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Comparison of Effectiveness: Course-Integrated Information Skills Instruction or Instruction of Information Skills in Isolation

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Abstract

What effect does the course-integrated method of information skills instruction have on student scores on the Reference Section of the "Work Study Skills" subtest of the Iowa Tests of Basic Skills compared to the traditional method of teaching information skills in isolation by the library media specialist alone?

Comparison of Effectiveness: Course-Integrated Information Skills Instruction or Instruction of Information Skills in Isolation

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Chapter 1

Introduction

Students in the Cardinal Community School District, Eldon, Iowa, have had low information skills scores on the standardized Iowa Tests of Basic Skills. No formal instruction by the library media specialist has been taking place in the school district due to limited staff. New staffing in the district provided an opportunity for the demonstration of the effect of a planned program of information skills instruction by a library media specialist in cooperation with a classroom teacher and integrated into the curriculum, and the comparison of that approach with the more traditional separate teaching of information skills taught by the library media specialist alone.

School libraries support, extend, and individualize the school's curriculum; library and information skills should not, therefore, be separate school subjects.

> They are process skills -- skills used to reach other learning goals. We use library skills to locate and interpret materials that expand our understanding and better enable us to make decisions & choices. When process skills are taught as isolated subjects, learning problems, such as lack of motivation, retention and transference, often result. (Kuhlthau, 1981, p. 4)

The seemingly obvious benefits of integrated information skills instruction are discussed in many publications. One advantage acknowledged by many professionals is that instructing students at the point of need brings relevance to the skills, helping students understand the importance and usefulness of the library media center in their lives (Jweid and Rizzo, 1988, and Cutlip, 1988).

A second advantage of integrated instruction is the application of critical thinking skills to the use of information resources. Through integration students go beyond locating and accessing to evaluating, synthesizing and communicating -- skills needed to be life-long learners (American Association of School Librarians..., 1988). All of life from medicine to geography to business to entertainment changes daily, and students should have the opportunity to discover the vast amount of information available which is not in their quickly-outdated textbooks (Cutlip, 1988).

Another important and sometimes overlooked advantage of information skills integration is the importance of the classroom teacher's influence on students' attitudes regarding use of the library media center materials. A teacher who models the significance of the library media center will inspire students' use and understanding of information skills and resources (Lubans, 1974; Wehmeyer, 1984; El-Hagrasy, 1962; Hart,1985).

Problem Statement

What effect does the course-integrated method of information skills instruction have on student scores on the Reference Section of the "Work Study Skills" subtest of the Iowa Tests of Basic Skills compared to the traditional method of teaching information skills in isolation by the library media specialist alone?

Hypotheses

1. There will be no significant difference at the .05 level between 1992 scores of the Reference Section of the "Work Study Skills" subtest of the Iowa Tests of Basic Skills compared to the same scores for 1993 for either the students taught information skills by the course-integrated method or the students taught the same skills in isolation by the library media specialist alone.

2. There will be no significant difference at the .05 level among posttest scores of the Reference Section of the "Work Study Skills" subtest of the 1993 Iowa Tests of Basic Skills of students taught information skills by the course-integrated method and the students taught the same skills in isolation by the library media specialist alone.

Assumptions

It was assumed that students who were in the fifth grade in school during the winter of 1993 had approximately the same reading ability and background.

It was also assumed that while some students may have received individual instruction in information-related skills, none of the students had received formal instruction by a library media specialist in these skills.

Significance

This study adds to the limited amount of previous research regarding the effectiveness of course-integrated information skills instruction. It also provides rationale and motivation for the method of information skills instruction to be used by this researcher in the future. A possible significant side-effect of the study may be that the cooperating teacher may become a believer in the integrated approach and may promote the potential effectiveness of integrating information skills to other classroom teachers. The study may also point out obstacles which can be dealt with prior to using integration on a full scale (Walker & Montgomery, 1983).

Limitations

The population was limited to one grade level in the Cardinal Community School District, Eldon, Iowa. The study was also limited to standardized testing of students' knowledge about information skills, and does not demonstrate the competence of applying those skills in using acquired information and producing well-documented papers or projects created through critical thinking.

Definitions

Information Skills: may be called library media skills. These skills include (1) Organization skills, referring to location and arrangement of information materials; (2) Selection skills for choosing the most appropriate resources; (3) Utilization skills for effective use and interpretation of material; (4) Comprehension skills for gaining meaning from resources; and (5) Production skills used in communicating/presenting information (Hyland, 1978 and VanVliet, 1984). Teaching of information skills is called user education, bibliographic instruction, and library skills instruction.

Thinking Skills: Cutlip (1988) says that the term is still somewhat nebulous, but general agreement of the meaning is the "ability to process or 'think about' knowledge in order to arrive at more thoughtful understandings and decisions" (p. 85). Eisenberg and Berkowitz (1988) describe higher thinking skills levels as analysis, synthesis and evaluation.

Course-integrated Instruction: Instruction which is developed, taught and evaluated cooperatively by the classroom teacher and the library media specialist. Course integration uses one set of objectives, activities and assessments, incorporating both classroom and information skills. This is also known as team teaching.

Isolated Instruction: Traditional method of teaching information skills by the library media specialist

separately from any classroom instruction and emphasizing specific tools and resources. Kuhlthau (1987) says this includes only organization and selection skills. Also called the library source approach.

Chapter 2

Review of Literature

Most authorities stress that successful programs of information skills instruction should be based on students' needs and the "educational assumption that students learn best if the information is taught in a way that closely parallels the manner in which the skill will be needed in real life" (Lubans, 1978, p. 35). In comparing the integrated method of instruction with instruction of skills in isolation, many professionals accept that active learning is much more effective than passive learning. This is in total agreement with the ancient Chinese proverb: Tell me, I forget; Show me, I remember; Involve me, I understand. Biggs (1980) notes that "people are much more likely to absorb information if they know that it will soon be put to use" (p. 36). Integration of information skills into regular classroom assignments also provides the opportunity for practice and reinforcement, and Jay (1983) warns that students should never be given the impression they are doing "a library assignment."

Walker and Montgomery (1983) note that integration of skills into classroom content provides immediate, practical application and makes lessons meaningful, functional experiences, while Cutlip (1988) says that learning is more permanent and retrievable when information is related to real-life situations. Integration provides a connection,

helping students realize that research is a vital part of the learning process, complementing and enriching every subject (Jweid and Rizzo, 1988).

Biggs (1980), speaking from the perspective of an academic librarian, is one of many professionals who feels that skills integration is a more beneficial method of instruction, saying "ideally, all secondary-school students should have the benefit of fairly sophisticated bibliographic instruction. . . . To be of maximum future use, this instruction must be more process-oriented than title-oriented" (p. 34). Isolated skills instruction is usually more title-oriented, while instruction through integration naturally falls into the research process.

Library media specialists are not the only professionals to observe the value of skills integration. According to Lundin (1990), the integrated approach is based on principles of learning and teaching skills first published in 1963 as an appendix to Skill Development in Social Studies, the 33rd Year Book of the National Council for the Social Studies. This publication promotes a "coordinated program in which skills are integrated systematically, sequentially, and accumulatively with all other aspects of the curriculum (p. 83).

One advantage to course-integrated instruction is that individual progress can be encouraged during the process of the research paper/project. More advanced students can be

directed to the more advanced tools, while students needing more instruction in the use of general encyclopedias and general indexes can receive reinforcement in those tools.

The integrated approach also takes advantage of the strength of both the teacher and the library media specialist. Teamwork between the classroom teacher and library media specialist promotes better relations between that teacher and the library media specialist, sets a good example for other teachers, and helps students realize the importance of library research through example. Teachers can create an atmosphere that will motivate students (Hart, 1985), and "failure to make well-planned use of library media center resources on a regular basis can diminish the richness of the learning experiences for the student" (Urbanik, 1989, p. 2).

Course-integrated instruction also provides assistance for the classroom teacher herself/himself in learning what the library media center has to offer. Differences in teachers' reading habits and library backgrounds have been correlated with performance of sixth grade classes in library skills (El-Hagrasy, 1962). Reed and Walker (1974) discuss a study by Helen Fleischman who also concluded the presence of the teacher had some influence on achievement of library skills by sixth graders. It is, therefore, important for the classroom teacher to be involved in information skills instruction, and integration into the classroom curriculum can help achieve that.

Awareness of the curriculum for the library media specialist is also enhanced through course-integrated instruction, which suggests that collection development will be more responsive to the curriculum and to students' personal interests. "Interlocking the school library media center with the curriculum planning process will help in the continuous improvement of the quality of instruction" (Urbanik, 1989, p. 11).

Many authors discussed the opportunity for application of critical thinking skills through integration. Krapp (1988) comments that "learning should be a relevant active process, not memorizing facts" (p. 34), and Mancall, Aaron, and Walker (1986) cite a simple, but powerful statement made in 1916 by John Dewey in Democracy and Education which applies to current educational thought: "All which the school can or need do for pupils, so far as their minds are concerned, is to develop the ability to think" (p. 27).

In 1976, Representative Major R. Owens wrote:

> Information literacy is needed to guarantee the survival of democratic institutions. All men are created equal, but voters with information resources are in a position to make more intelligent decisions than citizens who are information illiterates. The application of information resources to the process of decision making to fulfill civic responsibilities is a vital necessity. (p. 27)

Reports that followed A Nation At Risk call for active learning that prepares students for life-long learning (Pastine and Katz, 1989). Resource-based instruction

integrated into the curriculum can provide the opportunity for students to think critically. "Knowing how to find answers to questions is an essential element of one of the broad goals of education: learning how to learn. Once learned, the skills involved can serve an individual for a lifetime" (Urbanik, 1989, p. 1).

Mancall, Aaron and Walker (1986) discuss the theoretical implications of current research on how children and adolescents process information and ideas. They conclude that critical thinking skills are essential for survival in a rapidly changing world, and should be incorporated into many curricular areas. Thinking requires basic data from which students can develop their own ideas and materials. This beginning data can be acquired through the library media center. "The concept of teaching library resources as evidence to be examined for shaping a topic rather than a quick answer to a question is the key idea behind problem solving and learning how to learn in the library" (Kuhlthau, 1987, p. 24).

Too much information exists in society to be mastered by any one person, so it is crucial that students are able to discern obsolete information from the latest, pertinent information. The focus of instruction must go beyond specific tools, location skills, and correct answers to process skills which will enable students to acquire, evaluate and use information for problem solving (Cutlip, 1988) while developing considerable self-reliance. "The end

result should be students who can evaluate the ideas and facts they retrieve and who can bring an understanding of how to apply what they already know to a new problem" (Mancall, Aaron & Walker, 1986, p. 24).

From a political perspective, there are good reasons for course-integrated information skills instruction. "Declining test scores, critical national reports, and improved research on teaching critical thinking" are causing "administrators and other educational decision makers" to pay attention "to any vehicle within the educational setting that shows potential for delivery of a critical thinking skills component" (Mancall, Aaron and Walker, 1986, p. 23). Until all educators and students are aware of the potential of the library media center as a learning tool and put that awareness to use, students will continue leaving high school knowing little of the skill and joy of research (Lubans, 1978).

Methods of Instruction

Marchant, Broadway, Robinson and Shields (1984) summarized a study done by Louis E. Barrilleaux in 1965 for his Ph.D. dissertation. He found that use of extensive library activities, which reinforce classroom instruction, improved critical thinking and understanding of science in eighth-grade students. Those who used library activities, and no textbooks, "displayed better retention, increased learning, and more selective science reading than students who used textbooks" (p. 22). This study, done at Malcolm

Price Laboratory School, University of Northern Iowa, Cedar Falls, found that "at year's end, the experimental students scored only slightly higher, but at the end of a two-year period, their margin of superiority was significant" (p. 22).

A study of instructional methods by Maude H. Jacobs in 1965 and reviewed by Reveal (1976) showed no significant difference between instruction by librarian alone, classroom teacher alone and cooperative instruction by the librarian and the classroom teacher.

Another study conducted at the university level by Kohl and Wilson (1986) was summarized in RQ. They investigated and found a measurable difference in the sophistication of bibliographic research done for course assignments of those students taught a cognitive strategy for selecting types of tools appropriate to their research question compared with those who had received bibliographic instruction taught in an approach that emphasized specific tools. The group given traditional instruction heard a lecture teaching the process of beginning with encyclopedias and dictionaries, proceeding to the card catalog to identify books, then consulting periodical indexes and abstracts, and finally considering bibliographies. The students provided course-integrated cognitive strategy were instructed how to identify tools most appropriate to a particular topic by determining what kind of information (general, indepth, current, historical) was needed. Kohl and Wilson (1986) concluded that effective

bibliographic instruction "needs to be recast into an approach that begins with the student's research question rather than the library tool and that focuses on understanding how information is organized rather than simply explaining the mechanics of how to use library tools" (p. 210).

Reveal (1976) investigated the variance in student acquisition of information skills taught by a classroom teacher compared to a teaching team of classroom teacher and librarian. Smith (1978) investigated differences in learning of information skills between students taught through classroom activities by the classroom teacher compared to students taught through a separate course by the school librarian, and a control group which received no instruction. Murrell (1985) investigated the difference of students' scores through formal instruction by the librarian independent of the classroom teacher, instruction by librarian and teacher team teaching, and instruction by teacher presentation as a part of the Houghton Mifflin Reading Program and independent of the librarian.

Reveal's investigation compared two twelfth grade classes in two small high schools, while Smith used an elementary population (three classes of fourth, fifth, and sixth grades) at different buildings in the same school district; and Murrell used an elementary population of all fifth grade classes in different buildings within the same school district.

Reveal's control group was instructed using the classroom teacher's specific lesson plans developed around a course outline of library instruction developed by the librarian, and the experimental group was taught search skills by the librarian with the assistance of the classroom teacher. Murrell's first experimental group (librarian instructed) used lecture, class discussion and written exercises 30 minutes a day for one week. The second experimental group in Murrell's study used jointly planned lessons (librarian and classroom teacher) which focused on an inventions and inventors unit. Murrell's control group was instructed by their respective classroom teachers from the lesson in the Houghton Mifflin text. All three groups' lessons were designed to address the same objectives.

Smith's first experimental group classes were instructed by classroom teachers who were directed by Smith during weekly thirty-minute conferences. The classroom teachers were also provided instructional modules developed by Smith which presented the basics of library skills instruction moving from an overall view to more precise points, and also included suggested teaching strategies of action-oriented or inquiry approach. Smith's second experimental group classes were given direct instruction by the school librarian using a standard plan consisting of parts of a book, three types of catalog cards, using the card catalog, collection of biographies and nonfiction

books, guide cards, and reference books. Smith's control group was not given any instruction.

Reveal and Smith both examined differences between pretest and posttest scores, while Murrell examined only differences between the same posttest scores of all groups. Smith used the Library/Study Skills, Level II test, consisting of 50 multiple choice questions. Reveal's evaluation instrument was one used by the La Mesa-Spring Valley School District, California, consisting of 67 questions covering use of the card catalog, alphabetizing, use and content of reference materials, parts of books, shelving of biographical works, the Dewey Decimal Classification system, and the Reader's Guide to Periodical Literature. Murrell's evaluation instrument was designed to cover the objectives established by the Houghton Mifflin Reading Program, and consisted of 34 questions covering use of the card catalog.

Reveal's results showed difference in favor of the experimental group (taught by team teaching). Murrell's study showed no significant difference among the three methods of instruction at the .05 level with the librarian-instructed group having mean scores of 31.98 of a possible 34.00, the librarian and classroom teacher instructed group having mean scores of 32.05 of 34.00, and the classroom teacher instructed group having mean scores of 30.85 of 34.00.

Smith's study found instruction by the school librarians to be significantly better than no instruction, but found no significant difference between instruction by the school librarian and instruction by the directed classroom teacher. Instruction by the classroom teacher was not significantly better than no instruction. Smith did find, however, that one class instructed by a classroom teacher who had exhibited unusual motivation and interest had a gain score relative to the gain scores of classes taught by the school librarians.

Reveal recommended that librarians and classroom teachers continue cooperative teaching. Murrell concluded that each method of instruction was valid with the librarian instructed method having the advantage of holding students' attention to the skill itself. The advantage of team teaching was immediate use of the skill, but there was a disadvantage of students' attention being focused on the specific unit, not the skill. Team teaching also had the disadvantage of limited planning time with the classroom teacher. The teacher-instructed method had the advantage of familiar procedures and evaluations for students with perhaps fewer outside distractions than in the open library, but had the disadvantages of no actual card catalog and lack of immediate need or use. Murrell concluded that the teacher-instructed method could be the best in her particular situation because of responsibilities for media centers in five buildings, with the understanding that

skills could be reinforced by library media staff prior to a specific research unit and at point of need.

Smith concluded that library skill instruction in the elementary school should be emphasized and improved in the immediate future due to low scores from all three groups; and that instruction should be a cooperative effort between school librarians and classroom teachers so that it is related to classroom content. She also concluded that classroom teachers need instruction in library organization and that the role of the school librarian needs clarification.

Summary

There appear to be many advantages to teaching information skills through course-integrated instruction. These include relevance, application to critical thinking skills, and the public relations value of team teaching. The one disadvantage noted by several authors was the limited amount of time available to accomplish a good program of integration. Research studies have shown both significant improvement and no significant improvement in information skills through course-integration. It appears that there has been an extensive amount written about integration of information skills instruction, while there is little published literature confirming its effectiveness. More research needs to be done to test effectiveness and find the best methods for integrating information skills in all curricular areas.

Chapter 3

Methodology

This study was conducted using a population of fifth grade students in the Cardinal Community Schools (Eldon, Iowa) during the winter semester of 1993. Two of the existing three sections of the fifth grade were used in the study. None of the students had been placed in classes by ability level. One section was the experimental group receiving course-integrated instruction of information skills taught cooperatively by the classroom teacher and the library media specialist. The control class received traditional instruction of information skills in isolation taught by the library media specialist independent of the classroom teacher.

It is recommended by Urbanik (1991) and Eisenberg and Berkowitz (1988) that integration begin by analyzing the status quo and clarifying goals and objectives of the school. Both the Cardinal Language Arts Curriculum Guide and the Cardinal Library Media Curriculum Guide were reviewed for specific information skills to be taught at the fifth grade level. These skills were incorporated into the planned lessons.

Urbanik (1991) describes the next step as analysis of learner characteristics. Van Vliet's (1984) discussion of the middle school student points to four characteristics which should be considered in planning a program of

instruction. This age group needs to be accepted by everyone and needs to build self-confidence. She also indicates that middle school students are easily bored and need activities that provide manipulation and movement and the opportunity to express themselves. Activities were, therefore, based on these and other observed characteristics in order to provide for these needs. Hands-on activities, initially in groups, characterized a large portion of the instruction. Activities providing a high possibility of student success were also chosen.

Objectives for both instruction groups covered alphabetizing, parts of a book (table of contents, index, glossary, copyright, spine), card catalog, encyclopedias, key words, general reference materials, and general classification (Dewey, Easy, Biography, and Fiction). Included in the objectives were task definition, information seeking, location and access, use, synthesis and evaluation skills (Eisenberg and Berkowitz, 1990). Objectives for the experimental group were developed with the classroom teacher.

Richardson (1991) suggests the use of short projects, especially for younger high schools students; the limited period of time allotted for this study required such short projects. (See Appendix A for integrated group lessons and Appendix B for isolated group lessons.) Due to very limited space in the media center, both classes were taught in their respective classrooms with the library media specialist

carrying in materials to be used for each lesson. The integrated class had a book cart of many materials from the Area Education Agency which was left in the room for use in their project.

The instructional period was every Monday, Wednesday and Friday for ten lessons. Each lesson for both groups lasted approximately 40 minutes, and all lessons took place in the morning. One week after instruction was completed, all students took the Iowa Tests of Basic Skills (ITBS). The Reference Section of the "Work Study Skills" subtest of ITBS consists of 42 items and covers alphabetizing, using a table of contents, index, dictionary, encyclopedias, and general reference materials (Iowa Tests of Basic Skills . . ., 1990). A group item analysis and breakdown between the two classes was requested for comparison of similarities and differences. Mean scores were used in determining if there was a significant difference using the t-test.

Chapter 4

Data Analysis

A decision was made to use the Iowa Grade Equivalent (IGE) scores from the Iowa Tests of Basic Skills (ITBS) because these scores are updated annually. The scores did not include students placed in special education programs; the school reports and receives results on those students separately. Each class then consisted of scores for 17 students in 1993.

The Iowa Grade Equivalent scores on the ITBS are on a developmental continuous score scale where the first digit of the score "indicates the grade and the second digit represents the month within the grade in which the typical pupil makes the corresponding raw score (ITBS Batteries Manual for Administrators, 28). Following this pattern, the typical fifth grade student at the time of this test should have been scoring at approximately 56. Eleven of the 17 students in the isolated class scored 56 or above with a range in scores from 35 to 82 on the Reference section of the "Work Study Skills" subtest, while only seven of 17 students in the integrated class scored 56 or above with a range of 30 to 68.

In calculating the significant difference of scores for the first hypothesis, the isolated class had only 12 student scores due to five of the students being new this year. The current (1993) IGE scores were compared to last year's

(1992) scores for each class to test the first hypothesis which was, there will be no significant difference at the .05 level between 1992 scores of the Reference section of the "Work Study Skills" subtest of the Iowa Tests of Basic Skills (ITBS) compared to the same scores for this year (1993) for either the students taught information skills by the course-integrated method or the students taught the same skills in isolation by the library media specialist alone. The t-test showed no significant difference between scores for the integrated class, but there was a significant difference between scores for the isolated class. Results of the t-test analysis for the isolated class are shown in Table 1 and results for the integrated class are shown in Table 2.

Table 1. Comparison of 1992 and 1993 Scores on ITBS Reference Section for Isolated Instruction Class

Isolated	Mean	Std Dev	N
1992	51.58333	9.57704	12
1993	60.91667	9.59601	12

t = 3.794, df = 11

Table value: t = 2.201 at .05, df = 11

Table 2. Comparison of 1992 and 1993 Scores on ITBS Reference Section for Integrated Instruction Class

Integrated	Mean	Std Dev	N
1992	47.41176	14.34424	17
1993	51.47059	11.50064	17

t = 1.642, df = 16

Table value: t = 2.120 at .05, df = 16

The null hypothesis is accepted, but there is a significant difference between scores for the isolated class.

The mean Iowa Grade Equivalent (IGE) score on the Reference section of the "Work Study Skills" subtest for the students taught information skills in isolation was 59.65, while the mean score for the students taught information skills integrated into the curriculum was 51.47. The second hypothesis tested was, there will be no significant difference at the .05 level among posttest scores of the Reference section of the "Work Study Skills" subtest of the Iowa Tests of Basic Skills of students taught information skills by the course-integrated method and the students taught the same skills in isolation by the library media specialist alone. The t-test showed no significant difference at the .05 level, and the null hypothesis is accepted. Table 3 shows the results of the t-test analysis.

Table 3. Comparison of 1993 Reference Section ITBS Scores by Type of Instruction

	Mean	Std Dev	N
Isolated	59.64706	12.34373	17
Integrated	51.47059	11.50064	17
t = 1.998, df = 32			

Table value: t = 2.042 at .05, df = 32

Other Observations

The Group Item Analysis report for both classes was reviewed. Table 4 shows the percent correct for each category of the Reference section of the "Work Study Skills" subtest of the ITBS, comparing the integrated class, the isolated class and the Iowa norms.

Table 4. Comparison of Percent Correct on Group Item Analysis

Category	Isolated	Integrated	Iowa
Alphabetizing	66	60	68
Using Table of Contents	87	76	76
Using Index	93	79	82
Using Dictionary	84	74	75
Encyclopedia	87	69	69
General Reference	69	65	61

The lowest percent correct for both classes was alphabetizing. In comparison to the Iowa norms, both groups were lower in three- and four-step alphabetizing, while the isolated group was ten percentage points higher than Iowa in two-step alphabetizing. While the General Reference percent correct also appears to be one of the lower scores, both classes were higher than the Iowa norm of 61.

The highest percent correct for both classes was on the seven items in the Using an Index section, where the isolated class scored above the Iowa percent correct on six items, five of them at 100% correct. The cross-reference was the most difficult item for both groups with the isolated class two points below the Iowa percent correct norm, while the integrated class was 20 percentage points lower than the Iowa norm on the same test item. On Using a Table of Contents, the isolated group scored a higher percent correct of between 5 and 13 percentage points than the Iowa norm on all seven items, while the integrated group scored more than 5 percentage points above the Iowa norm on only two items.

Chapter 5

Conclusions, Recommendations, and Summary

Conclusions

While the students are not "tracked" into similar ability classes, it appears that the isolated class has a higher ability level in general. Comparing the 1993 Reference section mean scores for both classes to their ITBS "Complete Composite" mean, as well as comparing the 1992 Reference section means for each class, shows the isolated class with consistently higher scores than the integrated class. Observation during instruction also indicated the integrated class to be more restless and somewhat less attentive. Both the ability level and behavior observations may partially explain why the results were more positive for the isolated class.

The significant difference between 1992 and 1993 scores for the isolated class may indicate that some instruction by the library media specialist will have a positive impact on student success with information skills. It may have been more apparent with the isolated class initially since their abilities appear to be higher anyway.

Due to time limitations and a previously set schedule, instruction for the integrated class began when the classroom teacher was ill, so the initial relationship between the researcher and those students was possibly weaker than the relationship with the isolated class whose

classroom teacher was there to introduce the researcher. While there did not appear to be a great difference in the researcher's rapport with one class or the other, perhaps that initial contact had some effect on the students' perception and attitude about the instruction.

Using the t-test results which show no statistically significant difference between the two classes for the current year's Reference scores, it would appear that both methods of instruction are valid for teaching information skills. This researcher is the only library media specialist for two buildings covering kindergarten through twelfth grades for approximately 750 students, so time constraints will not allow all classes at all grade levels to be taught as extensively by the library media specialist as was done for this study. However, since both methods appear to be valid and current literature promotes skills instruction through integration, it is the intent of the researcher to work as closely with as many teachers as is reasonably possible to integrate information skills into the curriculum.

One advantage that teaching information skills through integration provided was the classroom teacher's knowledge of individual students which helped in pairing and grouping, as well as with help in the subject area and the specific assignment. One disadvantage of integration was limited teacher-librarian cooperative planning time, especially since this researcher had responsibilities for kindergarten

through twelfth grades at three separate buildings and was at the elementary building only five hours per week.

Both methods have the advantage of developing rapport with the students, as well as presenting teachers and students with the idea of librarian as teacher. During the instruction, students asked how they could keep books which the researcher had introduced to them from the Area Education Agency, and after instruction, students have asked that the researcher buy specific books for the elementary library. Both of those incidents are valuable bi-products which probably would not have happened without the librarian-student contact made during instruction.

Over the ten lessons, the information skills were introduced followed by some practice time. The amount of time spent in both instruction and practice was not the ideal. Since time is limited, it is imperative that library media specialists work with the classroom teachers in information skills instruction for the benefit of keeping the importance of information skills visible, as well as the ultimate benefit of better educated students who will become functional citizens in the information world.

Recommendations

Since information skills is a process, continuous instruction at more than one point during the school year, as well as in future years might prove to have a more significant difference in students information skills abilities. Testing long-range retention of the skills might

provide more insight into the effectiveness of the two methods, as shown by Barrilleaux (discussed in Marchant, Broadway, Robinson, and Shields, 1984). Instruction over a longer period of time, possibly more than one year, or instruction at intervals throughout the year with the testing done at a later time after instruction may supply more insight into the effectiveness of the two methods discussed in this study.

While the ITBS is a valid indication of development for content, it tests only location skills and not the whole process of information skills including use, synthesis and communication of information which is the end result. Testing of the process, which may be over a longer period of time might provide different results. Library media specialists may need to identify another measurement to test results of information instruction. The ITBS also tests a variety of information tools, which may have been too numerous or broad for the limited amount of time in this study. It might be helpful to do the study by teaching and testing fewer skills or using a longer period of time to cover more information tools.

While as many variables as possible were controlled, there are many variables which cannot be controlled: previous instruction by teachers (current year and previous years), individuality of students, limitations of the ITBS. One recommendation would be that the study be conducted with

students at a grade level where the students have the same teacher to give even more control to the study.

Summary

The purpose of the study was to determine if there was a significant difference between teaching information skills in an isolated method by the library media specialist alone, or by integrating the skills into a curricular unit and teaching with the classroom teacher. Two fifth grade classes were each taught ten lessons by the two methods over a three and one-half week period of time. The students then took the ITBS a week later. Using the IGE scores of the Reference section of the "Work Study Skills" subtest, the t-test showed no significant difference between the two classes at the .05 level.

A t-test of the students 1992 fourth-grade IGE scores of the Reference section of the "Work Study Skills" subtest of the ITBS and their 1993 fifth-grade scores for the same test showed significant difference for the isolated class, but no significant difference for the integrated class. This may indicate some benefit to information skills instruction by the library media specialist.

It appeared that while the students were not placed in their respective classrooms by ability level, the isolated class had higher abilities in general and may have scored higher than the integrated class on the 1992 and 1993 Reference sections, as well as their "Complete Composite" mean for 1993, because of those abilities.

Many variables were controlled in this study, but there were also many variables which could not be controlled. Time limitations as well as individual student abilities are factors that affected this study. Careful investigation of all variables should be a major consideration of anyone who might attempt another such study.

Both methods of instruction are valid and consideration of all variables and information gathered in this study brings the researcher to the conclusion that the additional advantages of integration of information skills will benefit all involved -- students, teachers and library media specialist.

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Appendix A

Integrated Class Lessons

Task Definition

Objectives: Students will be introduced to task definition as the first step in the Big Six Information Problem-Solving Skills.

Motivation: Video - "Future Habitats"

Activities:

- Define problem / actual assignment
  - final product (written, oral, video, illustrations), time deadlines
- Identify information requirements
  - key words, elements needed - bibliography, specific information requested by teacher

Information Seeking

Objectives: Students will recognize the second step in the Big Six Skills as predicting possible sources and determining best sources for their information needs.
Students will be introduced to the pathfinder.
Students will review fiction vs. non-fiction as information sources.

Motivation: Reading from The Martian Chronicles.

Activities:

- Discussion of The Martian Chronicles as fiction vs. non-fiction.
- Small Group brainstorming of possible sources for planet research assignment, including human sources (librarian and/or subject expert).
- Introduction to pathfinder
  - Encyclopedia for background
  - Other reference books for background/statistics
  - Non-fiction books for more detail
  - Magazines for current information

Class discussion of best sources. Where do we look if we need definition, pronunciation, spelling, background, information about a certain person? Introduction of outside sources - public libraries & AEA.

Location/Access & Use of Encyclopedias

Objectives: Students will understand the purpose of encyclopedias as general background information containing facts and summaries. Students will realize encyclopedias are a part of the reference section in the library media center. Students will be introduced/reminded of importance of copyright dates. Students will use encyclopedia index and articles.

Motivation: Guided visualizing of an unfamiliar city from atop the tallest building. Students close their eyes as library media specialist gives directions and descriptions of what they are seeing. (To emphasize encyclopedia as overview)

Activities:

Class discussion of article location (index or volume) (Overhead of encyclopedia set - Planets, Planet Names Solar System)

Class discussion of subheadings, cross references

Pairs of students compare two encyclopedia articles covering the same planet by completing worksheet.

Encyclopedia Comparison

Planet:_____ Names:_____
Encyclopedia: _____ _____
Copyright Date: _____
Volume: _____
Pages: _____

Using the one-volume index, how many entries are there for _____ that are not about the planet? _____

What are the other entries about?_____

How many paragraphs are in the article? _____

Does this article have subheadings (bold type or underlined)? _____ What are the subheadings? _____
_____

What other subject headings did the article suggest you read for more information? (See Also) _____

Does this article have a picture or illustration? _____
If yes, what is it? _____

Does the article give pronunciation for the planet? _____

Write a one-sentence summary for each paragraph.

_____

_____

_____

_____

_____

_____

_____

What information is given in this encyclopedia that is not given in the other encyclopedia? _____
_____
_____

Put a star beside information that is given in both.

Which encyclopedia has the most information about _____?
_____

Which encyclopedia would you rather use for information?
_____
Why? _____

Location/Access & Use of Almanacs

Objectives: Students will realize that there are other reference sources for facts and summaries. Students will learn to use both indexes with the World Almanac. Students will recognize importance of using most current source. Students will recognize use of alternative subject headings.

Motivation: Interesting Fact about Planets/Solar System from almanac

Activities:

Pairs of students list all possible subject headings from "Quick Reference Index" that might provide information about the solar system. (Aerospace, Astronomy, Disasters, Discoveries & Inventions, Space Flights); followed by guided class discussion of more detailed general index.

Students will be given almanacs from different years and will compare latest "Manned Space Flight".

Students will use coded index to find information about planets, and then use general index to find specific planet.

Using Encyclopedia Comparison sheets, students will record any additional and/or supporting information found in almanac.

Key Word / Alternate Subject Headings

Objectives: Students will become aware of multitude of words which may be searched for information relating to the same topic (for this lesson space, planets). Students will understand that sometimes information may be found under more general or more specific terms.

Motivation: Presentation of crossword puzzle with several related terms, and help completing two or three of the terms.

Activities:

Classroom teacher and library media specialist will present examples of general to specific and specific to general relating to previously studied scientific areas. Students will then practice general to specific and specific to general with solar system terms in small groups or as a class.

Crossword puzzle developed by library media specialist for related space terms.

Location/Access of Books

Objectives: Students will understand the basic concept of classification system. Students will recognize card catalog as map/index to books in the library media center. Students will understand that card catalog is arranged alphabetically and review/practice those skills. Students will recognize the significance of the call number on the catalog card and the spine of the book. Students will be introduced to alternative subject headings on catalog card.

Motivation: "Dewey Rap" audio-cassette tape

Activities:

Students will have previously reviewed alphabetizing skills with classroom teacher and completed worksheet of arranged cards and headings taken from actual card catalog, confirming their answers with dictionary and/or card catalog.

Library media specialist and classroom teacher will lead class discussion on organization (closets, kitchens, grocery & department stores). Library media specialist will then present overview of Dewey Classification ten divisions. Students will become aware that if they have lots of time to browse (which is fun) they can go to a certain section to find books on the topic they want. Displaying several books so that students can easily see cover and title, they will indicate which book they believe might have the best information about:

Women in space	(Sally Ride)
Mercury	(Mercury)
Neptune	(Nine Planets)
Moon	(Footprints on the Moon or Eagle has Landed: Story of Lunar Exploration)
Aliens	(Search for Extraterrestrial Intelligence)
Soviet Space Men	(Cosmonauts in Orbit or Russians in Space)

Overhead of "Space" cards from catalog for discussion of call number, author, title, description, copyright, and alternative subject headings. Discussion of finding books by searching subject, but can also be found if we know the exact title, or that an author is noted for good books about our subject (Roy Gallant, Seymour Simon).

After classroom teacher and library media specialist review decimals, group of students will list in order, according to call number, their group of books.

After discussion of where to find needed pieces of bibliographic information on title page or verso and that this is also information needed for their research bibliography, students will be given blank catalog cards. With a sample showing placement for Call Number, Author, Title, Copyright, Publisher, students create a subject card catalog for planet/space related books previously borrowed from the AEA and kept on a separate book cart.

Students will chose a book for their planet research assignment from the school library media center or cart of books from the AEA.

Location/Access in Books

Objectives: Students will review and practice use of index, table of contents and glossary as access points to information within books.

Motivation: Shel Silverstein's "Planet of Mars" poem

Activities:

Overhead of actual Table of Contents from Astronomy Today. Students will choose which chapter would best have information about:

Neil Armstrong	(Humans in Space)
Mars, Venus & Earth	(Planets)
Rockets	(Launch Vehicles)

Overhead of actual Index from Moon Flights. Students will indicate which page we should turn to for information about:

Many astronauts	15-17, 19, 30, 32, 33, 37, 38
Buzz Aldrin (last name)	15, 16, 20, 25, 27, 28, 30, 34 (note same pages)
Rockets	9, 10, 24, 45
Saturn rocket	24
Apollo 15 (Be careful)	34, 37

Overhead of actual glossary from Moon Flights. Students will note that while definition may be determined by reading a certain page within the book, a quicker way is the glossary, which also gives pronunciation.

Use

Objectives: Students become aware of dated vs. current material. Students will practice with classroom teacher and library media specialist extracting and summarizing.

Motivation: Reading from 1953 The First Book of Space Travel and 1962 Go! The Story of Outer Space (Students listen for misinformation

Activities:

Students will be introduced to the most recent form of information by browsing through Odyssey magazines.

Using the same page of information groups of students will decide the main thought of each paragraph and tell the rest of the class using only five or six words.

Students will extract and summarize from their chosen book.

Biography

Objectives: Students will be introduced to biography as a source of information about people and understand their location in the Dewey classification.

Motivation: Show favorite baseball cards.

Activities:

Students will create their own biography "space" card about a scientist or astronaut relating to space.

Synthesis

Objective: Students will learn to organize/group like information together.

Motivation: Given a group of magazine pictures, small groups or pairs of students will organize the pictures into like groups and give a theme or title.

Activities:

With classroom teacher and library media specialist assistance, students will use their notes taken from the encyclopedia worksheet, almanac, and book to organize the information into paragraphs.

Evaluation

Objectives: Students will recognize their own responsibility in evaluating their product before they present it. Students will recognize their role as a participant and evaluator of their learning by completing an assessment form evaluating the information problem solving process.

Motivation: A chance to tell the library media specialist and teacher what they think!

Activities:

Pairs of students will work together to determine if they met the requirements of the assignment, if their product is as good as it can be, if they would have done anything differently.

Individual students will complete assessment form.

Evaluation

Activities:

How much did you enjoy:	Disliked				Enjoyed
Brainstorming for possible sources?	1	2	3	4	5
Guided visualizing for overview of city?	1	2	3	4	5
Comparing two encyclopedia articles?	1	2	3	4	5
Information search in World Almanac?	1	2	3	4	5
Making Biography Card?	1	2	3	4	5
Organizing Magazine Pictures?	1	2	3	4	5

Collection:

Materials I used were: Too Easy 1 2 3 4 5 Too Hard

Learning:

Compared to other assignments, this was: Less Enjoyable / Same / More Enjoyable

Compared to other assignments, I learned: Less / Same / More

Some of the things I learned about:

_____
_____
_____
_____
_____

Some things I wish were done differently:

_____
_____
_____
_____

Overall, the Big Six Information Problem-Solving Skills:
helped me were fun were boring
other: _____

(Adapted from Loertscher, 1988)

Appendix B

Isolated Class Lessons

Task Definition

Objectives: Students will be introduced to task definition as the first step in the Big Six Information Problem-Solving Skills.

Motivation: Jack Prelutsky's poem "Never Mince Words with A Shark"

Activities:

Define problem from sample assignment (do a research report on animals)
- final product (written, oral, video, illustration), time deadlines - what is the due date? is the teacher giving us class time or do we need to work on this at home?

Identify information requirements
- key words, elements needed (specific information requested by teacher - i.e. kinds of homes, food, country of origin; bibliography)
- questions we need to task ourselves - what kind of animals (wild, pets, fish, birds), how much information - how many pages or minutes?

Information Seeking

Objectives: Students will recognize the second step in the Big Six Skills as predicting possible sources and determining the best sources for their information needs. Students will be introduced to the pathfinder. Students will review fiction vs. non-fiction as information sources.

Motivation: Students browse through National Geographic World, Ranger Rick and National Wildlife.

Activities:

Discussion of a fiction book about animals vs. a non-fiction book about animals.

Small group brainstorming of possible sources, including human sources (librarian or subject expert)

Introduction to pathfinder
- Encyclopedia for background
- Other reference books for background/statistics
- Non-fiction books for more detail
- Magazines for current information

Class discussion of best sources. Where do we look if we need definition, pronunciation, spelling, background, information about a certain person. Introduction of outside sources - public libraries and AEA.

Location/Access & Use of Encyclopedias

Objectives: Students will understand the purpose of encyclopedias as general background information containing facts and summaries. Students will realize encyclopedias are a part of the reference section in the library media center. Students will be introduced/reminded of importance of copyright dates. Students will use encyclopedia index and articles.

Motivation: Guided visualizing of an unfamiliar city from atop the tallest building. Students close their eyes as the library media specialist gives directions and descriptions of what they are seeing. (To emphasize encyclopedia as overview)

Activities:

Class discussion of article location (index or volume) (Overhead of encyclopedia set - students determine which volume would be best for variety of terms given by library media specialist: Alps, Bronte sisters, copyright, diary, electoral college, The Federalist, greeting cards, hobbies, Independence Day, kaleidoscope, Liberty Bell, fashion modeling, New Year celebrations, origami, phonograph, Red Cross, stained glass, tricks & puzzles, ventriloquism, wind instruments)

Class discussion of subheadings, cross references

Pairs of students compare two encyclopedia articles covering the same topic by completing worksheet.

Encyclopedia Comparison

Topic:_____ Names:_____
Encyclopedia:_____ _____
Copyright Date:_____
Volume:_____
Pages:_____

Using the one-volume index, how many entries are there for _____? _____

What are the other entries about?_____

How many paragraphs are in the article? _____

Does this article have subheadings (bold type or underlined)? _____ What are the subheadings? _____

_____

What other subject headings did the article suggest you read for more information? (See Also) _____

Does this article have a picture or illustrations? _____
If yes, what is it? _____

Does the article give pronunciations? _____

Write a one-sentence summary for each paragraph.

_____

_____

_____

_____

_____

_____

_____

What information is given in this encyclopedia that is not given in the other encyclopedia?_____

_____

_____

Put a star beside information that is given in both.
Which encyclopedia has the most information about _____?

_____

Which encyclopedia would you rather use for information?

_____

Why?_____

Location/Access & Use of Almanacs

Objectives: Students will realize that there are other reference sources for facts and summaries. Students will learn to use both indexes with the World Almanac. Students will recognize importance of using most current source. Students will recognize use of alternative subject headings.

Motivation: Interesting fact from almanac

Activities:

Pairs of students will list subject heading under which they found information about given topics in both the Quick Reference Index and the General Index (i.e. corn (food in Quick Reference).

Students with different editions of the World Almanac will compare "Memorable Dates in U.S. History"

Students will use coded index to find information about sports, and then use general index to find specifics.

Students will complete almanac worksheet.

Location/Access of Books

Objectives: Students will understand the basic concept of classification system. Students will recognize card catalog as map/index to books in the library media center. Students will understand that card catalog is arranged alphabetically and review/practice those skills. Students will recognize the significance of the call number on the catalog card and spine of the book. Students will be introduced to alternative subject headings on catalog card.

Motivation: "Dewey Rap" audio-cassette tape

Activities:

Students will complete worksheet of arranged cards and headings taken from actual card catalog, confirming their answers with dictionary and/or card catalog.

Library media specialist will lead class discussion on organization (closets, kitchens, grocery & department stores). Library media specialist will then present overview of Dewey Classification ten divisions. Students will become aware that if they have lots of time to browse (which is fun) they can go to a certain section to find books on the topic they want.

Overhead of 796 divisions to discuss decimal meaning and arrangement on shelf.

Given a variety of books from the shelves, groups of students will list call numbers in correct order.

Displaying several books from one of the ten main divisions so that cover and title are easily visible, students will indicate which book they think might best give us information about specific terms.

Overhead of "Indians of North America" cards from catalog for discussion of call number, author, title, description, copyright, and alternative subject headings. Discussion of finding books by searching subject, but can also be found if we know the exact title or an author that is popular.

After discussion of where to find needed pieces of information on title page or verso, and that this is also the information needed for a bibliography, each student will make a catalog card for random-subject books borrowed from the AEA.

Key Word / Alternate Subject Headings

Objectives: Students will become aware of multitude of words which may be searched for information relating to the same topic. Students will understand that sometimes information may be found under more general or more specific terms.

Motivation: Presentation of crossword puzzle with several related terms, and help completing two or three of the terms.

Activities:

Library media specialist will present examples of general to specific and specific to general (Animals - zoo, pets, wild - monkey, dog, tiger; Buick - passenger car - automobiles - transportation) Groups of students will then practice with suggested terms (food, furniture, writing utensils, flowers, trees, communication, bodies of water, cherries, watch, Eldon.

Crossword puzzle developed by library media specialist for Iowa history terms.

Location/Access in Books

Objectives: Students will review and practice use of index, table of contents and glossary as access points to information within books.

Motivation: Jack Prelutsky poem from The New Kid on the Block (found by using the index)

Activities:

Overhead of actual Table of Contents from Animals of the Sea and Shore. Students will choose which chapter would best have information about:

Lobster	- "Many Legs"	Seal	- "Fur"
Shark	- "Fins"	Oyster	- "Shells"
Starfish	- "Sharp Spines"	Man-O-War	- "Soft Bodies"

Overhead of actual Index from Animals. Students will indicate which page we should turn to for information about:

reptiles	p. 24-39, 40	piranha	p. 28
backbone animals	p. 22-58	fish	p. 7,
shrimp	p. 12		21-28, 33, 40
crustaceans	p. 12	snakes/fangs	35

Overhead of actual glossary from Animals. Students will note that while definition may be determined by reading a certain page within the book, a quicker way is the glossary.

Use

Objectives: Students become aware of dated vs. current material. Students will practice extracting & summarizing.

Motivation: Reading from outdated book.

Activities:

Students will review most recent form of information by browsing through Odyssey and National Geographic World magazines.

Using the same page of information groups of students will decide the main thought of each paragraph and tell the rest of the class using only five or six words.

Biography

Objectives: Students will be introduced to biography as a source of information about people and understand their location in the Dewey classification.

Motivation: Share favorite baseball cards.

Activities:

Students will create their own biography card about any person they can find information about in the library.

Synthesis

Objectives: Students will learn to organize/group like information together.

Motivation & Activity: Given a group of magazine pictures, small groups or pairs of students will organize the pictures into like groups and give a theme or title.

Evaluation

Objectives: Students will recognize their own responsibility in evaluating their product before they present it. Students will recognize their role as a participant and evaluator of their learning by completing an assessment form evaluating the information problem solving process.

Motivation: A chance to tell the library media specialist what they think!

Activities:

Discussion of things to look for when finishing a project (were the teacher requirements met, is the product as good as it can be, could we have done something better?

Individual students will complete assessment form.

Evaluation

Activities:

How much did you enjoy:	Disliked				Enjoyed
Brainstorming for possible sources?	1	2	3	4	5
Guided visualizing for overview of city?	1	2	3	4	5
Comparing two encyclopedia articles?	1	2	3	4	5
Information search in World Almanac?	1	2	3	4	5
Making Biography Card?	1	2	3	4	5
Organizing Magazine Pictures?	1	2	3	4	5

Collection:

Materials I used were: Too Easy 1 2 3 4 5 Too Hard

Learning:

Compared to other assignments, this was: Less Enjoyable / Same / More Enjoyable

Compared to other assignments, I learned: Less / Same / More

Some of the things I learned about:

_____
_____
_____
_____
_____

Some things I wish were done differently:

_____
_____
_____
_____

Overall, the Big Six Information Problem-Solving Skills:
helped me / were fun / were boring
other: _____