



Developing Critical Thinking in the Schools

By Ed Meyer

There is general agreement that the purpose of going to school is to prepare youngsters to contribute to society and to be successful adults. Success in the workplace and in life requires the ability to think critically. Unfortunately, K-12 education in the United States is not producing critical thinkers. The underlying problem is a shift away from challenging the students to think for themselves and a shift toward loading the students with content while giving them a non-thinking protocol to follow to get the desired response.

There are many reasons for this shift, but I believe that the primary one is simply that struggling in school has a negative connotation. In general, teachers don't want their students to struggle, school administrators don't want the students to struggle, parents don't want their children to struggle, and the students themselves don't want to struggle. However, without struggle there is no development. In fact, without struggle, the brain atrophies.

Research on the human brain tells us that a toddler has about 100 trillion neural connections and as the child grows and interacts with the world, the brain strengthens the connections that are used frequently while pruning away the ones that aren't. If the neural connections associated with critical thinking are not used, they will atrophy. The result will be adults who have trouble thinking for themselves. Instead of coming up with their own ideas, they robotically adopt the ideas of others. Instead of considering options involving relationships, financial decisions, and career choices, they want to be told what to do because that's how they were trained by the K-12 educational system; if you don't know what to do, you raise your hand, and the teacher tells you.

To nurture the development and maintenance of the neural connections involved with critical thinking, K-12 students must be given opportunities to think

critically; to invest time trying to reach a new level of understanding, and to have an "AHA!" moment.

When the goal of a class session is developing the students' critical thinking skills, the teacher adopts the role of a coach instead of a source of information. The coach provides a challenging mental workout and encourages the students to keep working at it to reach a new level of understanding. The students are not following any rules, protocols, or instructions. They are exploring, they are wandering around in their own mind palace. They are trying to come up with their own ideas. They are developing their critical thinking skills.

On the other hand, when the goal of a class session is to transfer knowledge, the teacher is an authority. The students are supposed to listen attentively and perhaps take notes. Later, the students will take a test to determine if they remember what they have been told.

When the goal of a session is to develop critical thinking skills, the students might be trying to solve a challenging logic puzzle. When the students are not heading straight to the answer, it is detrimental to their development if they get any hints or facial expressions that steer them toward the solution. They must be left alone to think for themselves. This is difficult to do for most humans. When compassionate, empathetic adults see a youngster having difficulty, it is natural for them to want to help. In some cases, this is the right thing to do. When the goal is to develop the thinking skills of the students, however, it is crucial to let the students try to figure it out for themselves.

Trying to figure out the way forward and trying things that don't work is an important part of developing problem solving skills. This makes the development of thinking skills seem inefficient, but this is only if the goal is to get the answer as fast as possible. If the





goal is to develop the students' thinking skills, they must be allowed to head down the wrong path until they realize that the path does not lead to the solution. Guidance often undermines their development. After all, as soon as they get direction, they are not thinking for themselves (like wolves) - instead they are doing what they are told (like sheep).

As a university professor, I see many students that have lost the ability to think for themselves. When they get a problem that they have not been trained how to solve, they raise their hands and say, "I don't know how to do this," as if they have never been presented with a problem that they do not know how to do. I usually reply something like, "I know you don't know how to do it; that's why I gave it to you" (but the specific response depends on the student). I also get, "I don't know what I'm supposed to do." In this case, I ask the students to give it some more thought. They can push back a bit at this, saying, "How do you expect us to get the answer; you're the teacher; that's your job." I also get, "You're just setting us up for failure!" These students have already been set up for failure in the real world, as they will not know what to do when confronted with a problem that they have not been trained to solve in their schooling. This is understandable because the majority of their entire K-12 education involved feeding them information plus remembering rules and protocols for getting answers to specific problems that were given them by a teacher.

One strategy to add the development of critical thinking skills to the curriculum without the students rebelling, is simply to clearly differentiate between a class session that is designed for remembering facts and a class session that is designed for developing their minds.

One way to do this is to have a class called something like, "Critical Thinking Development," or "General Problem Solving." In such a class, the teacher will take on the role of a coach, who presents a challenging mental workout and allows the students to struggle. When the students understand the goal of the session is not to get the answer as quickly as possible, they "take their shoes off" and have a delightful walk to explore the solution space. They won't ask for help, they will enjoy the struggle, and, with good coaching, they should not experience any stress or anxiety.

They are ready to develop, not learn. They adapt quickly and will "get with the program." The transformation over a single semester can be remarkable. Students who were perfunctory at the beginning of the semester are showing active engagement by the end of the semester. In addition to the development of critical thinking and problem solving skills the students have developed their communication and collaboration skills, because good thinkers want to share ideas.

Near the end of the semester, problems are presented, and the teachers leave the room. After the students recover from this abandonment, groups form, students go to the board to share their ideas and discuss them intelligently. This leads to shared insights. This type of "education" more closely matches the skills needed to be a successful adult and to contribute to society and it should be a significant part of K-12 education.

If you are a teacher and would like to develop a course that focuses on the development of problem-solving and critical thinking skills, please contact me at GedankenInst@gmail.com.

If you are a teacher looking for challenging problems for your students, check out

<https://edmeyer.phd/grand-challenges/>





Quote Acrostic

edmeyer.phd

Instructions: Fill in the words at the bottom from the clues. Then write those letters in the grid at the top to reveal a quote. Black squares indicate the end of a word and punctuation has been removed. When you're done the first letters of the answers to the clues will be the author and subject of the quote.

QUOTE

1R	2I	3F		4P	5D	6S	7J	8H	9O	10F		11N	12F	13B	14I		15K	16N	17B	18T
	19Q	20L	21F	22I	23Q	24B		25L	26D	27R	28M		29M	30S	31H	32K		33D	34S	35J
	36F	37H	38Q	39C	40L	41R	42D		43G	44P	45Q	46S		47E	48C	49T	50A			
51S	52D	53E	54A		55L	56H	57M	58R	59N	60G		61C	62M	63T	64E					
65G	66N	67E	68B	69L		70O	71Q	72N		73B	74S	75H	76J	77K	78K	79D		80Q	81M	
82O	83M	84D	85R		86C	87S	88B	89H	90F	91S		92H	93C	94B	95G	96O	97E			
98Q	99O	100P	101L		102I	103R	104L	105C		106A	107R	108F	109P	110D	111R	112N	113T		114I	115N
	116E	117C		118D	119P	120S	121B	122R	123E	124D	125K		126O	127F		128S	129C	130P	131G	
132G	133I	134C	135B	136K	137P	138Q														



CLUES

A. Dynamite	<u>106</u>	<u>50</u>	<u>54</u>							
B. British coin introduced in 1280	<u>88</u>	<u>17</u>	<u>135</u>	<u>121</u>	<u>73</u>	<u>94</u>	<u>68</u>	<u>13</u>	<u>24</u>	
C. Goal	<u>93</u>	<u>39</u>	<u>86</u>	<u>134</u>	<u>61</u>	<u>105</u>	<u>129</u>	<u>48</u>	<u>117</u>	
D. Romance Facilitator	<u>79</u>	<u>26</u>	<u>33</u>	<u>118</u>	<u>52</u>	<u>42</u>	<u>84</u>	<u>110</u>	<u>124</u>	<u>5</u>
E. <u>Non-believer</u>	<u>53</u>	<u>64</u>	<u>116</u>	<u>47</u>	<u>67</u>	<u>123</u>	<u>97</u>			
F. Cargo dispatch	<u>12</u>	<u>21</u>	<u>108</u>	<u>36</u>	<u>10</u>	<u>3</u>	<u>90</u>	<u>127</u>		
G. Dodgy	<u>95</u>	<u>131</u>	<u>43</u>	<u>132</u>	<u>65</u>	<u>60</u>				
H. Florida's theme park hub	<u>75</u>	<u>37</u>	<u>8</u>	<u>31</u>	<u>89</u>	<u>92</u>	<u>56</u>			
I. Blanch	<u>102</u>	<u>2</u>	<u>114</u>	<u>14</u>	<u>133</u>	<u>22</u>				
J. Recede	<u>35</u>	<u>7</u>	<u>76</u>							
K. Catalogued	<u>77</u>	<u>136</u>	<u>125</u>	<u>15</u>	<u>78</u>	<u>32</u>				
L. Mandible Malady	<u>40</u>	<u>20</u>	<u>25</u>	<u>69</u>	<u>55</u>	<u>104</u>	<u>101</u>			
M. Flail about wildly	<u>28</u>	<u>57</u>	<u>29</u>	<u>62</u>	<u>81</u>	<u>83</u>				
N. Like the Ladies' Auxiliary in River City	<u>16</u>	<u>72</u>	<u>59</u>	<u>112</u>	<u>11</u>	<u>115</u>	<u>66</u>			
O. Purpose	<u>126</u>	<u>96</u>	<u>82</u>	<u>9</u>	<u>99</u>	<u>70</u>				
P. Direct flight	<u>109</u>	<u>100</u>	<u>137</u>	<u>44</u>	<u>130</u>	<u>119</u>	<u>4</u>			
Q. Magna Carta monarch	<u>98</u>	<u>80</u>	<u>23</u>	<u>138</u>	<u>19</u>	<u>38</u>	<u>71</u>	<u>45</u>		
R. Not eliminated	<u>111</u>	<u>58</u>	<u>1</u>	<u>103</u>	<u>41</u>	<u>107</u>	<u>122</u>	<u>27</u>	<u>85</u>	
S. Remarkable	<u>120</u>	<u>6</u>	<u>46</u>	<u>30</u>	<u>128</u>	<u>87</u>	<u>74</u>	<u>51</u>	<u>34</u>	<u>91</u>
T. Polite fellow	<u>113</u>	<u>49</u>	<u>63</u>	<u>18</u>						

