Prior Knowledge Activation and Content Area Literacy

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Abstract

Prior Knowledge Activation (PKA), involves the stimulation of existing information within a student’s memory in order to facilitate his or her reading comprehension of a text within the same domain. Within the practice of PKA, there are differentiations of the method, which include the use of note-taking, meta-cognition, and the assistance of students that speak English as a second language (ESL). Specific examples of PKA activities that can be used to introduce the practice in a classroom setting include “We Know, We Want to Know, We Learned.” (KWL) and “Story Impressions”. The PKA method, its various techniques, and the activities used to practice it in the classroom all contribute to the increased reading comprehension, memory, recall, and advanced learning of students.

Keywords: reading, comprehension, cognitive, knowledge, memory, schemata
Prior Knowledge Activation and Content Area Literacy

Introduction

Prior Knowledge Activation (PKA) is a learning technique used in literacy development that assists students in their reading comprehension by using information they have previously obtained and retained. When engaging in a subject area in which they have previous experience, a student can use their prior knowledge to integrate any new information that is coming into their minds more efficiently and with greater recognition. By building a bridge between previously learned material and incoming data, students can better understand the new information, while simultaneously refining the existing knowledge, all of which leads to better recall and comprehension (Wetzels, 2011). However, prior knowledge cannot be helpful to a student’s learning unless it is activated. According to Wetzels (2011), “Prior knowledge activation involves the transfer of available knowledge from long-term memory to working memory” (p. 275). Without this transfer, less room is accessible for new information, and therefore, less of a chance exists that full reading comprehension will occur.

The increased ability to store information, otherwise known as improved coding, is one of three documented ways by which PKA improves student memory capacity. The second way that this can occur is through the creation of useful associations, which allows a student to make stronger connections between the material and his or her existing knowledge. These connections help form lasting bonds within the brain that increase student recall. The third way that improved memory can occur is through better decision-making. A PKA can give students an improved ability to determine which reading comprehension strategies are more appropriate and therefore more useful, leading to better retention of information (Kostons, 2015).
In order to introduce PKA, teachers typically use one of three instructional techniques, called “Problem Analysis”, “Self-Explanation”, and “Mobilization” (Wetzels, 2011, p. 276). Problem analysis is a process in which students work together to collaboratively activate their prior knowledge in order to solve a given problem. They develop possible explanations based on what they already know. Self-explanation occurs when students are asked to generate the explanations individually in order to activate their personal prior knowledge without being overwhelmed with the PKA of fellow students. Finally, mobilization is an activity conducted by the entire class, in which the students are asked to brainstorm and contribute any knowledge they have in the domain being discussed, regardless of its possible relevance. It should be noted that mobilization is the most useful technique when dealing with learners whose prior knowledge may be limited (Wetzels, 2011).

**Activating Prior Knowledge Using Note Taking**

Activating prior knowledge, on its own, has its benefits, but there have also been studies that show that including a note taking requirement within the process can further increase the retention and recall of learners. When students take notes, it decreases the mental effort required by their memory. There are limits to the amount of information a brain can simultaneously activate and process. Studies show that around seven ‘slots’ of memory are available for different pieces of information, and that while multi-tasking, that number can decrease to three. As a result, a student’s cognition can be increased by freeing up some of those slots. Note taking accomplishes this task by moving the prior knowledge information from the brain to external storage in the form of notes. Freeing up space in the brain helps prevent cognitive overload, which can cause students to forget what they are learning or even shut down altogether (Wetzel, 2011, p. 278).
Note taking during PKA can act as a bridge between existing prior knowledge and the information students hope to acquire. In addition, it facilitates the integration of the new data into the existing knowledge structures that already exist in the brain due to the aforementioned prior learning. This creates an organizing framework that allows students to relate to concepts without using up valuable working memory space. As a result, students experience higher recall and better understanding of the new information (Wetzels, 2011).

**Activating Metacognition Through Prior Knowledge**

Metacognition is defined as “the knowledge or beliefs of what variables act and interact in ways to affect the course and outcome of cognitive enterprises. Metacognitive knowledge comprises on how, when, and why to use learning strategies” (Kostons, 2015, p.266). In other words, metacognition is the awareness and understanding of one’s own thought processes, and how they can use it to increase learning. This type of knowledge can benefit from PKA in the same way that content knowledge can. Just as PKA for content can connect previously learned ideas to subsequent readings, reintroducing various learning processes can connect the brain to previously learned strategies (Kostons, 2015).

Many learning strategies take an extensive amount of class time to teach, and using PKA with a metacognition focus allows a teacher to save that valuable time by reactivating previously taught thought processes. This is equally as important as PKA for content, because without proper use of metacognition, students may be unable to deal with difficult readings and will consequently fail to fully comprehend their text. This failure of metacognition is called “production deficiency” and it can result in students misunderstanding what they are reading (Kostons, 2015, p.267).
Prior Knowledge Activation and ESL Students

Activating prior knowledge can be particularly important for students that speak English as a second language (ESL students), as they are at a greater risk of misunderstanding a given text than the average student. Corbit (2008) states that “jogging the mind to touch on previous learning or knowledge, also known as ‘schemata,’ helps students organize information from past experiences and sets the stage for future understanding” (p. 23). This is a critical step for ESL students as it allows them to “engage in discussion, build vocabulary, share cultural parallels and link their experience with other students” (p. 23). In addition to helping the students, using PKA with an ESL classroom can help the teacher as well. Conducting PKA activities allows the teacher to create a baseline for student knowledge, which tells them where to start their lesson. Many times, this baseline is higher or lower than a teacher assumes, especially with ESL students, so establishing it is an important part of the learning process (Corbit, 2008).

PKA Strategies for the Classroom

KWL

The creator of the KWL (We Know, We Want to Know, We Learned) strategy, Donna Ogle, explained her motivation for doing so when she stated, “Students’ questions are the starting point for their engagement and thinking. As educators, it is our challenge to create such conditions and guide students in pursuit of interesting and important ideas” (Ogle, 2009, 57). Ogle was a great believer in activating prior knowledge and as such she created the KWL graphic organizer tool, which serves as both a self-evaluation and a springboard for future learning. It helps students understand what they know and make their own decisions on what they want to learn. Because this strategy is often used with a group of students containing
limited prior knowledge, it utilizes the mobilization technique in order to utilize the power of group thinking and shared knowledge increasing the level of learning for all students.

In order to provide a full example of how to use the KWL method in the classroom, I have developed a sample lesson plan, which can be found below:

**KWL Lesson Plan**

**Subject:** KWL - “The Jungle Book” By Rudyard Kipling

**Grade:** 6th

<table>
<thead>
<tr>
<th>Thinking About Planning:</th>
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<tbody>
<tr>
<td><strong>1. Common Core Learning Standard(s) Addressed:</strong></td>
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<tr>
<td>CCSS.ELA-LITERACY.RL.6.1</td>
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<tr>
<td>Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.</td>
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<tr>
<td><a href="http://www.corestandards.org/ELA-Literacy/RL/6/">http://www.corestandards.org/ELA-Literacy/RL/6/</a></td>
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<table>
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<tr>
<th><strong>2. Learning Target(s):</strong></th>
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<tr>
<td><strong>Objective:</strong></td>
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<tr>
<td>Students will be able to use reading comprehension to gather information from a text and interpret that information in the context of a theme.</td>
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<tr>
<td><strong>Goal:</strong></td>
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<tr>
<td>The goal of this assignment is to teach students the importance of activating prior knowledge before reading a text. After the lesson is complete, the students will understand how to use the KWL method (what I Know, what I Want to know, what I Learned) to assist them in their prior knowledge activation, which it accomplishes by giving them purpose and arousing their curiosity. Additionally, the assignment aims to increase the students’ self-efficacy and to motivate them to become more active readers. The subject of the KWL and subsequent reflection will be an excerpt from “The Jungle Book,” by Rudyard Kipling.</td>
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<th><strong>3. Academic Language:</strong></th>
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<tbody>
<tr>
<td>Students will engage in the following language functions: analyze, compare/contrast, describe, explain, interpret, question, retell, summarize. They will be asked to describe and explain when telling what they know, question when telling what they want to know, and analyze, interpret, retell, and summarize when telling what they’ve learned. After the assignment, they will be asked to complete a reflection in which they compare and contrast what they learned with what they wanted to know through reflection.</td>
</tr>
<tr>
<td>• What vocabulary will be challenging?</td>
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<tr>
<td>o Jungle</td>
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<tr>
<td>o India</td>
</tr>
<tr>
<td>o Madness</td>
</tr>
<tr>
<td>o Wilderness</td>
</tr>
<tr>
<td>o Betrayal</td>
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<tr>
<td>o Revenge</td>
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</table>
**Will students need discussion skills?**

Students will need to be able to discuss their point of view at various stages in the KWL process, describing the knowledge they have, hope to gain, or have learned relating to the text.

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### Thinking About Instruction

#### 4. Engagement/Motivation

As a major motion picture based on the book has recently been released, I will start my lesson by asking if anyone has seen the movie, and if they know that it was based upon an actual book. I will show them the trailer to the movie in order to whet their appetites for the subject. Next, I will discuss the themes of the book, including adventure, the jungle, animals, and courage, and I will ask the class to brainstorm for any other ideas or subjects that they think might be involved. I will write a list of our collective themes on the board and leave it up for the duration of the assignment.

#### 5. Explicit Instruction

- **Direct Instruction**

  After I feel I have properly engaged and motivated the students, I will introduce them to the KWL method. Before beginning, I will ask if any of them have used the method previously, and if any have, I will ask one of those students to summarize for the class what they know. Once that knowledge is shared, I will correct and supplement the student’s explanation as needed, or if no students have any experience at all with KWL, I will explain the entire process. That explanation will be as follows:

  “KWL stands for “Know/What/Learn,” and it is a method that is used to assist students in better understanding their readings. During this method, students will write out and discuss three types of information: What they know about the text and its subjects, what questions they want answered from reading the text, and, after reading, what they have learned from reading the text.”

  In order to reinforce the method, I will go through a quick example using a sample paragraph that focuses on a core subject.

- **Guided Practice**

  After the students have been instructed as to what the KWL method entails, I will hand out worksheets that contain three sections, “Know,” “What,” and “Learned,” and inform the students that these areas are for their thoughts on “The Jungle Book” excerpt. As a class, we will go through the list of themes that were written on the board and I will ask the students to tell me everything they know about them. As the students share, the class will be instructed to write down their own knowledge, which includes anything a classmate contributed that they agree and understand themselves.

  Once we have shared and written down everything we know, I will repeat the brainstorming and writing process for the second section of the worksheet. I will ask the students to share what they would like to learn from the book, and require each to write down their own thoughts on their worksheet. After this is complete, we will read the excerpt from “The Jungle Book” aloud, together as a class.

- **Independent practice**

  Once the group reading is complete, I will ask the students to work independently in order to complete the final section, describing what they learned from the reading. In this section, I will guide the students in gathering information from the text and interpreting it for the purposes of describing and summarizing it on their worksheet. I will use this opportunity to go around the room and check on each student individually to ensure they are not facing any unsurmountable hurdles within the challenge itself.
Thinking About Assessment:

6. Type of assessment
   - Will you be using formative or summative assessment as part of this lesson or some combination?
     I will be using a summative assessment at the end of the lesson and it will take the form of a reflection paper, in which I will ask the students to summarize their process, explain the information they included on their worksheet as well as why it was included. The students will be asked to compare and contrast what they hoped to learn with what they actually learned, and to relate their feelings as to how the process worked.
   - How will you know your students have met the objective? What questions can you ask? What can you observe?
     Through the summative assessment, I will be able to judge whether or not my students are able to using their reading skills to gather information from a text, and then communicate that information in written form. The final piece of the reflection will ask that they give their thoughts on the entire assignment and whether they think the initial brainstorming and knowledge sharing added to their reading. I will give them leading questions in order to help them develop their thoughts, such as:
       - Did the background knowledge make you more eager to learn more?
       - Did discussing the themes ahead of your reading arouse your curiosity?
       - Were you able to understand the content better as a result of the pre-reading activity?
       - Do you feel that the KWL method is worthwhile? If so, explain.

7. Resources/Materials:
   - “The Jungle Book,” by Rudyard Kipling
   - KWL Worksheet
   - Classroom Smartboard

Story Impressions

Story impressions are used as a PKA strategy when a teacher wishes to use vocabulary as a catalyst that stimulates student thinking. In order to do so, the teacher provides key phrases from a reading assignment and asks his or her students to compose a best guess scenario in the form of a written story. This writing induces the cognitive functions in the students’ brains by “activating relevant schemata, developing a sensitivity to passage structures, predicting future material, and monitoring comprehension” (Denner, 2003, p. 314). Composing a story gives readers a chance to construct a mental model of possible themes, increasing the possibility of reading comprehension. In addition, it influences the readers’ motivation to comprehend the text in order to determine the accuracy of their prediction (Denner, 2003).
In order to provide a full example of how to use the story impressions method in the classroom, I have developed a sample lesson plan, which can be found below:

**Story Impressions Lesson Plan**

**Subject:** *Creating Story Impressions - “The Call of the Wild” By Jack London*

**Grade:** 7th

**Thinking About Planning:**

1. **Common Core Learning Standard(s) Addressed:**
   
   **CCSS.ELA-LITERACY.RL.7.2**
   
   Determine a theme or central idea of a text and analyze its development over the course of the text; provide an objective summary of the text.
   

2. **Learning Target(s):**

   **Objective:**
   
   Students will be able to identify and connect multiple themes within a text and will analyze those connections in order to summarize them in written form.

   **Goal:**
   
   The goal of this assignment is to help students connect their prior knowledge of given subjects to a text by having them brainstorm, make predictions, and analyze the text. At the end of the lesson, students will be able to compare their own thoughts to those of their fellow classmates as well as the author himself. Through that comparison, the students will gain deeper understanding of the subject matter, its interwoven themes, and as a result become more engaged readers who are motivated to learn.

3. **Academic Language:**

   Students will engage in the following language functions: **analyze, compare/contrast, describe, interpret, predict, retell, and summarize.** They will be asked to analyze a list of words and interpret what story themes they may represent. Using those interpretations, they will be asked to predict the story in the text and will describe how they came to that decision. Next, they will be asked to analyze the text itself, comparing and contrasting it with the prediction they made. Finally, they will be asked to present their work to the class, retelling their process and summarizing their conclusions.

   - **What vocabulary will be challenging?**
     
     - Nature
     - Alaska
     - Wild Animals
     - Wilderness
     - Freedom
     - Captivity
**PRIOR KNOWLEDGE & LITERACY**

<table>
<thead>
<tr>
<th>Will students need discussion skills?</th>
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<tbody>
<tr>
<td>As a group, students will need to summarize their process and conclusions in front of the class, orally discussing what steps they took and what they learned from the assignment.</td>
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</tbody>
</table>

### Thinking About Instruction

**4. Engagement/Motivation**

I will begin the lesson by asking if any of the students own pets, specifically dogs. I will explain that we will be reading a story about a dog that day, but not in the fashion that they are used to. I will pique their interest by informing the students that a guessing game will be involved that will require them to be creative and work together with their peers.

**5. Explicit Instruction**

- **Direct Instruction**
  
  After I feel I have properly engaged and motivated the students, I will introduce them to the story impressions process. Before beginning, I will ask if any of them have participated in the activity previously, and if any have, I will ask one of those students to summarize for the class what they know. Once that knowledge is shared, I will correct and supplement the student’s explanation as needed, or if no students have any experience at all with story impressions, I will explain the entire process. That explanation will be as follows:

  “Story impressions are a pre-reading tactic that we can use to add understanding to a text. By defining certain vocabulary and brainstorming on possible connections between the themes presented, we can open our minds up to the content at hand. You will be given a list of words that I have pulled from the text you will be reading later on. In your assigned groups, you will brainstorm connections between the words in order to make a prediction as to what you think the text is about. After your group has finished brainstorming, you will write a paragraph with your final prediction, and we will read the text together as a class to see how accurate everyone’s predictions turn out to be.” After this explanation, I will take the students through an example, using a sample list of words.

- **Guided Practice**
  
  After the students have seen my example, I will split them up into groups and hand out a worksheet to each group that lists the vocabulary I have chosen from the excerpt of “The Call of the Wild,” by Jack London. The worksheet will guide the students in their process, and they will be asked to put their brainstorming thoughts in a middle section. During this time, I will be walking around the room checking in with each group to make sure they are getting along ok in their task.

- **Independent practice**
  
  Once the brainstorming is complete, the groups will write a paragraph summarizing what they think the excerpt of the story may be about. We will go around the room and one by one, each group will share what they predict will be in the text we are about to read. After all of the groups have shared, we will read the excerpt together out loud, as a class. I will ask the students to take notes during this time, instructing them to write down any thoughts they have about the text and its connecting themes. Students will be reminded that an assessment is upcoming and will be encouraged to ask any questions that they might have about the text, the connecting themes, and the assignment itself.
**Thinking About Assessment:**

6. **Type of assessment**
   - Will you be using formative or summative assessment as part of this lesson or some combination?
     
     I will be using a summative assessment at the end of the lesson to determine whether or not the learning objective and goals have been met. Students will complete a reflection exercise, during which they will write a one-page summary of their thoughts on the assignment. They will be asked to explain the process they went through with their group and what led them to the prediction they settled upon. Students will also be asked to compare and contrast the prediction their group made with the text we read together in class, with special consideration to be given to the discussion of themes.
   
   - **How will you know your students have met the objective? What questions can you ask? What can you observe?**
     
     Based on the oral presentation the students complete with their groups, along with the separate reflections I receive from each individual, I will be able to assess whether or not the students can identify themes among texts. The students will show their ability to connect their own prediction themes to the ones in the text, and they will provide evidence that they can summarize those connections and any other thoughts they may have in a written form.

7. **Resources/Materials:**
   - “*The Call of the Wild,*” by Jack London
   - Story Impression worksheet
   - Classroom Smartboard

**Reflection**

When I first began my research on the content area literacy subject of prior knowledge activation, I had little idea as to the wealth of study and discussion it had already generated in educational communities. The PKA literacy tool has depths of methodology and technique that I found to be both significantly useful and completely fascinating. I was able to gain a new appreciation for not just the tool itself, but also the overall work being done to improve content area literacy in classrooms.

The scientific aspect of my findings were impressive, and the breakdown of how the PKA method physically assists our brains was convincing. As a math teacher, my mind typically follows a logic trail, and the cause and effect explanation for how the PKA works helped me fully appreciate the effect it can have on students and their ability to comprehend texts. In
addition, the application of the PKA method using metacognition, in order to assist the content area literacy PKA simultaneously taking place, was something I found to be a brilliant extension of thought, and is a concept I will take with me going forward.

Content area literacy in the classroom is tremendously important, and with a tool such as PKA, I can feel more comfortable in my teaching, knowing that the science behind the method has been proven to be effective in countless studies. It will give me great peace of mind to know that my students are fully understanding and retaining whatever text they are given, as that is a vital part of their learning, and it will assist in fully preparing them for their lives outside the classroom.
References

Corbit, H. (2008). Activating prior knowledge: how to connect with the content matter: Holly Corbit explains how she helped her students to find the time to activate their prior knowledge despite the constraints of a hectic daily timetable. ESL Magazine, (62), 23.


