Michaela Mabe	Challenge #4	5/21/23	EDCI 60002c	Summer '23
SUPRA-BADGE:	Planning and Analysis			
SUB-BADGE:	Analysis Techniques For Instruction			
CHALLENGE:	Use appropriate techniques to analyze various types and sources to validate content.			
ARTIFACT:	EDCI 531 Final Paper			
CRITERIA:	**Criteria for successful completion of this challenge:** Evidence of utilizing validation techniques (checking the source, researching the author - education, experience, reputation, how many times cited, etc.). **Reflection must address:** The specific techniques you used to validate your sources and content.			

Competency and artifact identification

My **Final Paper: Guide To The Learning Theories! Scientific Method Edition** from EDCI 531 provides the evidence for the sub-badge, Analysis Techniques For Instruction, and the challenge, "Use appropriate techniques to analyze various types and sources to validate content.". This artifact provides evidence that I can use appropriate techniques to analyze sources and validate content about different learning theories. I completed research, compared and contrasted it, and aligned it with teaching science lessons. I used peer-reviewed sources to complete research about the different learning theories and which one aligned with teaching the scientific method efficiently.

Description of how the artifact supports the competency

My final paper for EDCI 531 supports the challenge because it shows that I am able to take peer-reviewed sources to create a paper explaining the different learning theories and apply a learning theory to a core subject in education. To make sure that I complete research that is relevant and accurate for college and my career, I make sure to look at the CRAAP method, which is an acronym and stands for Currency, Relevance, Authority, Accuracy, and Purpose. I analyzed each of the learning theories from different sources, created a graphic to help align the theories, and picked a theory that would go best with teaching the scientific method and science content. While there wasn't one theory that perfectly fit teaching the scientific method, the one that fits the best with teaching science was Constructivism. This taught me that there are different perspectives by analyzing different sources and validating the content by applying it to my teaching career. The sources I chose I made sure to validate the by checking the source, researching different papers the authors wrote, and looking at the times that the papers were made to make sure they had relevant information to what I am doing in my career in college.

Competency alignment with prior knowledge and experience

This aligns with my teaching experience and bachelor's experience because I've had to look at many different sources, analyze and synthesize them, and validate them to my current experiences. Currently, in my teaching career, I have to use sources to make sure I am using teaching strategies that are research-based and effective with my population of students. I also complete research for the

instructional design program to learn more about learning design and different learning technologies and theories to improve my professional portfolio. Using the CRAAP method is a quick and easy way to remember important things to look for when looking at sources for teaching or for my college courses.

Reflection on experiences

Overall it was important to review how I complete my research and how I validate the sources I use currently and ways I can improve it in the future. I like the system I currently use, but there is always an opportunity to grow and learn new and improved methods for analyzing and validating content. There is also more sophisticated technology to help anyone with access to the internet validate the content and make sure it is accurate and relevant.

Guide To The Learning Theories! Scientific Method Edition

Project Option #2

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EDCI 531: Learning Theory and Instructional Design

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Learning comes in many formats, whether that be through a formal lesson plan in the classroom or by going to an exercise class to learn a new workout. There are six main learning theories that help us better understand the ways that people can learn and the history of learning. These include Behaviorism, Social Cognitive Theory, Cognitive Information Processes Theory, Cognitive Learning Processes, Constructivism, and Gagne's Theory of Instruction. A description of each learning model is listed in the table below.

Working as a middle school teacher, the scientific method is one of the first subjects covered by that population of students to make sure they can use that material in their other material throughout the school year. The scientific method consists of asking a question, making a hypothesis, testing the hypothesis, analyzing the data, and communicating the results. To figure out what learning theory best fits this lesson, it is important to look at the lesson strategies a teacher would use, the lesson objective, the materials that will be used, the type of instruction, and the assessment used. According to Larison, “In recent decades, constructivism has become almost universally touted as the most effective approach to achieve learning in the science classroom” (p. 213). While this can be a helpful learning theory to teach science content, it is not the only one that can be effective.

Below is a quick glance summary of the different learning theories and how they can be applied to teaching and input into a lesson plan format. Adding the necessary components of a lesson plan in the tables and the infographic was done intentionally to help an educator see which theory fits best with whatever lesson or content they will be presenting with their population of students.

Behaviorism	
Definition	Behaviorism was described by Schunk, “Instruction is more effective when (1) teachers present the materials in small steps, (2) learners actively respond instead of passively listen, (3) teachers give feedback immediately following learners’ responses,

	and (4) learners move through materials at their own pace" (p. 109).
Strategies	Reinforcement, feedback, repetition, chaining, and generalization
Objective	The students are conditioned to learn and remember the material
Assessment	Positive Reinforcement and Feedback on Assignments

Social Cognitive Theory	
Definition	The social cognitive theory is described by Schunk as, "...human learning occurs in a social environment. By observing others (models), people acquire knowledge, rules, skills, strategies, beliefs, and attitudes" (p. 125).
Strategies	Modeling, goal setting, self-efficacy, worked examples, I can statements
Objective	The students will meet the goal they set at the beginning of the lesson
Assessment	Group Project

Cognitive Learning Processes	
Definition	The cognitive learning processes are described by Schunk as requiring a, "...knowledge of the facts, principles, and concepts of that domain, coupled with the general strategies that can be applied across domains and specific strategies that pertain to each domain" (p. 309).
Strategies	Metacognition, comprehension, problem-solving, computation,
Objective	The students will be able to transfer the knowledge they learned to new content
Assessment	Make a project or poster transferring their knowledge

Cognitive Information Processing	
Definition	The information processing theory is described by Schunk as, "...how people attend to environmental events, construct and encode information to be learned and relate it to knowledge" (p. 169).
Strategies	Working memory to long-term memory, chunking, visual aids, advanced organizers, set up or trigger a schema
Objective	The students will be able to problem-solve the material
Assessment	Problem Solve Word Problems or Real Life Situations

Constructivism	
Definition	Constructivism is described by Schunk that learners, "form or construct much of what they learn and understand" (p. 312).
Strategies	Inquiry, scaffolding, effective questions, discovery learning, student-led, cooperative learning, reflections
Objective	The students will be able to inquire about the content and discover new knowledge
Assessment	Complete an inquiry project about a concept of their choice

Gagne's Theory of Instruction	
Definition	According to Growth Engineering, "The model gives the trainer a structure to work through that will keep the learner engaged, and help them retain the content" (para. 8).
Strategies	Facts, paraphrasing, concrete concepts, problem-solving, motivation, real-life examples, cause and effect
Objective	The students will be able to follow the steps of the lesson and transfer the skills they learned to another lesson or skill

Assessment	Complete a test or quiz about the material and give feedback based on how they answered the questions

When teaching any science content, it is important to add helpful teaching tools such as models, videos, interactive components, and experiments to help the students engage and retain the content they learn. According to Krajcik and Merritt, “models are a common theme in science education since they run through all the natural sciences (and also other disciplines) and their teaching” (p. 324). This was also echoed by Develaki, “Models and modeling are core elements of scientific methods and consequently also have a central place in the conception and teaching of scientific methodology” (p. 298). Modeling is talked about in a few learning theories but is the most prevalent in the Social Cognitive Theory. Also when looking at this theory, according to Larison, “It is only through exposing our students to the narratives of scientists will they be able to make sense of science in the broader context of society” (p. 232). This stresses the importance of using multiple theories to teach science to make sure the educator is addressing the educational needs of all of the students and using multiple modalities to do that.

When doing research about teaching science using learning theories, a common theory that was discussed was Constructivism. Looking at the nature of science lessons and teaching the scientific method, it would make sense to follow the Constructivist learning theory which relies on the use of visuals and inquiry and constructing knowledge based on the information presented to them. Constructivism according to Kurt and Sezek, “This approach is to shape the new information that the individual has learned with the knowledge and experiences in his own cognition” (p. 87). This means that by starting off with teaching the scientific method at the beginning of the year, the students can construct new learning based on what they already know about the scientific method.

While the learning theories can be separated and taught just using the specific learning theory, it is important to look at different components of each learning theory that will fit that teacher's classroom and population of students. It’s just the pieces that fit the best in the puzzle. If a teacher wanted to do a lesson and base it on the scientific method but use repetition and positive reinforcement, that would follow parts of Behaviorism. You could also teach it by following Gagne’s Nine Levels of Instruction which help systematically teach and assess the content which could work well for distance learning in a learning management system. Overall, each learning theory has given education important concepts and instructional methods. Teachers are able to use the knowledge from each learning theory to help create and guide their lesson plans to help their students succeed.

Choosing A Theory

01 Content

What content are you teaching?

- Science
- Social Studies
- Mathematics
- Reading
- Writing
- Life Skills

Grade Level

What grades are you teaching?

- Elementary School K-4
- Middle School 5-8
- High School 9-12

02 Instructional Strategy

What types of instructional strategies do you want to use in your lesson?

- Reinforcements
- Modeling
- Chunking/ Attention Grabbers
- Metacognition
- Inquiry Strategies
- Problem Solving

03 Lesson Objective

What do you want the students to be able to do by the end of the lesson?

- The students are conditioned to learn and remember the material
- The students will meet the goal they set at the beginning of the lesson
- The students will be able to transfer the knowledge they learned to new content
- The students will be able to problem solve the material
- The students will be able to inquire about the content and discover new knowledge
- The students will be able to follow the steps of the lesson and transfer the skills

04 Materials

What types of materials are you going to use during the lesson?

- Behavior Chart, Rewards
- Peer Review Worksheets, Peer Discussion Prompts, Models
- Technology, Multimedia
- Advanced Organizers and Visuals
- KWL Charts, Wonder Wall
- Worksheets, Practice Materials

05 Instruction

What type of instruction are you going to use during your lesson?

- Direct Instruction
- Indirect Instruction
- Independent Study
- Experiential Instruction
- Inquiry (Direct/Guided)
- Interactive Instruction

06 Assessment

What type of assessment do you want to give during your lesson?

- Positive Reinforcement and Feedback
- Group Project
- Make a project or poster transferring their knowledge
- Problem Solve Word Problems or Real Life Situations
- Complete an inquiry project about a concept of their choice
- Complete a test or quiz about the material

07 Learning Theory

Which learning theory fits best based off the choices made in the flowchart?

- **Behaviorism** — First boxes of each category
- **Social Cognitive Theory** — Second boxes of each category
- **Cognitive Learning Processes** — Third boxes of each category
- **Cognitive Information Processing** — Fourth boxes of each category
- **Constructivism** — Fifth boxes of each category
- **Gagne's Theory of Instruction** — Sixth boxes of each category

References

Develaki, M. Key-Aspects of Scientific Modeling Exemplified by School Science Models: Some Units for Teaching Contextualized Scientific Methodology. Interchange 47, 297–327 (2016). https://doi-org.ezproxy.lib.purdue.edu/10.1007/s10780-016-9277-7

Krajcik, J., & Merritt, J. (2012). Engaging Students in Scientific Practices: What does constructing and revising models look like in the science classroom? Science Teacher, 79(3), 38–41.

Kurt, U., & Sezek, F. (2021). Investigation of the Effect of Different Teaching Methods on Students' Engagement and Scientific Process Skills. International Journal of Progressive Education, 17(3), 86–101. https://doi-org.ezproxy.lib.purdue.edu/10.29329/ijpe.2021.346.6

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McPherson, G. R. (2001). Teaching & Learning the Scientific Method. The American Biology Teacher, 63(4), 242–245. https://doi.org/10.2307/4451093

Schunk, D. H. (2020). Learning theories: An educational perspective. Pearson.

What Are Gagne's Nine Levels of Learning & Why Are They So Important? Growth Engineering. (2019, December 5). Retrieved February 22, 2023, from https://www.growthengineering.co.uk/gagnes-nine-levels-of-learning/

Requirements	Points Explanation				Points Earned/Available
	Exceeds Standard	Meets Standard	Needs Improvement	Unacceptable	Points
	9-10	7-8	5-6	0-4	
Context clearly identified	The student clearly identifies their target audience and context, and all language and terms are appropriate for that context	The student clearly identifies their target audience and context, and most language and terms are appropriate for that context	The student identifies their target audience and context, but more detail is needed, or the language and terms are vague or general	The student does not identify their target audience and context, or the language and terms used are inappropriate or incorrect	/10
One page visual	The visual is the correct size/length, it is well-designed and visually pleasing, and it is easy and intuitive to understand how to use this visual to choose a given theory for a particular project	The visual is the correct size/length, it is well-designed, and it is easy or requires minimal instruction to understand how to use this visual to choose a given	The visual is the wrong size/length, is visually confusing or confusing to use, and does not clearly help choose a given theory for a particular project	The visual is too long or too short, does not include all the learning theories, is difficult to use, or does not allow members of the target audience to choose a given	/10

		theory for a particular project		theory for a particular project	
Paper	The paper is in a reader-friendly academic tone, it is well-organized, and provides a good foundation for all 7 of the learning theories	The paper is in a tone that is mostly read-friendly or academic, it is organized in a way that makes sense, and adequately explains the foundation for all 7 learning theories	The paper is sometimes too academic or too colloquial, is confusing, or is missing some depth and information to adequately explain the foundation for all 7 learning theories	The tone of the paper is entirely academic or entirely colloquial, is poorly organized, is missing one or more of the learning theories, or does not provide sufficient depth to explain the foundation for all 7 learning theories	/10
Differentiation of learning theories	The entire project highlights similarities and differences in a way that is intuitive, helpful, and clear	The project highlights similarities and differences in a way that is helpful and clear, but may require some explanation or exploration to fully understand	The project highlights some similarities and differences, but may miss key differentiations or create differentiations that are not part of the theories, or the differentiations are indicated in a way that is confusing	The project does not highlight similarities or differences for 2 or more learning theories, the differentiations are inaccurate, or the differentiations are very confusing	/10

Research and Conventions	Sources are from reputable places, are correctly cited, and the minimum number of citations was included. There are no spelling or formatting errors	Sources are from reputable places, are cited with 1-2 minor errors, and the minimum number of citations was included. There are a few minor spelling or formatting errors	Sources may not be from reputable places, there may be more than occasional errors, or the student missed 1-2 of the required number of citations. There are several spelling or formatting errors that are occasionally distracting	Sources are not reputable, there were consistent errors in citation, there was evidence of plagiarism, or the student was missing more than 3 of the required number of citations. There are multiple distracting spelling or formatting errors	/10
Comments					
Total					/50