

EFFECTIVENESS OF SELF-DIRECTED LEARNING ACTIVITY
PACKETS VERSUS LECTURE AND NOTE TAKING METHOD
OF INSTRUCTION IN TECHNOLOGY EDUCATION

by

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A Research Paper

Submitted in Partial Fulfillment of the Requirements for the
Master of Education Degree With a Major in
Technology Education

2 Semester Credits

A handwritten signature in black ink that reads "Michael Galloy Ph.D." in a cursive style.

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ABSTRACT

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Effectiveness of Self-Directed Learning Activity Packets Versus Lecture
and Note Taking Method of Instruction In Technology Education

Technology Education Dr. Michael Galloy June, 2001 34 pages

American Psychological Association Publication Manual

The purpose of this study was to determine which method of instruction allowed students to achieve a higher score on a written post-test. It was of interest to learn if students perform significantly different when the method of instruction is delivered in different formats. The results determined which method of instruction was most effective, as indicated by student performance on a written test. A comparison using post-test scores did serve as an indicator to evaluate each method of instruction.

Student scores on the written post-test ranged from a low of 20 to a high of 88 on the self-directed learning activity packet. Scores on the lecture method post-test ranged from a low of 18 to a high of 94. Since the range of scores was similar for each method of instruction, both methods are a valid way of teaching students enrolled in Technology Education courses. Learning, whether instructor driven or student driven, appears to be comparable.

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Chapter 1

Introduction

In the last decade, the traditional course of Industrial Arts changed its title to Technology Education. This name change allowed a broader content area that is classified into four groups. It is now possible for instructors to present course content using a wide variety of teaching methods.

The search continues to determine the best way for students to learn. The traditional method involves the instructor lecturing or demonstrating while students take notes. In Technology Education, the latest instructional method revolves around self-directed learning activity packets. According to Petrina (1993), "currently, but unique to the area of technology education, the same thing is happening with 'modules', or more generally, the modular approach to technology education" (p. 72). Welty and Wei-Kun collaborated with Petrina by stating (1995), "a modular approach using individualized instructional materials is being implemented across the country" (p. 321).

In the packets, students find explicit directions to complete a specific activity. Bro stated (1974),

the primary concern was that it enable the student to know what was expected of him, why it was important, where he could obtain information and assistance, and what activities he should perform to acquire the knowledge and abilities expected of him (p.104).

If students experience difficulties, the instructor is available as a resource. Gloeckner and Adamson reinforced this point by stating (1996), "It is equally important that an active and visionary leader or facilitator guide students

through our content of doing while using various methods of instruction” (p. 18). When not serving as a resource, the instructor continually monitors student progress. Luna added (1998), “I would like to know that what I do in my classroom is in the best interests of the students, and I scrutinize and evaluate everything I teach to promote that notion” (p. 26).

The traditional method is teacher centered. Johnson believed (1997), “most teachers still approach education by the shotgun method, aiming their shotguns of knowledge at the students, pulling the trigger, and hoping they hit a few” (p. 32). Students focus on what the teacher says and does. Since the responsibility is on the teacher, students have the freedom to daydream or engage in undesirable behaviors. Traditional lecturing is effective and efficient for the teacher, but may not be the most effective and efficient method for the learner. In self-directed learning, students are more likely to stay on task.

Barnhill observed that the packet approach (1998), “inspire(s) students to excel and shed their ingrained notions about education, motivating them...” (p.30). Mulford agreed with Barnhill (1995), “[students] are learning more and behaving better” (p. 34). Students are responsible for accomplishing a task in a specific amount of time. Nejad reinforced this concept when he stated (1998), “the learner is forced to assume responsibility for executing the process...” (p. 12). The consideration of being off task is lessened by using this method. This approach promotes students to take the initiative to complete an activity. It also encourages them to consult the resource person, as needed.

Being challenged is an important concept students should understand to succeed in society. Students will face obstacles in everyday living. Pullies questioned the traditional method, by asking (1997), “Where do they have an opportunity to apply the lab experiences to real world situations?” (p. 28). The

self-directed learning activity packet method is applicable to real life situations in that many businesses assign employees task that require self-direction. Magid believed (1998), "America's educational system must be upgraded so that future graduates are qualified for jobs in the next millennium" (p. 125). Today's students need a different set of intellectual skills and abilities than those of previous generations. Technology is growing at an exponential rate of change; therefore, to stay current, students must become technological literate. These self-directed learning activity packets are a step in this direction. Gonzales stated (1997), "As learners we realize best how important it is for us to be able to understand the content and apply it to our everyday lives" (p. 61). Quam, Smet, and Ivey collaborated by saying (1998), "this is the new basic: real-life preparation for the work world they will enter" (p. 26). Student's need an education that prepares them for a lifetime of learning, so they can make the necessary adaptations for future challenges. When students become active participants in their learning, they develop a purpose or understanding for the learning.

Not everyone agrees that self-directed learning activity packets prepare students for the future. Providing a different opinion is Hutchinson who commented in an article by Daugherty and Foster with (1996), "I do not see modules as particularly effective in providing students with the transferable tools they need to solve problems in the larger world" (p. 28). deGraw and Smallwood stated (1997), "modular instruction does not provide everything necessary to develop skilled thinkers and workers for a global economy and work force" (p. 2).

Up to this point, statements have been made about self-directed learning activity packets. Zuga stated (1999), "gone are the interactions with other

students as they work and plan together and observe each others projects” (p. 2). There are opinions for both methods of instruction. Is it possible that student performance will be the same when the post-tests are compared? According to Clark as cited in Mackenzie and Jansen (1998), “other research indicated that when two lessons are designed using similar instructional methods but presented through different media, the results are pretty much the same” (p. 64). Gokhale collaborated with Clark by stating (1991), “There was no significant difference between the two methods of instruction” (p. 30).

Statement of Problem

Different methods of instruction are being considered for sixth graders who are required to take a nine week Exploring Technology course at Horace Mann Middle School in Neenah. Currently, the instructor delivers concepts by lecturing and students take notes. The alternative method being explored is a self-directed learning activity packet. The department is interested in learning which delivery method encourages students to achieve at their highest level. The present approach has been in existence for several years. Throughout the years, no systematic study has been done to determine if the current delivery method of instruction best represents the students comprehension. The department is interested in studying which method of delivery will allow students to best demonstrate their comprehension on a written test.

Purpose of the Study

The purpose of this study was to determine which method of instruction allowed students to achieve a higher score on a written post-test. According to Born, Gledhill, and Davis (1972), “examination performance of students in the personalized sections was found to be superior to that of students in the lecture section” (p. 33). It is of interest to learn if students perform significantly

different when the method of instruction is delivered in different formats at Neenah middle schools. The results determined which method of instruction was most effective, as indicated by student performance on a written test. A comparison using post-test scores will serve as an indicator to evaluate each method of instruction.

Research Questions

1. What were students scores on a written post-test using the self-directed learning activity packet method of instruction?
2. What were student scores on a written post-test using the lecture and note taking method of instruction?
3. Were self-directed learning packets an effective way of teaching students enrolled in technology education courses?

Significance of the Problem

Currently, Technology Education programs are experiencing changes. One of these changes is in the presentation method of the material. The delivery style needs to change as societal needs change. Eisner stated in an article written by Wright (1998), "But change, really, is the only constant" (p. 41). Self-directed learning activity packets are a different method of instruction which would impact how students learn. Change is not bad, just different. With this knowledge, educators will have a basis for making program changes.

Limitations

1. The self-directed learning activity packet was designed, evaluated, and implemented by the researcher.
2. The subjects are randomly selected which makes the results universal to the entire sixth grade.
3. The test instrument was instructor developed.

4. The time the classes meet are not randomly selected which could effect the results.

Definition of Terms

Self-directed Learning Activity Packets - a self-contained package that contains all necessary information that allows students to learn a particular activity at their own pace.

Chapter II

Review of Literature

This chapter is divided into two sections. One section describes the lecturing style of delivery and the other describes self-directed learning activity packets. The purpose of this chapter is to inform readers of educational theories, research, and observations related to these topics.

Education

Education is the main component of any society. The goal of educators is to provide students with a wide variety of information needed to succeed. When educators instruct effectively, can students achieve at a higher level? Are educators instructing in such a way that students are able to get the most out of a lesson?

The most popular method of instruction is lecturing. Lecturing usually takes place in front of a group of students. Since lecturing is one-way communication, instructor enthusiasm plays a major role in keeping students interested. Is it possible that there is a more effective method?

The way students are tested remains virtually the same, too. With rapid advancements in technology and the knowledge students have at their fingertips, instructional methods need updating. Students need to be prepared for the future.

Students' school schedules are structured. They have the same class, on the same day of the week, at the same time. All this is regimented and does not take into account individual differences. Can teaching effectiveness be improved through a different instructional method?

After years of teaching, instructors become comfortable with their methods of instruction. Should they step back and examine their teaching method? Are they really preparing students to meet the future challenges? Instructors looking toward the future will be using different techniques to get their point across (Gloeckner and Adamson, 1996).

Are students learning through an effective method? Our educational systems can be upgraded in order to meet future needs of students (Magid, 1998). Upgrading the system will educate students to solve problems and look for answers on their own. With this approach, students can learn by themselves and from one another. Students need to know how to learn, because their education will never stop: they become lifelong learners (Glines, 1986).

Technology Education is one course where the curriculum has changed. Industrial Arts is a phrase with which many Technology Education instructors are familiar. In the Technology Education curriculum, there are four major systems of technology. These systems include communication, transportation, manufacturing, and construction. According to A Guide To Curriculum Planning In Technology Education, welding, printing, woodworking and other areas associated with Industrial Arts have been eliminated (Wisconsin Department of Public Instruction, 1988).

Technology has been around for a long time. Years have passed since the agricultural era, when people lived off the land. Gone too is the Industrial Revolution, when the factory system was discovered. In this current stage of the information age, many inventions are based on electronics and the computer.

Technology has a profound impact on our day-to-day living. It would be very difficult to go through a single day without being affected by some type of

technology. Change can be difficult to accept, but with technology advancing like it is, it is here to stay. Everyday vocabulary has changed to include words such as lasers, computers, microwaves, facsimile machines and compact disks. By studying technology, people will have a better understanding of the technological world and realize its benefits (Hacker and Barden 1993). For example, correspondence can be immediate with the use of facsimile machines or surgeries can be performed with few or no incisions using lasers.

Technology is defined by Hacker and Barden (1993) as “the use of knowledge to turn resources into goods and services that society needs” (p. 4). This definition is helpful when analyzing technology for educational purposes. Problem solving skills are important steps in this process. This skill allows students to demonstrate their creative ability by turning resources into a solution for a problem.

Students need to be exposed to technology for various reasons. Our society is a technological one. Today, people need to understand, use, and control technology to survive (Hacker and Barden 1993). Our students are the future and will require all this knowledge to live healthy and be productive members of a highly technological society.

Instructional Methods

In the past, the most common method of instruction is the instructor lecturing and students taking notes. This method of instruction is efficient for the instructor and provides control over learning. Accordingly, (George and Alexander 1993), “all persons involved realize that their job is to pursue the academic objectives which have been set for them, there is no other choice” (p. 149). Students are also familiar with this technique of instruction. Is this the best method by which students learn? Student involvement is minimal with this

technique of instruction. With the instructor verbalizing information, students write what they think is important. With the teacher directed approach, students have minimal opportunity for input or questions (George and Alexander 1993). Does this mimic the style of everyday living? Are people constantly being addressed and asked to decide what is crucial? In the business world, teams of workers are employed to solve problems by arriving at the best possible solution. When instructors lecture, the role of the student is a passive one.

Current instructional methods in Technology Education are more individualized. The trend in Technology Education is to use modules to expose students to the systems of technology. What is a modular approach? Welty and Wei-Kun defined it as an (1995), "approach using individualized instructional materials..." (p. 321). The self-directed learning activity packets are self-instructional, self-paced, student directed, and place the responsibility for learning on the student. The role of the student is active rather than passive. Self-directed learning activity packets provide students with an opportunity to develop their self-esteem and an increased level of achievement in the content area. This technique allows students to work through the material in a systematic, efficient, and timely manner. The end results are achieved when students work through the procedural sequence.

The traditional lecturing method is an efficient way for the instructor to disseminate content to all students at the same time. By adding a discussion to the lecture, students are more involved. Students will also ask questions indicating interest. Every student is unique. Will this method work for everyone, or is there a better way?

The definition of a educational system is the area of study that deals mainly with methods of teaching and learning in schools (Merriam and Webster,

1985). Individualized instruction is a method by which the content is more personalized to the student. Students play an active role in the learning process. Students have the opportunity to work by themselves or in a small group. Students can make choices which stimulate the thinking process. The instructor is available in these situations to provide assistance on individualized basis (George and Alexander, 1993).

In the past, as it is today, the primary goal for a educational system is to provide effective instruction for the learner (George and Alexander, 1993). The theory is the instructor has information that the students need to know. Helping students receive this information is the objective. Instructors are aware of the fact that students have unique differences. Information needs to be presented in such a way that it addresses these differences. In an article by Williamson, a principal remarked (1998), "I just can't seem to get the staff to change the way they teach; most of them have been teaching for years, and they're not excited about changing their ways".

Individualized instruction is one way to meet the needs of students. The content is not designed for any particular learner level, so students are able to complete the competencies with minimal assistance. A self-directed learning activity packet is a method of communicating between a student and/or small group of students and the instructor. The content of a particular topic or activity is explained through the use of self-directed learning activity packets. With this method the teacher sheds the role of presenter, demonstrator, driller and questioner, and now takes on the role of facilitator, initiator, monitor, coach, and coordinator (George and Alexander, 1993).

Self-directed learning activity packets can be developed by an instructor for a specific unit or can be purchased as a unit from vendors. Many times, the

purchased units need modifications to fit the program at particular locations. In any event, the student benefits from the use of packets.

Self-Directed Learning Activity Packets

Using the self-directed learning activity packet method of instruction, a classroom of students could be divided into small groups or teams. This teaming approach allows students to develop cooperative skills. These teams would each receive a different topic. Once the team has its topic researched, it could report back to the entire class. This method allows a variety of topics to be covered in shorter amount of time. When using this technique, time is used efficiently and students are playing an active role in their learning.

Self-directed learning activity packets provide information to students on specific topics. The packets contain introduction, objectives, expectations, procedures, allotted time, related readings, pre and post evaluation measures, and a list of required supplies (George and Alexander 1993). Everything students need to complete the task would be addressed in the self-directed learning activity packet. A combination of the self-directed learning activity packets and some degree of freedom motivates students.

When designing self-directed learning activity packets, many components need to be addressed. For example: Will the learner have adequate time to achieve the task at an acceptable level? Do the students have the knowledge and understanding necessary to complete the task? Can students formulate questions to ask when additional information is needed? Do students have the necessary motor skills or movement ability that may be required? In regard to personal development, is the student self-disciplined, willing to put forth effort, and willing to follow directions? Is the student mature enough to be a self-motivated learner?

Self-Directed Learning Activity Packets Versus Lecturing

Research indicated one advantage of self-directed learning activity packets: they allow students to learn more (Mulford, 1995). When students learn more, will they achieve higher test scores? In individualized instruction, students are responsible for the learning (Nejad, 1998). Are higher test scores the outcome when students are responsible for their learning?

One advantage of the lecturing method is that students focus on the content that the instructor is delivering. When students work in small groups, it's possible for them to be off task. If students study materials, will there be a difference on a test score depending on which method of instruction used?

Feedback

One way of evaluating teacher effectiveness is through student feedback. Given the option which method of instruction would students prefer? If the lesson is presented enthusiastically, student interest should be high. Some students might have specific reasons why they prefer the large group method over the small group method. The opposite could also be true. Students could suggest some ways of improving the method of instruction. The focus remains, provide needed information and keep students interested.

Conclusion

Research indicates that self-directed learning activity packets are an important instructional strategy to be employed in middle schools (George and Alexander, 1993). Self-directed learning activity packets are the current trend in newer Technology Education programs in the nation and particularly in Wisconsin. When comparing these two methods of instruction there is no significant difference on post-test scores (Gokhale, 1991). The researcher will test these methods to determine what the differences are, if any.

Chapter III

Methodology

Purpose of the Study

The purpose of this study was to determine which method of instruction allowed students to achieve a higher score on a written post-test. According to Born, Gledhill, and Davis (1972), "examination performance of students in the personalized sections was found to be superior to that of students in the lecture section" (p. 33). It is of interest to learn if students perform significantly different when the method of instruction is delivered in different formats at Neenah middle schools. The results determined which method of instruction was most effective, as indicated by student performance on a written test. A comparison using post-test scores will serve as an indicator to evaluate each method of instruction.

Subjects

The subjects of this study were sixth grade students in Exploring Technology classes at Horace Mann Middle School in Neenah, Wisconsin. There are two classes of Exploring Technology students. The Exploring Technology class is required of all students, males and females, on a daily basis, for nine weeks. When students enroll in the middle school, the computer automatically assigns them to one of the two classes. The average class size is 24. Both classes were used in this study.

Methodology

A self-directed learning activity packet on Technology In a Changing World was used by one section. The other section covered the same material using the lecture and note taking method of instruction. In both methods of

delivery, all instructions and objectives were stated verbally before beginning the activity.

No pretest was administered because this was the students first exposure to technology education. The post-test used was previously administered and analyzed using item difficulty and item discrimination analysis methods. This analysis indicated questions needing improvement. These questions were revised to make the post-test more reliable. The cognitive exam has a variety of questions including true/false, multiple choice, matching, completion, essay, and problem solving. The same exam was used to evaluate both classes.

The data from the exam results was analyzed separately. Class averages were calculated for each method of delivery. The averages were compared by quarters to determine differences.

The self-directed learning activity packet was designed, developed, and implemented by the instructor. Subjects were randomly assigned to groups. The test instrument was developed by the instructor. The same instructor delivered both methods of instruction, which provided continuity.

Procedures

The procedure for this study was implemented during the 1999-2000 school year in a period of three consecutive days. Two days to cover the material and one for the post-test. This time frame allowed the study to be repeated four times throughout the school year. There were two sections each quarter. A self-directed learning activity packet was used in one of the two sections. The lecture and note taking method was used in the other section. Both methods covered the same material, in one class period of 50 minutes. The following day, both sections received the identical post-test, completing it in

the class period.

Data Analysis

Upon completion of the written post-test, calculations were made. A mean score was calculated by adding post-test scores of students and then dividing the number by the total number of students. The mean score was calculated twice. Once, for students who used the self-directed learning activity packet method of instruction. It was also calculated for students who received the lecture and note taking method of instruction. The data was used to answer the research question of this study.

Chapter IV

Analysis of the Study

During the 1999-2000 school year, students enrolled in the sixth grade Exploring Technology course participated in a study to determine if there was a difference between self-directed learning activity packets and the traditional lecture method. A post-test was given on chapter 1 of the textbook Living With Technology by Michael Hacker and Robert Barden. This chapter titled, "Technology In A Changing World" is material that is part of the course curriculum. There were two sections of this class, second and third hours. A total of 198 students participated.

During first and third quarter, the second period class received the self-directed learning activity packet. Third hour received the information by the lecture method. In the second and fourth quarter, the methods of delivery were reversed between the hours. Meaning, second hour received the lecture method and third hour the self-directed learning activity packet.

After each group mastered chapter 1 material, the post-test was administered. The test was scored and analyzed to determine if there was a difference between self-directed learning activity packets and lecture method of instruction.

The scores of these tests are listed on the next page. The test was valued at 100 points.

First Quarter

self-directed learning method lecture method
(score-number of students who achieved that score)

| | |
|--------------|-------------|
| 81 | 87 |
| 80-II | 82 |
| 79-II | 81 |
| 76-II | 80-II |
| 73 | 79 |
| 72 | 78-II |
| 71-III | 75 |
| 69 | 74-II |
| 67 | 73 |
| 66 | 72 |
| 63 | 68 |
| 61 | 66 |
| 58-II | 63 |
| 56 | 62 |
| 54 | 61 |
| 52 | 60-II |
| 50-II | 59 |
| _____ | 58 |
| total: 1613 | 55 |
| 24 students | 46 |
| 67.2 average | _____ |
| | total: 1671 |

24 students
69.6 average

Second Quarter

| lecture method | self-directed learning method |
|--|-------------------------------|
| (score-number of students who achieved that score) | |
| 86 | 88 |
| 84 | 80 |
| 82 | 74 |
| 78 | 70-III |
| 76 | 68-II |
| 70-II | 66 |
| 68 | 62 |
| 66 | 60-II |
| 64 | 58 |
| 62-III | 56-II |
| 54 | 50-II |
| 46-II | 44 |
| 44-III | 42-III |
| 40-II | 36 |
| 26 | 34 |
| 18 | _____ |
| _____ | total: 1458 |
| total: 1438 | 25 students |
| 25 students | 58.3 average |
| 57.5 average | |

Third Quarter

self-directed learning method lecture method

(score-number of students who achieved that score)

| | |
|--------------|-------------|
| 86 | 88 |
| 82 | 86-II |
| 80 | 84 |
| 76 | 80 |
| 74 | 76 |
| 68-II | 70 |
| 66 | 68-II |
| 63 | 66 |
| 62 | 64-II |
| 60 | 62 |
| 58 | 52 |
| 56 | 50 |
| 54-II | 48-II |
| 50-III | 44 |
| 46 | 42-II |
| 42 | 40-II |
| 32-II | 38 |
| 30 | 36 |
| 20 | 34 |
| _____ | 30 |
| total: 1359 | 26 |
| 24 students | _____ |
| 56.6 average | total: 1532 |

27 students
56.7 average

Fourth Quarter

lecture method self-directed learning method
(score-number of students who achieved that score)

| | |
|-------------|-------------|
| 94 | 82 |
| 92 | 80 |
| 90-II | 76 |
| 86 | 72 |
| 80 | 70-II |
| 78-II | 68 |
| 76-III | 66-II |
| 70-III | 64 |
| 62 | 62-II |
| 60 | 60 |
| 58 | 58 |
| 56 | 56-II |
| 52 | 54 |
| 50 | 52 |
| 46 | 50 |
| 44 | 48-II |
| 42 | 42 |
| 40 | 36 |
| 32 | 24 |
| <hr/> | |
| total: 1668 | total: 1422 |

25 students
66.7 average

24 students
59.2 average

The mean score (this being the mathematical average of scores) on the post-test for quarters one through four are 67.2, 58.3, 56.6, and 59.2 respectively in the self-directed learning packet group. This suggests a 60.3 average for students using the self-directed activity packet throughout the year. Mean scores of 69.6, 57.5, 56.7, and 66.7 were calculated for quarters one through four respectively for the lecture method. This indicates a 62.6 average for the year by students in the lecture method.

The point difference between the self-directed learning packet and lecture method is 2.3. This is a relatively small amount indicating either form of instruction should yield the same results. Learning, whether instructor driven or student driven, appears to be similar.

Chapter V

Summary

Purpose of the Study

The purpose of this study was to determine which method of instruction allowed students to achieve a higher score on a written post-test. According to Born, Gledhill, and Davis (1972), "examination performance of students in the personalized sections was found to be superior to that of students in the lecture section" (p. 33). It is of interest to learn if students perform significantly different when the method of instruction is delivered in different formats at Neenah middle schools. The results determined which method of instruction was most effective, as indicated by student performance on a written test. A comparison using post-test scores will serve as an indicator to evaluate each method of instruction.

The subjects were sixth grade students enrolled in the Exploring Technology course. This course is required of all students, male and female, on a daily basis for nine weeks. The post-test was instructor developed. This instrument was previously administered and analyzed using item difficulty and item discrimination analysis methods. Any questions needing improvement were revised to make the post-test more reliable. This cognitive exam has a variety of questions including true/false, multiple choice, matching, completion, essay, and problem solving. Students who received the self-directed learning activity packet had two days to comprehend the material and be prepared for the post-test on the third day. Students who received the lecture method were on the same time table.

This study was conducted four consecutive quarters during the 1999-

2000 school year. There were two sections each quarter. One section received the self-directed learning activity packet and one the lecture method. The mean score was calculated for each group, each quarter. A 2.3 point difference was determined between the self-directed learning activity packet and the lecture method on the post-test.

Restatement of the Problem

Different methods of instruction were being considered for sixth graders who are required to take a nine week Exploring Technology course at Horace Mann Middle School in Neenah. Currently, the instructor delivers concepts by lecturing and students take notes. The alternative method being explored is self-directed learning activity packet. The department is interested in learning which delivery method encourages students to achieve at their highest level. The present approach has been in existence for several years. Throughout the years, no systematic study has been done to determine if the current delivery method of instruction best represents the students comprehension. The department is interested in studying which method of delivery will allow students to best demonstrate their comprehension on a written test.

Methods and Procedures

The procedure for this study was implemented during the 1999-2000 school year in a period of three consecutive days. Two days to cover the material and one for the post-test. This time frame allowed the study to be repeated four times throughout the school year. There were two sections each quarter. A self-directed learning activity packet was used in one of the two sections. The lecture and note taking method was used in the other section. Both methods covered the same material in one class period of 50 minutes. The following day, both sections received the identical post-test, completing it in

the class period.

Major Findings

The mean score (this being the mathematical average of scores) on the post-test for quarters one through four are 67.2, 58.3, 56.6, and 59.2 respectively in the self-directed learning packet group. This suggests a 60.3 average for students using the self-directed activity packet throughout the year. Mean scores of 69.6, 57.5, 56.7, and 66.7 were calculated for quarters one through four respectively for the lecture method. This indicates a 62.6 average for the year by students in the lecture method.

Conclusion

Student scores on the written post-test ranged from a low of 20 to a high of 88 on the self-directed learning activity packet. Scores on the lecture method post-test ranged from a low of 18 to a high of 94. Since the range of scores is similar for each method of instruction, both methods are a valid way of teaching students enrolled in Technology Education courses. Learning, whether instructor driven or student driven, appears to be comparable.

Recommendations

Recommendations Related to This Study

Students achievement on the same post-test would be similar if content material was delivered by self-directed learning activity packets or by lecture method of instruction. Either style of delivery could achieve the same results. Since the current trend in this district is student driven instruction, student knowledge on comprehension should not be affected. Students enjoy this type of instruction, are having fun, and this district should continue to update its curriculum with this type of instruction.

Recommendations for Future Study

The self-directed learning activity packet used in the study required students to comprehend what they were reading. Self-directed learning activity packets are now available where a computer can read the information to the students. Some packets even test the students knowledge and won't allow them to continue until a basic level of comprehension is mastered.

By testing more than one self-directed learning activity packet, the additional information might indicate a more significant difference. Some self-directed learning activity packets may be better designed, depending on type used. It is questionable if additional time was given to students to fully comprehend the material if the results would be the same.

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Name _____
Period _____

TECHNOLOGY IN A CHANGING WORLD - TEST

You have this class period to finish this test.

Directions: Determine whether each of the following statements is true or false. If the statement is true, circle the "T" preceding the statement; if the statement is false, circle "F." There are two points for each correct response.

- T F 1. During the Stone Age tools were made from bones and wood.
- T F 2. Scientists develop systems to communicate information.
- T F 3. In the Bronze Age, weapons were made from iron.
- T F 4. Technologists build space shuttles and satellites.
- T F 5. Henry Ford is often called the "father of mass production."
- T F 6. During the Iron Age, people made tools from a mixture of copper and tin.

Directions: For each of the questions, select the correct response from among the four listed. Circle the correct response. There are two points for each correct response.

7. The study of why natural things happen the way they do is called
- a) Technology
 - b) Health
 - c) Social Studies
 - d) Science

8. Who developed the first manufacturing system?
- a) Richard Arkwright
 - b) Henry Ford
 - c) Orville Wright
 - d) Karl Benz
9. The use of knowledge to turn resources into goods and services that society needs is called
- a) Mathematics
 - b) English
 - c) Technology
 - d) Science
10. What is the process of making iron from ore called?
- a) refining
 - b) smelting
 - c) harvesting
 - d) recycling
11. Which of the following technologies fill our needs and wants?
- a) television
 - b) automobile
 - c) new medicines
 - d) all the above

Directions: Match each word to the descriptive response. Insert the letter identifying your response in the blank space to the left of the event. There are two points for each correct response.

| <u>Event</u> | <u>Response</u> |
|--------------------------|--|
| () 12. Agricultural Era | A. Affected by products of technology |
| () 13. Industrial Era | B. Learn how minerals in the earth were formed |
| () 14. Routine | C. Inventions based on electronics and computers |
| () 15. Scientist | D. Makes useful products out of materials |
| () 16. Technologist | E. Machines replaced human and animal muscle power |
| | F. People lived off the land |
| | G. Produces cars at a rapid rate |
| | H. Irrigation to increase crop yield |

Directions: Read the statement carefully and respond by supplying the correct answer in the space provided. There are two points for each correct response.

17. During the Information Age, the rate of change is described as _____.

18. Using a plow, people were able to grow their own _____.

19. During the Bronze and Iron Age, tools and other items were made of _____.

20. The time when many people were employed in factories was the _____.

21. During the Industrial Revolution, laws were passed to prevent factory owners from hiring children below a certain _____.

Directions: Read the question critically, formulate an outline, prepare your response, and check your response for possible errors. There are five points for each item and five points for correct grammar, spelling, punctuation, and penmanship.

22. Everyday you have a routine, explain yours before arriving at school.

23. Explain why Technology is responsible for a great deal of the progress of the human race.

24. Explain what it means to be technologically literate.

25. Explain why the factory system produces goods quickly and cheaply.

26. Explain what peoples basic needs and wants are that technology satisfies.

Directions: Read the item carefully, show any calculations you made, and indicate your solution to the problem. There are eight points for showing the correct response.

27. Using the concept of exponential rate of change, how many would you have after one week if you purchased one the first day and doubled your purchases each day thereafter.