

**Repercussions in Educational Robotic
of the information and
communications technology to
the instructional didactic
servo technology and paintings
in their steps fractals**

Repercussions in Educational Robotic of the information and communications technology to the instructional didactic servo technology and paintings in their steps fractals

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PREFACE

The art organizes everything by parts. The authors of this work are implacable authors of some dawns, evenings and nightfalls that bring a fresh change to the Homo Sapiens at any place of the planet. Their valleys, volcanoes, atmospheres, are not only theirs, they are of all of us. They are of the whole world. They will be of the future world. The future generations will enjoy their discoveries, of what today they copy from the nature that surrounds us. The landscape, suddenly becomes difficult to rescue but with the knowledge and dexterity characteristic of the authors of this beautiful book, one proves that, in all the five continents, new aesthetics and semiology transformations, are generated.

Repercussions in Educational Robotic of the information and communications technology to the instructional didactic servo technology and paintings in their steps fractals demands an imagination effort. The authors go developing dimensions with colors and give organic forms arranged to them while they paint. They recognize that the essence of life, increases, it transform and changes in the synergetic objects that they paint in the solid, liquid and gaseous states. They allow in their representations that those parts are logically adequate, so that there is harmony in their painting. The parts that they organize, require a structural setting that is adapted to the variations of functional requests and allows to give extension and relation to the organic structures that the authors paint in the pattern, continuity that they search and study in the nature.

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Bibliography.....

The authors.....

DEDICATION

To family.

To my brothers, my sister, friends, grand- fathers (Roberto Arturo Vasquez Pereira, Victor Ceron Martinez Madrigal), grandmothers (Laura Escobar Henao, Francisca Rosa Vasquez Perez), great-great-grand-fathers, great-great-grandmothers, relatives, family, humanity, cosmos. To Dr. Fabio Vasquez Escobar To the Most Excellent Bishop Gerardo Martinez Madrigal. To the Most Excellent Bishop Guillermo Escobar Velez. To the Excellent Ambassador Raul Vasquez Velez. To the Excellent Ambassador Lucelly Garcia Tobon.

To Marco Tulio Duque's School, Conrado Gonzalez Institute, IDEM Fray Julio Tobon Betancu, Colombian Polytechnic, National University, Autonomous Latin-American University, SEP, University of Antioch, Bolivian Pontifical University, UNAM, UAG, UNISARC, Sao Paulo University, Free University, Salvador Duque School, University EAFIT, University of Sydney, University of Helsinki, University of Tampere, University of Cape Town, TEC; University of Guadalajara, UCLA, MIT, University of Houston, Harvard University, Yale University, Oxford University, Linguaphone Institute, Cambridge University, Scranton University, UNESCO, DOMETAL, RIOTEX, COLTEPUNTO, Company of Packings S.A., Technological Institute. Pascual Bravo., Modern Institute of Education, ASSTI, ESAP, Colombian Polytechnic Jaime Isaza Cadavid, Montessori School, SENA, University de San Buenaventura, International Center of Cambridge, The St. Lukas Academy, Bamberg University, Pekin Normal University, Who's Who in the World, American Biographical Institute, The Marquis Publications, Editorial Papiro, Colombian Polymers, VIAMACOL, Rotary International, Biographical

Institute of United States of America, Superior Academy of Technical Industrial Services, National Service of Learning, Reforestation Company La Floresta, Casa de Reyes, Engineering School of Antioch, The Southern African Comparative and History of Education Society, University of Paris, Hospital El Carmen de Viboral, Beijing Normal University, Tokyo University, Waseda University. University of Guadalajara.

To the schools, institutions and universities of the five continents that offered me the opportunity to recreate, relearn, reinvent, rethink and study.

And to the whole last, present and future humanity that consecrates the cultivation of the right values, the positive visions, and life, is a great company, the post modernity, the fractality, the harmony of the societies and universal cosmos.

GRATEFULNESS AND RECOGNITIONS

To the whole last and present humanity
and their universal cosmos.

Recognition also to the M. C. Tonatiuh Bravo Padilla, Rector General, U. de G.; Dr. Marco Antonio Cortés Guardado, Rector CUC, U. de G.; to Dr. Remberto Castro Castañeda, U. de G.; to Dr. Jorge Tellez Lopez, U. de G.; to Bachelor Raul Padilla Lopez, U. de G.; Dr. Raul E. Tamayo Gaviria, Professor Vagn Lundsgaard Hansen, Professor Ching-Lin Hu, Professor Byung-Jin Lee, Professor Erwin H. Epstein, Professor Shin'ichi Suzuki, Dr. David Turner, Dr. Medardo Tapia U., MRS. Guadalupe Gonzalez de Turner, M.C. Jesus Cabral, U. de G.; M.C. Maria Morfin, U. de G.; Bachelor Maria Antonia Abundis, U. de G.; Bachelor Arturo Fernandez, U. de G.; Bachelor Javier Fernandez, U. de G.; M.C. Patricia Medina, U. de G.; Dr. Alfredo Cesar Dachary, U. de G.; Dr. Stella Arnaiz, U. de G.; to MRS. Barbara Bush, to Dr. Fabio Vasquez E., to Dr. Humberto Martinez V., to Dr. Guillermo Esquivias L., for their observations and comments.

INTRODUCTORY COMMENT

ABSTRACT

This project shows the significant learning achievement using different director of information according to the logical and visual model of multiple learning styles with multimedia (EMMA)

For this investigation the educative servo technology was being used for the first time in this scientific work for geometric activities. The uniform rectilinear movement and the uniform curvilinear movement were the developed activities.

Introduction

Education starts on the idea of extracting the knowledge of the human brain by teaching strategies; not making use of these resources creates a fracture in the teaching-learning process where the learner becomes only the information receiver and the professor becomes a transmitter. This is according to what was presented by Roman Jakobson in his essay on "General Linguistics" in which frames the elements and functions of a communication system such as the sender, message and receiver.

It is important to point that teaching as an element of instructional design enables the generation of knowledge from information received. This, according to an ideal world no longer educationally

presented in full in the academic world.

The problem permeates in any school levels, both vertically and horizontally; It is on the upper level where explodes "educational globe" that represents the knowledge that students raised in previous studies. The result, an ambiguous reality between wanting and able to learn.

This is supported by the poor performance of freshmen students in institutions of higher mainly due to lack of reading comprehension as well as the shortage of reflective thinking and creativity in both abstract and concrete subjects. In other words, there is a big educational problem where the university is a turning point and also it is in any case on the need to adapt the contents to a cognitive level that is understandable by the newcomers; which represents an academic setback.

However, it should be noted that it is not general because some students come with their own educational baggage so they achieve their professional studies. Also, there is a growing technological skill in software development at the core of information and communication and the devices and embedded systems consist mainly of servomotors.

Therefore, it is important to foster in students, an interest in discovering the truth through scientific thought generating knowledge not only with the theory; the application of knowledge in practice make a difference in the quality of education.

This research results in a document that serves as a teaching guide for the development of instructional materials using effective instructional models through the use of a logical-visual-kinesthetic instructional design based on multiple styles of learning with multimedia and servo technology.

In the last two decades, the information and communication technologies have been incorporated into the daily life of most people in the global order being settled that the information and communication technologies are not only in the present but in the future.

Given the above, the way of living has changed and also how communications are performed. The distances are shorter and it multiplies the chance of getting information. Lots of everyday activities have also changed.

Now it is possible to learn or educate from a computer to another computer located in a different geographic location, and most interesting, assimilate abstract topics through the use of servo technology education.

The curricular objectives for the career of Engineer in computer systems at the Multidisciplinary Academic Mante Unit of the

Universidad Autonoma de Tamaulipas arise from reviews of curriculum criteria according to the Competency Standards, they are defined as the knowledge, skills and attitudes required for a student to perform productive activities in the workplace, with a high level of performance.

The competency standards are determined by the sectors that require staff to perform a job according to what is considered relevant to their competitiveness and growth.

According to the above, the increase in students' skills in each of the subjects in computer systems engineering and the development of learning strategies related with the analysis of needs, algorithms and programming is a priority in their training.

Increasing the skills of students and the right educational methodology are needed to achieve meaningful learning, it gives a beginning and a meaning to a gap towards the empowerment of information through the use of instructional didactic servo technology, it develops scientific knowledge and reflective thinking, and it also develops creative and enterprising attitudes generating ideas according to the self-esteem theory proposed by Coopersmith.

While this article is expected to grow the performance of students in computer systems, the introduction of new teaching methodologies

for the transmission and reception of information converging in the generation of knowledge requires promptitude for the creation of curricular contents that not only reflect one mark or an educational goal, but also to promote the interest in students that practice in the scientific area.

Having established that the Universidad Autonoma de Tamaulipas develops their curricula according to Competency standards, it can be seen as in education, the influence of information technology and communication has been felt through international educational policies generated by organizations such as the Organization for Economic Co-operation and Development and the United Nations Educational, Scientific and Cultural Organization, these organizations promote the use of technology in the classroom and set it as a priority to short, medium and long term.

In Mexico, the National Education Plan (2013-2018) [4], incorporates these trends and places the use of educational technology by academic institutions as important and an alternative to correct various deficiencies in the education system.

When Universities follow what is postulate by the above policies; computer equipment, fiber optic networks, digital platforms and databases were supplied. Both teachers and students experience

changes in their traditional way of working.

The incorporation of information and communication technologies in the classroom framed as processes, applications and equipment which teachers and students access, create, organize, analyze, present and communicate information in a range of formats including text, image, video and sound has occurred in most cases in a disorderly manner (Park, 2004) [5].

Few universities have established specific programs for teacher education with the acquisition of technological tools. Bates (2000) [6] states that priority has been given to the technical arguments and assuming the benefits of technology for themselves. Thinking that the mere fact of bringing technology to educational institutions is presenting the knowledge, however most of the time the methodology used for these digital tools is completely absent.

Contextualized teaching practice must respond to the present curriculum reforms in higher education, therefore the teacher as a generator of knowledge must provide teaching materials through multimedia elements and servo technology using a logical design manual and thus be able to integrated with the students in the knowledge society and ensure that the information reaches students through a clear and timely academic communication.

The proposal in this research is for teachers to analyze and develop from simple learning units to full content through multimedia resources in interdisciplinary form of their subject; especially where the information transmitted is abstract for the student.

This experiment is performed using servo motors to achieve the assimilation of information transmitted over distances and speeds in the geometry of curves and cylindrical gear in the context of embedded systems. The students received questionnaires in order to know the intellectual level concerning the solution of the two problems of displacement of the servomotor.

According to the results the instructional methodology is explored, and it also reflects if it is a significant teaching strategy for students, and it is also explored if is a medium to increase the transmission and reception of information and likewise the generation of knowledge, the selection and use of educational teaching servo technology for the development of teaching and learning.

In this context, improving the achievements and use resources optimally requires to have the adequate technology to do so. The use of new technologies provide to education reach the plasticity needed to adapt and respond effectively to the challenges of the technological

world.

It is important to mention that this study was applied in Tamaulipas, Mexico; however, the impact of instructional methodology proposed and according to the globalized educational needs can make national and international echo.

Reinforcing the proposal of this article it is set that it should have more critical use, informed and systematic use of technology before being applied to the academic programs.

For this reason, it is necessary a methodology that points to the logical-visual-kinesthetic learning content to make effective environments that generate new knowledge stating a set of strategies for using technology in education generated is necessary.

Additionally, once completed the incorporation of instructional methodology, it is proceed to investigate about the benefits achieved. Therefore, the main interest of this study is to design a logical-visual-kinesthetic instructional model as a guide to meet the needs of scholarly communication through the use of robotics; specifically the servo technology, interactive and adaptive media as well as embedded systems with the premise that every student receives information differently according to very specific learning styles

(Laurillard, 1993) [7].

This study is organized as detailed below

1) Servomotors and their attachments: sensors, connection and a central processing unit under the experiment where the servos described and its practical use during instruction.

2) Interface software

3) Learning unit: The uniform rectilinear motion and curvilinear motion uniform.

4) Educative servo technology as an instructional methodology

5) Questionnaires and analysis

6) Conclusions and recommendations.

1 Servomotors and their attachments: sensors, connection and a central processing unit under the experiment where the servos described and its practical use during instruction.

Currently there are many learning strategies with the use of robotics for teaching; achievements are revealing because they can make possible an effective environment for the generation of knowledge through the verbalization of playful and cognitive skills

that enable the development of scientific experiments on students [8]. It is also important to note the use of servomotors in exploring academic content as it potentiates the generation of knowledge through challenges or responsibilities, for example a timeout contest to set the servo[9]. The above is a motivational axis for students and a factor that base and justifies this experimental job.

Servomotors

The servomotors also commonly known as servos are devices capable of converting electrical energy, hydraulic and / or pneumatic power to automate permanent cyclical processes or paused cyclical processes and / or cyclic routines programmed in embedded systems [10].

A justification to the concept of robot from the Czech language which means forced labor and SERVO which means slave according to the Latin SERVUS.

Electronic, hydraulic and / or pneumatic actuators performed according to a regulatory driver able to activate other mechanisms such as this study and the spin of a wheel to travel a certain distance depending on the speed according to rotations per centimeter of the wheel and its brake to allow the opposite wheel to keep doing the route and create a great change of direction for this experiment so electronic servomotors will be use because they are more stable in its performance when running the programmed routine as this actuator operates in any position.

Its electromechanical structure is composed of a DC motor, a reduction device and a control circuit. The servos are commonly used in industrial robotics, however, has lately expanded its application to various areas such as the transmission of information in education [11].

Sensors

Sensors are the senses that through the central processing unit give direction and control servos. They also allow the operational accuracy in their paths and processes, both in speed and autonomy. Sensors are in any case those who allow the robot to know the environment in which it will perform.

[12].

However, specific purposes for this article, sensors shall not be used because students will program routines for wheel scroll incorporated into servomotors from the central processing unit.

It is important to mention that the use of the sensors can be applied in another experiment that involves in addition to what is proposed in this document the installation and configuration of input devices such as: ultrasonic sensors, color sensors, rotation sensors, touch sensors, electro sensors, light sensor, sound

sensor, tilt sensors and others.

Connecting items

As mentioned before, servomotors can be different type; in the case of electronic, they require both dc power to generate potency also instructions for the central processing unit; whether those obtained by sensors or programmed directly. Given the above, connecting items are required to instruct to servo the processes they have to perform.

Connections can be wired or wireless, the guided cable connections are terminated with connectors compatible with NXT Mindsensors for ports 1, 2, 3 and 4 to allow the reception of measurements made by different types of sensors as mentioned in the previous section. Furthermore, connectors are compatible with NXT to output ports A, B, C and D that allow sending instructions to the servomotors and a type Mini USB connector on the D port to transfer the programming done from the software interface for the PC user [13,14 y 15a].

The central processing unit

The central processing unit also known as Brick is the component that controls both the data and the energy. First it runs scheduled routines and after that it feedbacks the servos acting as a power source.

It also has ports of entry and exit as described in the previous paragraph; in which different servos and other accessories such as speakers, WiFi devices and interfaces to the PC can be connected.

This component has a LINUX user interface and a panel physical with 6 buttons for navigating in menu option for both to run a file transferred from the PC or directly programmed in the central processing unit. In addition to RAM, FLASH memory; where files are stored with the programming routines that servos should follow.[15a y 16].

2 User interface software

The user interface is used to program routines from the PC starting in the window called **lobby** where you can browse through a tab and / or the description of activities either to start a new project or open an existing one.

Projects are folders containing programs, experiments, images, sounds, videos and instructions. Also, the user interface allows the **programming** of the servo motors to move, track lines or identify obstacles, and mathematical processes.

Palettes are used in order to run the program; those are located in blocks categorized according to its type and function as:

action, flow, sensors, data, advanced blocks and those generated by the user. The software also can get information from installed devices through input and output port. [15b].

3 Learning unit: The uniform rectilinear motion and uniform curvilinear motion

Motion phenomenon involves speed and distance factors for mathematic in the subject differential calculus by derive and integrate expression, taught at the Unidad Academica Multidisciplinaria Mante [17 y 18].

The rectilinear motion and curvilinear both can be in two modes: uniform and uniformly accelerated. In the first, the speed is continuous from point A to point B, while in the uniformly accelerated movement speed increases steadily between equidistant points.

Uniform motion equation:

$$v = v_0 = \text{const.}$$

$$v = \text{speed}$$

Equation of uniformly accelerated rectilinear motion:

$$v = v_0 = \text{const.}$$

$$v = \text{speed}$$

Uniform curvilinear motion equation:

$$v = v_0 = \text{const.}$$

In this experiment the concepts of curvilinear uniform rectilinear motion were applied, as it is explained in the section on methodology. However, it is not excluded the importance of further research about the types of movement unused.

The uniform rectilinear motion

Variables figure.

Equation figure.

Derivative figure

Integral expression figure

The uniform curvilinear motion

Variables figure.

Equation figure

Derivative figure

Integral expression figure

Integral and derivative figure

Rectilinear motion figure

Curvilinear movement figure

Set up and run an experiment.- If you want to set up and run an experiment, start by clicking the Settings button Datalogging EV3 Block, located in the lower right corner and it is symbolized by a wrench.

Use the left and right buttons to move it and the Center

button to click OK. Now you can decide the sampling rate of your experiment, which may vary from one sample per minute a thousand samples per second.

Use the Up and Down buttons to highlight Rate, then use the Left and Right buttons to select the sampling rate to use for their experiment. Then you can select the sensor to be used in the experiment.

Highlight Sensor Setup and click OK with the Center button.

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Note: To page 36 to 72, the reader is left between the mentioned interpretation and paints for the reader to generate their own ideas and creative about. This is an exercise in creative writing and painting to generate new ideas.

OBSERVATION:

Rhochrematic process in electromagnetism pedagogy.

Discreet Variable

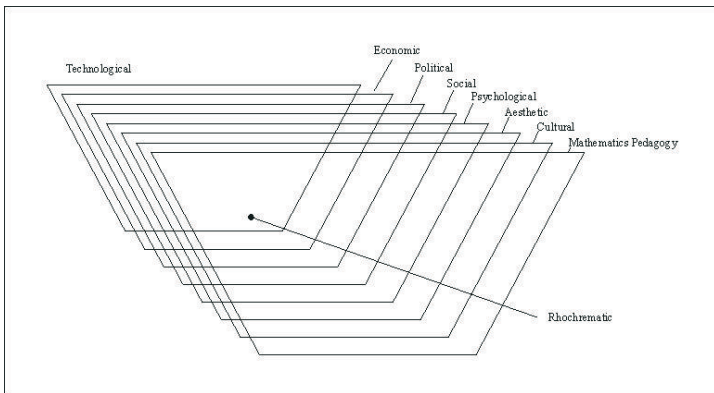
$$\sum_{b1}^{a1} x1 + \sum_{b2}^{a2} x2 + \dots + \sum_{bn}^{an} xn + \dots + \sum_{bk}^{ak} xk$$

Continuous Variable

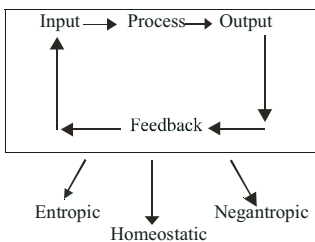
$$\int_{b1}^{a1} x1 + \int_{b2}^{a2} x2 + \dots + \int_{bn}^{an} xn + \dots + \int_{bk}^{ak} xk$$

Integrating the Rhochrematic process in electromagnetism pedagogy.

Integration System



Rhochrematic → The Process of Reprocess
Process System



$n_1 \dots n_2 \dots n_n \dots n_k$ with Discret Variable and Continous Variable in the System

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**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 1

Repercussions in Educational Robotic of the information and communications technology to the instructional didactic servo technology and paintings in their steps fractals



Phase 2

Repercussions in Educational Robotic of the information and communications technology to the instructional didactic servo technology and paintings in their steps fractals



Phase 3

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 4

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 5

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 6

Repercussions in Educational Robotic of the information and communications technology to the instructional didactic servo technology and paintings in their steps fractals



Phase 7

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 8

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



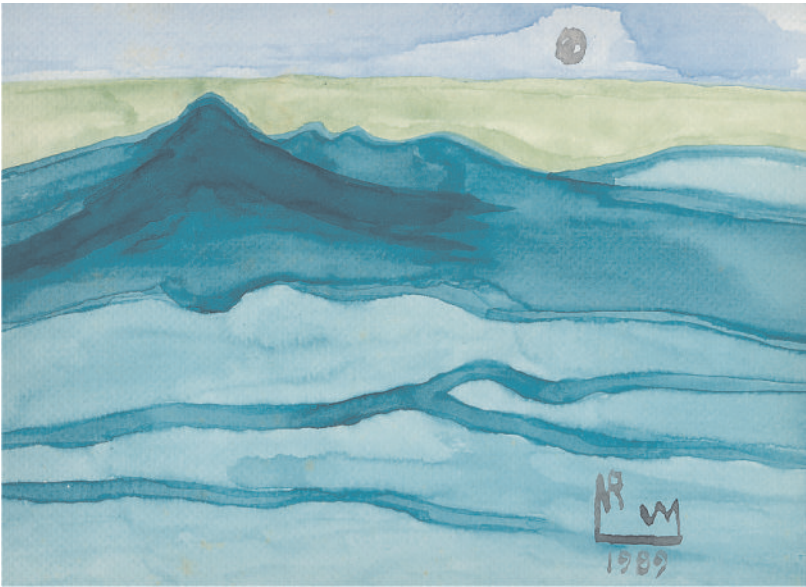
Phase 9

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 10

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 11

Repercussions in Educational Robotic of the information and communications technology to the instructional didactic servo technology and paintings in their steps fractals



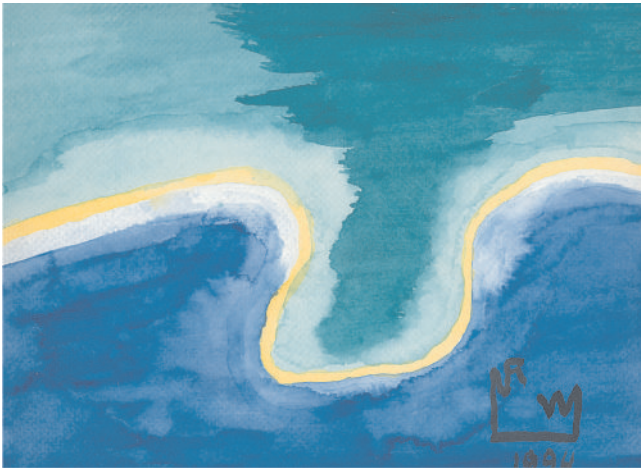
Phase 12

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



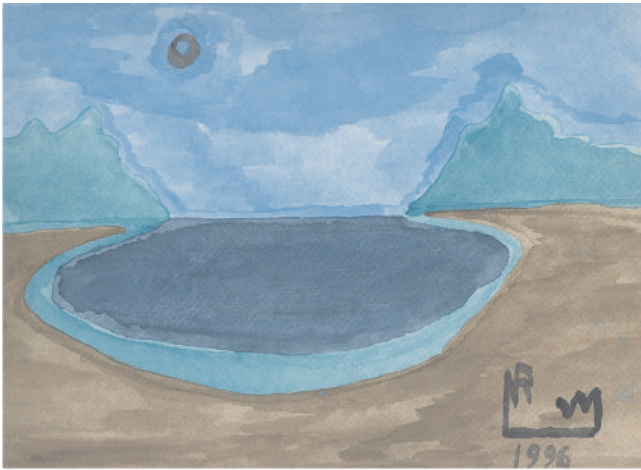
Phase 13

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 14

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 15

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 16

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 17

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 18

**Repercussions in Educational Robotic of the
information and communications technology to
the instructional didactic servo technology
and paintings in their steps fractals**



Phase 19

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