

CSCE 625: Artificial Intelligence

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- **Course Homepage**

<http://robotics.cs.tamu.edu/dshell/cs625/>

- **Textbook**

Artificial Intelligence: A Modern Approach, 3rd Edition

by Stuart Russell and Peter Norvig, 2009

Infinitesimal Calculus

by James M. Henle and Eugene M. Kleinberg, 1979

- **Other Reading Material: See the course homepage**

Objectives

- Understand and enumerate the basic techniques for creating intelligent programs.
- Create a successful program illustrating the operation of one of these methods.
- Apply the right programming language or technique to the right problem and be able to evaluate a proposed AI application for likelihood of success.
- Be able to discern sensationalism from science on the possible impact of AI on society.

Different definitions of the discipline A.I

- “New” problems? Things on the fringe?
- Is it just algorithms for difficult problems?
- Is it just heuristic control theory, but light on theory?

Paraphrasing H. S. Wall:

Uppermost in the minds of the professors is the desire to help the student develop the ability to set up and solve problems, and to make free use of computing. I believe progress can be made in that direction. Perhaps the fault lies in the prevalent idea that the subject is a kit of tools all arranged in little packages. Over the years this has come to be reflected in our textbooks, which in trying to meet the demand for more and more tools in the kit, have reached the point where one can question whether we are teaching science at all.

Real Objectives

- Give some indication of the intellectual activity of scientists.
 - Characteristics of scientific procedures.
 - Goals for which the scientist strives.
- The new outlooks which the work gives for the great mysteries of human existence.
- I want to get you to think critically *and* inquisitively.

What I cannot create,
I do not understand.

Why const x sort .PO

Know how to solve every
problem that has been solved

TO LEARN:

- Bethe Ansatz Probs.
- Kondo
- 2-D Hall
- accel. Temp
- Non linear Classical Hydro

$$(A) f = u(r, a)$$

$$g = u(r, z) u(r, z)$$

$$(B) f = 2|r, a| (u, a)$$



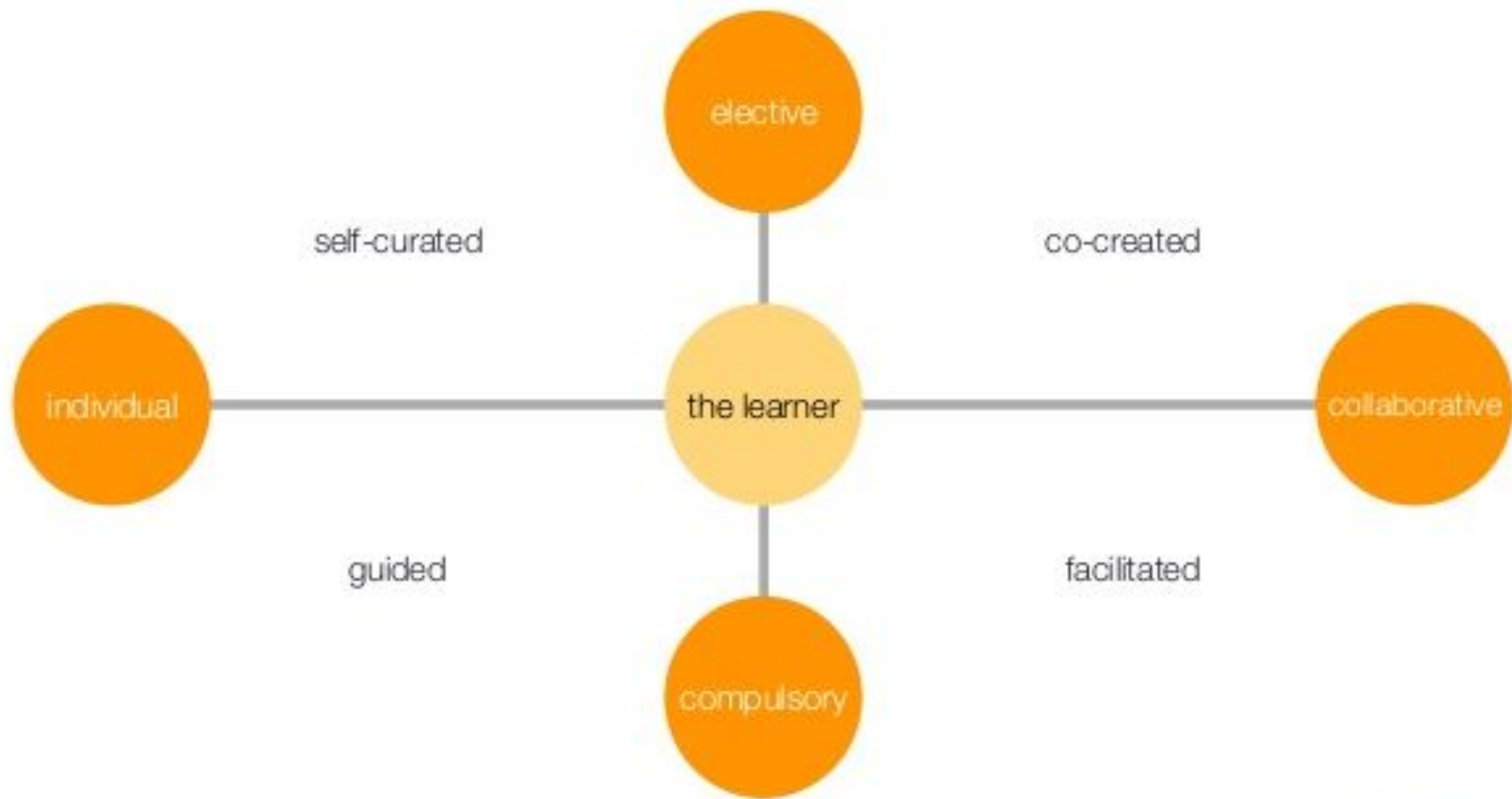
Caltech Archives

Creation Redux

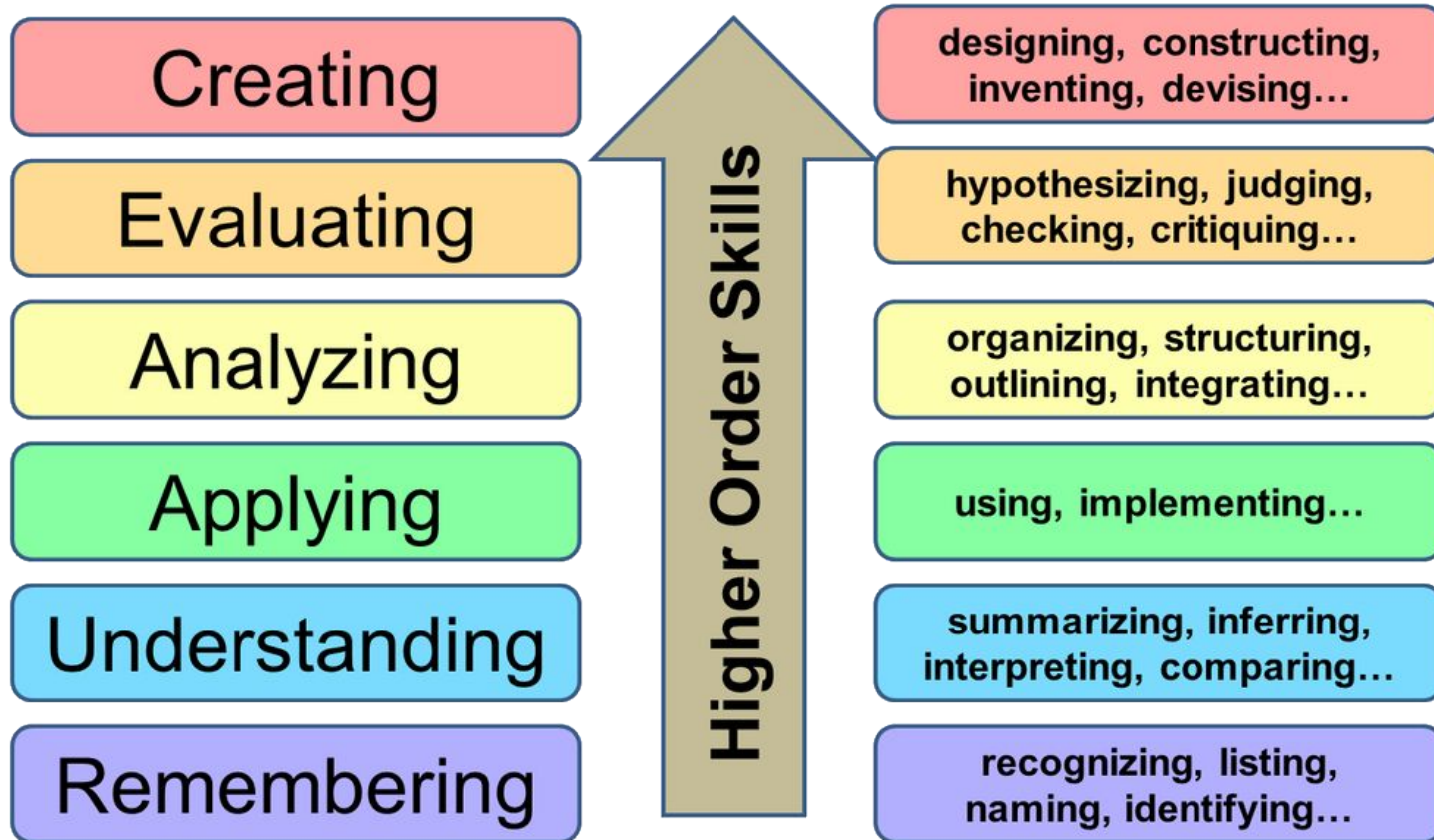
"It has often been said that a person does not really understand something until he teaches it to someone else.

Actually a person does not *really* understand something until he can teach it to a *computer*."

-- Donald E. Knuth.



Bloom's Taxonomy



Our roles and respective responsibilities

"I see my role as that of someone who opens a door to the riches of the world of mathematics and encourages the students to take responsibility for their own education.

...the standard pattern of the teacher as the sole source of initiative, and of the teacher-and-textbook combination as the sole source of wisdom, induces a condition of intellectual bondage; an umbilical cord is indispensable at the fetal stage of growth, but it must be cut if the next stage of growth is to take place."

-- Abe Shenitzer

The Texas Method

R.L. Moore, F.B Jones, H. J. Ettliger, and H.S. Wall

- Much attention is given to matters of language and logic.
- To develop clear thinking, it is necessary to develop the ability to make statements that say exactly what is intended.
- Also, it is necessary to learn to deny statements.

The Texas Method

“Examination systems, in spite of all efforts to the contrary, seem to influence our teaching in the direction of formalism rather than insight; because it is easy to test a student’s manipulative skill and extremely difficult to test their ability to think.”

-- W. B. Carver

The Texas Method

“The Great contribution of mathematics, pure or applied, is not rigor. It is ideas. Those are what our teaching should explain, and our own research should look for, and our writing should express”

-- G. Strang

A PROPOSAL FOR THE DARTMOUTH SUMMER RESEARCH PROJECT ON ARTIFICIAL INTELLIGENCE (url Ila)

We propose that a 2 month, 10 man (sic) study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire. The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together for a summer.

J. MCCARTHY, *Dartmouth College*

M. L. MINSKY, *Harvard University*

N. ROCHESTER, *I.B.M. Corporation*

C.E. SHANNON, *Bell Telephone Laboratories*

August 31, 1955

Sources:

Bloom's Taxonomy <http://ezsnips.squarespace.com/blooms-taxonomy/>