Comprehension Inquiry And Reaction

Chris Harvey

Virginia Tech

Author Note

Chris Harvey, undergraduate math education major and music technology major at Virginia Tech, class of 2011.

This assignment is a requirement for the course EDCI 5264: Comprehending Processes and Reading in the Content Areas, instructed by Rhonda Phillips, M.Ed., taken in the Spring 2010 semester, and due on Thursday, February 11, 2010 at 7:00 PM.

Comprehension Inquiry And Reaction

Personal Opinion

A concept such as comprehension of a text is so vaguely defined that there is no wonder why scholars have attempted to construct an explicit definition. No clear distinction between comprehension and recitation seems to exist, although we do have an intuitive sense of the difference. How can we say for sure, that when a student reads from a text, the true meaning (the author's intended meaning) reaches his/her mind? In my own reflection, I define one's ability to comprehend a text as the ability to put concepts in one's own words, to demonstrate that one has processed the information, to show reasoning, and to explain a topic from opposing points of view.

The first of my criteria seems to be the most obvious. A student's paraphrasing of a passage without any external assistance is strong evidence that he/she comprehends what he/she has read. However, paraphrase itself requires no more than a substitution of synonyms and similar phrases. A student that can paraphrase by no means shows 'proof' of comprehension, but rather, shows that they have a well-experienced internal thesaurus.

The student must be able to demonstrate that the information has been processed in his/her mind. We all have had moments where we are reading a page in a book, and suddenly our train of thought diverges to a completely unrelated topic. Our eyes will follow the words (we experience sensation), but the words, and thus the semantics, do not get passed to our minds (we do not experience perception). Ormrod (2009) defines a cognitive process as a "particular way of mentally responding to or thinking about information or an event." A student must be able to show that cognitive processes are taking place in his/her mind, and that the words are not just

'going in one ear and out the other.' Although responding to an event is sufficient for learning, I do not believe that response is sufficient for comprehension. Students must be able to show that they know how something works, and be able to draw conclusions from a text.

Reasoning is a process that takes place in all minds. Even when we act on instinct and intuition, a small amount of reasoning occurs. When learning a new topic, students must be able to explain how it works and why they are learning it. An excellent tool for demonstrating comprehension is for a student to take opposing points of view on the topic. For example, reciting a definition of a given a vocabulary word, and reciting the word after hearing the definition, is strong evidence that the student comprehends the meaning of the word. Being able to graph a given algebraic function, and being able to construct a function by looking at a given graph, also demonstrates at least partial comprehension of the function. If a student can take opposing points of view on a topic, he/she is more likely to draw meaningful conclusions and make intricate connections between concepts.

Opinions From Others

I have interviewed four of my friends for a more in-depth exploration on the meaning of comprehension. Abby and Elizabeth are senior math education majors who are enrolled in this course. Abby believes that comprehension of a text involves understanding it on a "deeper level," which she defines as being able to break it into parts and analyze it in a reductionistic sense. She says that "regurgitation" is simply not enough: the reader must "read in between the lines" to understand the author's true meaning. Understanding the author's meaning is important when comprehending a text. If a reader is confident that he/she knows the meaning, but it is

inconsistent with the author's, the reader may have 'missed the point.' Comprehending a text is more than deriving meaning from it.

Elizabeth says that connections are another important part of comprehension. The reader needs to make connections across other content areas—known as "transfer" (Ormrod, 2009)—and also across events in the reader's personal life. The more the reader can relate a concept to his/her own experiences, the more likely and effectively he/she will remember and understand the passage.

Brian, a senior marketing major and my third interviewee, agrees with me that comprehension involves making sense of the text in one's own way. The reader must take something from the text that he/she read and transform it into a useful way—to make it practical. In contrast to Abby's response, Brian says that the reader should be able to draw meaning and ask questions about a text in a holistic sense. Making conclusions, developing generalizations, and using inductive reasoning shows that the reader comprehends the text. I would add that in addition to asking questions about a text, the reader should make an active effort to answer those questions while reading.

Nathan, a junior electrical engineering major, says that one must "be able to teach it back to someone else." If students can teach or tutor the subject to other students, they can demonstrate that they have thoroughly understood the subject. Although teaching is an excellent method that suffices to show comprehension, it is my opinion that it is more than necessary and does more than qualify for simply a definition of comprehension. Nathan also says that a reader processes information in such a way that "they can relate it back to other ideas" and prior knowledge, consistent with Elizabeth's response.

Research

Learning is explicitly defined as "long-term change in mental representations or associations due to experience." The scientists Ivan Pavlov and B. F. Skinner proved that the behavior of animals could be influenced via classical conditioning and operant conditioning, respectively. The animals' behaviors can be changed based on introducing or removing external stimuli. This learning theory is the basis of the Skinner's system of reinforcement and punishment (Ormrod, 2009). It is clear that however comprehension may be defined, it is a strict subcategory of learning: all comprehension implies learning, but not all learning implies comprehension.

Memory is bigger aspect of comprehension. Long-term memory is necessary for learning, and furthermore, content must be learned before it is understood. Ormrod suggests four distinct cognitive processes to encode a concept into a learner's long-term memory bank. The first method, rehearsal, is not recommended, as it is similar to Pavlov's dog experiment: it involves repetition and practice, "with little or no attempt to make sense of what is being learned." The other three methods are much more effective in that they make "connections between new information and prior knowledge:" elaboration, organization, and visual imagery (Ormrod 2009). As important as memory is to understanding a concept or topic, comprehension involves more than memorization.

Memorization is the lowest level of cognitive demand, according to Smith (1998). A task that elicits memorization does not require students to use procedures or make connections, but only to reproduce facts that they may or may not have fully understood. The students are expected to reproduce or recite the exact information in the form in which they learned it,

thereby not demonstrating any elaboration or organization of the information. Posing memorization tasks for students is not an efficient method to determine their comprehension of the content. Rather, to determine students' comprehension of a concept, one must pose tasks that elicit higher-level cognitive demands. These tasks should require non-algorithmic procedures that involve both intuition and reasoning, be represented in multiple ways, e.g. visually, aurally, and tactilely, and require self-monitoring and self-regulation.

Self-regulation is a discipline that students should use to promote higher-level thinking. If students can think about their thinking, they will understand their learning methods and try to improve on them. Mature self-regulating students should set their own goals and standards, in addition to the course's standards. Students that meet their own goals will be likely to reinforce their desired behavior, and students that do not will be likely to punish their undesired behavior. A system of self-reinforcement and self-punishment provides for more intrinsic motivation (Ormrod, 2009).

Tasks that have no explicit procedure but call for a specific solution are most likely to engage students in higher-level thinking (Stein, 2000). For instance, higher-level thinking illustrates the difference between knowing the definitions of two synonyms and recognizing their similarities; and being able to compare and contrast them and make a decision on which is the best one to use in a given context. Problem solving, critical thinking, and logical reasoning are all categories of higher-level thinking (Ormrod, 2009), which is sufficient to show comprehension.

Problem solving uses prior knowledge to address a question or situation. This process is dependent on the connections that students must make between prior knowledge and newly

acquired information, and is therefore affected by the quantity and quality of students' prior knowledge. Hence a vicious circle emerges: prior information affects how new information is learned, thus affecting future learning.

Another major component of higher-level cognitive processes and comprehension is critical thinking, which involves "evaluating the accuracy and worth of information," and comes in several forms: verbal reasoning, argument analysis, probabilistic reasoning, and hypothesis testing. Ormrod (2009) suggests that critical thinking may not have the same form, depending on the content area. Usually critical thinking involves using deductive and inductive logic, making decisions based on weighing the pros and cons of each outcome, calculating likelihood and uncertainty, considering alternative methods and explanations, and constructing generalizations and specifications. Without thinking critically, students will blindly accept information at face value and may falsely comprehend the matter.

As educators, we must promote higher-level cognitive processes that will lead to comprehension. Graves (1999) stresses that we "teach for understanding" by ensuring that students remember, truly comprehend, and actively use the important content we teach them. It is better to teach fewer topics but provide a more in-depth approach than to provide a shallow approach of many topics. Much of the topics students learn come from reading itself, which illustrates the importance of reading comprehension.

Conclusions

Reflecting upon the results from opinion and research, a few general themes occurred. A consistent understanding prevailed of what the word 'comprehension' means, although explicit definitions were all different. Each case mentioned a list of processes that would suffice to

demonstrate comprehension of a topic. These processes demand higher-level thinking and deeper understanding. The evidence that leads one to believe comprehension is present includes such processes as problem solving, reasoning, connection, and representation.

Memory is necessary for learning, and learning is necessary for comprehension. This hierarchy of the mind illustrates the complexity of comprehension. Several methods exist that learners should use to encode information in long-term memory, thereby making it possible to comprehend. Rote learning and memorization is not recommended, as the meaning of the content is lost through repetition and rehearsal. Rather, more effective approaches to learning include processes that require the learner to draw on previous experiences and prior knowledge, interconnecting concepts in his/her long-term memory. Knowledge is more than just a collection of facts; it is the connections between those facts that are important.

Students who are intrinsically motivated are more likely to comprehend a text over students who are only extrinsically motivated. More mature students will self-regulate and have mastery goals in mind. They are willing to accept that their rewards are not material and that they come from understanding content alone. On the other hand, students who have performance goals in mind are looking only to complete the given tasks at any cost—including comprehension of the topic.

The responses to the meaning of comprehension seemed to be based on both a reductionistic and a holistic approach. It seems that to truly understand a topic, students must be able to break it down and make sense of each part, but also be able to take a step back and see the bigger picture. This duality was consistent with the notion that students must also be able to see opposing points of view of a subject, i.e. knowing it forward and backward.

The fact that most of the respondents' answers were consistent was probably due to the fact that they are all in higher education. Their goals (at least temporary) are to learn, and over time they have developed and conditioned to better their learning experience. Although everyone had a slightly different point of view, the general theme of comprehension was consistent. This consistency suggests that a common agreement exists, no matter how implicit, of what it means to comprehend an item. The responses are certainly consistent when discussing evidence of a student's comprehension.

Graves (1999) urges the importance of teaching fewer topics with more stress on each topic, which is not a serious goal in most public schools. Public education aims for the more 'well-rounded' student and thus emphasizes more topics but with less stress on each topic. For example, a typical high school junior-level physics course covers the same amount of material in two semesters of college-level physics courses. Although the same amount of time is allotted for the same amount of content, it is obvious that high school students learn at a slower rate than college students and it is unreasonable to expect the former to perform at a college level. To compensate, high school physics teachers spend less time on each topic, therefore not covering the concepts and ideas as deeply as desired. They sacrifice quality for quantity. Graves suggests that if we were to err on one side or the other, it would be better to sacrifice quantity for quality.

In conclusion, common themes existed within all of the interviewees' responses and the research materials: although no explicit definition of comprehension exists, a common intuitive and implicit understanding of comprehension exists and we can identify behaviors and processes that suggest the appearance of comprehension.

Impact On My Own Teaching Practice

I think this project will be very useful for my teaching experience. I have come to a better understanding of what it means to comprehend a text, and I have learned a few things about classroom content and how to promote student learning. I have also come across a few sources I will find useful in my profession, and I do not doubt I will have the need to refer to them in the future. This paper especially summarizes my findings, which will make it easier for me to organize the information and knowledge I have gained throughout this journey.

References

Graves, M. L. (October 1999). Fostering High Levels of Reading and Learning in Secondary Students: An Invited Commentary. *Reading Online*. Retrieved from http://readingonline.org/articles/.

Ormrod, J. E. (2009). *Essentials of Educational Psychology*, pp. 18–23, 30–33, 105–111, 113–122. Upper Saddle River, New Jersey: Pearson.

Smith, M. S. and Stein, M. K. (February 1998). Selecting and Creating Mathematical Tasks: From Research to Practice. *Mathematics Teaching In The Middle School*, pp. 344–350.

Stein, et al. (2000). *Implementing Standards-Based Mathematics Instruction: A Casebook for Professional Development*, pp. 1–18. New York, NY: Teachers College Press.