Applying Critical Thinking Skills on the World Wide Web

Karen R. Juneau
The University of Southern Mississippi, USA

INTRODUCTION

Like a phoenix rising from the ashes, every decade brings a renewed call for the importance of teaching critical thinking. Across the disciplines the importance of the subject is universally recognized, an interesting phenomenon since there is no common definition of critical thinking. To a scientist, critical thinking is often equated with the scientific method. To a philosopher, critical thinking implies a logical analysis of an argument and the ability to develop abstractions. To an engineer, critical thinking refers to effective problem-solving skills.

All of these definitions have common elements. In each approach, a problem or concept is identified and a rational approach to the problem or case is applied. Critical thinking requires an analysis of the validity of an argument as well as the ability to anticipate potential consequences. It is analysis justifying the acceptance of an idea and determines a direction for action. Critical thinking skills are situational and are difficult skills to master since there is no mental template that is true for all cases.

As access to information expands, it is important that computer users develop the skills to critically assess the value of the information that is presented to them. This is a basic skill for effective Internet citizenship and a foundational skill for critical thinking. The ability to identify a central concept or problem and to assess the validity of supporting information in an argument is particularly important in a media that has no gatekeepers to vet the quality of the information presented.

BACKGROUND

Critical thinking has been described as a productive and positive activity. It is a process rather than an outcome and is dependent upon the subject area in which it is applied. Although critical thinking is traditionally thought of as a dispassionate process, there are subjective elements within the thinking process that can add meaning to the interpretation of events.

Modern approaches to critical thinking are founded in pragmatic approaches largely developed by Charles Sanders Peirce, William James, and John Dewey in the United States during the 1800s. In1878, Peirce wrote an essay titled "How to Make our Ideas Clear" that established the philosophical foundation of pragmatism (Peirce, 1878). He described thought as a result of the "irritation of doubt," and believed that thought ended in the formation of beliefs. When two beliefs produce the same result, they are equivalent beliefs. This concept allows for the simplification of problems by focusing on the primary cause of the problem rather than a secondary problem.

This idea can be illustrated by a simple example. Suppose you have lost the remote control for your television. Your television will not work at all without it. Your spouse believes that it is lost in the living room. You believe that it is lost in the kitchen. After an extensive search, neither one of you finds the remote control yet both of you are certain that you are correct. This certainty has two effects: it prevents you from looking in the bedroom where the remote control is conveniently located in the laundry basket and it prevents you from recognizing that if the remote is really truly lost, questions such as "Where was it lost?" "Who lost it?" and "Who ran it through the washer?" do not matter. The problem is not that the remote control is lost but that you now have a nonworking television. This is the problem that you need to solve rather than continuing to look for the remote control.

In order to break a mental impasse, examine the results. If the remote control is lost, the television will not work. If the remote control has been washed and dried, it will not work and since the remote control is needed to operate the television, the television will not work. The outcome is the same: a nonworking televi-

sion. Both beliefs have the same outcome so they are equivalent beliefs. The problem then is not what action to take about the remote control but rather the problem is what action to take about the television.

William James expanded on the work of Peirce and examined how ideas become accepted through experience (James, 1907). James wrote that it is very difficult for new beliefs to replace older beliefs as long as the older beliefs are perceived as true by an individual. The initial response when presented with information that cannot be fully reconciled with an existing worldview is to try to modify the old ontology to accept enough new information to allow the old belief to function in the adjusted reality. Only when this is not possible will a new belief replace an older one. James wrote:

A new opinion counts as 'true' just in proportion as it gratifies the individual's desire to assimilate the novel in his experience to his beliefs in stock. It must both lean on old truth and grasp new fact . . . When old truth grows, then, by new truth's addition, it is for subjective reasons (James, 1904, ¶ 29).

James recognized that even the most logical systems of thought have subjective underpinnings. John Dewey believed that active manipulation of the environment was an important part of developing knowledge. He proposed a modification of the scientific method to describe this process of knowledge acquisition which he calls the process of inquiry. The process of inquiry has four stages: habitual solutions to the environment are recognized to be no longer effective, information is gathered related to the problem, reflection on the information results in possible solutions, which are tested, and successful solutions are integrated into everyday life (Dewey, 1938).

According to pragmatists, critical thinking is triggered by positive as well as negative events. The motivation to acquire new knowledge is often a response to a perceived problem. For many routine tasks, individuals depend upon scripts or mental schemes to address these problems (Schank, 1990). In such cases, there is no motivation to adopt a new mode of thinking as long as the original process is still effective. It is the need to solve a current problem that motivates individuals to seek solutions.

Initially all individuals are reluctant to give up old concepts in favor of new ideas, so much so that the initial impulse is to modify the original concept to make it fit a new circumstance. Failing this, individuals tend to adopt only as much of the new concept or method as is needed to effectively address the problem. Rarely will individuals wholly abandon a previously successful methodology in favor of a new approach to a problem. Modification of the existing method to accommodate the new circumstance or information is the preferred course of action.

This pattern explains why it is so difficult to restructure Internet resources in nonlinear frameworks. Although the technology exists to create environments that can be accessed in multiple ways, the majority of Internet documents are based on the same structural framework as a printed document. These electronic versions of paper documents succeed because the format is familiar to the user. The problem that the Internet effectively addresses is an accessibility problem. In general it does not address innovations in content presentations since the majority of users prefer formats that allow users to obtain printed copies if desired. The much heralded paperless revolution has never taken place because such an innovation does not solve a perceived problem for the majority of users.

This process has been reconceptualized as phases or stages by multiple writers. Broomfield (1987) describes the phases of critical thinking as five stages. A trigger event motivates the need for change and a review of the perceived problem. The initial approach to the problem commonly begins with denial of the importance of the needed change and then moves to clarify the nature of the problem. Once the problem has been clearly identified, attempts are made to identify new approaches and to blend those approaches into previously used methods. If this fails, a new approach will be developed and adopted. This new approach becomes a permanent part of a thinking pattern only as long as it continues to support the need for which it was developed. Once it fails to meet this need, the cycle will begin again and the individual will seek out alternate solutions to the problem.

Paul and Elder (1996) identify seven universal standards to develop critical thinking skills: *clarity, accuracy, precision, relevance, depth, breadth,* and *logic* that could be used by teachers to assess student learning.

1. Clarity of a resource refers to how well the writer communicated a central idea.