MATH 112
1.6: Communication
Section 1.7: Connections

Prof. Jonathan Duncan

Walla Walla College

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Outline

1. Communication

2. Connections

3. Conclusion
Mathematics without communication is of little use. If you can solve a problem in your head, but can’t communicate it with others, have you really solved the problem?

**NCTM Standard 8: Communication**

Instructional programs from pre-kindergarten through eighth grade should enable all students to:

- organize and consolidate their mathematical thinking through communication;
- communicate their mathematical thinking coherently and clearly to peers, teachers, and others;
- analyze and evaluate the mathematical thinking and strategies of others;
- use the language of mathematics to express mathematical ideas precisely.
Types of Mathematical Communication

There are two types of communication involved in solving a problem. They are:

1. Communication with Yourself – make sense of your own strategies and solutions.
2. Communicate with Others – share your observations and understanding with others.

Example

Arrange the following activities in order of their knowledge retention rates starting with the lowest retention rate.

- Demonstration
- Practice
- Discussion
- Read
- Lecture
- Teach
Hierarchy of Learning Methods

Example

Research has shown that the type and extent of communication in a learning situation can dramatically affect the rate of retention.

1. Lecture: (5%) – somebody tells you how to do it
2. Reading: (10%) – you read how to do it
3. Demonstration: (30%) – you are shown how to do it
4. Discussion: (50%) – you talk about how to do it
5. Practice: (75%) – you do it
6. Teach: (90%) – you show others how to do it
Communication in a Problem

As you solve the following problem, think about how you can use communication with yourself and with others.

Example

There are ten people in a room. If each person shakes hands with every other person exactly once, how many handshakes will there be?

In your search for a solution, try the following:

- Restate the problem
- Describe a strategy for solving
- Connect with a known problem
One of the ways in which we approached the previous example was to try to make connections with previous problems. Making connections is an important part of mathematics.

### NCTM Standard 9: Connections

Instructional programs from pre-kindergarten through eighth grade should enable all students to:

1. recognize and use connections among mathematical ideas;
2. understand how mathematical ideas interconnect and build on one another to produce a coherent whole;
3. recognize and apply mathematics in contexts outside of mathematics.
As the standard states, many different types of connections exist in mathematics.

<table>
<thead>
<tr>
<th>Types of Connections</th>
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<tbody>
<tr>
<td>Connections between problems and a representation that makes sense to you</td>
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<tr>
<td>Connections between new concepts and old concepts</td>
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<td>Connections between different concepts</td>
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<td>Connections between different models for the same concept</td>
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<td>Connections between concepts and procedures</td>
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<td>Connections between mathematics and the physical world</td>
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Using Connections with An Example

Example

A locksmith is making key rings. Each key ring requires a piece of wire which is $3\frac{3}{4}$ inches long. If the wire comes in 50 inch coils, how many key rings can be made from one coil, and how much wire is left over?

Finding Connections

Solve this problem using the following strategies and mention any connections involved.

- The Division Process (connecting new problems to old)
- The Number Line (connecting different models)
- Making a Table (connecting to the procedure)
Important Concepts

Things to Remember from Sections 1.6 and 1.7

1. Communication in Problem Solving
2. Effective Learning Processes
3. Solving Problems making Connections