. And much of the research exploring the concerns associated with homework has yielded inconclusive findings. At this time, recent research efforts allow further examination of unresolved issues. Review of large-scale investigations, exploratory studies, and extensive meta-analyses (1) extends understanding of the relationship between homework practices and achievement, (2) suggests appropriate teacher concerns and behaviors, (3) identifies the complexities of home study issues, and (4) reconfirms that many questions remain unanswered.

In regard to the effects of home study on student achievement, theorists maintain that more time spent on homework results in advanced student performance. Research support for this position has emerged from comparative studies of public and private schools that associate better outcomes of private schools with more time spent on homework (8, 33).* In addition, large-scale investigations of representative samples of high school students reveal that homework does have a measurable effect on students' standardized test performance (36, 44) and grades (35, 36) even when expected intervening variables (e.g., ability and socioeconomic status [SES]) are controlled.

In advocating increased home study time, theorists suggest that homework extends student "time on tasks," a factor considered conducive to both learning and achievement. The results of one study with high school students support this position by confirming that increased home study time contributed significantly to improvement in course grades (24). Other studies, however, report only moderate improvements in student achievement resulting from increased homework (32), and some caution that substantial increases in assigned study time result in diminishing effects (61, 64).

The majority of the studies conducted involve high school students. Based on a more restricted number of studies, positive effects of homework

*Numbers in parentheses appearing in the text refer to the Bibliography beginning on page 28.

are also reported for junior high students (10). In contrast, and paralleling previous conclusions, studies examining the use of homework with elementary school students do not report consistent positive effects (6, 9). And, although some researchers maintain homework is an effective learning tool with elementary pupils, others do not support its extensive application at this level (9).

In summary, the most recent research tends to substantiate a positive relationship between homework and performance for older students. However, generalizations are cautioned due to research limitations. It is noted that most of the studies rely on self-report date. Furthermore, because many are correlational, not experimental studies, causal implications are restricted. And while a meaningful association is reported, the observed correlations are modest ($r = .25$ [9] and $r = .32$ [35]). An additional concern results from the observation that for study time to be effective, students must be focused and engaged. Simply increasing homework time will not guarantee that this time will be productive.

A recurring implication of the literature detailing the positive benefits of home study is indication that homework may be regarded as an appropriate intervention for students with diverse needs, including low-ability students, minorities, the economically disadvantaged, and the learning disabled. In part this appears to result from the observed compensatory effects of homework. Specifically, at the high school level, less able students acquired achievement levels commensurate with average students as a result of homework efforts, i.e , increased time (35). Facilitative effects of homework time on school performance have also been documented for Black and Hispanic seniors (34, 36). Other researchers observe that economically disadvantaged students who persevere with homework tasks outperform their more affluent peers who do no homework (36, 46).

While these findings are encouraging, mediating influences of the home environment and other student pressures (e.g., the need to spend after-school time earning money) mitigate against homework being an easy solution, "a greater equalizer" (9).

For learning-disabled students, research attention has focused on survey of existing practices and the application of homework accompanying therapeutic needs, including counseling (23, 31). While it appears that this set of learners may do less homework because they are not asked, or expected, to work at home (29), this is not considered beneficial (68). In essence, the objectives of assigned homework and teachers' practices in regard to its preparation, purpose, and followup for special learners reflect the research-based procedures advocated for the general population of students as presented in this text.

In regard to teacher behaviors, it appears that the influences of both student and parent characteristics, in addition to appropriate planning and followup, are important to enhance effectiveness.

Among student characteristics affecting homework are attitude, motivation, and effort. To promote positive attitudes and high motivation, teachers must assign stimulating activities. Recognizing that current instructional trends (especially in the language arts) focus on process teaching and increased attention to critical and creative thinking, it appears increasingly important for teachers to avoid homework activities that lack stimulation, e.g., repetitive drills.

In general, parental influences on homework are considered powerful (59). Although research evidence is limited, it is suggested that parents' education, their confidence in their ability to help, the availability of educational items in the home, and the number of books in the home have been found to correlate with students' success with homework (19).

Parents anticipate and support the assignment of homework (20, 27). Furthermore, they recognize their need to acquire effective instructional strategies, and they believe the schools could help them develop their skills (20).

Delineation of these influential factors reinforces the importance of our recommendations for teachers to consider home situations in assigning tasks, to provide supporting materials as needed, and to plan opportunities to inform and train parents. Several recent studies suggest positive results for parents and children resulting from teacher-directed training sessions (12, 56). Recognizing that parents differ in skill and available time, however, a caution that educators limit the formal role of parents in children's learning is warranted (9).

It remains evident that homework assignments must be applied sensibly. They must complement instructional objectives, be adjusted according to students' ages and abilities, and be commented on and reinforced. With respect to these procedures, the practices recommended in the previous edition remain unchanged and are presented here intact.

A final observation of the most recent research suggests that the effects of homework are confounded by a range of complex variables. Based on his extensive review, Cooper (9) suggests that "homework probably involves the complex interaction of more influences than any other instructional device" (p. 87). Consideration must be given to the mediating effects of student characteristics, subject matter, grade level, home and parental influences, assignment and classroom factors, and followup and outcome factors. Therefore, rather than studying homework "as simply an either/or, more/less variable" (21, p. 3), research efforts must explore the complete array of issues and influences. As suggested in the previous edition, projects that are designed rigorously, employing appropriate procedures and controls, are paramount to clarifying the potential of homework as a learning experience. This is the research needed to resolve the many unanswered questions and to establish homework procedures and policies that will truly promote effective schooling.

OVERVIEW

During the last decade of the twentieth century, the process of education seems certain to continue to undergo dramatic changes. The impact of new technology and information delivery systems, as well as economic and demographic alterations in the nation's social structure, will in all probability continue to reshape learning methods in the United States. Perhaps no single aspect of U.S. education will change as much or as rapidly as the process of studying at home (11, 57).

Because teachers and students, as well as parents, will be facing these changes with attitudes and expectations formed by both current and past practices, a brief review will help to establish a historical perspective.

Throughout most of its existence, from colonial times until well into the twentieth century, the U.S. school was considered primarily a dispensary of information, a temple of learning, where teachers imparted essential knowledge to the young. In a predominantly agrarian nation composed of a widely scattered and immigrant population, at a time when all human "knowledge" might be found in an encyclopedia, this was a reasonable and workable concept. The purpose of the school was to impart to the young the essential skills and the basic information that would enable them to take their place among the educated. Through the medium of the printed word—and later through drawings and photographs—the school also attempted to provide windows on the world to those children whose out-of-school experiences were limited to their immediate environment.

In this context, study at home or homework was a straightforward and simple matter. Students were given at-home tasks that involved practice in skills learned in school; or they were expected to prepare, usually by reading, for the next day's lessons. Assignments often involved substantial amounts of memorization—names, dates, sequences of events, passages of literature—and practice drills, particularly in mathematics. Since there was substantial, if not universal, agreement on *what* should be learned, the only questions concerning the home study were those related to how much should be assigned, at what age level it should begin, and so on.

During the second quarter of the twentieth century, however, new educational philosophies emerged that cast this study at home in a different light. Dewey's concept of problem solving as a basic educational activity, for example, did not readily admit the need for memorization and drill. In this view homework, if necessary at all, should be an extension of the problem-solving activities begun in school. Other philosophies, such as the life adjustment movement, also called into question the need for home study, frequently citing it as an unwarranted intrusion into the student's private at-home time.

Since the end of World War II, a number of factors have combined to make the topic of homework confusing to both teacher and parent, and, on

occasion, the center of public controversy. Shifts in demographic patterns, begun around the turn of the century and accelerated in the postwar years, rapidly transformed the United States from a rural to an urban society. At the same time television and other mass media inundated the society with information. The information-poor child of the nineteenth century suddenly became the information-saturated child of the midtwentieth. And knowledge itself began to grow at such an accelerated rate that the schools could no longer easily identify just what "everyone should know." New insights into the traditional academic subjects raised doubts about the structure of the various disciplines; "new maths," "new grammars," and "new physics" challenged the very content of the traditional curriculum. Throughout the 1950s, 1960s, and 1970s a variety of new approaches—some student-centered, some subject-centered—called into question much of what was once considered the core of a solid, basic education.

Amidst all the change and confusion, the practice of assigning homework was both championed and challenged, defended as an academic necessity and derided as useless busywork. Parents schooled in the old math threw up their hands in despair at the new math homework of their offspring. Rebellious and restless children of the television age protested at-home drill and practice, and indeed often resisted any sort of homework assignment. Conflicting educational philosophies among teachers, often working side by side, prompted vastly different homework policies. The comfortable consensus of the nineteenth century was completely shattered, replaced by a wide and shifting variety of individual attitudes and practices.

Ironically, outside public education the concept of home study was taking a firm hold. Aided by new developments in inexpensive electronic media, home study courses continued to grow at a rapid rate. By 1980 it was possible to study everything from effective communication to organic gardening using tapes, cassettes, slides, records, and other devices, combined with individual study guides. In the United States, it became possible to earn college credits from the Sunday newspaper as well as from television.

As we look forward to an age of videodiscs and cassettes, home computers, and new possibilities for educational TV through cable networks and satellite transmission, it appears obvious that we are on the brink of an era of unprecedented growth of home study (11).

Yet even as this era draws rapidly closer, as the line between classroom and living room begins to blur, the old questions persist: How much homework? How often? To whom? For what purpose? At what age? Unfortunately, after all these years there are still no definitive answers. But a look at what research tells us may shed some light on these questions and on the new ones about to be raised.

THE KINDS OF HOMEWORK

Not surprisingly, most teachers automatically equate home study with homework—tasks assigned students during the school day to be carried out at home. It is important to remember, however, that school assignments constitute only a part (and a shrinking part at that) of a much more complex pattern of home study in this country. The seventh grader leaving the school bus with an armload of books and a full assignment pad may very well enter a house to find a mother taking a home study course in office management, a father preparing for a job-related examination, or an older brother learning to play the guitar by mail. While this sort of home study is far from typical, it represents a growing trend and is common enough so that teachers should consider the possibility that their student with the homework assignment may have to compete with other members of the household for study time, space, and attention.

Against such a background, let us examine the various kinds of homework usually assigned in schools today. Lee and Pruitt have developed a useful taxonomy of homework types designed to help pre-service and in-service teachers clarify their homework policies and practices (40). While the entire taxonomy is too elaborate to describe here, the three basic categories—practice, preparation, and extension—provide a useful framework for discussion.

Practice

Perhaps the most familiar and certainly the longest-standing kind of homework is the practice exercise. The purpose of such assignments is to provide students an opportunity to reinforce newly acquired skills or apply recent learnings. For example, after a lesson in a particular arithmetic operation, the student receives a homework assignment to practice performing the operation. Or after the introduction of a historical or geographical fact in class, the assignment is to memorize the fact at home—an attempt at reinforcement of learning once very common, but little practiced today.

Despite the strong tradition of this type of homework, it is highly questionable in terms of both effectiveness and utility (2, 25). Far too often practice-type homework assignments are dull, unimaginative, repetitive exercises that produce little besides student boredom. Only a very unusual student is excited and challenged to perform a page of essentially similar mathematical operations or to underline subjects and verbs in 20 or 30 sentences. The able student frequently masters the skill quickly and plods mechanically through the remainder of the exercise merely to complete it; while the less able student, more in need of the practice, soon gives up.

This is not to suggest that practice exercises cannot be useful. They are most valuable, however, when they are carefully matched to the ability and

background of the individual student (as in the case of the piano teacher who chooses practice pieces according to the student's progress). Research findings about individualized prescribed instruction over the past several years indicate that careful monitoring of pupil progress and appropriate well-timed feedback are essential to the success of such learning (57). "Blanket" homework practice assigned an entire class, no matter how well intentioned, simply cannot be sufficiently individualized to be effective. Practice drill of this type is better left to the classroom where the teacher is available to make the necessary adjustments for individual differences. In many cases, however, class size makes individualization of assignments more difficult for the teacher.

The most effective kind of practice assignments asks the student to apply recently acquired learning in a direct and personal way. For example, students who have recently studied cloud types may be asked to find and label old magazine photographs of the various clouds. Or students who have learned about a particular chemical reaction may be asked to find examples of the reaction in their own environment.

Preparation

"For tomorrow, read chapter 7 and answer questions 1, 3, and 6 at the end of the chapter." This type of homework assignment is one of the most common, particularly in the upper grades. The intent is to have the student obtain sufficient background information to be prepared for the following day's discussion or lecture. In some subject areas (literature, for example) this kind of preparatory reading is a continuous process. While such preparation can be a valuable part of the pattern of learning, such homework assignments can also be ineffective unless teachers assign them carefully.

One of the most important considerations in assigning preparatory reading is to give students sufficient guidelines. In the example just cited, for instance, students need a clear understanding of *why* they should read chapter 7. Does it contain significant new information or concepts? How does it relate to what has gone before? Is it an expansion? an illustration? a continuation? Students should also receive clear guidance on *how* to read the chapter. Are they looking for specific information or merely getting an overview? Should they attempt to relate all or part of what they read to what they have previously learned? How is the chapter particularly significant? Why are they to answer questions 1, 3, and 6 and not 2, 4, and 5? Is the material covered by this second set of questions less important? And so on. If students are to profit from preparatory reading, this sort of guidance is not incidental, but absolutely essential.

Another consideration is the length or difficulty of a reading assignment. Some teachers at the secondary level have no clear idea of the reading

speed or ability of their students, other than group test scores sometimes supplied by the guidance office. At least one study has shown that teachers consistently underestimate the amount of time students will spend on an assignment (52). In addition, teachers of different subjects rarely coordinate homework assignments in terms of either length and difficulty or content. As a result, students may become overburdened with several difficult assignments on one night and have little or no homework the next, or they may do isolated readings in closely related subjects such as U.S. history and literature. When teachers coordinate these readings, the assignments can become much more meaningful.

In addition to assigned reading in the class text, other kinds of preparatory homework include asking students to do library research, to study some aspect of their environment, or to carry out any number or other activities requiring the gathering and organizing of information prior to a class discussion. As with practice assignments, preparation homework that calls for initiative, imagination, and individual effort provides a greater challenge and more stimulation than the routine read-the-chapter/answer-the-question type.

Extension

Extension assignments attempt to take the student beyond the work begun in class and to encourage individualized and often creative and imaginative pursuit of knowledge. Rather than mere more-of-the-same practice or read-to-get-ready preparation, extension homework aims at individual application, research, and study.

Frequently, work of this sort takes the form of a long-term continuing project that parallels the class work. Less often it is a one-night assignment designed to take the student beyond the work done during the day. In either case the primary characteristic of extension homework is its focus on student *production* rather than *reproduction*. Its aim is to foster student initiative for learning by allowing a great deal of student choice in expanding on the learning begun in class. Extension homework is often built around problems, either student-identified or teacher-identified, that enable the student both to apply previous learnings and to reach out to new understandings.

A second feature of extension homework is its individuality. Except in those cases where students are permitted to collaborate on an assignment, no two projects or papers will be the same. Because so much of the effort is student-initiated, there is little danger of the kind of copying and cheating that may accompany routine homework.

Extension homework can be made mechanical and routine, of course, in which case it loses much of its value. A class studying the history of the U.S. labor movement, for instance, might be assigned the task of finding

out the names of the current presidents of the 20 largest labor unions. While such an exercise technically "extends" the work being done in class, it is really a rather simple library assignment that does little to extend the student.

While these categories cover most of the different kinds of homework normally assigned by teachers, they obviously do not describe all types, particularly some of the more imaginative and creative assignments. It is fair to say, however, that very few school homework assignments cannot fit under one of these three headings.

Purposes

If practice, preparation, and extension summarize the kinds of homework that teachers normally give students, these three terms only begin to describe the purposes usually cited to justify the assignment of home study. Among those most frequently advanced are the following:

1. Homework is good discipline. Over the years many teachers have believed that homework is good for students, irrespective of any learning that may result from it. This view holds that the sense of accountability and responsibility engendered by homework assignments is a valuable end in itself and that schooling is somehow "cheapened" without substantial amounts of out-of-class work.
2. Homework eases time constraints on the curriculum. According to this argument the school curriculum, particularly in the upper grades, is so demanding that without substantial home study, it would be impossible to cover meaningful amounts of material. Without preparatory reading and practice application outside class, the amount of work accomplished in a given time period would be considerably reduced. In effect, this is an argument for a longer school day.
3. Homework fosters student initiative, independence, and responsibility. While students' lives are regulated by bells and attendance slips during the school day, the management of their afterschool hours is largely up to them. As they learn how to budget time to fit homework in among their other activities, students learn valuable lessons that will serve them for the rest of their lives.
4. Homework reinforces and supplements school learning experiences. By providing the necessary integration, practice, and application, as described earlier, home study facilitates and improves learning.
5. Homework brings the school and the home closer together. Not only do take-home assignments help answer the "What-did-you-do-in-school today?" question, but they help assure parents that their children are indeed doing *something.* And if parents can participate in the process by helping with the assignment, the link between school

and home can be strengthened. As we shall see later, however, this aspect of homework can also lead to other problems.

A study of the time allocated to homework assignments found a wide variation among fifth, eighth, and tenth grade mathematics and reading-language arts teachers in New York City and Connecticut (28). In general, the higher the teacher's perception of a class's ability level, the greater the homework assignment. In the upper grades more homework is assigned and more learning activities are shifted from the classroom to the home. These circumstances produce a kind of circularity in which able students, who tend to come from supportive home environments, are assigned large amounts of homework. This increases the influence of the home environment in the learning process, which in turn increases the influence of the home environment on academic achievement.

Summary

Three types of homework assignment are common in U.S. schools: practice, preparation, and extension. Routine practice drills are of questionable value and may even be counterproductive, especially for able students. Mechanical exercises tend to bore the able and frustrate the slow, sometimes leading to copying and cheating. To be effective, practice experiences must be highly individualized, based on the progress of each student. Especially valuable are practice exercises requiring creative and imaginative application of newly learned principles or skills to student-identified situations.

Preparation normally refers to reading assignments given prior to class meetings, although other kinds of preparation can be required. Homework of this sort should be carefully assigned to ensure that the student receives sufficient specific instruction, explanation, and guidance—that is, a clear idea of the purpose of the assignment. Extension homework attempts to take the student beyond the work done in class. It frequently uses projects, problem solving, or individual research as a method of organization. Typically, it involves a high degree of student participation in both the identification of the topic and the method of investigation.

Among the reasons often cited for giving homework are (1) its usefulness as an act of intellectual discipline; (2) its easing of time constraints on the amount of curricular material to cover (3) its ability to foster student initiative, independence, and responsibility; (4) its value in supplementing and reinforcing work done in school, and (5) its ability to bring home and school closer together.

THE EFFECTIVENESS OF HOMEWORK

Certain key questions about the usefulness of homework keep recurring in the literature: Does homework really help students learn? If so, what is the optimum amount to assign? What kind of assignments are most effective? Are there beneficial side effects? Or harmful ones? What is the relationship between the student's age and ability and the type and quantity of home study?

It would be satisfying to be able to list and explain the answers to these questions. Unfortunately, current research fails to provide any definitive answers. Some of these questions have not been researched at all. Others have yielded conflicting and often contradictory results. On the other hand, there seems to be some kind of consensus among experienced teachers and educational experts.

Academic Achievement

First, what does research tell us about the effect of homework on the improvement of learning? Not surprisingly, most of the work in this area has focused on mathematics, generally aiming at high school and college students. While the results are hardly uniform, there are some suggestions that homework, under certain conditions, does improve test scores and grades. For example, one study reported that a review of homework research in mathematics indicated that homework seems preferable to nonhomework, that the effects of homework may be cumulative, and that drill homework may not be of much value (2). A second study noted, however, that required drill homework did improve mathematics grades without producing negative effects on student attitudes (45). And a study of the effectiveness of mandatory versus voluntary homework in an engineering course reported that higher test scores accompanied mandatory homework assignments (37).

On the other hand, several researchers reported finding no measurable link between homework assignments and improved mathematics performance (13, 15, 41). Another study noted that homework assignments had minimal impact on the performance of primary grade students (30); and another reported no improvement in the performance of high school shorthand students due to homework procedures (48).

Three large-scale analyses of secondary school data suggested that homework was positively related to students' academic performance. One study found that secondary schools that assigned homework frequently demonstrated higher student achievement (test scores) than did comparable schools that reported infrequent assignment of homework (51). A second study, analyzing data from the National Center for Education Statistics (NCES) study of high school seniors, reported that although ability had the

largest impact on performance, homework had a measurable effect on achievement even when other important variables were controlled (44).

Time Spent on Homework

In a separate analysis of NCES data, Keith concluded that the amount of time spent on homework was positively related to performance for 20,364 seniors. Increased time on homework resulted in higher grades for seniors of all ability levels. Because low-ability students obtained grades commensurate with peers of higher ability as a result of increased home study time, Keith noted the compensatory potential of homework (35).

In contrast to the positive findings for older students, a study of elementary students in 16 Maryland school districts revealed a negative relationship between homework time and achievement in math and reading. Epstein reported that low achievement was associated with more time spent doing homework, teachers' frequent requests for parental help at home, and resultantly more minutes of parental assistance. Also associated with more homework were students' negative attitudes toward it and more discipline problems. High achievement, on the other hand, was associated with reduced need for homework and parental assistance, more positive attitudes toward homework, and fewer discipline problems. Epstein therefore concluded that it was not clear that increasing home study time improved the achievement, attitudes, or behaviors of low-achieving elementary students (18).

Two additional studies focused on the specific amount of time spent on homework and its relation to scholastic achievement. North Carolina students in grades six and nine were asked to indicate the amounts of time they spent on both assigned and unassigned homework per week. Consistent results were reported for groups studied over a two-year span. Those students at both grade levels who reported more time spent on homework achieved higher scores on the California Achievement Tests than did their peers who reported less home study time. For sixth graders, achievement levels at or above the national average were associated with one to three hours of assigned homework per week and no hours of unassigned homework. Students at this level with lowest scores reported having homework but not doing it. For ninth graders, achievement at or above the national average was associated with three to five hours of assigned homework per week and one to three hours of unassigned home study. Lowest performance at this level was associated with those who reported having no assigned homework (43).

A second study identified homework times associated with achievement by assessing the relationship between television viewing, leisure time reading, homework, and scholastic achievement. Data for 9-, 13-, and 17-year-old students were collected by the National Assessment of Educational

Progress. Although homework was not assigned to 9-year-olds, one to two hours of leisure time reading and three to four hours of television viewing daily were associated with highest reading achievement. For 13-year-olds, one to two hours of homework and one to two hours of television viewing per day were associated with highest levels of reading performance. And 17-year-olds who completed more than two hours of homework and watched less than one hour of television per day demonstrated the highest reading performance. The lowest performance among the two older groups was found for 13-year-olds who did not complete assigned homework and watched the highest levels of television and 17-year-olds who were not given homework and also watched the highest amounts of television for their age group. As for the effects of television on performance, over four hours of daily viewing were found to be detrimental at all ages (65). Although television viewing has a differential relationship to reading achievement at different ages (65), others have also noted its negative effect on school performance (60).

In a related study the National Assessment of Educational Progress examined the relationship between the amount of homework, the amount of television viewing, and the presence or absence in the home of such items as a specific place for study, reading materials, and the like. This study, too, showed higher performance on mathematics assessment tasks associated with more homework—and with less television viewing (1).

Another study also reported the results of a secondary analysis of data collected on 90,000 students in grades 5, 8, and 11 in 750 participating schools in Pennsylvania. When the data were analyzed according to the characteristics of students, there was little evidence to support any relationship between TV viewing and cognitive or noncognitive achievements. When analyzed according to the characteristics of schools, however, the same data indicated a strong negative relationship between television viewing and cognitive achievements (39). Apparently, television viewing has a harmful effect on cognitive skills only when those skills are considered within the school environment.

Additional Studies

In a review of 24 research studies on the correlation of homework and academic achievement conducted between 1923 and 1979, Friesen reported that the data neither support nor refute the effectiveness of homework (25). Similar conclusions were suggested by others. After examining homework research from 1900 to 1979, Knorr determined that the relationship of homework to achievement was unresolved (38). Likewise, in a review of five research projects, Pendergrass reported inconclusive findings and suggested that these were representative of the homework research in general (47). In contrast, one meta-analysis of 15 empirical studies

suggested that homework appeared to benefit learning, especially if graded and commented upon (46). All reviewers, however, agreed that most homework research projects have been inadequate. To date there simply has been no study that was able to control carefully enough the many variables that affect the relationship. Friesen suggests that individual teachers weigh carefully the need for home study and, if such study seems logical and useful, structure the assignments carefully so as to maximize student achievement (25).

Student and Parent Attitudes

In a separate study Friesen also reviewed homework surveys, questionnaires, and polls taken between 1916 and 1978 (26). During this time the attitudes of those surveyed showed a surprising consistency. While the experimental research into the effectiveness of homework may be inconclusive, students have generally believed that it helps them achieve better grades, an attitude that has remained fairly constant over the years. Likewise parents have been consistently strong supporters of homework, an observation supported by more recent studies such as the Farrell and Johnson study of the educational concerns of inner-city Black parents. These researchers reported one of the parents' primary concerns to be the lack of homework assigned their children (22). Friesen also noted a general agreement that the amount of homework increases significantly as students progress through school and that the amount of time they spend working on homework assignments has increased markedly over the past 30 years. Administrators generally approved the idea of increasing amounts of home study from fourth grade on. There is a strong consensus, supported by some research, that homework is both inappropriate and ineffective in the primary grades (25, 26, 30).

A related study of student, teacher, and parent perceptions of homework assignments found that, in general, girls spend more time on homework than boys, tenth graders more time than twelfth graders, college-bound students more time than their noncollege-bound peers. And, perhaps most significant, this study found that teachers almost invariably think an assignment will take less time than students actually spend on it (52).

Eddy quoted similar findings from a 1983 U.S. Bureau of the Census survey of homework practices. Again, girls were found to do more homework than boys, and Black and Hispanic students were reported to do more than white students. At the elementary level, public school pupils spent 4.9 hours and their private school peers spent 5.5 hours a week on homework. High school students reported doing 7 hours of homework a week, ranging from 6.5 hours for public school students to 14.2 hours for their private school peers (16).

What, then, does research tell us about the usefulness of homework?

Unfortunately, not nearly as much as we would like.

In terms of improving academic achievement there is limited evidence that homework is very effective, and enough negative research to raise strong doubts about its efficacy. This is particularly true of routine practice kinds of assignments and somewhat less true of preparation. Because of their nature, extension assignments are less likely to be directly linked to academic achievement. But it is difficult, if not impossible, to measure the extent to which individual, at-home, extended study contributes directly to improved test scores. On the other hand, there is a substantial body of reported experience attesting to the interest, excitement, and (presumed) growth these individual explorations can promote (49, 50, 54).

Research confirms that homework for young children is not only inappropriate, but may well be counterproductive. It also tends to support (albeit very tenuously) the practice of increasing the amount of study at home according to student age and ability level. Older, higher-achieving students do show some tendency to improve performance in mathematics when they are part of a program that includes mandatory homework. In addition, increased home study has been shown to benefit the academic performance of high school seniors.

Teacher Reinforcement and Feedback

Related to the effect of homework on achievement and learning are the teacher's responses to students' completed work. Current research verifies the importance of teachers' providing both reinforcement and feedback for all homework efforts. If teachers consider homework an important and valued activity, their reinforcement will strengthen this understanding and motivate students to attend to it diligently (47).

Related to the need for reinforcement is the positive effect of evaluative feedback. All students benefit from feedback on the quality of their efforts. Although grading is one form of evaluation, teachers' comments on students' homework also represent a beneficial form of feedback. As for the effects of feedback, researchers suggest that comments on homework papers can result in higher achievement (2, 17, 53, 60). Paschal, Weinstein, and Walberg confirm that greater effects on achievement were observed for homework containing teachers' comments or grades. They further assert that assigned but ungraded homework is only half as effective as that which teachers evaluated (46).

In discussing the need for teacher reinforcement and feedback, Pendergrass observed that the amount of homework assigned to students should be adjusted to allow the teacher time to react to each individual's efforts (47). Therefore, the teacher's time as well as the students' time should be considered in determining appropriate amounts of assigned homework.

Student Motivation

Do research findings suggest that people cannot learn privately and at home? Certainly not. The accumulated evidence of countless individuals who have done just that—from hobbyists to convicts who have taught themselves law (not to mention all those who have completed correspondence courses)—provides ample proof that at-home learning is possible. What the research calls into question, however, is the effectiveness of traditional routine homework assignments growing out of a school setting. While a highly motivated convict may well turn into a potential lawyer through self-study, a student who detests mathematics is not likely to become a math wizard by doing extra problems at home.

The implication is clear: homework assignments that students view as highly motivating and useful will promote learning; homework assignments that students view as drudgery will not promote learning—they may, in fact, further decrease student interest and lead to cheating. Required exercises, whether practice or preparation, are best accomplished in class under teacher supervision. Homework is best reserved for assignments that extend classwork and increase student interest and motivation. Good teachers have known this for generations.

If these conclusions are true, why is it that so much routine work continues to be assigned as home study?

One answer, as Tevye the fiddler would say, is, "It's tradition!" To a great extent, this answer is valid, except that there is not a single tradition—there are several.

Parental Involvement

Among these traditions, as noted earlier, many parents expect their children to have homework, and tend to regard teachers and schools that do not assign it as inferior (22). Further, homework provides a kind of bond between parent, child, and teacher that can be very important to a student's success in school (50). Despite protests of annoyance, parents called upon by their children to help with homework often feel flattered and important, and closer to the teacher and the school. They feel a part of the formal education process.

If, however, the assignment leaves the parent feeling threatened and insecure, quite the opposite result can occur, particularly among educated parents. A college-educated parent baffled by a sixth-grade homework assignment can feel not only frustration but a loss of stature in the child's eyes, which can translate all too easily into antagonism for the school program. To appreciate this threat to the parent's self-esteem, consider for a moment how such a situation calls into question the validity of the parent's own education. The parent schooled in the curriculum of the 1960s

or 1970s who is faced with questions growing out of non-Newtonian physics, modern set theory, or current systems of linguistic analysis can have some very unsettling questions about the current value of his/her education. Conversely, such a parent may question the value of the new subject matter: "What are they teaching that stuff for?" "If it was good enough for me, why isn't it good enough for my child?" Such questions are less likely to be directed at innovations in the sciences (where constant change is an accepted, and expected, fact) than at those in the social sciences and humanities. Recent parental attacks on values clarification exercises and new grammars, for example, have in most cases arisen from homework assignments.

It is vital, therefore, that teachers carefully explain to students any homework accompanying or growing out of curricular innovations or new subject matter. It is also vital that they make an attempt to prepare parents for the new work. Suggested methods include sending parents flyers or handouts explaining the nature of the new materials or approach, outlining what the children will be doing, why they are doing it, and what the school expects. These recommendations are paramount in light of one study revealing teacher-parent relations. This study discovered that even when teachers confirmed explicit communication of homework policies to parents, the same parents reported that such practice seldom occurred (55). Perhaps meetings or conferences to explain these matters directly to parents would enhance the communication process. In general, it appears that the more directly teachers engage parents as partners in educational efforts, the more benefit to children (59, 60).

One approach, instituted by the Philadelphia School District, involves a telephone resource center that provides assistance or information to parents and students about problems related to homework, as well as information about parent partnership activities and services available to parents and children in the school district. Eight teachers with expertise in various curriculum areas are assigned to answer phones during the evening hours. These teachers assist students from public, private, and parochial schools from various grade levels. Many of the calls they receive are from parents trying to assist their children with homework assignments (5). This system provides not only widespread, inexpensive tutoring, but an immediate source of relief for frustrated parents and, accordingly, an excellent opportunity for the school to explain curricular innovations.

The University of North Florida has initiated a similar program for parents and students of the Jacksonville public school system. In addition to offering aid via phone, teams of teachers staff school media centers after regular school hours to provide direct assistance with homework. It is reported that parents and students use and profit from both programs (67).

While such large-scale approaches are extremely important in keeping

the home-school relationship positive and mutually supportive, their effectiveness depends upon sensitive and sensible practices by classroom teachers. If teachers avoid assigning large quantities of mindless drill or requiring unrealistically large amounts of reading or using homework as punishment, and instead adequately explain the nature and purpose of each assignment, and match the assignment to the ability and maturity of the students, they can easily turn both students and parents into friends and supporters of the school.

Summary

Research into the effectiveness of homework in improving academic achievement is inconclusive. While some studies indicate that such improvement does result, an equal number shows no demonstrable relationship between homework and improved academic achievement.

The role of homework as a link between home and school is a vital one. Homework assignments can serve as a means of providing a bond of common effort among parent, child, and teacher. Inappropriate or badly explained assignments, however, can just as readily serve as a source of antagonism among parent, teacher, and child.

It is therefore essential that classroom teachers make every effort to ensure that assignments are (1) necessary and useful, (2) appropriate to the ability and maturity level of students, (3) well explained and motivated, and (4) clearly understood by both child and parent.

FUTURE DEVELOPMENTS

Since the end of World War I a steady stream of developments in electronics and communications has been gradually changing methods of gathering, storing, accessing, and transmitting information. As we move toward the end of the century, this stream seems likely to become a torrent, flooding the world with new technologies that may well drastically alter entire societies. The period into which we are moving has been called, among other things, the "Communications Era" or the "Information Age." Regardless of the label, however, it appears certain that the next few decades will continue to see dramatic changes in our methods of learning, and that home study will play an increasingly important role in that changing pattern.

While it is impossible to foretell the exact nature of these changes, based on currently available technology certain broad outlines and trends are identifiable. They provide a strong general indication of future developments.

There seems to be little doubt, for instance, that information, knowledge, and education enterprises will employ most U.S. workers during the remainder of this century. In 1981, more than half the U.S. work force was employed in these fields, and most forecasts call for a figure of about 66 percent by the turn of the century. Thus, by the year 2000 approximately two out of three workers will be engaged in some activity dealing with knowledge and information.

Both a major cause and effect of this employment shift is the fact that greater numbers of people will require education for longer periods of time. As new technology demands new competencies, more people require education to meet those demands, creating more pressures for still more educational technology which, in turn creates demands for still newer skills. Thus, the cycle continues. We have already seen the beginnings of this spiral in such areas as the burgeoning demand for computer specialists and secretaries trained to use electronic office equipment. As a result, the private sector of the U.S. economy spends as much as or more than the public sector on education.

There is little doubt that this trend will continue and that it will be accompanied by a rapid rise in home study as increasing numbers of people search for professional and personal fulfillment. In the home, personal, often individualized, study will both grow out of and depend upon an array of increasingly sophisticated equipment, much of which is already available. Before examining the implications of these social and educational changes for school homework policies, it might be well to discuss briefly some of the equipment currently available, together with its instructional potential.

Cable Television

In recent years the availability of cable television has increased substantially, and all indications are that this trend will continue to accelerate. With direct satellite broadcasting to rural areas, reception of 50 or more TV channels will soon become possible everywhere in the United States. Many of these new channels will be educational in nature. Some may be linked via central computer to provide interactive capability; that is, they will enable the viewer to respond as well as to watch. Such systems are currently being field-tested in both the United States and Japan. The educational implications of such systems, capable of monitoring individual progress, storing individualized programs, and pacing materials according to user ability, far exceed those of any form of educational home instruction available in the past (apart from tutoring).

Home Computers

As these devices become more widespread—a trend that is almost certain—they promise to provide an enormous range of educational possibilities. Capable of a wide variety of functions on their own, they may also be linked with cable television and, via telephone lines, with other computers. The result will be an almost limitless access to information in the home, as well as the ability to program the information according to the user's desires.

Videotapes and Videodiscs

If cable TV can be linked to the magazine of the future, videotapes and videodiscs may be our new books. This is not to suggest that these devices will replace the printed word. The analogy refers to the way in which these devices store and display information. The viewer can recall and replay individualized sections quickly and "open up" the tape or disc to any "page" and "reread" it as often as desired. This is a marked departure from previous educational films and television. In fact, one disc system currently being marketed contains 54,000 frames, each capable of displaying a page of print, on a single disc about the size of a long-playing record. This system can show a video segment followed by print—for example, an instructional film followed by a test. Depending on the user's test results, different video segments follow. Paired with a home computer, the possibilities are virtually limitless.

Information Utilities

These private companies will make data bases or data banks available to owners of home computers for a subscription fee. For the cost of the

subscription fee, the user can obtain information ranging from business and financial reports, to discount shopping services and airline schedules, to computerized games. Several educational programs, including foreign languages, mathematics, spelling, and grammar, are also available with more expected to follow soon.

Implications for the Future

Almost all experts are agreed that these devices (as well as others under development) taken collectively will produce massive changes in U.S. society. Methods of shopping, working, banking, communicating, and even cooking will probably be markedly altered in the near future. For teachers in particular, these devices portend important changes both in students and in learning patterns. The first phase of these changes will see students as well as adults shifting from television viewing to television using. For some people, used to more than several decades of passive TV viewing, the shift will not come easily; there is in fact considerable debate as to how quickly the shift will come. Once old habits and attitudes are shed and replaced by new ones, however, we can expect to see a rapid acceptance of the household television set as a learning center. And as information and knowledge become readily available in the home, the role of the school, and particularly of homework and home study, can be expected to change also. As more people begin to take more personal charge of their own education, particularly through home instruction, they will expect homework to fit into their broader educational expectations. Ironically, the television set that is now the "enemy" luring the student from study with entertainment may soon become an educational rival. Obviously, the need for close cooperation between home and school will become increasingly imperative.

Interestingly, this shift is in many ways a reversion to earlier patterns of learning in this country. Until the relatively recent growth of free public education through the secondary level and the resultant large increase in higher education, at-home self-instruction was commonplace. Throughout most of the nineteenth century, family medical books, agricultural pamphlets, and a wide variety of self-study materials were accepted parts of rural U.S. households. In many ways, the changes that lie immediately ahead are a return to these earlier patterns rather than a departure from present practices.

For the teacher interested in the question of homework, the primary significance of these trends lies not in their suggestions for present homework practices but rather in their implications for future practices. As the transition to the Communications Era continues, teachers will need an increasing awareness of shifting roles and expectations. They will also need to base their out-of-school assignments on a solid understanding of, and cooperation with, the home educational environment.

CONCLUSION

Considering the history of home study in U.S. education, the findings of research and experience, and the emergence of an information society, a list of basic guidelines and principles can help the classroom teacher arrive at a feasible homework policy.

1. In the early school years traditional homework assignments are not very effective. Therefore use them very sparingly. In the primary grades there is little justification for *any* homework.
2. In the elementary grades devote substantial amounts of time and effort to establishing study habits and learning skills. This work should extend beyond traditional reading-study skills and library research. Insofar as practical, help young students become familiar with more recently developed means of storing and retrieving information—computer terminals, videotapes and discs—not to become accomplished researchers, but rather to feel comfortable with the variety of resources at their disposal.
3. At all levels of schooling, allot considerably more time during the school day to independent study and guided research. Wherever possible, use study halls and free periods as opportunities for students to pursue individual academic interests and to become proficient at a variety of research techniques.
4. Make a basic aim of all homework learning how to learn, not merely preparation or practice. To this end, be sure that homework assignments—
   a. Stress student initiative and freedom. Allow students to play a primary role in fashioning out-of-class work, giving them considerable latitude in determining how to accomplish the tasks chosen.
   b. Are as individualized as possible. Structure assignments taking into consideration student abilities, learning style, and interests. Base even relatively routine assignments on knowledge of student progress and achievement, calling for individual responses within group tasks.
   c. Require imagination and divergent thinking whenever possible. This does not mean that each assignment should call for an artistic response, but it should provide an opportunity for students to use imagination and creativity in identifying research topics and selecting research techniques.
   d. Consider a second aim of homework learning how to teach the content or skills to someone else. The increasing emphasis on small-group and team learning, and the lifelong need for independent learning, make this a basic for all students.
5. Be sure that the purpose of out-of-school assignments is clear and

important to students. Those who know why they are working and what they are working toward will gain greater benefit from the assignment than those who lack such knowledge. Clearly define in advance all assignments and projects, even those initiated by students.

6. Research and experience indicate that—
   a. Able students are more likely to do routine homework assignments and less likely to profit from them.
   b. Slower students are less likely to do routine homework assignments and more likely to profit from them.

   Therefore, assign projects, independent study, and the like to the more able and accomplish routine preparation and practice in class with slower students.
7. Give recognition, praise, and corrective feedback for all completed homework. A student who has spent considerable time completing a task deserves recognition, and specific academic praise can strengthen both attitudes and diligence. Finally, students benefit from feedback on the quality of their homework. Share evaluative feedback through comments or a rating scale. Note that the amount of homework assigned to students should be adjusted to allow the teacher time to react to each individual's efforts.
8. Keep a record of completed assignments. Noting students' patterns of errors (weaknesses) may be more effective than giving grades, especially on independent practice activities. Viewing these assignments as practice or rehearsal, rather than the concert itself, helps keep their purpose clear.
9. Provide all students, but particularly the more able, with frequent opportunities to engage in long-term projects that they have helped develop.
10. Give careful consideration to demands on students' time. In the upper grades, especially, make a concerted effort to develop policies and practices that strike a balance between the time demands of the various subjects. A most effective way to accomplish this is through integration of assignments such as a common list of supplementary readings developed by teachers of closely related subjects.
11. Recognize the importance of homework in the home-school relationship and do whatever is possible to keep parents informed of the kinds and amount of home study required. As the school and the home share more of the responsibility for education in the years ahead, cooperation between home and school is even more imperative to develop a sound and sensible educational program for the student.

While these guidelines cannot ensure the success of a home-study program, they will go a long way toward making homework the significant learning experience it can be rather than the mindless drudgery many students perceive

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