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Use of Interactive Notebooks in the Parenting Classroom

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State University of New York
College at Buffalo
Department of Career and Technical Education

Use of Interactive Notebooks in the Parenting Classroom

A Thesis in

Career and Technical Education

By

Kimberly Schildwaster

Submitted in Partial Fulfillment

Of the Requirements for the Degree of
Career and Technical Education, M.S.Ed.

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ABSTRACT

The purpose of this study is to examine the use of Interactive Notebooks in a parenting course.

The parenting courses in this study were composed of 10-15 students, ranging in age from 14-18 years. Parenting courses were designed for students to discuss important factors before becoming a parent, the process of conception to birth, and child development skills from 0-5 years.

Interactive notebooks are a tool that organizes information, instruction, and thoughts of students while also providing a resource for students to review information. Paper interactive notebooks allow for both input and output of information. The information remains a resource for students to assist with classroom activities and studying. Students interact with the material in multiple ways strengthening understanding and the ability to build on the information provided. Parenting classes include large amounts of vocabulary and concepts. A result of this study concludes interactive notebooks are an effective method for delivering Brain Learning Theory and research based strategies and information organization. Interactive notebooks increase student retention of information and concepts in the parenting classroom.

Keywords: Interactive Notebook, Classroom Strategies, Family and Consumer Sciences, Parenting Education

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INTRODUCTION

While some students refer to paper interactive notebooks as “arts and crafts” due to the cutting and pasting involved, they come to enjoy the relaxation, which reminds them of the basics of their early schooling. The act of cutting out the information provides the first glimpse of the upcoming unit, its vocabulary and concepts. Students are classifying the information and problem solving before instruction begins. Interactive notebooks change the way information is delivered and retained in the classroom. Most often, a spiral notebook is used but a folder or binder work well. Handouts are supplied by the teacher who ‘chunks’ the information into vocabulary, problems, statements, or questions. The input can come in many forms, but is supplied by the teacher and placed on the left hand side of the notebook. The student manipulation of information and synthesizes new ideas, this is performed on the right side and is called the output. They are designed to be utilized in conjunction with classroom strategies to increase thinking and writing skills.

We have all experienced dry writing of page after page of notes only to never review them again. This creates a disconnect between the information and the learner. We can copy down copious amounts of information and never connect it to our learning. Paper interactive notebooks allow for both input and output of information. The information remains a resource for students to assist with classroom activities and studying. Students interact with the material in multiple ways strengthening understanding and the ability to build on the information provided.

For example, in a parenting class, students might be asked to take their vocabulary cards and quiz, quiz, trade with students for a warmup activity. The teacher might have students adhere the vocabulary to their heads and play a guessing game by listing the qualities and attributes of their vocabulary word? On the output side of their notebook, they would write their questions

and how they were able to determine their vocabulary word. Students are interacting with the information in meaningful ways through group or individual activities while strengthening their skills. They are practicing decoding skills with prefixes, suffixes, and root words. This may be a natural strategy they employ or a prompt provided through scaffolding to assist the learner.

A benefit of utilizing interactive notebooks is the ability to add images and depth to strengthen comprehension. This is especially useful for English Language Learners as it assists with word and concept recognition. Interactive notebooks accommodate all learning styles. Visual learners benefit from images, graphs, and the chunked information that is easily accessed. Auditory learners benefit from the peer interaction with the material, and kinesthetic learners are able to physically manipulate the information through foldable, pockets, accordions, and moveable pieces.

Classes taught using interactive notebooks and the accompanying strategies increase student engagement. This study will research how interactive notebooks increase student retention of information and concepts in the parenting classroom.

Problem Statement

Do interactive notebooks affect student retention of information and concepts in the parenting classroom?

Methods

The method utilized in the thesis was a field experiment. Information was obtained utilizing scores from a single exam administered as both a pre and post assessment. The test was administered to students in two high schools with identical Parenting curriculums, scopes, and sequences. Both classes were taught by the same instructor. Class A was provided instruction without use of interactive notebooks for two chapters. Class B was provided instruction utilizing the notebooks for the same two chapters. The test was created by Verdene Ryder and Dr. Cecilia Decker for use in conjunction with their text: *Parents and Their Children*. Instruction was provided utilizing information from Chapters 4 and 5 from the text. Chapter 4 covers communication in families and ways children develop. Concepts and interactions are the focus of the chapter. Chapter 5 includes male and female anatomy, conception, and infertility. Test scores were compared between Class A and B for both exams for any significant variations between the notebook usages.

Participants

The participants consisted of twenty-six students ranging in age from 14-18. The students were separated into two classes in different schools with identical Parenting curriculum, scope, and sequence.

Limits

Factors that may affect the outcome include time of day. One class will be taught in the morning first period and one in the afternoon directly after lunch. Student activity levels may

differ due to the time of day. This might include focus, tiredness, participation, and hunger. First period classes had more student absence or tardiness, resulting in less contact with the material.

Teaching style may be affected due to classroom dynamics and time of day. The classes while containing 9-12 grade students, may have different makeups of ages with one class heavily populated by freshmen aged 13-14 or seniors aged 17-18. The class size differs slightly between the two programs and one class is all females. Class A has singular seating and Class B has group tables with multiple students seated together. These factors may have an effect on classroom dynamics and performance. This study did address the effectiveness of interactive notebooks based on student aptitude.

Assumptions

In this educational study, it was assumed that socioeconomic, learning accommodations and other factors are equally distributed. For the purpose of this study, it was to be assumed all students were trying their hardest to score the highest grade possible on their test. They were present and active in the classroom and used the notebooks as instructed. It is assumed the information was unbiased.

Definitions

Interactive Notebook

A spiral notebook used to organize information. The right side was used for teacher information (notes, lectures, discussions, handouts, etc.) The left side was used for student information (drawings, cartoons, personalized wording of vocabulary, etc.)

Learning styles

Preferential way in which the student absorbs, processes, comprehends and retains information

Critical Thinking

The ability to think clearly and rationally about what to do or what to believe. It includes the ability to engage in reflective and independent thinking. Someone with critical thinking skills is able to make connections, construct and evaluate arguments, detect mistakes and inconsistencies, problem solve, justify values and beliefs. (Lao, 2011, p.1)

Metacognitive Skill

Higher-level skill that requires thinking about thinking (Lao, 2011, p. 1) These skills require self-assessment of progress and self-correcting through evaluation. Like critical thinking, metacognitive skills require the ability to problem solve, evaluate, and make changes.

Ongoing Assessment

Evaluation with clear goals, may evolve over a performance, relevant to the goals for the unit, and everyone understands them (Blythe, 1998, p. 1)

Webb-Depth of Knowledge-DOK

Categorizing tasks according to the complexity of thinking required to successfully complete them. DOK has 4 levels with each requiring a deeper level of understanding. DOK includes: Level 1: Recall and Reproduction, Level 2: Skills and Concepts, Level 3: Strategic Thinking, Level 4: Extended Thinking (Aungst, 2014)

Vygotsky-Zone of Proximal Development ZPD

The difference between what a learner can do without help and what he or she can do with help (Culatta, 2011)

Instructional Strategies

Techniques teachers utilize to help students meet learning objectives

Collaboration

Working together to meet a shared goal or create a product/idea

Learning Goals/Targets

Statement of student expectations at the end of a lesson

Reflection

Concentrated thought on a past event, action, emotion, experience

Scaffold Learning

Supports added by a teacher to assist as student to reach a goal or target

Chunks

Breaking information into smaller pieces or appropriate learning depending on prior learning, for more ready consumption

Differentiated Instruction

Individualized/tailored for student needs. May include process, content, environment, or product

ELL- English Language Learners

Students learning the English language who communicate or learn effectively but require modified instruction to assist with language acquisition while learning and manipulating material.

Higher Order Thinking Questions

Questions that require more thinking and skill and are valued for their use outside of the context in which they were learned

Sustained Inquiry

Student driven questions that are rigorous. They require gathering data, evaluating evidence, and drawing conclusions.

Self-Management

Students learn to independently complete a task and take charge of their own learning and needs to gain the knowledge they seek

E-Doctrina

Web-based education software utilized by teachers to create lesson and unit plans, assessments and test sheets, program performs data analysis on student answers

LITERATURE REVIEW

The effectiveness of interactive notebooks was based on how the content is presented and the strategies employed. Understanding your students and basic brain functions will allow for effective lesson planning and notebook structure through use of techniques specifically designed to increase function in these areas. Research by Robert Marzano has shown performance can be greatly affected by the quality of a student's notes. Quality notes and research proven instruction join to make interactive notebooks an excellent tool for the classroom.

Interactive notebooks go further than traditional notetaking. They create student ownership through the design and organization of their thoughts. Students can explore and participate without fear of being wrong.

Interactive Notebooks- ISN- Interactive Student Notebook

Interactive Notebooks or ISN's were created by Lee Swenson and his colleagues at Aragon High School in California. (Williams, DiBella, Bruner, & Baker, 2016, p. 2) The original idea behind ISN's were instructional strategies such as notetaking, concept mapping, and organization of information. (Wist, 2015) They incorporate highly effective research based techniques such as comparing and contrasting, summarizing, nonlinguistic representation, cooperative learning, questions, cues, and generating and testing hypotheses. (Marzano, Pickering, & Pollack, 2001)

SETUP

Notebooks were setup with the teacher information on the right and student information on the left. This is based on the widely held theory that performing certain functions correlate with specific sides of the brain. Functions include process perceptions, putting things together to

form wholes, and sequencing are considered right-brain mode. Left-brain mode includes, drawing conclusions based on logic, making sense of incomplete patterns, and forming opinions. (Edwards, 1999) The teacher side often contains notes, procedures, readings, and other graphic organizers. An example could include a petal that opens and has facts that are written on each petal. Organization of the student's side follows the research with reflection, questions, predictions, practice, connections, and drawings being included. (Wist, 2015) "This helps the brain by making connections between what is experienced (learned) and what that experience (information) means to the learner" (Wist, 2015)

KEY FEATURES

Table of Contents

The Table of Contents allows students to stay organized and provides a quick check to see if information was missing due to missing a day, it can also include student work deadlines. Students can easily access information for review. When work was collected from the notebook, a Table of Contents gives its exact placement for note continuation.

Author Page

This page was another way to promote student ownership and was credited with reduced loss or misplaced books. Students customize the page with information about themselves or a getting to know you page. Teachers can ask students to record specific information. In the parenting classroom, this page includes quotes from their parents about what they do that makes them proud or activities they have in common.

Work In Progress

Organization was the key to utilizing interactive notebooks. Having a section (stapled manila envelope) for Work in Progress provides a starting point and hopefully an endpoint

when looking for work. It helped students transition seamlessly between activities while staying organized.

Grading

Depending on the type of notebook used, you may be able to grade work without collecting the whole notebook. When using a traditional composition notebook, it was best to collect the whole notebook. Covers keep work private and allow teachers to add notes and observation for students to view and utilize for future work. Timely feedback was important for learners. Teachers were able to identify misconceptions or delve deeper into the content based on interest. When reviewing notebooks, teachers are not only grading but informing instruction.

BENEFITS

Doodling

Doodlers finally had their day. They were listening while teachers lectured. ISN's provide subject matter for doodling through pictures and areas of customization. Studies prove doodling increase recall. "Subjects that were asked to doodle throughout the message were able to recall a solid 29% more than their non-doodling counterparts, indicating significantly better recall." (Levy, 2014, p. 1) Visual learners can utilize color and drawings to customize their notebooks. Gone were the highlighters. Students should be encouraged to draw arrows and clouds to and around important information. Do they need another view or picture to help remember a concept? ISN's offer a perfect place for our visual learners to think in their own language. Doodling helps prevent distraction. "With the mind engaged in doodling and further stimulated by the steady motor movement of the hand, it keeps a baseline activation and concentration that prevents the mind from getting bored and wandering, therefore keeping the student engaged in the lecture at hand." (Levy, 2014) Use doodling to your advantage by creating sections of the notebook for students to connect important concepts.

PROBLEMS

- ISN's can take a significant portion of class time to create. They include multiple pieces that must be cut and glued. Sometimes this requires a specific order that can be confusing to some students. Small pieces occasionally get lost. Missing students will be behind in cutting, pasting, and note collection.
- Not all students are "crafty" or enjoying coloring and drawing.
- Grading can be difficult if you have large classes and are collecting many notebooks. Teachers must find the work, examine it, provide feedback, and record the grade. The process of finding the work, especially if the Table of Contents isn't updated can be difficult and time consuming. Time was of the essence, the grading must be done quickly as students will most likely be using their notebooks daily.
- While ISN's are a great way to scaffold information, some students resent what they see as dumbing down the curriculum by chunking it into too small of pieces (Pennington, 2016)

ONGOING ASSESSMENT/FEEDBACK

An important component of ISN's was ongoing assessment and feedback. Assessment should be clear, relevant and public. (Blythe, 1998, p. 1) This included fostering understanding more than just evaluation. Educators should use the information garnered to inform on future instruction. Sustained feedback should include goals and opportunities or direction for growth of the student. Comments to the student allow metacognitive skill development to occur. These comments can be structured for direction in planning steps, strategizing, reflecting, and correcting errors. Educators can also have other students provide feedback through a selected set of criteria for a peer review. (Marzano, Pickering, & Pollack, 2001)

BRAIN FUNCTIONS

The brain is divided into multiple regions, which include the frontal lobe, temporal lobe, occipital lobe, parietal lobe, motor cortex and cerebellum. Each region of the brain is responsible for separate functions that work together. Damage to any area can have drastic effects on a person from abilities to personality. However, feeding each section of the brain through performing functions such as sorting, creativity, planning, problem solving, and critical thinking helps strengthen input and output. ISN's work as a tool to accomplish this task. Teachers must tie information to previous learned information and emotion for it to be retained in long-term memory. (Wist, 2015) One way to do this is to ask, "Does this have meaning?" When students can establish the importance of information and make connections, they are more likely to be able to recall and manipulate the information for future use.

LONG-TERM MEMORY

This refers to the process of storing and retrieving information. (Wist, 2015) Without long-term memory, students will not be able to perform well on assessments or utilize the knowledge gained in the classroom.

RELEVANCE

As educators, we frequently hear "When will I use this?" As a Family and Consumer Sciences educator, I offer a money-back guarantee. In the parenting classroom, it is easy to say that roughly 90% or 9 out of 10 of my students will become parents whether it be through adoption, birth, or marriage. However, it is still important to make sense. "Does the way I am presenting this information make sense?" We sometimes fail to see things from the learner's point of view and thus fail to provide relevance for the information we seek to instill. "When a speaker (teacher) provides relevance for a listener (student), the speaker conveys his or her intentions to the listener (teaching/learning) by tapping into the listener's cognitive need to make

sense of the world. Relevance is important to teaching and learning because it is directly related to student engagement and motivation” (Roberson, 2013)

Patterns and Connections

LEARNING STYLES

Do different learning styles exist and should we cater to them? One of the main arguments for ISN’s were that they appeal to a variety of learning styles or ways learners learn best. A study on learning styles concludes “...that at present, there is no adequate evidence base to justify incorporating learning styles assessments into general educational practice.” (Pashler, McDaniel, Rohrer, & Bjork, 2008) Learning styles categorize people by the way they perceive to learn best or based on an assessment from an inventory created to determine your best learning style. For the purpose of ISN’s we will focus on the following types: Visual, Audial, and Kinesthetic.

Through graphics and the encouragement to doodle and draw, visual learners should see improvement with ISN’s. They are able to draw connections and associations. Audial learners who traditionally fare well in a direct instruction classroom will still benefit, as ISN’s are teacher led. Kinesthetic learners are thought to see the most improvement with ISN’s. The ability to move and manipulate information through shuffling, unfolding, cutting, pasting, and the movement of pieces and construction should increase learning.

DEPTH OF KNOWLEDGE-DOK

We want students to engage in the material at the highest level. It requires building a base structure for students to be able to work at this level. Johnny does not come in one day and is designing, analyzing, and creating with new material. DOK 1 includes basic recall and simple procedures including reproduction. Examples might include listing facts and copying definitions.

DOK 2 includes skills and concepts. These include summarizing information, organizing, and prediction. DOK 3 is strategic thinking. Students might use evidence or create an experiment. DOK 4 requires complex cognitive effort. This thesis is DOK 4, synthesizing information from a variety of sources. For my study students utilized DOK 4 when they utilized information and their understanding of communication skills and evidence from the film *The Glass Castle* to analyze the films characters and how it affected their lives.

SCAFFOLD LEARNING-

Interactive notebooks themselves are an example of a scaffold in that they are organizers. Scaffolding involves providing students supports that are gradually taken away as they are able to complete a task on their own. When starting interactive notebooks, students would have to be shown how to cut certain shapes and when to apply them. As they become more proficient, they decide the placement based on their own needs. Visual aids are included to assist ELL's and other students with identifying vocabulary. Including a picture provides a quick visual hint to the meaning of the word and helps students recall the information. Prompts are a form of scaffolding that can be differentiated and tailored to the student process, content, environment, and product. Interactive notebooks often contain pockets for keeping and storing vocabulary, prompts, questions, and cue cards. Students are able to utilize these as much or as little as they require to meet their learning targets. Some require the scaffolding, some do not.

ORGANIZING THOUGHTS

Critical thinking skills require figuring out answers, reviewing mistakes, criticism and defending ideas or thoughts. Metacognitive skill involves thinking about thinking- students explore and defend thoughts and why they might hold certain beliefs. It requires them to self-assess and modify answer or plans. They may use this to understand where they made a mistake or misunderstood a concept. Chapter 4: Effective Parenting was primarily based on concepts.

Students were called on to defend their ideas about the main characters of the film *The Glass Castle*. While watching the film they took notes on the dynamics of the family and interpersonal relationships. They had to first organized their thoughts and then answer questions in an open forum

HIGH YIELD STRATEGIES

Interactive notebooks utilize what are called high yield strategies. This means research has been done to show these strategies are effective in teaching students and helping them retain information at a greater rate than other strategies. The book *The Core 6* and education researcher Robert J. Marzano cite the following as high yield strategies:

Reading for Meaning

Students approach reading as a process with the outcome increased comprehension. By setting goals before, during, and after reading, students are able to master the skills needed for critical reading. Student preview the text before reading and make predictions, they search the text for specific information, and then reflect on their findings. Interactive notebooks allow for addition of readings, space for predictions, information gathering, and reflection. When reviewing for a discussion, they have this information and make a deeper connection to the text. Marzano is proponent of organizers, which is the essence of interactive notebooks.

Compare and Contrast

Gains when using compare and contrast strategies create a 45% gain in learning.

(Marzano, Pickering, & Pollack, 2001) Interactive Notebooks

Academic Vocabulary

Common Core, *The Core 6*, and Marzano all stress vocabulary as a key factor in academic success. Interactive notebooks allow students to utilize vocabulary repeatedly. For the parenting classroom, vocabulary is domain specific. Students first see the vocabulary as they are cutting out the images. They might be asked as an anchor activity to quiz another student on a meaning and rotate as they go around the room. Vocabulary is readily available to reference for writings and reflection.

METHOD

The premise of interactive notebooks are to change the way information was delivered and retained in the classroom and increase thinking and writing skills. Do interactive notebooks increase student retention of information and concepts in the parenting classroom?

The method utilized in the thesis was a field experiment. Information was obtained utilizing scores from a single exam administered as both a pre and post assessment. The test was administered to students in two high schools with identical Parenting curriculums, scopes, and sequences. Both classes were instructed by the same educator and identical objectives and learning targets were employed. Class A was provided instruction without use of interactive notebooks for two chapters. Class B was provided instruction utilizing the notebooks for the same two chapters.

The test was created by Verdene Ryder and Dr. Cecilia Decker for use in conjunction with their text *Parents and Their Children*. Instruction was provided utilizing information from Chapters 4 and 5 from the text. Chapter 4 covers communication in families. Concepts include using me, us, and you statement for effective communication in parent-child relationships. It included the rate and sequence of development and discusses how families influence development. Mastering concepts and interactions were the focus of the chapter and instructional strategies included cues and questioning, gathering evidence and analysis. Students examine similarities and differences in communication techniques and discuss ways for improving communication. They examine multiple sources and unearth common themes.

Interactive Notebook Chapter 4- Effective Parenting: See Appendices

Notebook Description: This notebook contained 10 vocabulary words used the same font printed on rectangular cutouts. Also included were two task cards labeled Playdough Task 1 and 2. There were five rectangular shapes with a wave bottom. The first was labeled Physical, Intellectual, Emotional, and Social Development. A large circle divided into 4 quadrants takes up about half a page. There was a graphic of a baby and large numbers 1-4 and the words Patterns of Development.

Chapter 5 included family planning, male and female anatomy, conception, and infertility. Instructional strategies include role-play, summarization, imagery, and cooperative learning. Test scores between Class A and B were compared for both exams for any significant variations with notebook usage.

Interactive Notebook Chapter 5 Planning a Family: See Appendices figure

Notebook Description: This notebook had pictures of an egg being fertilized, male and female anatomy labeled, pictures of in-vitro and artificial insemination, a box labeled: forms of adoption, and dominant and recessive traits. There was also a small graphic that shows a man and woman and a doctor equals a baby.

The web-based software Edocrina was utilized to enter test questions and generate answer sheets for the assessments. This allowed data from both schools and students to be analyzed separately when it was uploaded in the system. The Chapter 4 test consisted of 12 True or False questions 8 Multiple Choice, and 4 Short Essay questions. The essay questions asked students to explain, identify, list, and provide examples. The Chapter 5 exam consisted of 12 True or False questions, 8 Fill-in-the-Blank, and 4 Short Essay questions. The essay questions

asked students to list, explain, and describe. Chapter 4: Effective Parenting, Chapter 5: Planning a Family See Appendices

The following method was utilized twice.

A one way ANOVA was used to analyze the variance in the two classes. It examined the dependent variable (test score) and explored results for Interactive Notebook Usage (independent variable 1) and pre-test score (independent variable 2).

This tool was used to examine the interaction between the two independent variables. It was not expected that the results will be the same across the categories.

The null hypothesis was there will be no significant difference among the two parenting classes. The alternative hypothesis was there is a significant difference among the two parenting classes. The data was downloaded into Microsoft Excel from Edocrina and applied to a bell curve. Data will be verified as a normal distribution/histogram. The Fm-ratio was calculated and associated probability value or p-value assigned using Excel. If the p-value is smaller than .05 then there was a significant difference between using interactive notebooks in comparison to the other strategy. If less than 0.05, null rejected, and the alternate H was considered. If the p-value was larger than .05, Null H is accepted. Then there was a difference in the use of interactive notebooks will be supported and the null hypothesis rejected.

A two-way ANOVA will be utilized once for each chapter. The difference in the final test scores will be calculated by subtracting the final test score from the pre-test score. The ANOVA will be run on this data.

Procedure:

1. Administered pre-assessment for Chapter 4: Effective Parenting, collect, grade essay questions and upload data
2. Provided instruction on Chapter 4 without use of the interactive notebook with Class A
3. Provided instruction on Chapter 4 using Interactive Notebook with Class B
4. Administered post-assessment Chapter 4: Effective Parenting, collect, grade essay questions and upload data
5. Administered pre-assessment for Chapter 5: Planning a Family, collect, grade essay questions, and upload data
6. Provided instruction on Chapter 5: Planning a Family without using the interactive notebook with Class A
7. Provided instruction on Chapter 5: Planning a Family using Interactive Notebook with Class B
8. Administered post-assessment of Chapter 5: Planning a Family, collect, grade essay questions, and upload data
9. Cleaned and sorted data by class to ensure all answers uploaded and scored with no duplicates or erasure errors
10. Transferred data into Excel
11. Performed 1-Way ANOVA twice with Group A and Group B Pre-and Post-Tests
12. Performed 2-Way ANOVA with differences in test scores between A and B pre-and post-tests
13. Analyzed data
14. Drew Conclusions

Population

The participants consisted of twenty-six students ranging in age from 14-18. The students were separated into two classes in different schools with identical Parenting curriculums, scopes, and sequences.

Instrument

Instruments utilized to gather data included the tests:

- Chapter 4- Effective Parenting
- Chapter 5- Planning a Family

See appendix:

ANALYSIS

Instruments utilized to analyze data gathered include:

- ANOVA
- E-doctrina
- Microsoft Excel

Hypothesis

Hypothesis 1:

Students who received instruction utilizing interactive notebooks will see a statistically significant increase in test scores over students not provided instruction utilizing interactive notebooks.

Null Hypothesis 1:

Students who received instruction utilizing interactive notebooks will not see a statistically significant increase in test scores over students not provided instruction utilizing interactive notebooks.

Hypothesis 2:

Students who received instruction utilizing interactive notebooks will see a statistically significant increase in retention of information.

Null Hypothesis 2:

Students who received instruction not utilizing interactive notebooks will not see a statistically significant increase in retention of information.

ANALYSIS

The purpose of this study was to examine the use of Interactive Notebooks in a parenting course and examine if use of the notebooks increased student retention of information. The sample included 26 students from two schools. Students were administered identical pre and post-tests for two chapters designated Chapter 4 and Chapter 5. Group A contained 11 females and no males and was taught in the morning. Group B contained 7 males and 8 females and was taught in the afternoon.

Institution/Class	N	Males	Females
Institution 1/Group A	11	0	11
Institution 2/Group B	15	7	8
Total	26	7	19

Figure 1- Table displays distribution of males and females in the study

The tests were comprised of True/False, Multiple Choice, Fill-in-the-blank, and short answer teacher scored questions. All exams contained 24 questions. eDoctrina was utilized to construct and score the examinations. The data received from the exams was sorted and displayed by test, group, and questions. The data was downloaded into MS Excel where Single Factor ANOVA's and other analysis were performed on the data.

Histogram (Chapter 4 and 5)

A histogram was created to plot the frequency of score occurrences and distribution of scores. Each data set was divided into three bins for Chapter 4 combining test scores of both

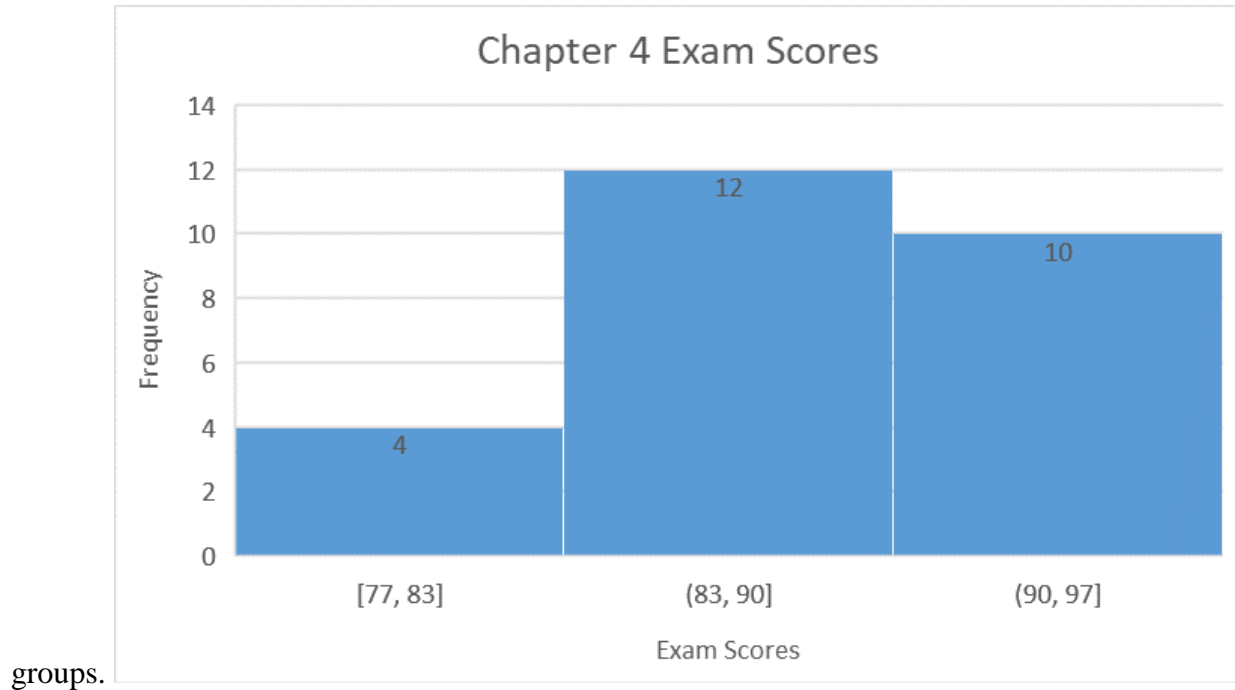


Figure 2- Figure shows distribution of scores among classes. Scores are not equally distributed.

This demonstrates the scores are not quite balanced, a large proportion of the class scored between 83 and 90 points. Only 4 of 26 students scored below 83. The first ANOVA was performed on the pre- and –post exam scores for Group A, Chapter 4.

Chapter 5 test scores for groups A and B were more symmetrical demonstrating the fairly balanced nature of the data. One student scored outside of the range of the median. For Chapter 5, 11 students scored between 81 and 90.

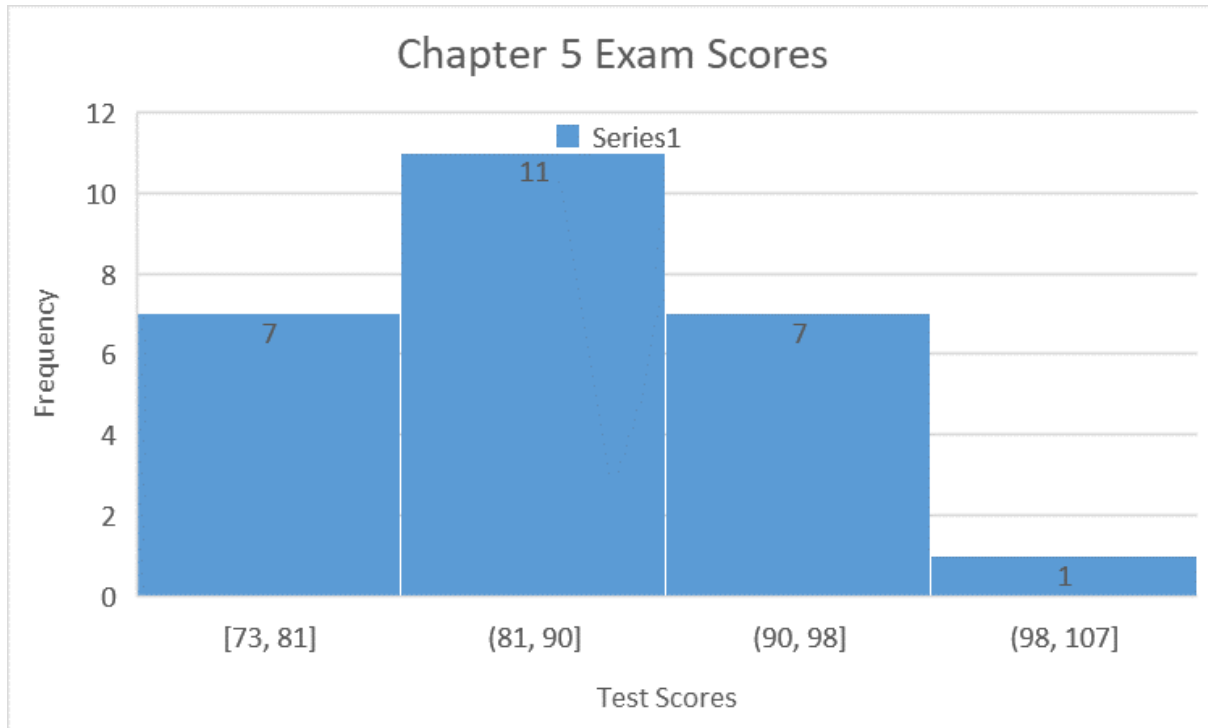


Figure 3: Figure shows distribution of scores among classes. Scores are fairly equally distributed.

Analysis Interpretation

MAIN EFFECTS CHAPTER 4

The results of each of the three main effects are briefly presented for Chapter 4. Results presented on each main effect are means and levels of significance, if the results proved to be significant.

Group A Main Effect (Pre-Test vs Post-Test) Chapter 4

The main effect means for the two test scores were 75.8 for the pre-test and 86.5 for the post-test. These means were significantly different $F(1,20) = 4.87, p=0.04$. The null hypothesis for the effect was rejected; therefore method A was effective.

Group B Main Effect (Pre-Test vs Post-Test) Chapter 4

The main effect means for the two test scores were 70.1 for the pre-test and 89.0 for the post-test. These means were significantly different, $F(1,28) = 15.27$, $p = 0.0005$. The null hypothesis for the effect was rejected; therefore method B was effective. This would indicate that use of the interactive notebook had an effect on student learning as evidenced by the more significant result. Further details are in APPENDIX

AB Interaction (Difference in Post-Test Scores Among Groups) Chapter 4

No statistically significant relationship was found among the groups. Use of interactive notebooks vs other method saw no significant difference in test score. While group B was far more significant, a direct comparison revealed no significant difference among the groups. The AB means ranged from 10.7 and 18.92 $F(1,24) = 2.39$, $p < 0.135$. This indicates that the relationship between the two variables was due to chance. The null hypothesis failed to reject; therefore, no significant difference amongst the two methods.

Both groups showed a significant growth and relationship between pre and post but no specific difference among post-test scores. Both methods of instruction were effective.

MAIN EFFECTS CHAPTER 5

Group A Main Effect (Pre-Test vs Post-Test) Chapter 5

The main effect means for the two test scores were 56.1 for the pre-test and 89.5 for the post-test. These means were significantly different $F(1,20) = 79.92$, $p < 0.001$. The null hypothesis for the effect was rejected; therefore method A was effective. The growth demonstrated a probability of occurring .0000021% of the time without effective instruction.

Group B Main Effect (Pre-Test vs Post-Test) Chapter 5

The main effect means for the two test scores were 53.8 for the pre-test and 83.5 for the post-test. These means were significantly different, $F(1,28) = 70.41$, $p = 3.97E-09$. The null hypothesis for the effect was rejected; therefore method B was effective. It was 10 times more significant growth than occurred with Group A. The chance of these test scores occurring without effective instruction was .0000004%. Further details are in APPENDIX

AB Interaction (Difference in Post-Test Scores Between Groups) Chapter 5

No statistically significant relationship was found among use of interactive notebooks and instruction without use of interactive notebooks despite the gains of students in their pre- and post evaluations. The differences in AB means ranged from 33.4 and 29.8 $F(1,24) = 0.54$, $p = 0.47$. This indicates that the relationship between the two variables was due to chance. The null hypothesis failed to reject; therefore, no significant difference amongst the two methods.

Both groups showed a significant growth and relationship between pre and post but no specific difference between post-test scores. Both methods of instruction were effective.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to examine the use of Interactive Notebooks in a parenting course and examine if use of the notebooks could increase student retention of information.

Interactive notebooks are a tool that organizes information, instruction, and thoughts of students while also providing a resource for students to review information. Paper interactive notebooks allow for both input and output of information. The information remains a resource for students to assist with classroom activities and study. Students interact with the material in multiple ways to strengthen understanding and the ability to build on the information provided. Parenting

classes include large amounts of vocabulary and concepts. This study hypothesizes that interactive notebooks increase student retention of information and concepts in the parenting classroom.

Researched and proven strategies create positive gains in student achievement include: compare and contrast, graphic organizers, domain specific vocabulary, scaffolding, and reflection. All of these strategies were utilized in the instruction of Chapters 4 and 5 for groups A and B. Interactive notebooks organize the information and allowed students to better manipulate the information.

The sample included 26 students from two schools. Students were administered identical pre and post-tests for two chapters designated Chapter 4 and Chapter 5. Test scores were collected and analyzed.

The results of the study conclude there was no statistical difference between the utilization of interactive notebooks and not utilizing interactive notebooks. When utilizing the same methods for instruction, both were effective. While the instruction was different, it was equal in that the same strategies were employed with or without the notebook. Both students saw significant gains from the parenting education provided as evidenced in pre-and post-test scores.

Brain-based research indicates students who utilized interactive notebooks should see larger gains through the use of multiple regions and connections. They were effective but not significantly more effective than utilizing proven, research based strategies for instruction.

Discussion

Through the use of specific instructional strategies, including scaffolding, this study confirms their efficacy. Over 69% of the class was able to achieve mastery on the exam (mastery which is generally considered 85%.) with another 19% within 2 points of mastery. This also led to the next finding.

While not part of the study or identifiable, students with accommodations in Group B outperformed similar students in Group A. It could be that the additional physical manipulation of the information and strategies incorporated increased their retention and recall.

It wasn't a surprise the use of interactive notebooks produced results. The original idea for research came from classes from previous years. The school year was split into two semesters. A parenting class is one semester in duration. During the first semester, no interactive notebooks were used. We used interactive notebooks second semester and saw an average increase in scores of around 10 points. After performing the study, I know that it was the strategies that were integrated into its use that are the cause rather than the notebook. The use of the notebook ensured that effective classroom instructional strategies were being utilized.

RECOMMENDATIONS FOR FUTURE RESEARCH

If future research is to be conducted, the following changes could be made. Collect information from a larger group of participants. Having only 2 classes limited the data collected and the variations between students. A larger sample limits the effect of outliers or extreme examples skewing the data and mean. The outliers may be students that come to school infrequently and have not had the same interaction with the information and notebook. Perhaps having a day count of the time spent using the notebook vs the same instruction time without the notebook run through a 2-way ANOVA would be beneficial.

Did the smaller class size and homogenous nature of Group A contribute more gains in tests scores? Did the makeup of Group B and its gender and age diversity effect Group B? Group A was provided instruction the first of the day. Did this give them an advantage over the just fed or hungry Group B. Using a larger population with students spread throughout the day would eliminate these data issues and create a better picture for analysis.

Are certain test questions better for use with interactive notebooks? Did students utilizing interactive notebooks perform better on the Chapter 5 Fill-in-the-blank than their Group A counterparts? I actually checked this one out and the answer was no they did not. However, a larger sampling might change that as 1-2 outliers could skew the results.

Additional data could be collected 8 weeks after the post-test to see which group was able to retain the most information. Perhaps the initial equal nature of the results would change based on the use or non-use of interactive notebooks.

Almost 10% of the students in the study qualified for Individual Education Plans for additional resources, time, or clarification. Additional research could be conducted to determine if INT's had an effect on their test scores and information retention. Did the additional organization, ability to manipulate the information, and nature of INT's contribute to their gains?

RECOMMENDATIONS FOR FUTURE PRACTICE

Traditionally the interactive notebooks actually use a notebook. These were sheets made and placed in a binder. In the future, this would be the route taken. After the two chapters had been completed in the notebook, we stopped using them. Had this study explored more than just

two tests, perhaps all chapter exams, and continued use of the interactive notebooks, there would be more significant improvement.

Do different ages see more benefits from interactive notebooks? The students in this study were 14-18 years of age. Do middle school students enjoy more hands-on activities such as cutting and gluing (this was a major complaint of the high school students) and would they garner more benefits? This study has shown the strategies employed were effectively used in conjunction with the notebooks. Do they lose effect after a certain age? This would be interesting to explore.

After grading the tests and the fill-in-the-blank questions, I wondered if changing the types of test questions would see benefits from certain groups. The questions were multiple choice, true and false, and short answer primarily. It would be interesting to study if students utilizing interactive notebooks were able to answer higher order questions on the test when most were in the recall range. Are they able to synthesize information or defend a stance? An analysis on what types of questions Group A and B performed best at respectively might answer this question.

IMPACT FOR FAMILY AND CONSUMER SCIENCE TEACHERS

Common Core has brought change to the FACS classroom. While 90% of our content is supposed to be hands-on, we have seen an increase in pressure from administration to increase rigor in our classes academically. This calls for more and extended writing, increase in domain specific vocabulary usage (we don't have a problem here), more reading and comprehension work, and integration of other subjects.. Utilizing the interactive notebook allows FACS teachers to organize all of the important topics we already cover and incorporate the added information

our administrators were requesting. The students have become accustomed to these types engaging, increasingly student centered and rigorous activities. We can use these in our classroom to meet administration, student, and teacher needs for hands-on activities. Interactive notebooks are effective in helping students retain information

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APPENDIX

ANOVA TABLES

ANOVA: SINGLE FACTOR GROUP A CHAPTER 4

Anova: Single Factor						
SUMMARY						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>		
Pretest	11	833.94	75.81273	212.6479		
Post Test	11	951.79	86.52636	46.14909		
ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	631.301	1	631.301	4.878735	0.039023	4.351244
Within Groups	2587.97	20	129.3985			
Total	3219.271	21				

Figure 4: $F(1,20) = 4.87, p=.04$ Is Significant, Reject Null

ANOVA: SINGLE FACTOR GROUP B CHAPTER 4

Anova: Single Factor						
SUMMARY						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>		
Pretest	15	1051.8	70.12	332.7692		
Post Test	15	1335.73	89.04867	19.08303		
ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	2687.208	1	2687.208	15.27464	0.000537	4.195972
Within Groups	4925.931	28	175.9261			
Total	7613.139	29				

Figure 5: $F(1,28)=15.27, p<0.01$ Is significant, reject null

ANOVA:SINGLE FACTOR SCORE DIFFERENCES AMONG A & B CHAPTER 4

Anova: Single Factor						
SUMMARY						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>		
Class A	11	117.85	10.71364	93.11635		
Class B	15	283.93	18.92867	240.9149		
ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	428.2811	1	428.2811	2.3882	0.13534	4.259677
Within Groups	4303.972	24	179.3322			
Total	4732.253	25				

Figure 6: $F(1,24)=2.38$, $p=.135$ not significant, accept null

ANOVA: SINGLE FACTOR GROUP A CHAPTER 5

Anova: Single Factor						
SUMMARY						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>		
Pre-Test	11	616.77	56.07	108.5148		
Post-Test	11	984.6	89.50909	45.38403		
ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	6149.95	1	6149.95	79.92199	2.01E-08	4.351244
Within Groups	1538.988	20	76.94941			
Total	7688.939	21				

Figure 7: $F(1,20)=79.92$, $p<0.01$ Is Significant, reject null

ANOVA: SINGLE FACTOR GROUP B CHAPTER 5

Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Pre-Test	15	807.14	53.80933	146.1977		
Post-Test	15	1253.85	83.59	42.71901		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	6651.661	1	6651.661	70.41896	3.97E-09	4.195972
Within Groups	2644.835	28	94.45838			
Total	9296.495	29				

Figure 8: $F(1,28)=70.41$, $p<0.01$ Is significant, reject null

ANOVA: SINGLE FACTOR SCORE DIFFERENCES AMONG A AND B CHAPTER 5

SUMMARY						
Groups	Count	Sum	Average	Variance		
B	15	446.71	29.78067	185.4539		
A	11	367.83	33.43909	120.3704		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	84.93735	1	84.93735	0.536438	0.471005	4.259677
Within Groups	3800.058	24	158.3357			
Total	3884.995	25				

Figure 9: $F(1,24)=0.54$, $p=0.47$ Not significant, accept null. Performance groups were not different.

Interactive Notebook Examples

CHAPTER 4- EFFECTIVE PARENTING

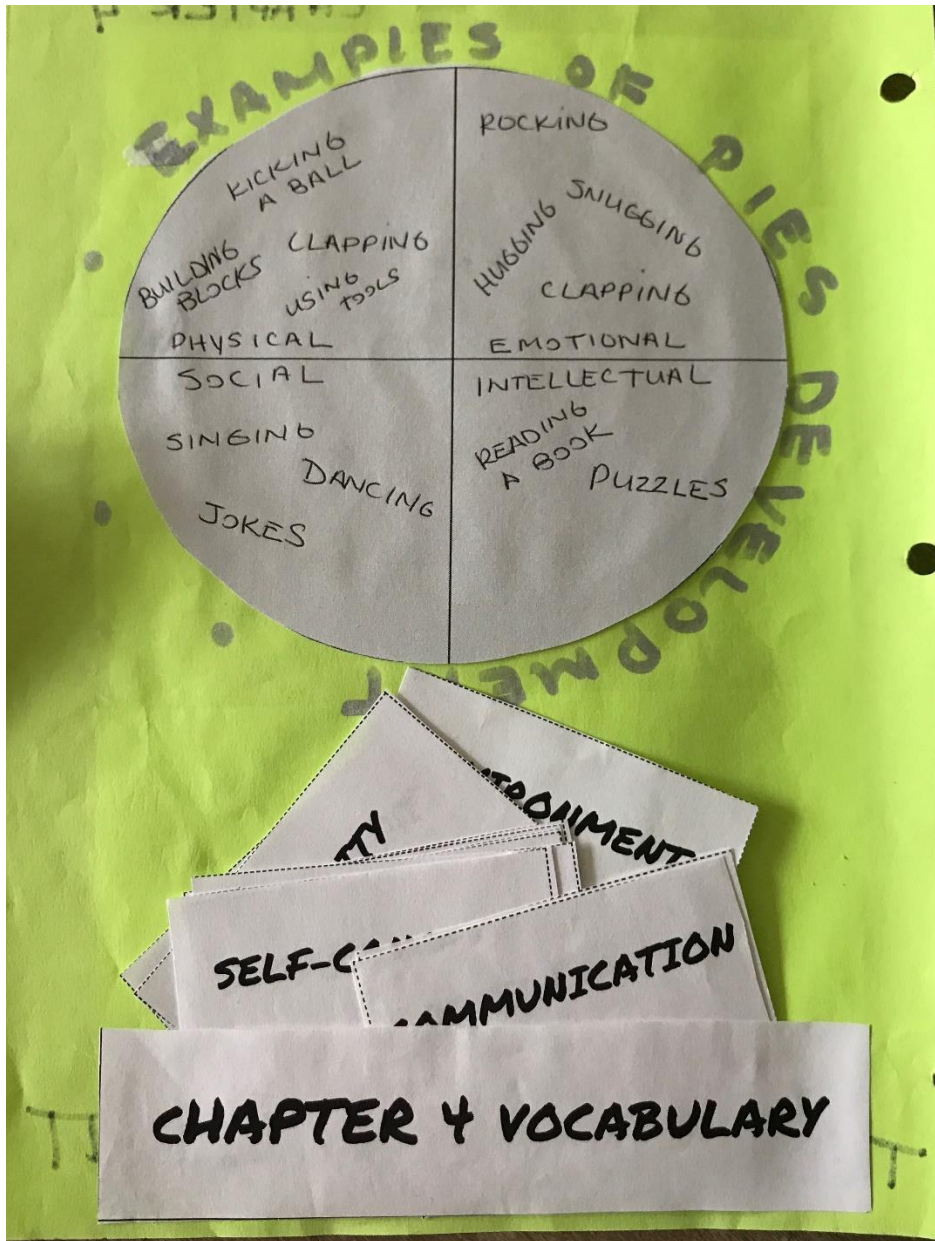


Figure 10: Chapter 4 Notebook Page- Includes vocabulary, classification, and chunking of material

CHAPTER 4: EFFECTIVE PARENTING/TYPES OF DEVELOPMENT

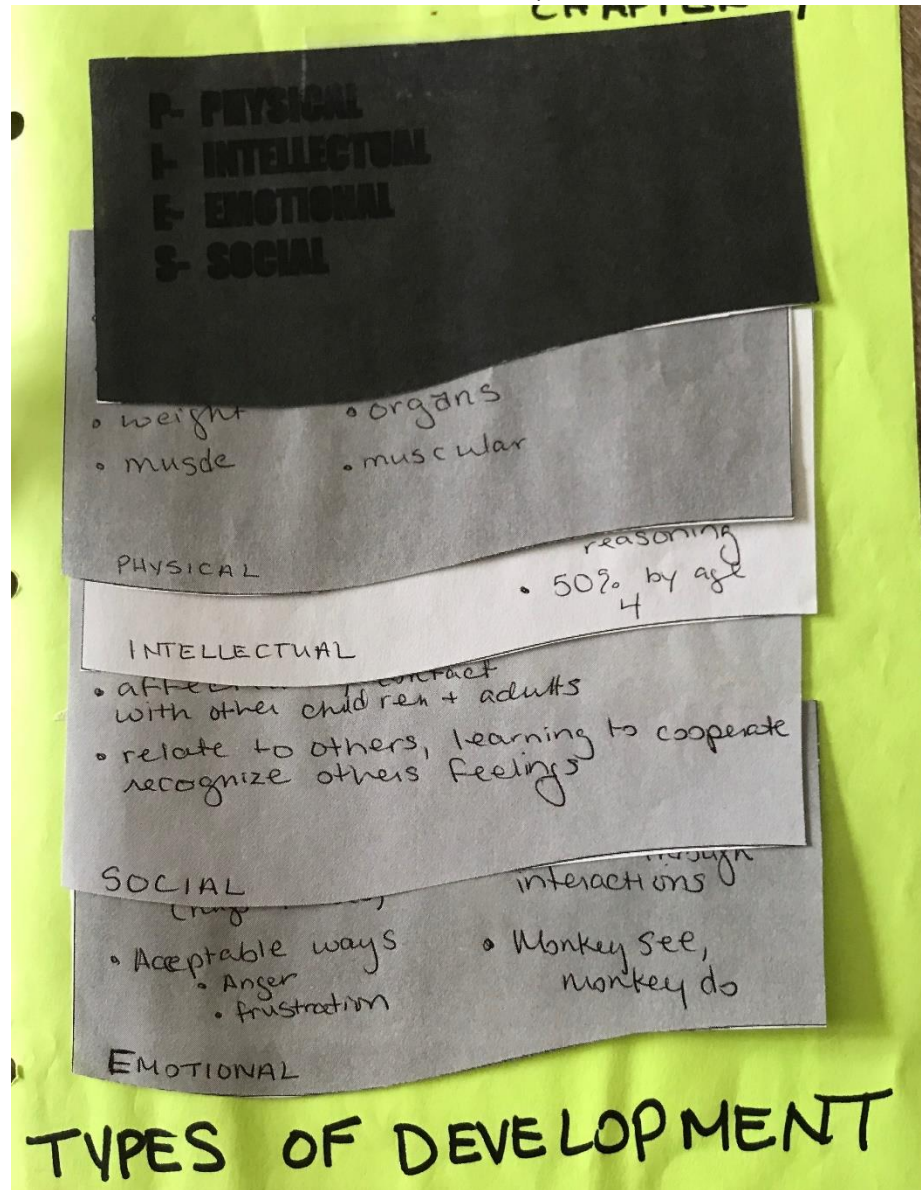


Figure 11: Chapter 4 Notebook page- prompts, student response

CHAPTER 5: FAMILY PLANNING- ADOPTION AND STERILIZATION

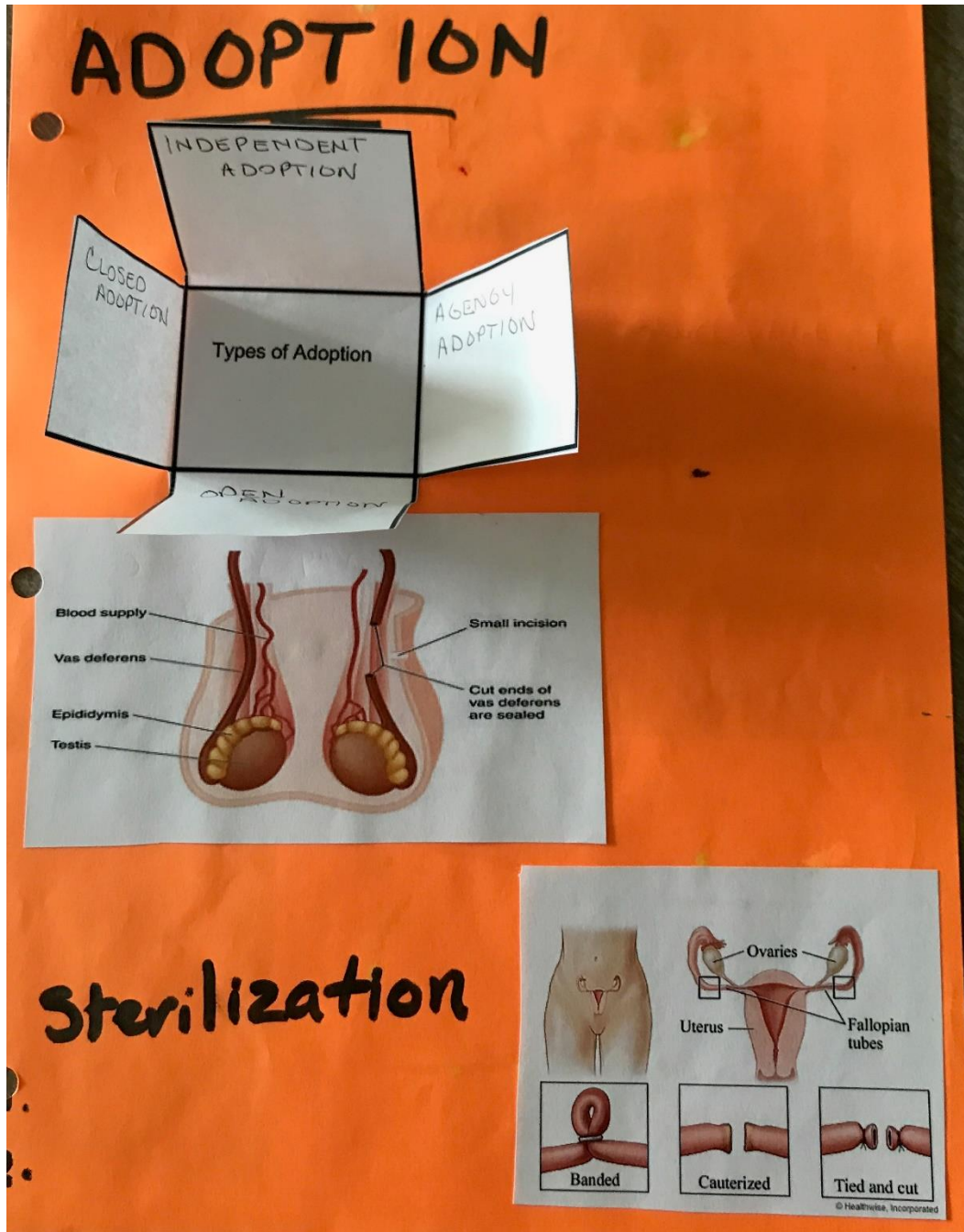


Figure 12: Chapter 5 Notebook page-key concepts, room for doodling, student connections, chunking information about adoption into small bites for Types of Adoption.

Exams

APPENDIX A: CHAPTER 4: EFFECTIVE PARENTING EXAM

APPENDIX B: CHAPTER 5: PLANNING A FAMILY EXAM