Computer use for people with learning difficulties

Basic needs

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Introduction

History

- Computer assisted education was designed by computer specialists
- Early programs based on behaviorism

Today :

- Two main categories of programs
  - Programmed teaching
  - Learning spaces

Starting from the person, Not the technology

- **Identify needs**
- **Assess learning capabilities**
- **Put together an education strategy**
- **Can a computer be useful for this strategy?**
- **What is specific of autism in that endeavour**
- **Other Potential Uses of Computers**
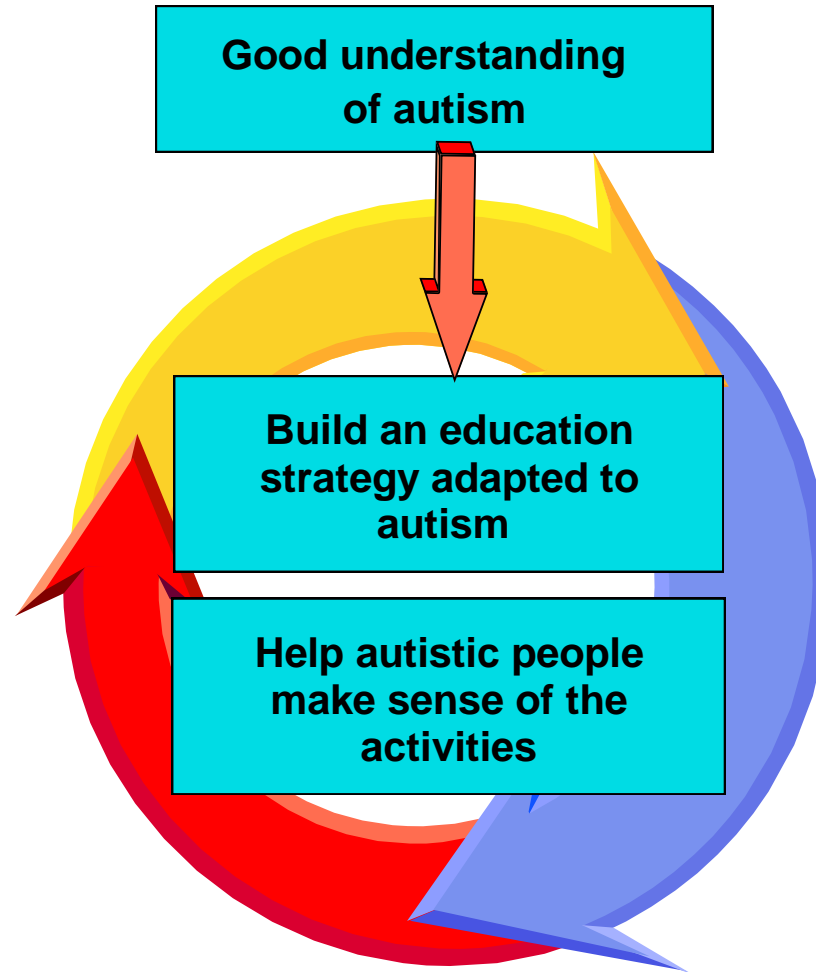- **Being a Year 2000 Citizen**

Starting from the needs will be ever more important in 2013 and after

- **Technology evolution is going faster and faster.**
- **Trying to follow this exolution will not be possible**
- **The needs on the contrary remain rather stable**
- **The solution will then be to look for a new technology better adapted to satisfy the needs**
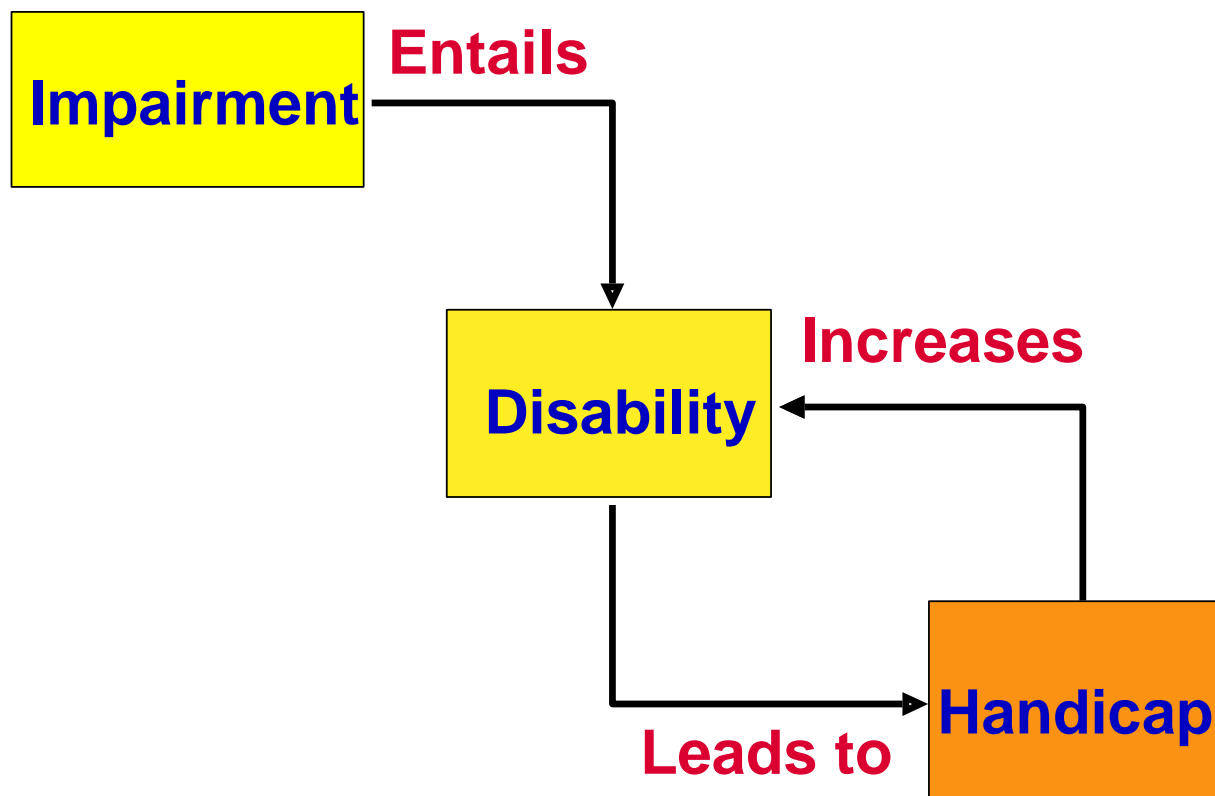
Vertuous circle

Good understanding of autism

Build an education strategy adapted to autism

Help autistic people make sense of the activities

Identification of Needs

- **Needs Expressed or Inferred by**
  - ►**Parents**
  - ►**Professionals**
  - ►**Autistic people**

- **Level of the Needs**
  - ►**Functional**
  - ►**Basic skills**
  - ►**Social skills**

W.H.O. Classification (1)

Impairment — **Entails** → Disability

Disability ← **Increases** — Handicap

Disability — **Leads to** → Handicap

(1) P. Woods 1980

Corresponding Intervention Levels

Impairment	Disability	Handicap
Functional Intervention	Compensation of Difficulties in General Acquisitions	Compensation of Social Skills Difficulties
Therapeutical Rehabilitation Programs	Adapted Educational Programs	Social Skills Training Programs

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Learning capabilities Assessment

- **Large Interpersonal Differences**

- **Developmental Domains Disparities**

- **Need for Specific Assessment Tools**
  - ► **To Detect Emerging Capabilities**
  - ► **To Evaluate Communication Skills**
  - ► **To Evaluate Social Adaptation Level**

- **Identify Missing Prereq. Skills**

Put Together an Education Strategy

- **Work on Emerging capabilities**

- **Use / Adapt Existing Teaching Activities**
  - ►**Schopler/Reichler**
  - ►**Feuerstein**
  - ►**Social Stories**
  - ►**Games (match level to skills)**
  - ►**Reading / Writing**

Two learning modes

- **Procedural**
  - ► **To succeed**
    - – **Associativity**
    - – **Sequencial knowledge**
  - ► **Local adaptatione**
  - ► **Often sufficient**

- **Conceptual**
  - ► **Understand**
    - – **what we know how to do**
    - – **Or how things work**
  - ► **Broaden the concept**
  - ► **Generalization**

Drill and practice

Tutorial systems

Foster category enrichment

Using acquired procedural knowledge

Procedural Categorization → **Conceptual Categorization**
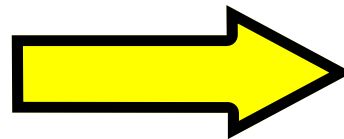
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Can a computer be useful for this strategy?

- **Some interesting features of computers:**
  - ►**Previsibility of computer behavior**
  - ►**Stable Visual Stimuli**
  - ►**Stable Auditory stimuli**
  - ►**Very rich set of user interfaces**

- **Adaptability to skill level**
  - ►**Use Photographic pictures, then Drawings ...**
  - ►**Evolve to symbolic, or text later on**

- **Use Animation Capabilities of Computer**
- **Use Simulated Social Situations**

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Some specific aspects of autism
for functional and basic learning

- **In Most Cases Visual Preference**

- **Use Single Sensory Modality**

- **Test Validity of Learning**
  - ► **Through Computer Exercises**
  - ► **In the Real World**

At the impairement level

- **Instrumental education**
- **Broadening perception modalities**
- **Visuo-motor coordination**
- **Joint Attention**
- **Imitation**
  - **Verbal**
  - **Motor**
- **Learning basic causality**
- **Development of deductive processes**
- **etc.**

Functional education
Ex : IBM SpeechViewer

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At the disability level

- **Teaching adapted to autism**
  - ►**Colors and shapes**
  - ►**Sounds and noises**
  - ►**Spacial and temporal relationships**
  - ►**Names of usual objects**
  - ►**Symbolic representation**
  - ►**Letters and reading**
  - ►**Numbers and computation**
  - ►**etc.**
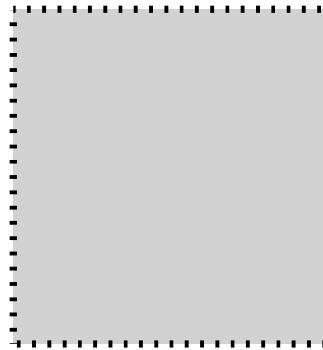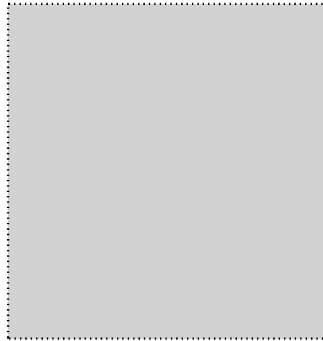
Color recognition
Context noise (example 1)
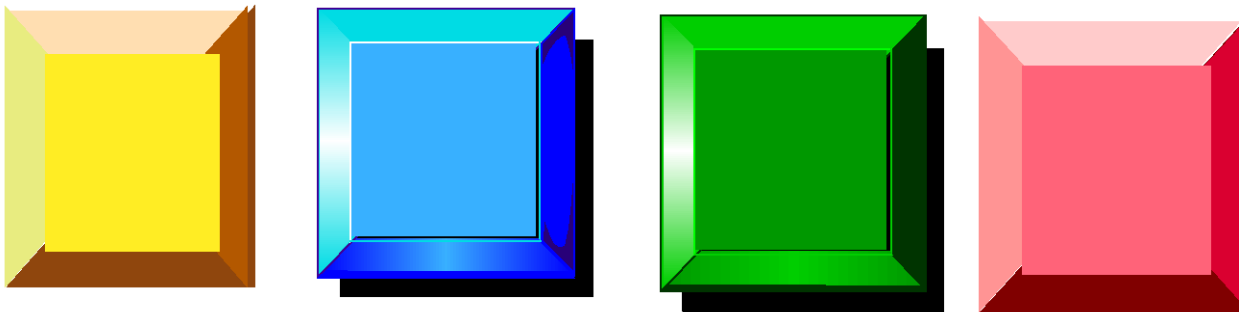
Color recognition
Context noise (example 2)
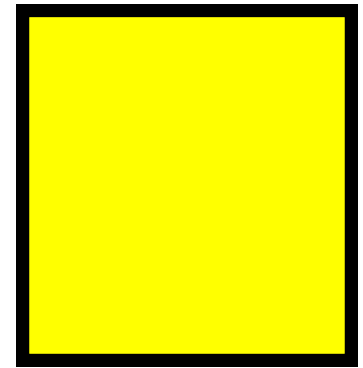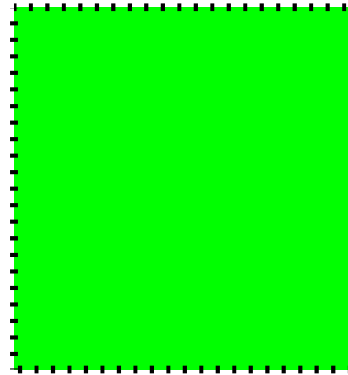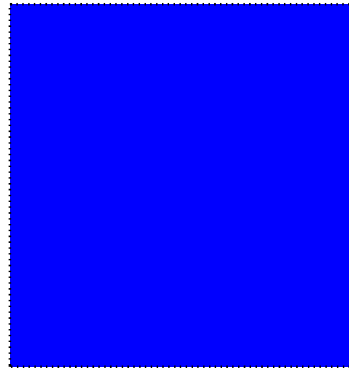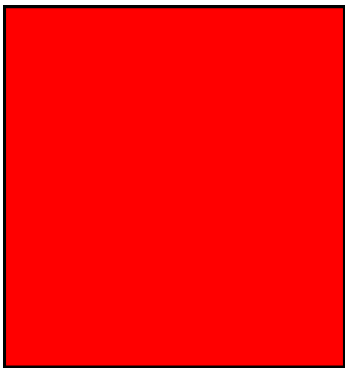
Pseudo color recognition
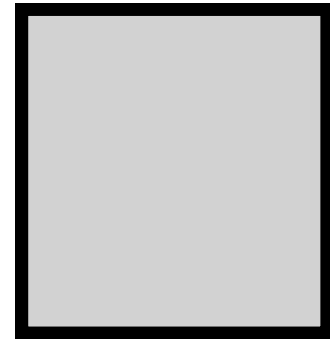
Color recognition
Eliminating context noise
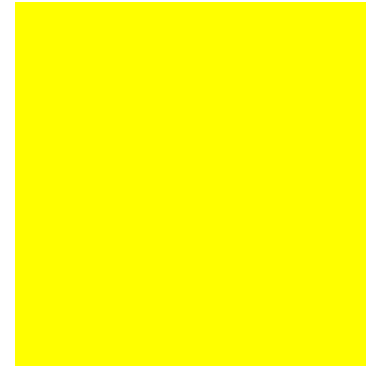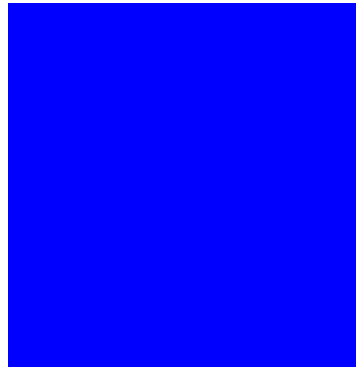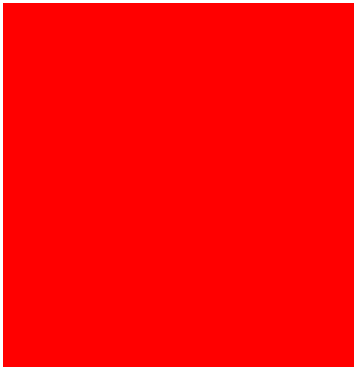
Shape and size generalisation
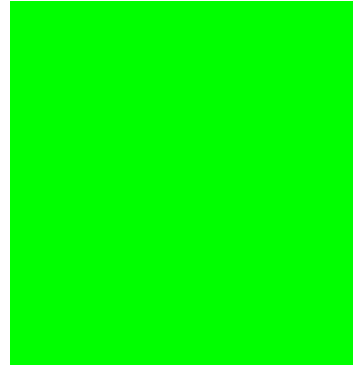
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Nuances

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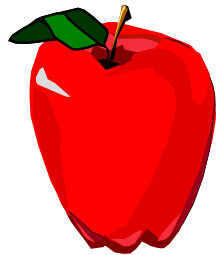*Handimatica 2012 Bologna - 24 novembre*

23
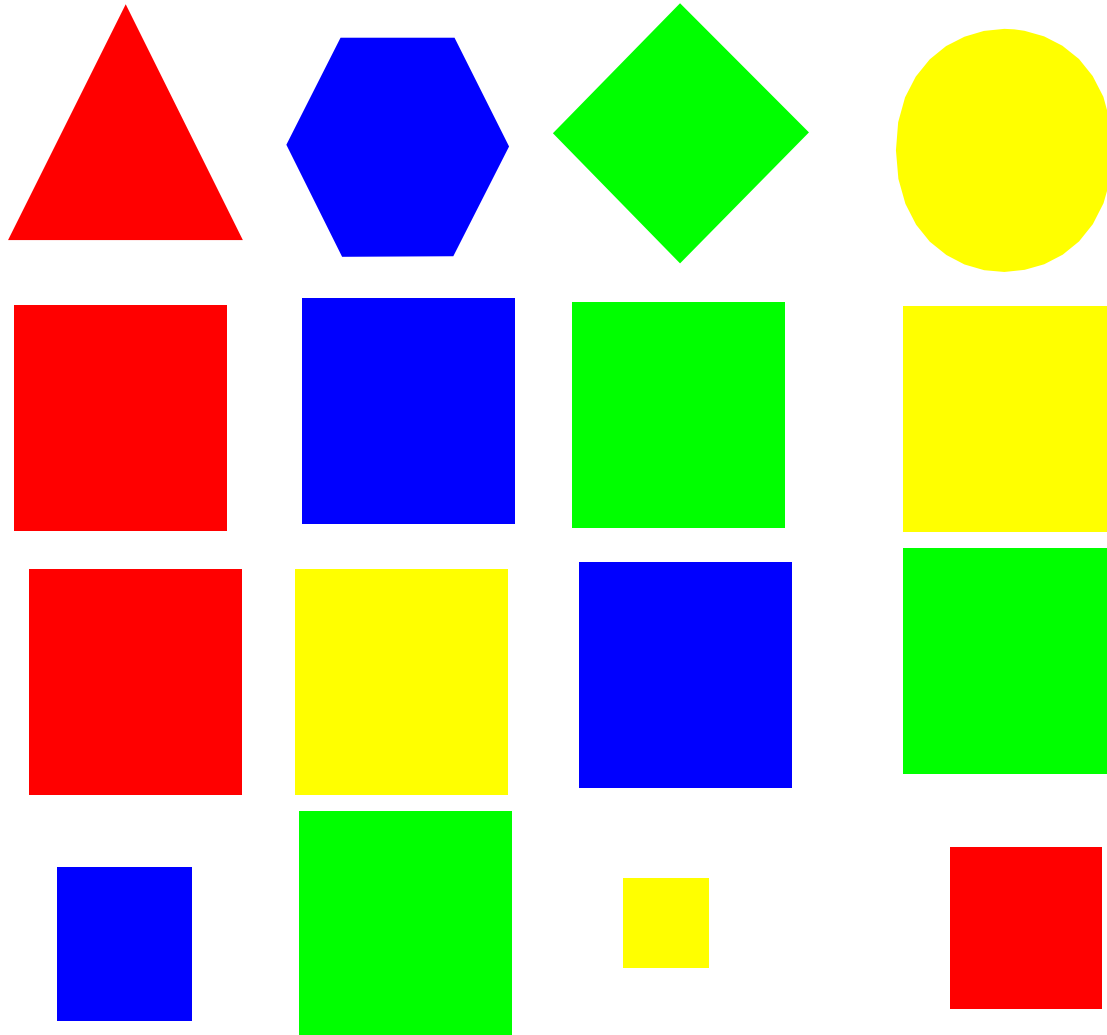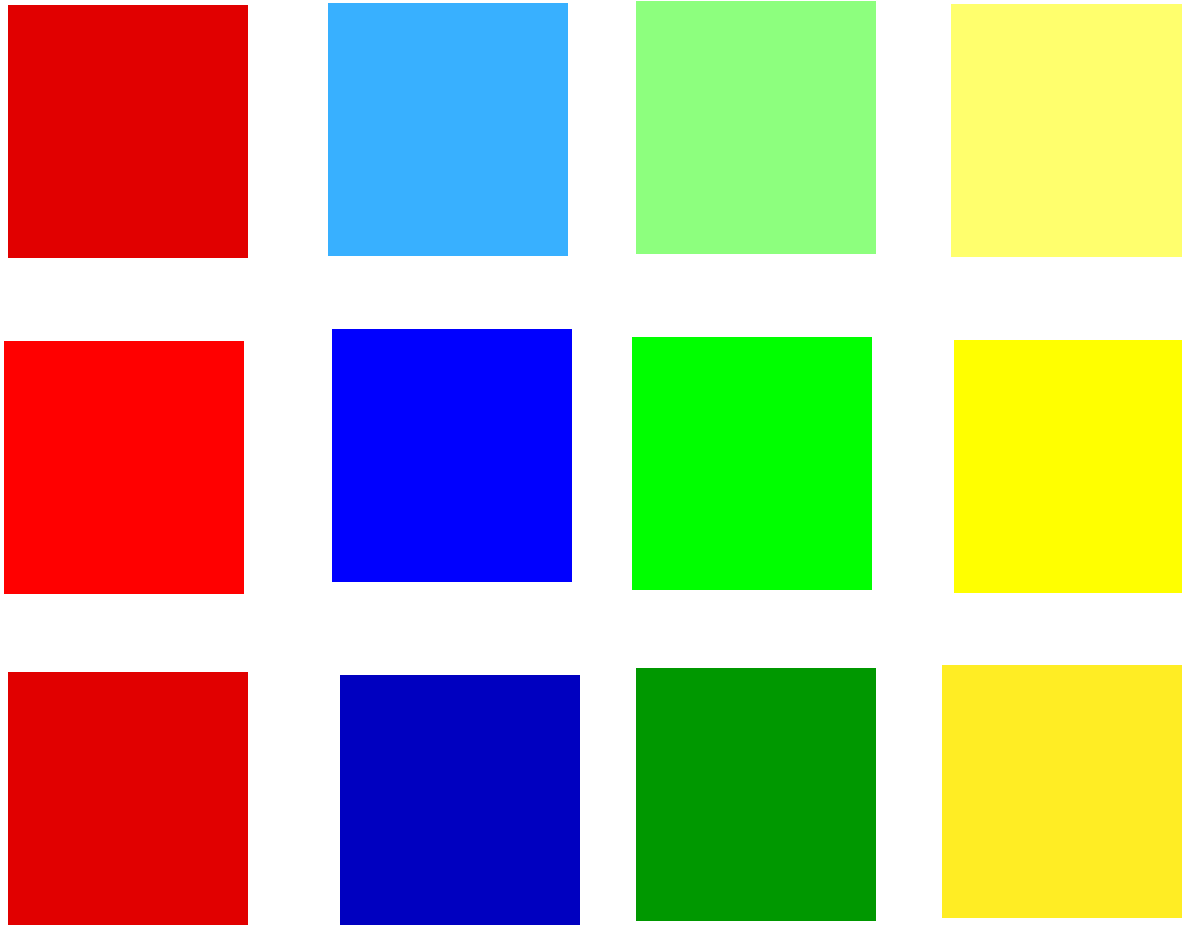
Some specific aspects of autism

for basic and social skills learning

- **Do not Imbed the Object in a Rich Context**
  - ►**Eliminate context at first**
  - ►**Re-introduce context progressively**

- **Beware of Individual Preferences**
  - ►**Fascinations for Some Subjects**
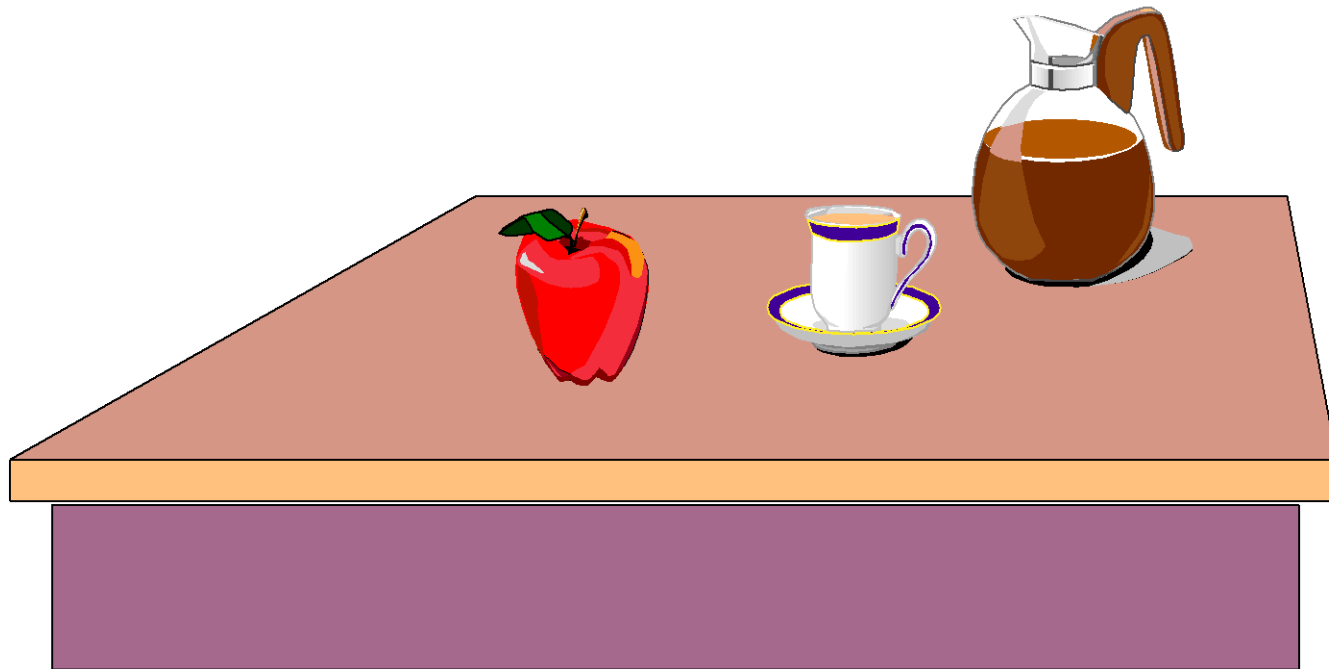 - ►**Phobia for Other Subjects**

Extract object from context

Introduce context progressively

Add more context

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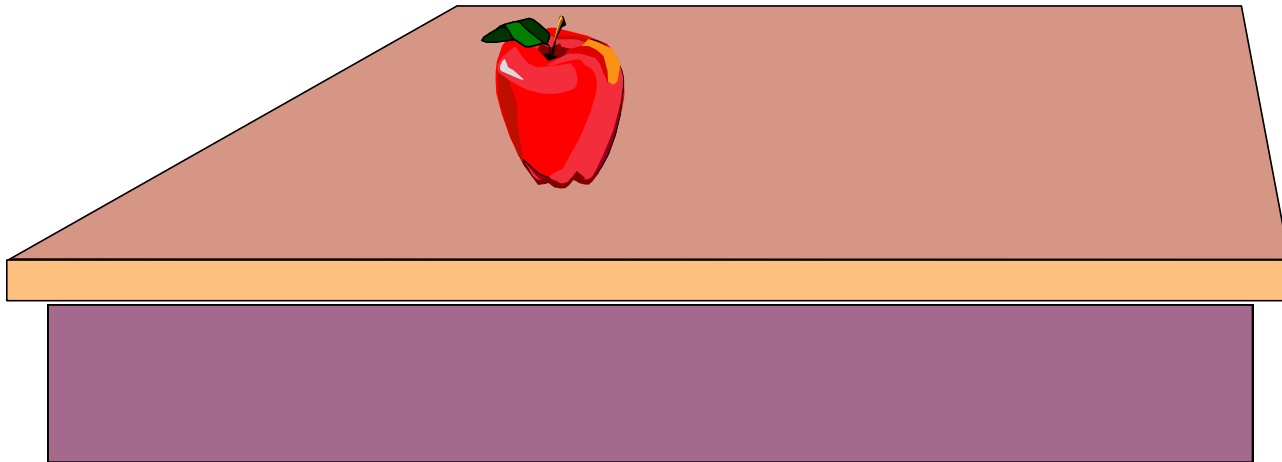
Object in a complex context

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At the Handicap level

- **Social skill training**
  - ► **To be accepted in the group**
    - – **induce new acquisitions**
  - ► **Moving about, autonomy**
    - – **At home**
    - – **In the classroom**
    - – **In town**
  - ► **Social exchanges**
    - – **Shopping**
    - – **Buy a drink at the cafeteria**
  - ► **Preparation to leisure time**
    - – **Understanding the rules of the games**
    - – **Understanding the rules of a sport**

Constructivist educational programs

"*a deficit in learning to be replaced by one of a difference in learning*"

- **LOGO**
- **AURORA**
- **Research program of the eighties**

Other Potential Uses of Computers

- **Communication**
  - ► Preference for visual media
  - ► Permanence of stimuli
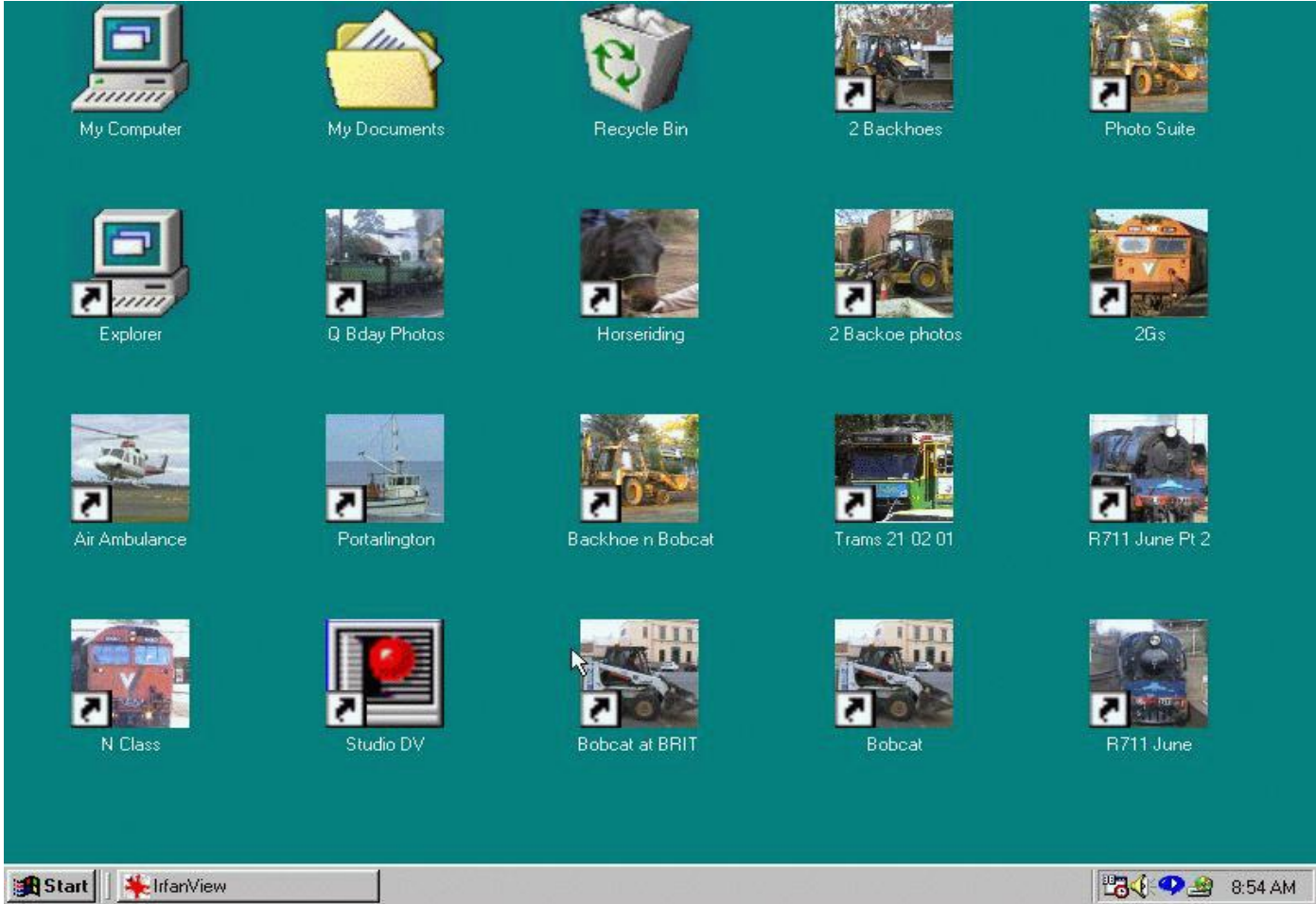 - ► Potential Speech Synthesis

- **Games**
  - ► Incidental Learning
  - ► Leisure time: FUN

- **Artistic Creativity**
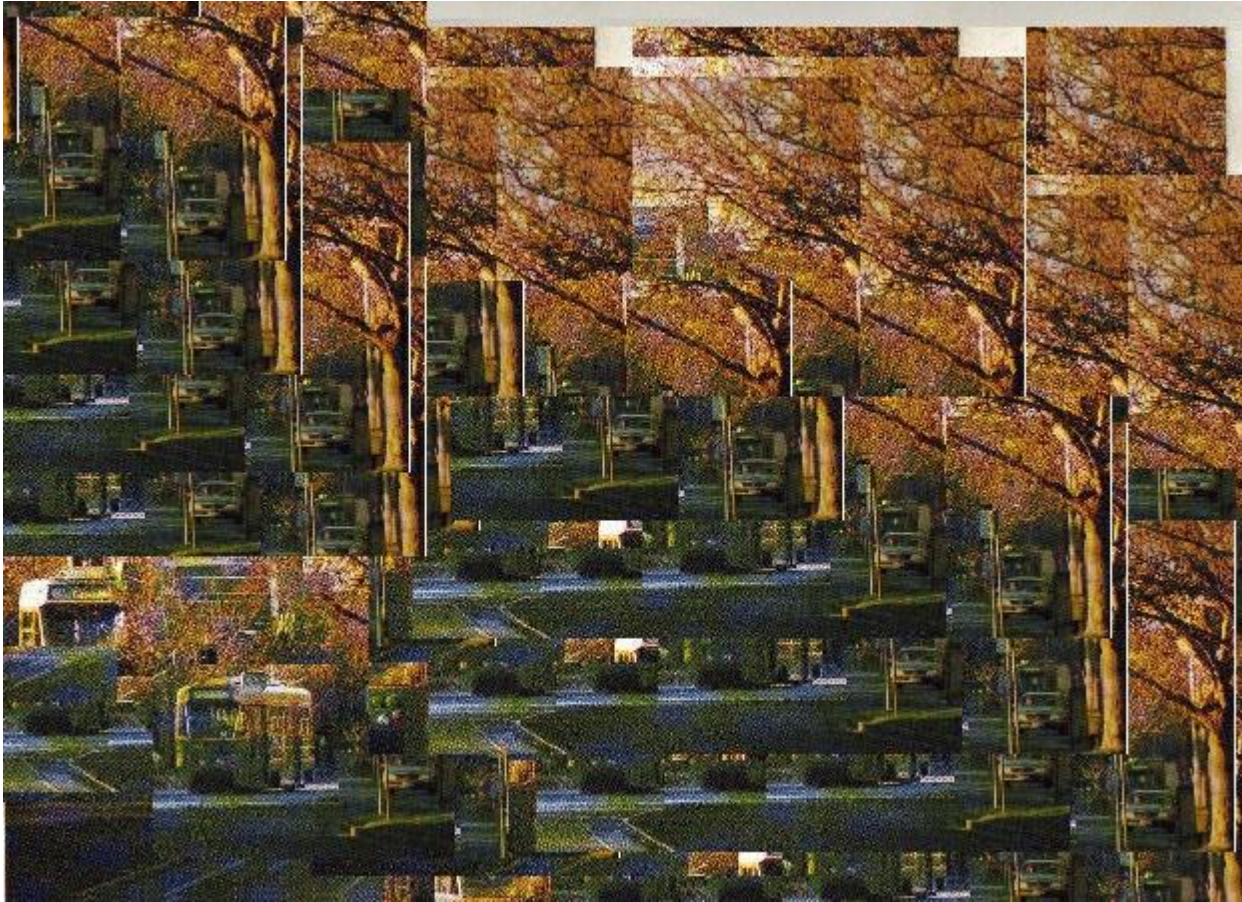 - ► Drawing, Music, Text
  - ► Fault Tolerant "Pencil"

Example of leisure time use

Use individual interests

Active : creativity

Computer environment

Dave on his computer Nov 2001

Construction of the film

The result…

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Benefits

- **A means to occupy his time, engage him.**

- **Increased self esteem.**

- **Reduction in violence.**

- **Increased social interaction and communication.**

- **Able to process/ live again events at will.**

- **Able to anticipate events.**

- **Learning patience.**

- **Viewing video on the camera's miniature screen assists in coping when in the community.**

- **Opportunity to demonstrate problem solving skills.**

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