

Application of Mental Representations

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EDU510 – The Cognitive Science of Teaching & Learning


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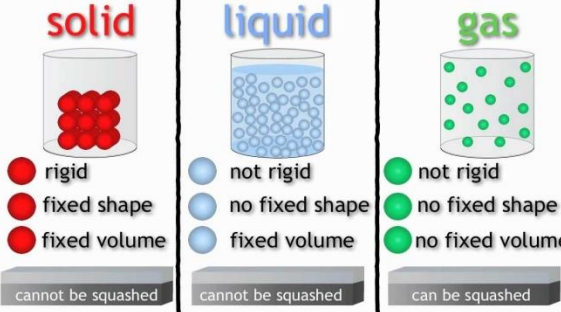
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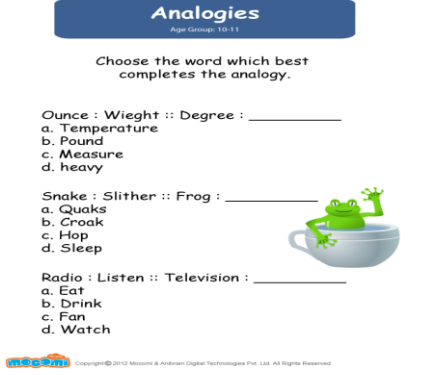
**Analysis & Application**


Many are the representations and computational operations that are imperative to understand human thought. In fact, in many cases, they complement each other and do not have to be mutually exclusive. Next, the five most outstanding mental representations (logic, rules, concepts, analogies, and images) will be cited.

<b>Mental Representations</b>	<b>Example</b>	<b>Instructional Event/Strategies</b>
<p style="text-align: center;"><b><u>LOGIC</u></b></p> <p>Logic refers to the study of valid reasoning. The conclusions are drawn through the application of rules of inference to a set of premises.</p> <p>A science of formal character that lacks content since it focuses on the study of valid inference alternatives. (Pérez &amp; Merino, 2012)</p>	 <p>An example where rules come into play is with the game called "Game of the hoop".</p> <p>Placed in a circle, all grabbed by the hand and previously introducing a hoop before grabbing, they must transport the hoop, between their bodies without letting go of their hands, thinking about what ways are possible and how it is easier to do it. Together, talking and agreeing can suggest ideas of how it is the best option. The hoop must move through all the partners, without letting go of the hands until reaching the initial starting place.</p> <p>Students need to know how to past the hoop from one partner to another in a PE class (where). They must discover what is the logical way to pass the hoop without letting go of their hands (why) They will develop logic in many situations such as problem-solving in the classroom (when) They will learn what is the most logical and effective way to solve this situation. The teacher will guide the students in the development of the activity (how)</p>	<p><b>Strategy 1:</b> The teacher will ask questions to the students so that they reflect on how to solve the problem:</p> <p>“What is the easiest way to pass the hoop to your partner without letting go of your hands?”</p> <p>“What other forms could you use?”</p> <p><b>Strategy 2:</b> Guided instruction to teach them different options so that they analyze and select the one they think is more effective.</p>

Mental Representations	Example	Instructional Event/Strategies
<p><b><u>RULES</u></b></p> <p>The rules are regulatory structures. They are those that tell how to behave in certain specific situations, depending on the place and moment.</p> <p>Are those by which the conduct of a human being is governed in accordance with society and with himself. (Queen, 2015)</p>	 <p>Students during the development of Physical Education classes must wear the appropriate clothing (where and when)</p> <p>They must wear sports clothes and training shoes. (how)</p> <p>This rule is imposed seeking comfort at the time of developing the physical activity, and fundamentally to avoid injuries. Because if they wear inappropriate shoes, the chances of injury are greater (why)</p>	<p><u>Strategy 1:</u> At the time of approaching the class rules, the internal regime of the center will be imposed.</p> <p><u>Strategy 2:</u> Progressive rules will be used, that is to say, many rules will not be imposed on the first day. Since other rules will be added gradually</p> <p><u>Strategy 3:</u> It will start using urgent rules, to establish others that are not so important initially. For example, an urgent rule is not to wear shoes in the classes. A rule that will be imposed later is the use of a specific type of sneakers, since thanks to it, not only injuries will be avoided, but also the performance of the kids will be improved.</p>

Mental Representations	Example	Instructional Event/Strategies
<p><b><u>CONCEPTS</u></b></p> <p>Concepts are basically abstract ideas, of a class of related objects or events, which generally correspond to a word.</p> <p>“Many concepts are formed by combining simpler concepts, and the meanings of complex concepts are derived in systematic ways from the meanings of their constituents” (Thagard, 1996)</p>	 <p>Students will study the states of the matter in the class of Sciences and at home with the help of their parents (where and when)</p> <p>They will learn the different states in which water can be found (solid, liquid and gas) through the concepts and the relationship with everyday life (how)</p> <p>Children should know the different concepts. Thanks to this activity the students will put an image to abstract concepts (why)</p>	<p><u>Strategy 1:</u> Recording prior knowledge and establish a connection with new knowledge</p> <p><u>Strategy 2:</u> Set connections between teaching and everyday life.</p> <p>For example, Students could better understand the concept of solid, liquid and gas if they associate it with aspects they can witness at home.</p> <ul style="list-style-type: none"> <li>- Solid: ice cubes in the fridge</li> <li>- Liquid: the water that comes out from the tap</li> <li>- Gas: the steam from the boiling pot</li> </ul>

Mental Representations	Example	Instructional Event/Strategies
<p style="text-align: center;"><b><u>ANALOGIES</u></b></p> <p>It is the mental process by which relations of similarity between two groups of objects are established.</p> <p>New situations are treated through adaptations of similar situations already known, that is to say, recalling previous experiences that resemble a new situation.</p>	<div style="text-align: center;">  </div> <p>This activity will be developed in the classroom during the school day, although the students can also work at home with the help of their relatives (where and when)</p> <p>Students should choose the word which best completes the analogy, establishing relations of similarity between groups of objects. (how)</p> <p>With the development of this activity new situations are treated starting from similar situations already known (why)</p>	<p><b>Strategies:</b></p> <p>There are several types of analogies, all aimed at developing linguistic, mathematical and scientific skills in children since they promote the use of abstract thinking in children.</p> <p>There are different ways to establish and propose these comparisons, some of them are:</p> <ul style="list-style-type: none"> <li>• Analogies with opposites ⇒ "near is too far as fast is to slowly"</li> <li>• Functional analogies ⇒ "The buttons are covered as the laces are to the shoes."</li> <li>• Analogies of gender and species ⇒ "cockroach is an insect-like rose is a flower".</li> <li>• Analogies that involve things and their properties ⇒ "Sugar is sweet as salt is salty."</li> <li>• Analogies cause-effect ⇒ "to pursue is to capture how to search is to find."</li> <li>• Analogies involving corrective actions ⇒ "Eating is to hunger as drinking is to thirst."</li> <li>• Analogies in grammar ⇒ "I write is to me I do not write as you write is to you do not write."(Eyheralde 2016).</li> </ul>

Mental Representations	Example	Instructional Event/Strategies
<p><b><u>IMAGES</u></b></p> <p>They are mental representations that reflect or resemble what they represent. They are an important element of thought and the construction of cognitive schemes.</p> <p>Mental images occur in almost all sensory modalities.</p> <p>Mental images are mental representations of physical objects or events that are not present. (Mel, 2017)</p>	 <p>An example where images come into play is with the game called "ordination by colors". In the game, the children have to place in the different delimited areas the objects that match the color of the corresponding area.</p> <p>The activity will be developed in the classroom during the hours of Physical Education classes (when and where)</p> <p>With the completion of this exercise, it is sought that through the stimulation of sight, the child begins to acquire association criteria (why)</p> <p>The teacher will give the instructions for the correct performance of the activity (how)</p>	<p><u>Strategy 1:</u> Four colored sheets will be placed in four different places in the class.</p> <p><u>Strategy 2:</u> The students will be told to place the objects/toys by colors: the green ball, in the green area. The red cone in the red area.</p> <p><u>Strategy 3:</u> Before beginning the activity, the teacher must make sure that the objects to be ordered are of a single color.</p>

### **Connections / Reflections**

The completion of this project has been challenging, but rewarding. I consider that after the study of mental representations my mind has been opened. During the last weeks, questions and experiences from my peers and professor have made me reflect.

I have obtained information about how the brain works and learns, as well as different learning styles that will help me to become a better teacher.

So far, I never imagined the importance of connections in our brain, and how they can affect the teaching-learning process.

Another aspect that I learned is that each person learns differently. Therefore, we as teachers should provide different learning styles to our students. What works for one person extraordinarily, for another one can suppose the opposite. So we should explore different learning styles so that our students can find their optimal style. Since our learning style is what makes us special, and allow our brain to acquire new knowledge.

Cognitivist theory tells us that learning takes place when a change is produced in the mental process. This theory is student-centered.

In my professional future, I will link prior knowledge with new knowledge, using the mental representations we have studied (logic, rules, concepts, analogies, and images). I think that for students to get the overall concept, they must first discuss what they already know. We must instill this idea before they acquire new knowledge and can make a precise and correct connection between prior and new knowledge.

In any area of knowledge, the knowledge acquired does not remain isolated, but rather there is a relationship with each other. Therefore, when a child learns something new, we have to put special emphasis on the connection there is between what he/she already knew and the new knowledge.

Both adults and children learn in this way, that is to say, we have a general scheme and which we are inserting new knowledge constantly.

Finally, I will refer to David Perkins. Thanks to the study of his seven principles we know the connection between emotions and motivation. As teachers, we must keep in mind that when students meet their needs, we will get to motivate and engage them.

It is also important that we establish a good emotional relationship student-teacher. Knowing the interests of the students and making them protagonists of the teaching process will cause their motivation to increase considerably.

In short, we must act on our students, discovering new knowledge through their actions. So that they modify them and integrate them into those they already had, getting an active knowledge.



## References

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