Amusement and rehabilitation of senile elderly patients by virtual playing facility

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Background

Increase of senile elderly patients

Utilization of conventional facilities
 at institution and home

New relation with senile elderly patients

Aim of the Study

- **Change of environmental mood by the "play" in virtual facility**
- **Some kind of mental and physical rehabilitation**
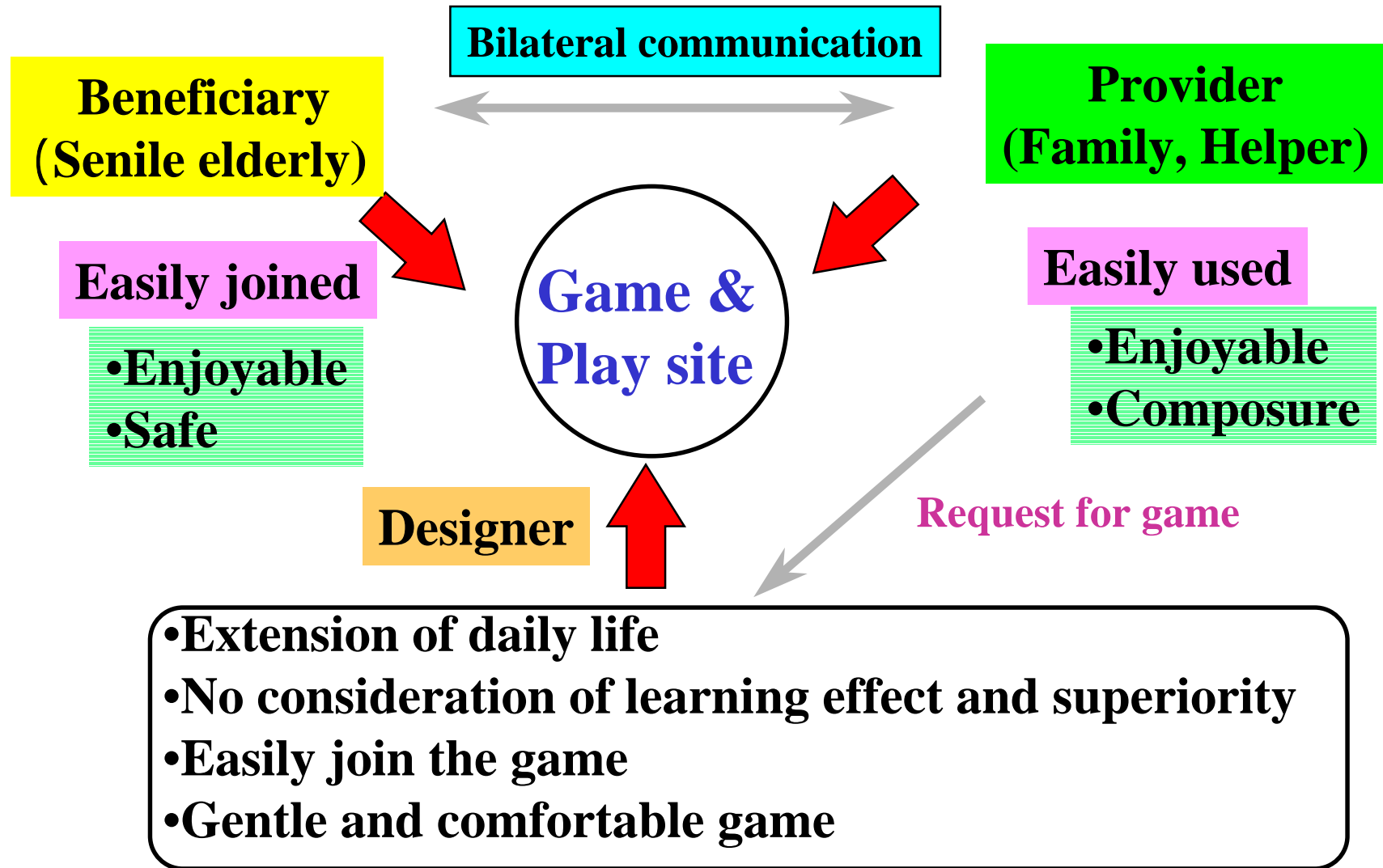- **Help to nursing service without additional burden of helpers**

Utilization of Amusement

play

enjoy

stimulation

Amusement for elderly people

Desirable play

Design of play

Provision of play

Amusement by playing game

Bilateral communication

Beneficiary Senile elderly)

Provider (Family, Helper)

Game & Play site

Easily joined
- •Enjoyable
- •Safe

Easily used
- •Enjoyable
- •Composure

Designer

Request for game

- •Extension of daily life
- •No consideration of learning effect and superiority
- •Easily join the game
- •Gentle and comfortable game

Materials and methods

- **Day-care room** related to
  2D virtual "play site" on the screen

- **Virtual playing facility**
  Video camera, Wide monitor screen

- **The senile elderly** enjoy games together with
  the moving image of themselves.

Application of virtual reality to play

Provision of "virtual experience" to the person who cannot have real experience"

Literature, Music, Art, Movie, Radio, Television etc.
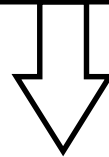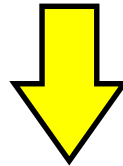
Various   kinds of virtual experience

Wide range of virtual experience by computer application

In order to apply "virtual reality" to the game

Principle

It is not "REAL" but "VIRTUAL".
- Necessity of mental and physical distance from reality
- Recognition of adaptation of children to the game and their growth-process

What virtual reality should be?

What <Game> should be?

Arousing interest & will of the patients

enjoyable, safe easy

Play with only imitation and experience
Based on only positive experience
Participation and quit with free will
Every patient can join the game
Helper and Family can join the game
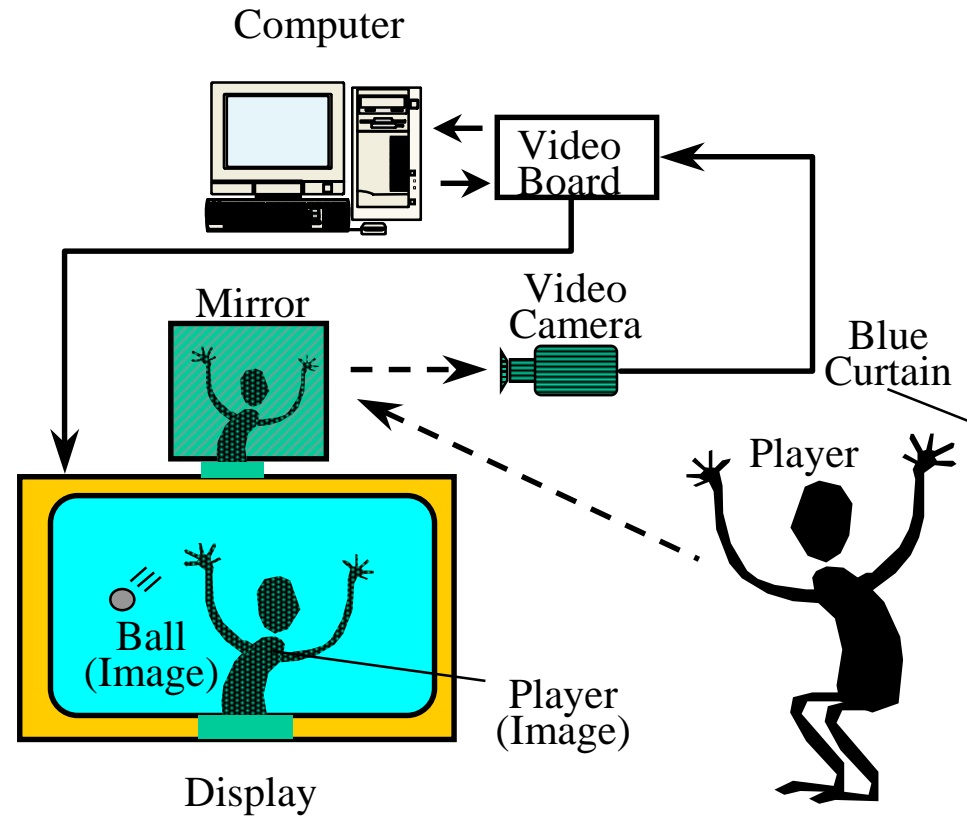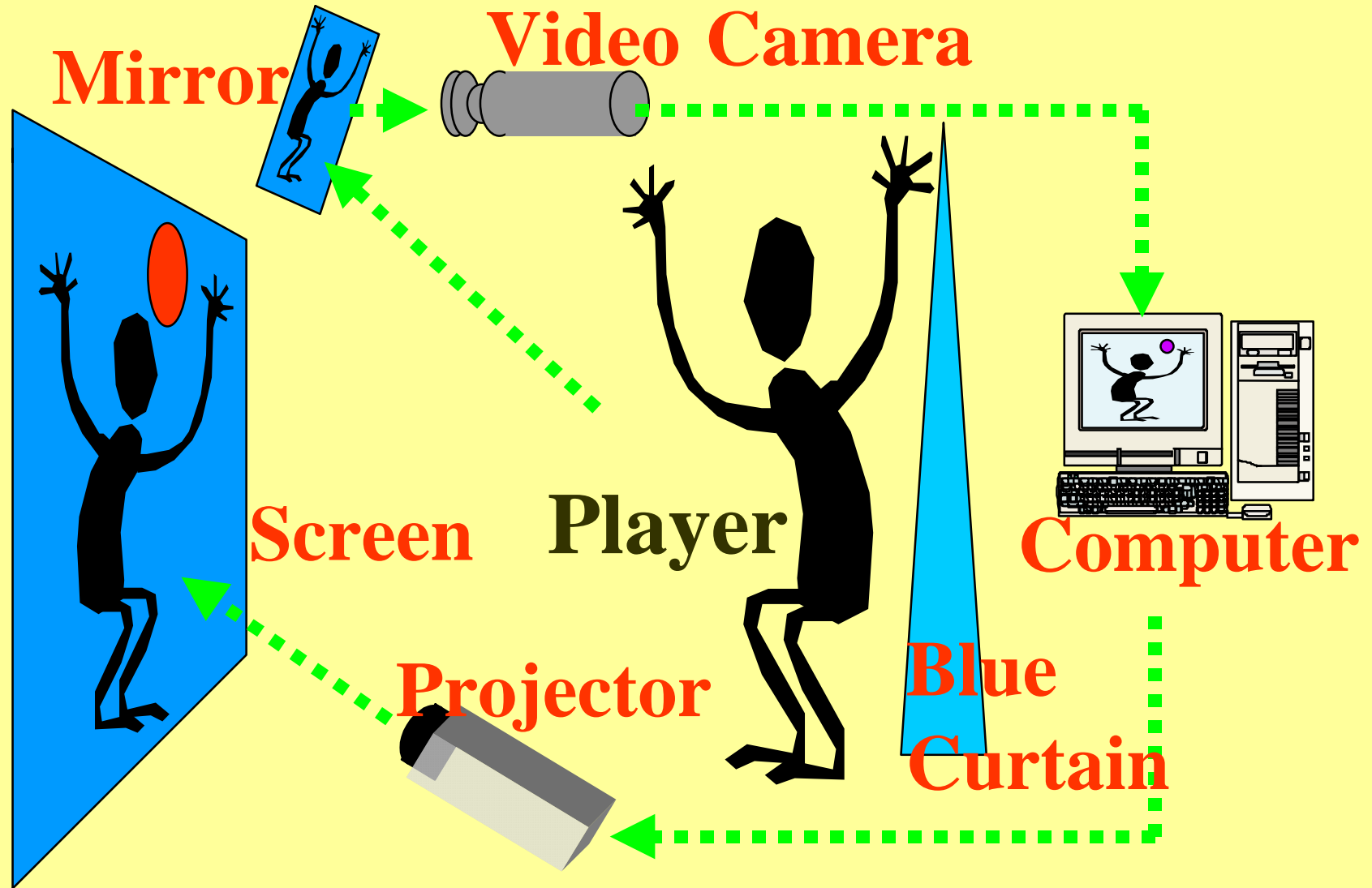No consideration of learning and superiority

Virtual Space

Moving
Object

Moving
Object

Moving
Object

Player

Standing Object

Moving
Object
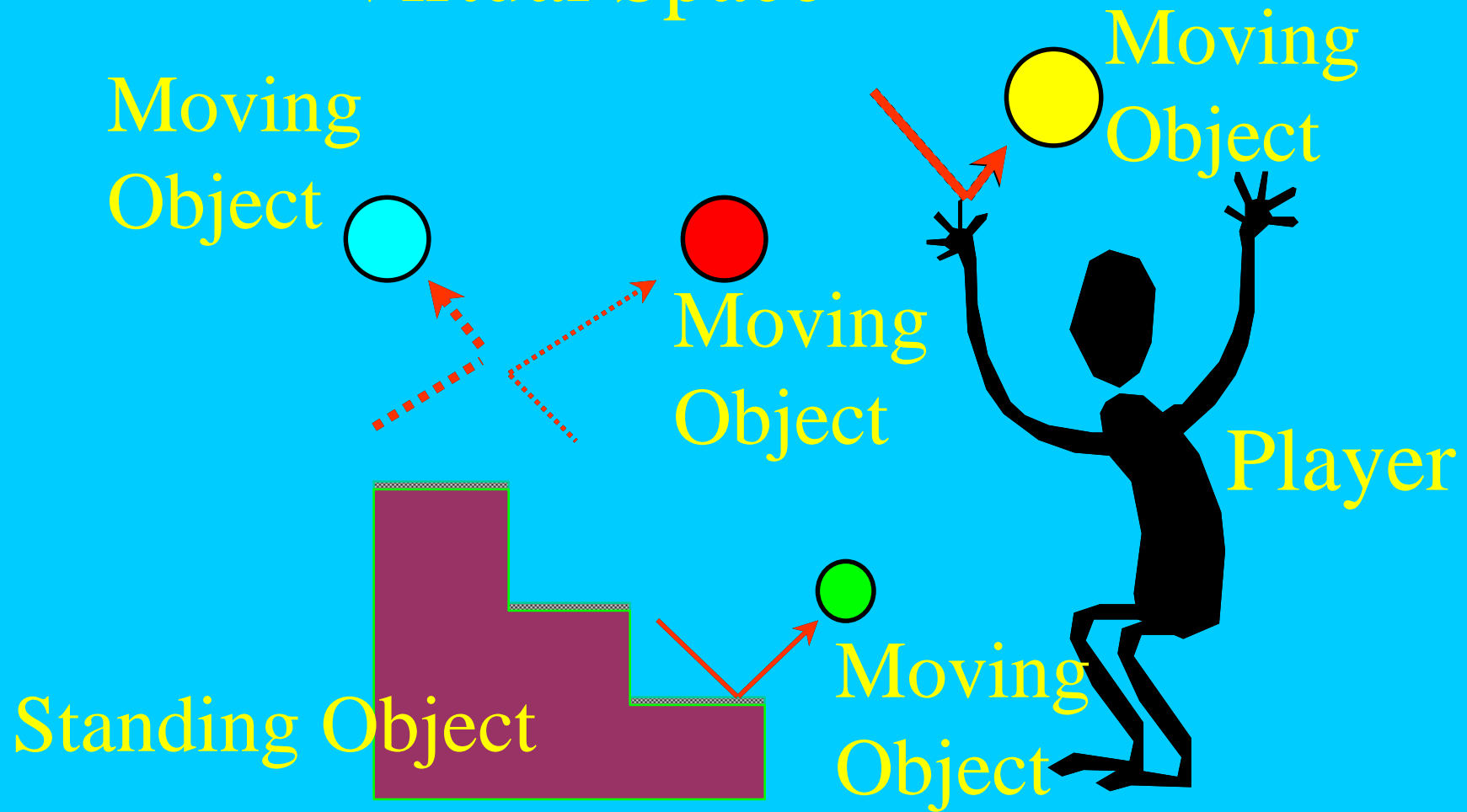
Basic Concept of the Game

Installation of the playing facility

Display, videocamera and computer

Reasonable system using in-home electrical apparatus

Computer

Video Board

Video Camera

Mirror

Blue Curtain

Player

Ball (Image)

Player (Image)

Display

Mirror

Video Camera

Screen

Player

Computer

Projector

Blue
Curtain

Wide screen type playing facility

Observation around the senile elderly playing game

Audience

Nurse, Helper

4.0[m]

Screen

Blue curtain

Day-care room

Safety in game

Audience

Players

Plural players can join the game
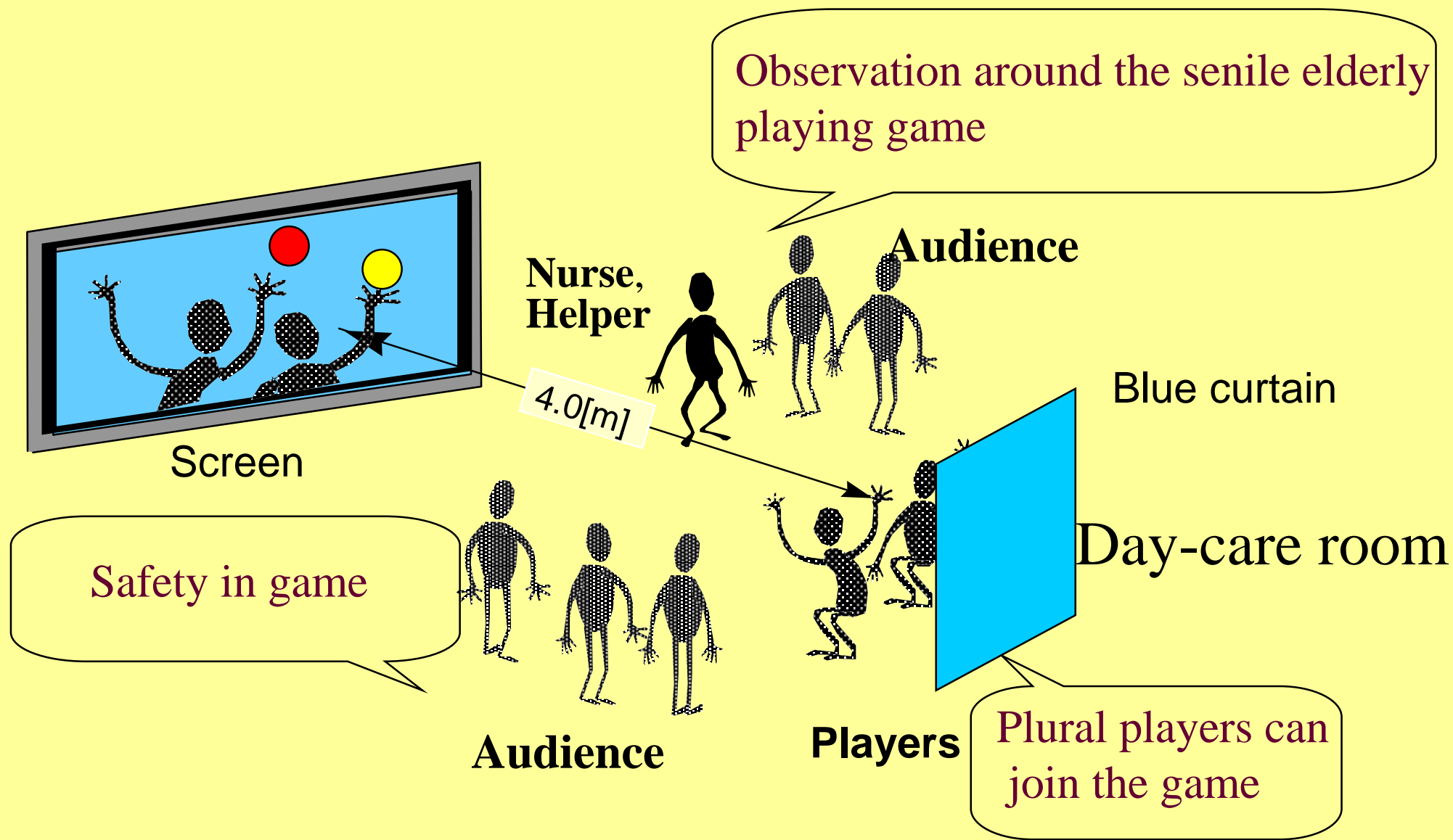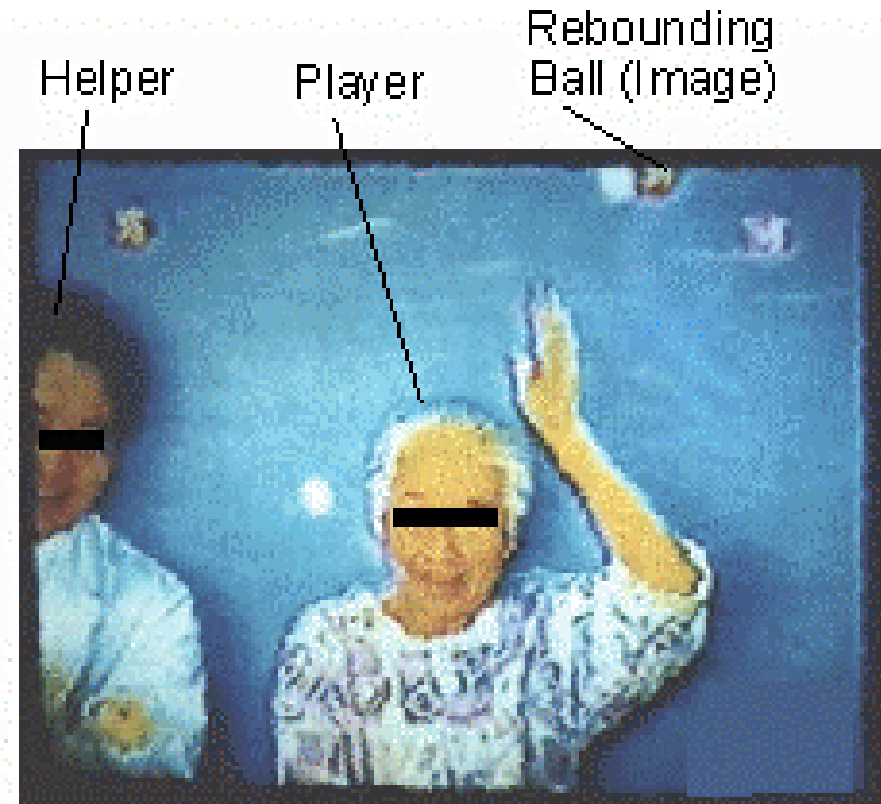
Theater-type play in a group

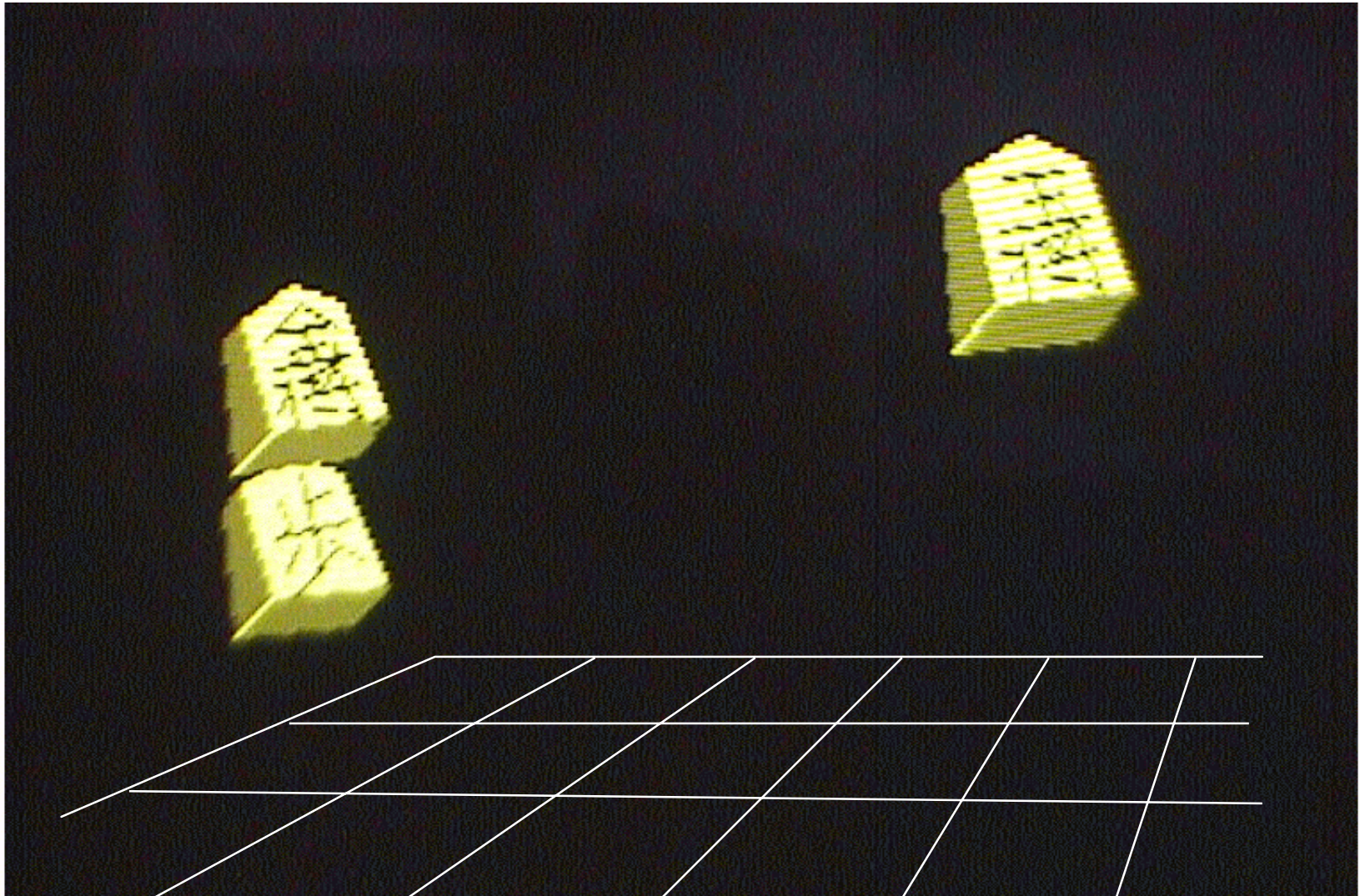**Senile elderly patients   imitation   playing in the virtual space**
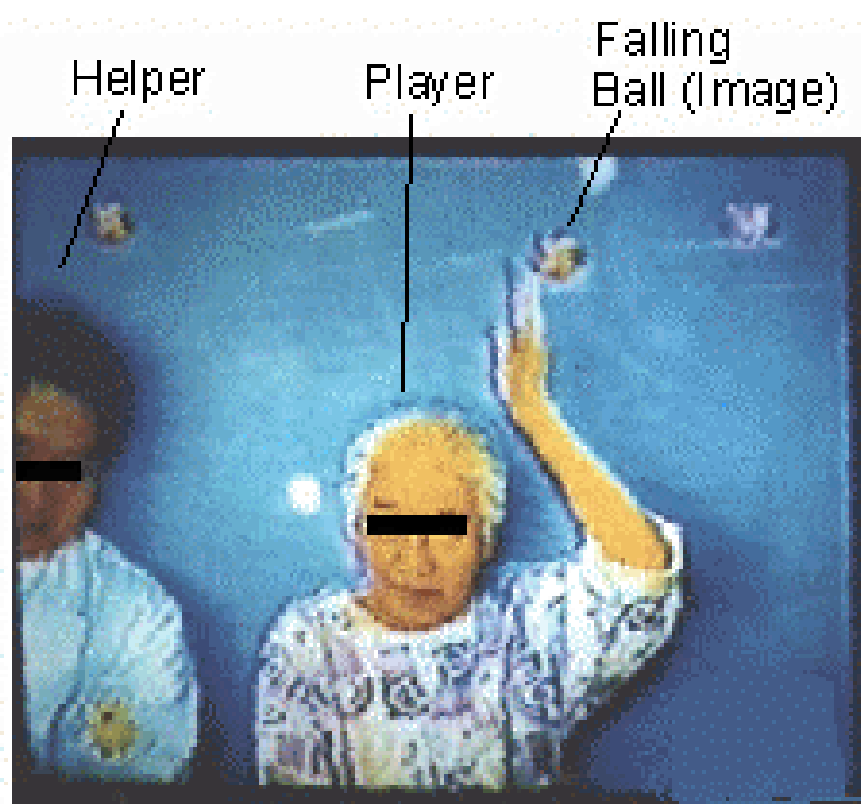
仮想空間の中で遊んでいる痴呆性老人

A playing elderly patient in the virtual space (on the monitor-screen)

Moving "Japanese chessman" in variable size in virtual space
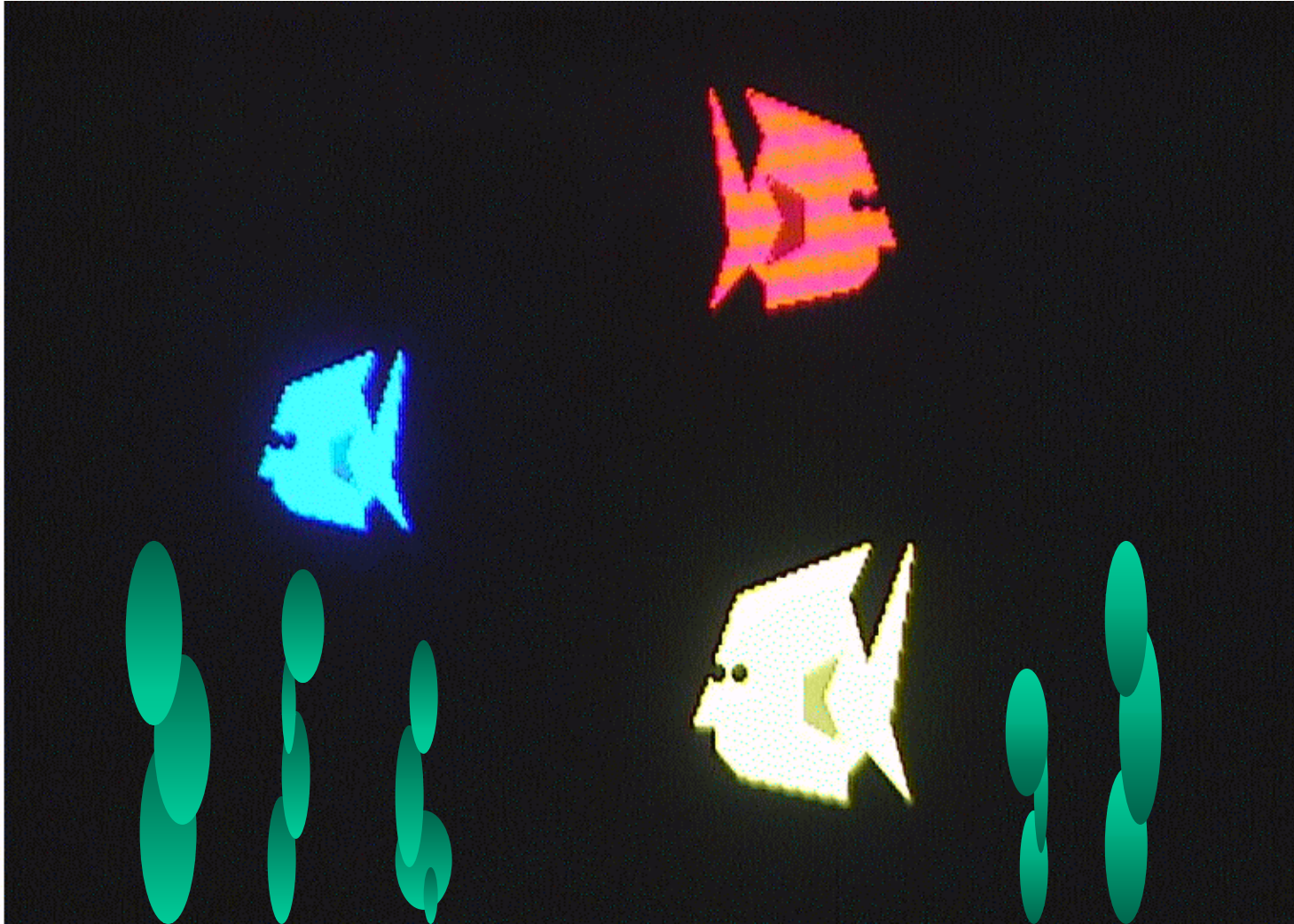
Fishes swimming in the virtual space

Subjects for Experiment

Hospitalized senile elderly patients

    4 men and 3 women,

    63-87 years of age

    with some helpers and nurses

Remarks on introduction to the games

a) Begin with everyday conversation
b) Never emphasize the "play"
c) Respect of their pride
   never "simple", "easy", "anyone can"
   character, former occupation, etc.

Introduction of the patients to the game

a) Based on knowledge about the state of a patient
Careful hearing from the helpers and nurses,
physical conditions ?   enough sleep?
abnormal behavior?   something pleasant?

b) To introduce a patient to the game
by appropriate gestures or imitation of others

Whether a patient recognizes or not?

a) his image on the screen as "himself"

b) who it is, when someone appears
on the screen

c) movement of balls in the virtual space

Subjects and grade of their dementia evaluated by MMS, HDS-R, IADL and PSMS

Subject	Gender	Age	Disease	Symptom	MMS	HDS-R	IADL	PSMS
A		72	Alzheimer	Severe	8/30	5/30	1/8	5/6
B		87	Cerebro-vascular	Severe	6/30	3/30	0/5	1/6
C		64	Alzheimer	Severe	5/30	3/30	0/8	1/6
D		66	Alzheimer	Severe	6/30	4/30	2/5	2/6
E		74	Cerebro-vascular	Moderate	13/30	7/30	0/5	5/6
F		63	Alzheimer	slight	19/30	14/30	2/5	1/6
G		77	Alzheimer	slight	23/30	24/30	7/8	4/6

Experimental results

patient	play	refuse	observe
A	8	0	0
B	3	1	2
C	5	0	1
D	5	0	0
E	5	0	0
F	6	0	0
G	5	0	0

Some Views on Patients

Case 1: Mrs. A gentle character
 Laughing loudly, stopped walking to watch the play
 Intimation with Mr. D (not familiar with her)

Case 2: Mr. B both arms never up to the shoulders
 Trying to touch balls above his head

Case 3: Mr. D trouble-maker by violence and wandering
Stopped wandering to watch the play
Joining the game and trying to touch balls by his arms
Some kinds of jokes during the play

Comments by helpers and nurses

Playing and watching elderly patients
- Chat or smile, change to expressive face during the play
- In good humor in several hours
- Decrease of their abnormal behavior after the play

Helpers and nurses
- Release from the physical and psychological burdens to stick fast to the patients.

Effect of the play

Being kept within some definite place in a certain while

The playing senile elderly enjoyed their "play" together
with their watching comrades.

Easy joining the same game in the next occasion

Interest in inexperienced virtual "play site"　and image game

Change of their mood in some while after the game

Chat with expressive face change
Decrease in their abnormal behaviors after the "play"

After Game

Little remembrance o the content

Easily join the game next time

Move to the play site with their own will

Content of the game

What everybody can naturally join and enjoy together?

Cheerful experience

- Avoid what reminds of life crisis e.g. in war
- Easily changeable persons and things on the game

Free join and quit

- Not necessary of logical process of the story
- Visually understandable

No request of superiority

- Never scoring

Moderate stimulation

- No sudden change in light and sound

Application of virtual reality

Summary

- **Prototype of the game**

- **Positive effect of playing the game**

Expected Effect from playing the Game

- **Interest Curiosity**
  willing to do something
- **Enjoyable**
  Free and refreshing mood

- **Feeling in contact with others**

  Communication among patients and helpers
  → **Positive effect on feeling of the senile elderly**
  → **Concentration and improvement of care
  by helpers and family**

- **Pursuit of the past experience**
  **Recall and revival of past positive experience,
  lost person and thing belonging to the patients**

Remark on the Design of the Game

- Respect for their past
- Accept of their present word and behavior
- Never to take a stand of teaching them
   in order to introduce the game
- Never require learning effect and superiority
- Join and quit with their own will
- Enjoyable content inducing their interest
- Came that everybody can easily join
- Game based on only their past positive experience

Basic attitude for developing game

- **Moderate stimulation to mental and physical activity**

  Comfortable stimulation to mental and physical condition

- **Avoid the stimulation of particular sensory or motor neural network**

  Game based on terror   suppression of feeling, lack of moral, and emotional or too much stimulation

  e.g. war game   ⟹   **avoid**

- **Clear boarder between Real and Virtual**

  Not desirable to provide "all " by virtual materials

Development of game

- **Children and Youth**

  Superiority of real experience to virtual experience.

- **People engaged in special work**

  **"Educational simulator" training works in the danger,
  e.g. in space in deep see, under the ground etc.**

- **Physically impossible experience**

  **Micro special world or long distant world which cannot be
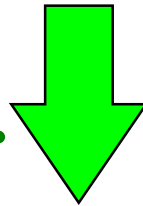 experienced.**

Development of game

- **Mentally or physically handicapped people**
- **Senile elderly people**

  New experience and recall past experience

  Comfortable feeling and movement

Realization and Remind of the lost persons and things.

Happy feeling and practical benefit obtained from operation and utilization of virtual reality and satisfaction of some accomplishment

Virtual Object, Virtual tool, Virtual facility for the supplement of insufficiency

Influence of virtual reality

Applicable domain
- Science
- Education
- Imdustry
- Economy
- Arts
- Sports

Virtual reality technique

New special domain

Refine and popularization of technology

Age for novice
Nonprofessional age

Everybody can design and utilize his own favorite system according to his interest.