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Using Curriculum Compacting to Challenge the Above-Average

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Curriculum compacting is a flexible, research-supported instructional technique that enables high-ability students to skip work they already know and substitute more challenging content.

As the dialogue about better ways to restructure our schools goes on, teachers still face the challenge of providing equitably for the broad differences in students' abilities, interests, and learning styles. Just as teachers experience frustration trying to adapt the curriculum for students who experience difficulty in learning, frustration also exists for students who have already mastered a good deal of the material or could easily master it in a fraction of the time required by other students. These students, who are academically ahead of their classmates, are held accountable for repetitious daily requirements that often lead to boredom, underdeveloped study skills, and disenchantment with school in general.

Curriculum compacting, an easy-to-implement instructional technique, is specifically designed to make appropriate adjustments for students in any curricular area and at any grade level (Reis, Burns, & Renzulli, 1992). The process simply follows the natural pattern teachers would follow if they were individualizing instruction for each student. Curriculum compacting might best be thought of as organized common sense.

In addition to its use in modifying the curriculum for above-average ability students, curriculum compacting can also benefit any student who displays strengths or high levels of interest in one or more content areas. Once teachers are familiar with the process, they report that it takes no longer than their usual teaching practices. The procedure has proven its effectiveness in a carefully controlled national research study, as well as through several years of classroom use in a variety of educational settings across the nation.

The Bad News

It is clear that a major problem facing our schools is the lack of curricular differentiation and academic challenge for many of our most able students. Research also supports this claim. In a recent study dealing with average and above-average readers, Taylor and Frye (1988) found that 78 to 88 percent of 5th and 6th grade average readers could pass pre-tests on basal comprehension skills before they were covered in the basal reader. The average readers were performing at approximately 92 percent accuracy,

while the better readers were performing at 93 percent accuracy on the comprehension skills pre-tests.

One reason so many average and above-average students demonstrate mastery of the curriculum is that contemporary textbooks have been "dumbed down," a phrase used in 1984 by Terrel Bell, former secretary of education. Chall and Conard (1991) concur with Bell's assessment, documenting a trend of decreasing difficulty in the most widely used textbooks from 1945–1975 "as measured by indices of readability level, maturity level, difficulty of questions and extent of illustration" (p. 2). Kirst (1982) believes that textbooks have dropped by two grade levels in difficulty over the last 10–15 years. Most recently, Altbach suggests that textbooks, as evaluated across a spectrum of assessment measures, have declined in rigor, evolving "over the past several decades into 'products' often assembled by committees in response to external pressures rather than a coherent approach to education" (Altbach et al. 1991, p. 2).

Bernstein (1985) summarizes the particular problem that current textbooks pose for high-achieving students:

> Even if there were good rules of thumb about the touchy subject of textbook adoption, the issue becomes moot when a school district buys only one textbook, usually at "grade level," for all students in a subject or grade. Such a purchasing policy pressures adoption committees to buy books that the least able students can read (p. 465).

Chall and Conard also cite difficulties for the above-average student with regard to less-difficult textbooks (1991, p. 111). Further, they stress the importance of a match between a learner's abilities and the difficulty of the instructional task, stating that the ideal match should be slightly above the learner's current level of functioning. When the match is not appropriate, "learning is less efficient and development may be halted" (p. 19).

According to Usiskin (1987) and Flanders (1987), not only have textbooks decreased in difficulty, but they also incorporate a large percentage of repetition. Even average 8th grade students, argues Usiskin, should study algebra since only 25 percent of the pages in typical 7th and 8th grade mathematics texts contain new content. Flanders corroborated this finding by investigating three popular mathematics textbook series. Students in grades 2–5 who used these textbooks encountered approximately 40 to 65 percent new content during the school year, which equates to two to three days of new material a week. By 8th grade, the amount of new content had dropped to 30 percent, which translates to encountering new material only one and a half days a week. Flanders (1987) suggests that these estimates are conservative because days for review and testing were not included in his analysis.

The trend toward less-challenging, repetitious textbooks may be causing our most capable children to learn less. Many of these bright students discover at an early age that if they do their best in school, they will be rewarded with endless more pages of the same kind of practice materials.

The Good News

A study recently completed at the University of Connecticut's National Research Center on the Gifted and Talented (NRC/GT) examined strategies that teachers use to modify the curriculum to accommodate the specific strengths of high-ability students. The study further examined the kinds of replacement activities that provide more appropriate levels of curricular challenge.

Twenty-seven school districts and 465 classroom teachers of 2nd through 6th grades took part in this study. To participate, districts could not have previously received training in curriculum compacting, and they had to be willing to accept random assignment to a treatment or a control group. In particular, we sought to recruit districts with elementary school populations of economically disadvantaged, limited-English-proficient, and handicapped students. The participating districts represented elementary schools from across the country, ranging from a small rural school in Wyoming to a magnet school for Hispanic students in California.

Three treatment groups, which received escalating levels of staff development, were used to examine the most efficient but effective method for training teachers to modify curriculum. Teachers from a fourth set of classrooms served as a control group; they continued their usual teaching practices. All treatment group teachers received videotape training and a book about the compacting process. Teachers in Treatment Group 2 also practiced two hours of group compacting simulations conducted by an experienced trainer. The simulations developed by Starko (1986) have been a standard resource in this type of training. Treatment Group 3 received the same training as Group 2 and an additional 6 to 10 hours of peer coaching throughout the year, as suggested by Joyce and Showers (1983).

Treatment and control group teachers were asked to target one or two candidates in their classrooms for curriculum compacting, using criteria specified by the research team. All targeted students in treatment and control groups were tested before and after treatment with out-of-level Iowa Tests of Basic Skills (ITBS). Next-grade-level tests were used to compensate for the "topping out" effect that is frequently encountered when measuring the achievement of high-ability students.[1]

How to Get More for Less!

Our most important finding might best be described as the more-for-less phenomenon. Approximately 40 to 50 percent of traditional classroom material was compacted for targeted students in one or more content areas. When teachers eliminated as much as 50 percent of regular curricular activities for targeted students, no differences were observed in post-test achievement scores between treatment and control groups in math concepts, math computation, social studies, and spelling. In science, students who had between 40 to 50 percent of their curriculum eliminated actually scored significantly

[1] A comprehensive technical report, with details of the descriptive and nonparametric statistical procedures used to analyze data from this study, is available from The NRC/GT (Reis et al., 1993).

higher on science achievement post-tests than their peers in the control group. And students in Group 1, whose curriculum was compacted in mathematics, scored significantly higher than their peers in the control group on the math concepts post-test. These findings clearly point out the benefits of curriculum compacting so far as standard achievement is concerned. Analyses of data related to replacement activities also indicated that students viewed these activities as more challenging than standard material.

Additional findings are based on an examination of the efficiency and effectiveness of the compacting process and the training provided to the three treatment groups. Of the teachers in the study, 95 percent were able to identify high-ability students in their classrooms and to document individual student strengths. Eighty percent were able to document the curriculum that high-ability students had yet to master, list appropriate instructional strategies for students to demonstrate mastery, and document an appropriate mastery standard. The most frequently compacted subject was mathematics, followed by reading, language arts, science, and social studies.

Replacement strategies consisted of three categories of activities for students: enrichment, acceleration, and “other” (including peer tutoring, cooperative learning, correcting papers, and other teacher assistance tasks). Ninety-five percent of teachers used enrichment as a replacement strategy, and 18 percent also used acceleration. Many more teachers indicated they would have used acceleration more frequently, but district policies prohibited students from working in textbooks beyond their present grade level. Although the majority of replacement strategies reflected student interests, needs, and preferences, replacement strategies often did not reflect the types of advanced content appropriate for high-ability students. This finding indicates that additional staff development is necessary. Teachers confirmed this finding; many expressed the desire to receive more assistance from enrichment or gifted education specialists and more training and assistance in locating and using appropriate enrichment materials.

Teachers in Treatment Group 3 used significantly more replacement strategies than did teachers in Groups 1 and 2. A difference in favor of Group 3 was also found with regard to the overall quality of curriculum compacting. A very encouraging finding was that a majority of teachers in all treatment groups said they would like to continue to compact curriculum beyond the study. They also expressed an interest in learning more about the process and in evaluating materials that could be used for replacement activities. Further, many teachers indicated that, as the year progressed, they were able to use the process with as many as 8 to 10 students in their classes, not just the 1 or 2 students originally targeted for this study.

Phase I

The curriculum compacting process consists of three phases. The first phase is *defining the goals and outcomes of a given unit or segment of instruction*. For most subjects, specific goals and outcomes can be found in teachers’ manuals, curriculum guides, scope-and-sequence charts, and some of the new curricular frameworks that are

emerging in connection with outcome-based education models. Teachers should examine these objectives to determine which represent the acquisition of new content or thinking skills as opposed to reviews or practice of previously taught material. The scope-and-sequence charts or a simple comparison of the table of contents of a basal series will provide an overview of new versus repeated material.

A goal of this phase is to help teachers make individual programming decisions. A larger professional development aim is to help teachers become better analysts of the material they are teaching and more sophisticated analysts of textbooks.

Phase II

The second phase of curriculum compacting is *identifying students who have already mastered the objectives or outcomes of a unit that is about to be taught*. First, teachers need to estimate which students have the potential to master new material at a faster than normal pace. Teachers can identify likely candidates by reviewing scores on previous tests, completed assignments, and classroom participation. Standardized achievement tests are a good general screen because they allow teachers to list all students scoring one or more years above grade level in particular subject areas.

Being a candidate for compacting does not necessarily mean that a student knows the material under consideration. Therefore, the second step in identifying candidates is to find or develop appropriate tests or other assessment techniques to evaluate specific learning outcomes. Unit pre-tests, or end-of-unit tests that can be administered as pre-tests, are ready-made for this task, especially when it comes to assessing basic skills. By analyzing pre-test results, the teacher can document proficiency in specific skills and select appropriate instructional activities or practice material to bring the student up to a high level on any skill needing reinforcement.

The process is slightly modified for compacting content areas that are not as easily assessed as basic skills and for students who have not mastered the material but are judged to be candidates for more rapid coverage. First, the teacher should discuss a given segment of material with the student to ascertain whether he or she has a thorough grasp of the goals and procedures of compacting, including the nature of the replacement process. Second, the teacher should specify how the student will demonstrate mastery at a high level—for example, by answering questions based on the chapters, writing an essay, or taking the standard end-of-unit test. Third, the teacher and the student should discuss the amount of time required to complete the unit, and they should agree on procedures—such as periodic progress reports or log entries—for teacher review. And, of course, an examination of potential acceleration and/or enrichment replacement activities should be a part of this discussion.

Another alternative is to assess or pre-test all students in a class when a new unit or topic is introduced. Although this may seem like more work for the teacher, it provides the opportunity for all students to demonstrate their strengths or previous mastery in a given area. Using a matrix of learning objectives, teachers can fill in test

results and establish small, flexible, and temporary groups for skill instruction and replacement activities.

Phase III

Providing acceleration and enrichment options—the final phase of the compacting process—requires cooperative decision making and creativity from both teachers and students. During this time, teachers obtain enrichment materials from other teachers, librarians, media specialists, and content area or gifted education specialists. These materials may include self-directed learning activities, instructional materials that focus on particular thinking skills, and a variety of project-oriented activities designed to promote hands-on research and investigative skills.

The time made available through compacting provides opportunities for students to participate in a variety of exciting learning experiences: small-group, special topic seminars directed either by students or community resource persons; community-based apprenticeships; community service activities; projects involving peers as well as mentors; and self-selected mini-courses. Decisions about which replacement activities to use are, of course, guided by time, space, and availability of resource persons and materials. However, the ultimate criteria should be the degrees to which the activities increase academic challenge and represent individual strengths and interests.

This phase of the compacting process is a creative opportunity for an entire faculty to work cooperatively to organize and choose a broad array of enrichment experiences. A favorite mini-course that a faculty member has always wanted to teach or the opportunity to serve as a mentor to one or two students who are engrossed in a teacher's beloved topic are just two ways replacement activities can add excitement to the teachers' part in this process. The benefits for students are obvious.

Curriculum compacting may also result in another interesting occurrence. We have found that when some bright but underachieving students realize they can both economize on regularly assigned material and "earn time" to pursue self-selected interests, their motivation to complete regular assignments increases. As one student put it, "Everyone understands a good deal!"

The Compactor Form

The best way to get an overview of the curriculum compacting process is to look at the management form that guides this process. "The Compactor" is an organizational and record-keeping tool teachers fill out for each student or group of students with similar curricular strengths. Completed compactors are kept in students' academic files and updated regularly. The form can also be used for small groups of students who are working at approximately the same level (for example, a reading or math group). The Compactor is divided into three sections:

— Section one includes the learning objectives for a particular unit of study, followed by data on students' proficiency in those objectives, including test scores, behavioral profiles, and past academic records.

— Section two describes the pre-test vehicles teachers select, along with test results. Instruments can be formal (like pencil-and-paper tests) or informal (such as performance assessments based on observations of class participation and written assignments). Specificity is essential. Recording an overall score of 85 percent on 10 objectives, for example, sheds little light on what portion of the material can be compacted, since students might show limited mastery of some objectives and high levels of mastery on others.

— Section three includes information about acceleration or enrichment options. In determining these, teachers must be alert to students' individual interests and learning styles. We have used two instruments: the *Interest-A-Lyzer* and the *Learning Styles Inventory*. Both provide profiles of general categories of student interests and the types of learning activities students would like to use in pursuing them (Renzulli and Smith 1979).

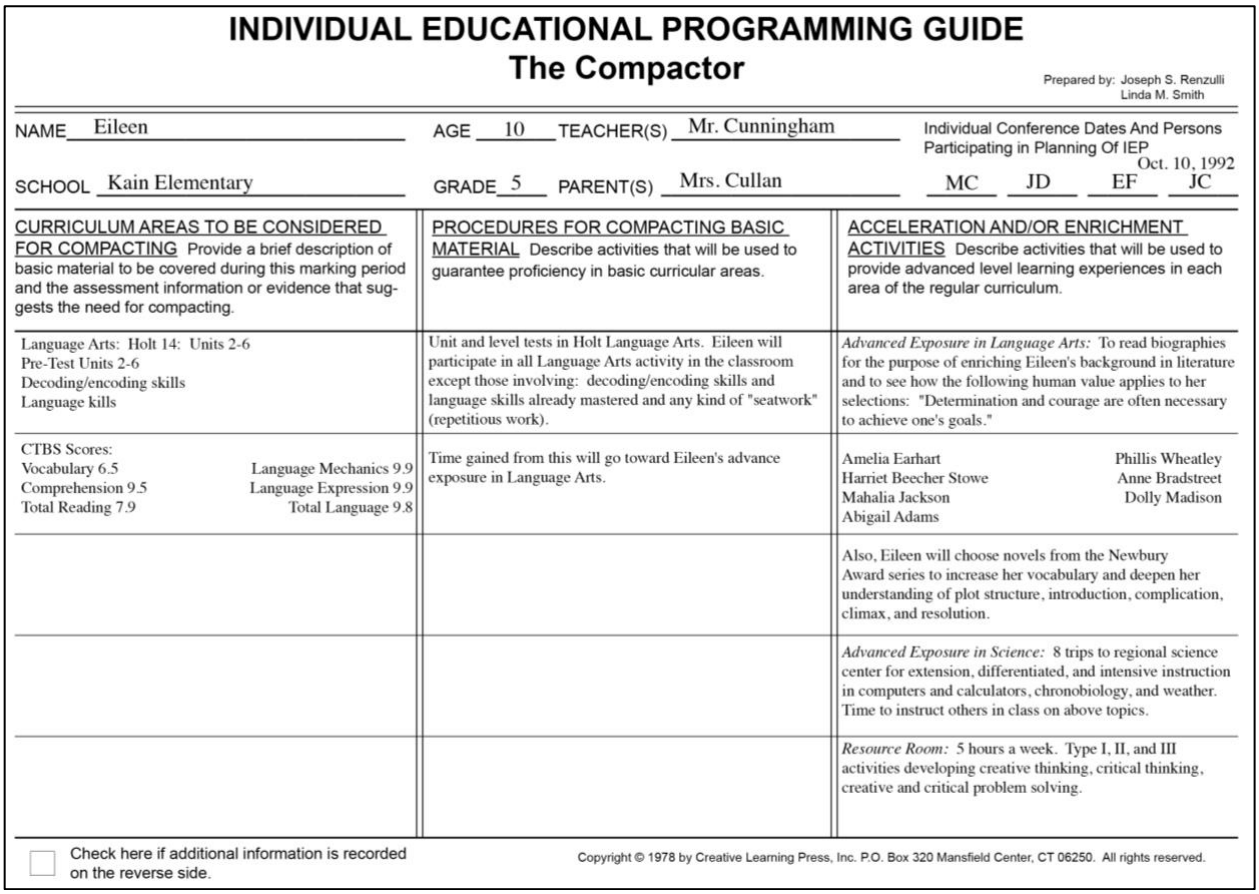
Eileen's Compactor Form

Figure 1 presents a completed example of the form for a 5th grader we'll call "Eileen." Her classroom, self-contained and heterogeneous, is located in a small school in a lower socioeconomic urban district. While Eileen's reading and language scores range between two and five years above grade level, most of her 29 classmates are reading one to two years below grade level. This presented Eileen's teacher with a common problem: What is the best way to instruct this student? He agreed to compact Eileen's curriculum.

Taking the easiest approach possible, Eileen's teacher administered all of the appropriate unit tests for the grade level in the Basal Language Arts program and excused Eileen from completing activities and worksheets in units where she showed proficiency (80 percent and above). When Eileen missed one or two questions, the teacher checked for trends in those items and provided instruction and practice materials to ensure concept mastery.

Eileen usually took part in language arts lessons one or two days a week. The balance of her time was spent with alternative projects, some self-selected. This strategy spared Eileen up to six or eight hours a week with language arts skills that were below her level. She joined the class instruction only when pre-tests indicated that she had not fully acquired the skills or to take part in a discussion that her teacher thought she would enjoy.

Figure 1. Individual Educational Programming Guide (The Compactor)



INDIVIDUAL EDUCATIONAL PROGRAMMING GUIDE
The Compactor

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NAME Eileen AGE 10 TEACHER(S) Mr. Cunningham

Individual Conference Dates And Persons Participating in Planning Of IEP
Oct. 10, 1992

SCHOOL Kain Elementary GRADE 5 PARENT(S) Mrs. Cullan

MC JD EF JC

CURRICULUM AREAS TO BE CONSIDERED FOR COMPACTING Provide a brief description of basic material to be covered during this marking period and the assessment information or evidence that suggests the need for compacting.	PROCEDURES FOR COMPACTING BASIC MATERIAL Describe activities that will be used to guarantee proficiency in basic curricular areas.	ACCELERATION AND/OR ENRICHMENT ACTIVITIES Describe activities that will be used to provide advanced level learning experiences in each area of the regular curriculum.
Language Arts: Holt 14: Units 2-6 Pre-Test Units 2-6 Decoding/encoding skills Language kills	Unit and level tests in Holt Language Arts. Eileen will participate in all Language Arts activity in the classroom except those involving: decoding/encoding skills and language skills already mastered and any kind of "seatwork" (repetitious work).	*Advanced Exposure in Language Arts:* To read biographies for the purpose of enriching Eileen's background in literature and to see how the following human value applies to her selections: "Determination and courage are often necessary to achieve one's goals."
CTBS Scores: Vocabulary 6.5 Language Mechanics 9.9 Comprehension 9.5 Language Expression 9.9 Total Reading 7.9 Total Language 9.8	Time gained from this will go toward Eileen's advance exposure in Language Arts.	Amelia Earhart Phillis Wheatley Harriet Beecher Stowe Anne Bradstreet Mahalia Jackson Dolly Madison Abigail Adams
		Also, Eileen will choose novels from the Newbury Award series to increase her vocabulary and deepen her understanding of plot structure, introduction, complication, climax, and resolution.
		Advanced Exposure in Science: 8 trips to regional science center for extension, differentiated, and intensive instruction in computers and calculators, chronobiology, and weather. Time to instruct others in class on above topics.
		Resource Room: 5 hours a week. Type I, II, and III activities developing creative thinking, critical thinking, creative and critical problem solving.

☐ Check here if additional information is recorded on the reverse side.

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In the time saved through compacting, Eileen engaged in a number of enrichment activities. First, she spent as many as five hours a week in a resource room for high-ability students. This time was usually scheduled during her language arts class, benefiting both Eileen and her teacher, since he didn't have to search for all of the enrichment options himself. The best part for Eileen was that she didn't have to make-up regular classroom assignments because she wasn't missing essential work.

Eileen also visited a regional science center with other students who had a high interest in and aptitude for science. Science was a second strength area for Eileen, and based on the results of her *Interest-A-Lyzer*, famous women was a special interest. Working closely with her teacher, Eileen chose seven biographies of noted women who had made contributions in their respective fields. Three books were on an adult level, but Eileen had no trouble reading them. Eileen's Compactor form, which covered an entire semester, was updated in January.

Eileen's teacher remarked that compacting her curriculum had actually saved him time—time he would have spent correcting papers needlessly assigned! The value of compacting for Eileen also convinced him that he should continue the process. The compactor was also a vehicle to explain to Eileen's parents how modifications were

being made to accommodate her advanced language arts achievement level and her interest in science. A copy of the compactor was also given to Eileen's 6th grade teacher, and a conference between the 5th and 6th grade teachers and the resource teacher helped ensure continuity in dealing with Eileen's special needs.

A Flexible Instructional Tool

The many changes that are taking place in our schools require educators to examine a broad range of techniques for providing equitably for *all* students. Curriculum compacting is one such process.

Curriculum compacting is not tied to a specific content area or grade level, it is adaptable to any school or curricular framework, and it is flexible enough to use within the context of rapidly changing approaches to general education. The study described here and practical experience gained through several years of field-testing and refining the process have demonstrated the many positive benefits that can result from this process for both students and teachers.

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