

Intelligence, Information, Thinking

By [Edward de Bono](#)

INTELLIGENCE

Intelligence is like the horsepower of a car.

Thinking is like the skill with which the car is driven.

Information is like the road map available to the driver.

Recently a taxi driver told me that his brother was an excellent fighter pilot but a very bad car driver.

The fighter pilot was excellent in control of his plane in a clear sky.

This was a matter of control.

With a car driver the control is only one aspect.

The behavior of other drivers on the road is very important.

The nature of the road itself is very important.

It can be the same with intelligent people.

We could define 'intelligence' as 'the ability to do well at IQ tests'.

If the performance on IQ tests does actually correlate with performance as an accountant or scientist then the IQ tests are a valid predictor for those fields.

The difficulty arises when the 'intelligence' part of the 'Intelligence Quotient' (IQ test) is taken as meaning the general use of the word 'intelligent'.

The original use of the IQ tests was a very valid one.

The intention was to see how an individual child compared to the average for that age and background.

Those children who were obviously below the average needed special attention.

The children who were below average might have been so because of an impaired mental capacity or because of their social background and a lack of stimulation at home.

'Culture free' tests were designed to try to remove the social effects.

There can be no doubt that IQ tests do measure a type of intelligence but is this the same as the general-purpose intelligence used in daily life?

There is evidence that IQ tests correlate well with the speed of transmission along the neurons in the brain.

This itself is determined by enzyme kinetics.

There is endless argument about the relative contributions of genes and nurture to traditional IQ results.

The Intelligence Trap

- 27 There are some aspects of a high intelligence that become a sort of trap.
- 28 A person with a high intelligence can take a position on a subject and then use their intelligence to defend that position very ably.
- 29 The better the defense of that position the less does that person see any need to consider alternatives or listen to others.
- 30 That is not good thinking.
- 31 Someone who has grown up with the realization that he or she is more intelligent than most people around wants to get the best reward for being so intelligent.
- 32 The quickest and best reward is to prove other people wrong.
- 33 This is a risk-free demonstration of superiority.
- 34 It is also relatively easy.
- 35 An intelligent person takes in information quickly and can reach a conclusion in a short time.
- 36 A less intelligent person has to wait to take in more information and may, occasionally, reach a better conclusion.
- 37 This is all like the driver of a fast motor car getting into bad driving habits.

38 ***Pieces of the Puzzle***

- 39 A person is sitting down at a table with all the pieces of a puzzle on the table before him.
- 40 The task is to complete the puzzle.
- 41 The intelligent person may complete that puzzle rather quickly.
- 42 When all the pieces of the puzzle are given there is a skill in seeing how they fit together.
- 43 But in most situations **the pieces of the puzzle are not given.**
- 44 You have to **find** and **select** the pieces.
- 45 Most situations are **open-ended** not closed-ended.
- 46 The intelligence needed to **find** and **select** the pieces is not the same as the intelligence needed to put pre-selected pieces together.
- 47 **Intelligence may be very good at 'understanding' things but is not necessarily so good at 'designing' or 'doing' things.**
- 48 **Different skills are needed for the different situations.**

49 ***Intelligence as Potential***

- 50 Like the engine of a motor car, intelligence is a potential.
- 51 There may be a fast car with rather a bad driver.
- 52 There may be a more humble car with a better driver.
- 53 The danger lies solely in believing that IQ-tested intelligence is enough and that it carries with it the needed thinking skills.
- 54 This conclusion is easy to reach in school where many of the tasks are very

similar to those given in IQ tests.

55 The real world may, however, be different.

56 Another danger is even more serious.

57 This is the belief that those with a low performance on IQ tests cannot be good thinkers.

58 This belief gives rise to a **huge wastage of talent**.

59 Given the right 'thinking tools' even those of relatively low IQ intelligence can do very well indeed, as we shall see later.

60 Less intelligent youngsters may not fully understand the 'game' that is expected of them at school, so they do poorly.

61 On a youngster's first day at school someone should sit that youngster down and tell him or her that the 'game' at school is to 'guess what the teacher wants'.

62 With this simple clarification everyone would do much better at school – especially the poor performers.

63 ***Develop Potential***

64 We need to acknowledge the importance of intelligence as a 'potential' and then we need to seek to develop that potential.

65 This may involve the **deliberate and direct teaching of thinking skills**.

66 There is a danger that such skills get taught only to the less intelligent, who are seen to benefit so greatly from such skills.

67 **It is a mistake to assume that intelligent people are necessarily good thinkers.**

68 **INFORMATION**

69 Thinking is never a substitute for information.

70 We need all the information we can get.

71 Two thousand years ago China was far ahead of the rest of the world in science and technology.

72 They had gunpowder, rockets and many other things long before the rest of the world.

73 Had China continued at the same rate of progress it would easily be the dominant power in the world today.

74 But it did not continue.

75 Progress came to a dead end.

76 Why?

77 The scholars started to **believe that they could move from certainty (fact) to certainty** without any need for the messiness of 'possibility'.

78 So they never developed the **possibility system**: hypothesis, speculation, imagination, etc.

79 Progress came to a dead end.
80 Exactly the same thing is happening today in the West.
81 Because of the excellence of our computers we are starting to believe that all you need to do is to collect and collate information.
82 That information will do your thinking for you.
83 That information will make your decisions, design your strategy and indicate the way forward.
84 This is much more dangerous than most people realize.
85 Thinking is needed to interpret the information in different ways.
86 Thinking is needed to put information together to design value.
87 Thinking is needed to see where to get more information.
88 Thinking is not a substitute for information but information is not a substitute for thinking.

89 ***Search Not Think***

90 Youngsters given computers and Internet connections have a huge world opened up for them.
91 This is a great privilege.
92 There is a danger, however, that youngsters start to believe that you do not need to think.
93 All you need to do is to 'search' and somewhere you will find that answer.
94 This is a difficult point.
95 Everyone does not need to re-invent the wheel for him and herself.
96 There is much useful information available that can save a lot of thinking.
97 What is important is that as we develop the search abilities we should at the same time develop the 'thinking' abilities.
98 The combination of thinking and information is most powerful.

99 ***School and Information***

100 A large part of school is taken up with information.
101 This is for two very practical reasons and two less so.
102 The first practical reason is that there is a lot of information around.
103 It is there and it is relatively easy to teach.
104 So as school is a sort of 'baby-sitting' exercise the information fills up time.
105 The pupils are busy.
106 The teacher is busy.
107 The parents are happy.
108 The second practical reason is that information is easy to test.
109 Does the pupil remember the information he or she is supposed to know?

- 110 Marks and grades can be given.
- 111 These are believed to be good motivators to get the pupils to work harder – directly or through the parents.
- 112 The third reason is that the information is there and has always been taught traditionally.
- 113 In the UK children leave school knowing the names of most of Henry VIII's wives and even the date of the Treaty of Utrecht.
- 114 Yet they **have no ideas** how the corner shop works or how value is created in society.
- 115 The fourth reason is the unfortunate belief that teaching information is a way of teaching thinking.
- 116 This is a dangerous mistake since it blocks the direct teaching of thinking as a skill.
- 117 Certain skills of presentation and argument may accompany the teaching of information but these are only a very tiny part of practical real-life thinking.

118 *Necessary but not Enough*

- 119 If a chef spends so much time making elaborate pastries that he has no time to make a decent sauce that does not mean that the pastries are bad or even a waste of time.
- 120 It simply means that time must be made available for the sauces.
- 121 There is no substitute for information.
- 122 We need as much as we can get.
- 123 But we need thinking as well.
- 124 The skill of thinking does not arise from teaching more and more information.
- 125 **Unless you can teach the right answer to every conceivable situation, then the skill of thinking is needed.**

126 **THINKING**

- 127 Thinking is the most fundamental of all human abilities.
- 128 The quality of our future will depend directly on the quality of our thinking.
- 129 There are few who would challenge the importance of 'thinking'.
- 130 So why do we not teach thinking explicitly and directly in our schools?
- 131 There are a number of possible reasons, which are listed below.
- 132 There may be others not included here.
- 133 I am aware that there are several schools which do now teach thinking explicitly.
- 134 There are even whole countries, like Venezuela, where it is on the curriculum.
- 135 By and large, however, most schools do not teach thinking explicitly.

136 The reasons below are not given in order of importance or even probability.

137 **1. Thinking is not necessary.**

138 You are taught what to do in any situation and then you do what you should do.

139 This is like workers on an assembly line.

140 They do what they are expected to do.

141 While this approach has some merit, it would be impossible to teach all situations and varieties of situations.

142 In a changing world this is even more impossible.

143 **2. Information is enough.**

144 God cannot think because God has complete information outside of time and cannot move from one thought to a better one.

145 So if we teach information and also how to get information (from the Internet, etc.) then the need for thinking is much reduced.

146 Information without thinking is not enough.

147 We need information but we also need thinking to see how to assess the information, how to use it and what further information might help.

148 **3. We already teach thinking.**

149 Because it seems so inconceivable that schools do not teach thinking, there is a claim that they do.

150 This claim is valid – up to a point.

151 Some aspects of thinking are indeed taught.

152 This includes the sorting of information, some analysis and the presentation of arguments.

153 This is all very valuable but is only a small part of the thinking needed in real life.

154 When my work was being used in Bulgaria they asked a nine-year-old girl from Plovdiv if she used the 'thinking tools' in real life.

155 She replied:

156 'I use them all the time in real life.

157 I even use them outside life – in school.'

158 John Edwards in Australia was teaching science to his pupils.

159 He decided to teach less science and some thinking instead.

160 His students did much better in their science exams than they had ever done.

161 In Argentina a school using my methods did so well in the national exams that they were investigated for cheating.

162 Their results were so far out of line with the results of other schools.

163 I would not deny that schools do teach some thinking but I would suggest

that it can be taught more powerfully and much more broadly than in the context of information skills.

164 **4. Thinking cannot be taught.**

165 This is probably the main reason.

166 There is the innocent ignorance of teachers who simply do not know how thinking can be taught.

167 Their teacher training colleges did not teach them how to teach thinking so they do not know that it can be done.

168 There is the dogmatic ignorance of those pundits who take the rigid position that thinking is a matter of inborn intelligence and cannot be taught.

169 This last view is simply absurd nonsense as the results of teaching thinking have become obvious.

170 ***Our Software for Thinking***

171 Around the world there are thousands of people writing software for computers.

172 How much effort have we made to write software for the human mind?

173 The answer is that, outside of mathematics, we have made no effort at all for about 2,400 years.

174 Why?

175 Because the excellence of the software designed by the GG3 (Greek Gang of Three) has seemed so perfect that there was no need for new software.

176 Socrates was trained as a Sophist.

177 He was concerned with dialectic or argument.

178 Plato was influenced by the mathematician Pythagoras and he believed that just as there were ultimate truths in mathematics so there should be ultimate truths everywhere.

179 Aristotle introduced his 'box logic'.

180 Define some categories or classifications.

181 Then you judged whether something was in this box or not in the box (it could not be halfWay or anywhere else).

182 Then you knew all about that thing from the label on the box.

183 During the Renaissance Greek thinking (GG3) came into Europe through the Arabs in Spain.

184 The people running schools and universities in Europe were largely Church people.

185 They were not interested in:

186 Perceptual thinking: because all the starting perceptions in theology were pre-determined.

- 187 Creative thinking: because there was no need and it could be dangerous.
- 188 Constructive thinking: because the operations of the Church were structured and strategic thinking was only for the top level.
- 189 Operational thinking: because that was not what the Church was about.
- 190 The interest of those Church thinkers was in logic, truth and argument.
- 191 These were needed to prove heretics wrong.
- 192 That was the basis for thinking in education and it has continued so, through tradition, to this day.
- 193 It is a very difficult continuity to break because any advisors come from within the tradition and so defend it.

194 ***Perceptual Thinking***

- 195 This is a very, very important part of thinking – and almost completely neglected.
- 196 No matter how good our logic may be the end result will depend on the starting perceptions.
- 197 If these perceptions are false and inadequate the answer will be rubbish – even if the logic is impeccable.
- 198 Gödel’s theorem shows how from within a system, logic can never prove the starting points.
- 199 The starting point is perception.
- 200 The CoRT program (Cognitive Research Trust), now widely used in schools, is all about improving perception.
- 201 This sort of thinking, taught by the Hoist Group in the UK to participants on the government New Deal program for unemployed youngsters, increased the employment rate five hundred per cent.
- 202 A year later ninety-six per cent were still in employment.
- 203 The ‘thinking’ was only taught for five hours.
- 204 This sort of thinking was taught by David Lane, the principal of the Hungerford Guidance Centre in London (for youngsters too violent to be taught in normal schools), to the violent youngsters.
- 205 In a twenty-year follow-up he showed that the rate of actual criminal conviction for those taught thinking was only one tenth of the rate for those not taught thinking.
- 206 In the Karee platinum mine in South Africa there used to be two hundred and ten fights every month between the seven tribes working there.
- 207 Susan Mackie and Donald Dawson taught this thinking to the totally illiterate miners who had never been to school even for one day in their lives.
- 208 The fights dropped from two hundred and ten to just four.
- 209 I use these examples because most people believe that bad behavior

depends on emotions and man's basic instincts, and that these cannot be touched by any amount of thinking.

210 This is simply not true.

211 Logic will never touch emotions but perceptual thinking will.

212 If you see things in a different way your reaction is different.

213 What was taught to all the people in the above examples was direct thinking not morals or attitudes or values.

214 Research by David Perkins at Harvard University confirms the importance of perception.

215 He showed that ninety per cent of the errors in thinking are errors of perception.

216 Logic accounts for a minor ten per cent.

217 Yet we continue to believe, as we have done for centuries, that thinking is all about logic.

218 As I mentioned earlier in the book, some people are very good at solving a puzzle if all the pieces are put out in front of them.

219 But that is not practical in real life.

220 It is perception that chooses and decides on the pieces.

221 No amount of excellence in logic will make up for a deficit in perception.

222 ***Critical Thinking***

223 This is a useful part of thinking.

224 But it is only part of thinking.

225 Our traditional (GG3) thinking is all about analyzing a situation and identifying standard elements.

226 Then we provide the standard answer to these standard elements.

227 So Ben S. Bernanke in Washington (head of the Federal Reserve Bank) looks at the economic situation.

228 If he recognize inflation the standard response is to raise interest rates.

229 If he recognize recession then the standard response is to lower interest rates.

230 There are serious flaws in the thinking – but it is traditional.

231 The word 'critical' comes from the Greek word, 'kritikos', for judge.

232 It is [judgement](#) thinking.

233 Is this right or wrong?

234 Does this fit in this box or does it not?

235 Is this consistent with what went before, or not?

236 Etc.

237 I want to emphasize again that this is a valuable part of thinking but by no means enough.

238 What is left out is:
239 Creative thinking
240 Perceptual thinking
241 Design thinking
242 Operational thinking
243 Exploratory thinking, etc.

244 ***Attitudes and Tools***

245 Attitudes are very weak and do not transfer.
246 Attitudes are like itineraries set up by a travel agent.
247 You use them but they do not lodge in your mind.
248 A tool is a specific mental operation.
249 The OPV tool in the CoRT program reminds the thinker to consider **the thinking of the other party** (for example in a fight).
250 OPV stands for 'Other People's View'.
251 Because it is an **acronym** it has a **place in the brain**.
252 This is just like the names of vegetables, which also have a place in the brain.
253 You do not ask for 'a shiny, round red vegetable which is good for salads'.
254 You ask for 'a tomato'.
255 The **acronyms** are an important part of the '**tool approach**'.
256 There have been schools where one teacher used the acronyms but another teacher disdained the 'phony acronyms' and tried to teach attitudes.
257 It did not work.
258 The second teacher quickly came back to using the acronyms.
259 **That is the way the brain works.**

260 ***Creativity***

261 While aesthetic judgement may play a key part in the art world, there is no mystique or magic about '**idea creativity**'.
262 **Idea creativity** is a **mental skill** that can be taught and practiced as formally as mathematics.
263 This is what lateral thinking is about.
264 The brain works as a **self-organizing information system**.
265 **Such systems make patterns**.
266 Patterning systems are **always asymmetric** (the path from A to B is not the same as the path from B to A).
267 Both humor and creativity depend on this **asymmetry**.
268 The formal techniques of lateral thinking (challenge, concept extraction, concept fan, provocation, random entry, etc.) can all be learned, practiced

and used deliberately.

- 269 One afternoon Caroline Ferguson in South Africa set up a group of workshops for the steel company ISCOR.
- 270 Using just one of the formal tools of lateral thinking the groups generated 21,000 new ideas.
- 271 It took nine-months just to sort through the ideas.
- 272 This goes far beyond inspiration or brainstorming.

273 ***Argument***

- 274 We have the tradition of argument designed by the GG3.
- 275 We use the method in **parliament** and in the **courts of law**.
- 276 It is an extremely primitive, crude and inefficient way of **exploring a subject** (if this is the need).
- 277 In a court of law if the prosecuting lawyer thinks of a point that would help the defense case, is that lawyer going to raise that point?
- 278 Of course not.
- 279 If the defense lawyer thinks of a point that would help the prosecution, is the defense lawyer going to raise that point?
- 280 Of course not.
- 281 The process is one of '**case-making**', not of exploring the subject.
- 282 In argument you must start with a position' – otherwise you cannot argue.
- 283 In exploration, you explore first and reach a position at the end of the exploration.
- 284 In argument there is **no design effort**.
- 285 You are arguing A against not – A or against B.
- 286 There is **no energy going** into designing the possibility of C, D or E.
- 287 Argument is about egos, emotions, attack, defend, win, lose, etc.

288 ***Parallel Thinking***

- 289 **An alternative to argument** is now becoming widely used around the world.
- 290 It is used in the primitive highlands of Papua New Guinea and in the top economic discussions in Washington.
- 291 It is used by four-year-olds in schools and by top executives in many of the world's best-known corporations.
- 292 A company in Finland used to spend thirty days on their multi-national project discussions.
- 293 Using the **Six Hats method** they now do it in two days.
- 294 Juries in the USA are being taught the method and are reaching unanimous decisions very quickly.

295 MDC, a corporation in Canada, did a careful costing and showed that in the first year they used the Six Hats they saved \$20 million.

296 People are beginning to realize that while argument has its place, it is a very poor way of exploring a subject.

297 The Six Hats method is being used more and more because **it gets the best thinking from all those present.**

298 Under the **White Hat** *everyone* focuses on **information.**

299 What do we have?

300 What do we need?

301 How are we going to get the information we need?

302 Under the **Red Hat** *everyone* is allowed to express their **emotions, intuitions** and **feelings of the moment.**

303 Under the **Black Hat** *everyone* focuses on the **dangers, problems, weaknesses** and **downsides** of an idea, and also on any **faults in logic or thinking.**

304 Under the **Yellow Hat** *everyone* looks for **benefits** and **values** and **how the idea could be made to happen.**

305 Under the **Green Hat** *everyone* looks for **new ideas, further alternatives and possibilities.**

306 Under this hat *everyone* is expected to make a creative effort – or keep quiet.

307 **People do not like keeping quiet** so they make a creative effort – and often surprise themselves.

308 The **Blue Hat** is the **organizing** hat.

309 This hat determines the **focus** and the **desired outcome.**

310 This hat sets the **sequence** of use of the hats and also the **discipline** of use.

311 This hat puts together the **outcome** and **decides the next step** in the thinking.

312 **Range**

313 I have taught thinking to four-year-olds and to ninety-year-olds (at Roosevelt University).

314 I have taught thinking to Down syndrome youngsters and to Nobel Prize winners.

315 I have taught thinking to illiterate miners in South Africa and to top

executives at some of the world's largest corporations: IBM, Shell, NTT Nokia, etc.

316 I have taught thinking to cricket teams and to orchestras.

317 ***Love It***

318 Children love thinking.

319 They love the opportunity to use their minds and to come up with new ideas.

320 In one school the main punishment for bad behavior was that you would not be allowed to go to the thinking lessons.

321 For a youngster every idea is an achievement – and an opportunity to show off.

322 Again and again children choose 'thinking' as their favorite subject.

323 Edward de Bono's [Textbook of Wisdom](#)