

Handbook of Research on Didactic Strategies and Technologies for Education: Incorporating Advancements

Paolo M. Pumilia-Gnarini
Independent Researcher, Italy

Elena Favaron
La Scuola che Funziona, Italy

Elena Pacetti
University of Bologna, Italy

Jonathan Bishop
Center for Research into Online Communities and E-Learning Systems, UK

Luigi Guerra
University of Bologna, Italy

Volume I

Information Science
REFERENCE

Managing Director: Lindsay Johnston
Editorial Director: Joel Gamon
Book Production Manager: Jennifer Romanchak
Publishing Systems Analyst: Adrienne Freeland
Development Editor: Myla Merkel
Assistant Acquisitions Editor: Kayla Wolfe
Typesetter: Nicole Sparano
Cover Design: Nick Newcomer

Published in the United States of America by
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: <http://www.igi-global.com>

Copyright © 2013 by IGI Global. All rights reserved. No part of this publication may be reproduced, stored or distributed in any form or by any means, electronic or mechanical, including photocopying, without written permission from the publisher. Product or company names used in this set are for identification purposes only. Inclusion of the names of the products or companies does not indicate a claim of ownership by IGI Global of the trademark or registered trademark.

Library of Congress Cataloging-in-Publication Data

Handbook of research on didactic strategies and technologies for education: incorporating advancements / Paolo M. Pumilia-Gnarini ... [et al.].
p. cm.

Includes bibliographical references and index.

Summary: "This book is designed to be a platform for the most significant educational achievements by teachers, school administrators, and local associations that have worked together in public institutions that range from primary school to the university level"--Provided by publisher.

ISBN 978-1-4666-2122-0 (hardcover) -- ISBN 978-1-4666-2123-7 (ebook) -- ISBN 978-1-4666-2124-4 (print & perpetual access) 1. Educational technology--Study and teaching. 2. Information technology--Study and teaching. 3. Teachers--Training of. I. Pumilia-Gnarini, Paolo M.

LB1028.3.D527 2013

371.33--dc23

2012032434

British Cataloguing in Publication Data

A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

Chapter 69

Why this Silence?

Eduardo Caianiello
Eironeia, Italy

ABSTRACT

The teaching of scientific subjects at schools and universities presents the eminent opportunity for what the psychiatrist/phenomenologist Ronald Laing termed a devastating experiential invalidation. For a long time, international institutions have been on the watch for the pathetic condition of the current didactics and pedagogy of science, which is no longer able to motivate pupils. What the author of this chapter claims is that the problem is more serious than how it is usually characterized; the standard ways of causing pupils to assimilate logical-mathematical truths that are essential to their social surviving, radically invalidates the existential – and hence ethical and political – totality of their experience of the world, namely their voice and capacity to emit it. The experiment described in this chapter consists of a series of courses entirely aimed to re-legitimize the “negative” experience of doubt and “aporetic” disorientation that any normally sane human subject necessarily makes when her mind for the first time comes to deal with the enigmatic world of scientific truths. It served to re-work the legitimization of education that allows the pupils to listen to that subtle dimension of the phenomena and of their own minds, which alone is able to feed their deepest creative energies, whether scientific, artistic, or directly philosophical.

INTRODUCTION

SOCRATES: Now this is just where my difficulty comes in. I can't get a proper grasp of what on earth knowledge really is. Could we manage to put it into words? What do all of you say? Who'll

Speak first? Anyone who makes a mistake shall sit down and be Donkey, as the children say when they are playing ball; and anyone who comes through without a miss shall be King and make us answer any question he likes.—Well, why this silence? (Platone, Teeteto 146a).

DOI: 10.4018/978-1-4666-2122-0.ch069

Why this Silence?

1. *Restoring life and meaning to the practice—at the moment highly poisonous—of knowledge transmission.*

(1) “But why do they so richly developed humanistic disciplines fail to perform the service here that is so admirably performed by the natural sciences in their sphere?” (Husserl 1935).

Since the years in which Husserl wrote this passage, the situation has not changed. This is because our pupils are still obliged to assimilate the forms of the natural sciences in increasingly massive doses. This is in spite of the fact that there is not yet a psycho-pedagogy that teaches to manage the forms of their mind in such a way that this process of assimilation does not change into a systematic practice of ‘poisoning’. It was as a result becoming aware of that state of affairs that has led me to pursue the aim of providing the outlines of a *science of education* that could provide an antidote against such a state of poisoning, so widespread at all levels of our civilization.

As to the bottom of the problem, my interpretation of its causes continues to follow Husserl’s path: that state of crisis directly descends from the enigmas and the “inextricable obscurities” (Husserl 1936: 35) that arise from the very core of our sciences – “even of the mathematical ones” (ibid.) – and thus it is associated with them since their first beginning. For if Socrates becomes aware of his ignorance before the evidence from mathematics and physics (Plato, *Phaedo* 95e), this is why any single truth drawn from that domain – starting from $1+1=2$ (ibid. 96e; but also e.g. Frege 1884:§36) – structurally brings with itself both “positive” knowledge and “negative,” perfect obscurity. For this reason, “any (scientific) evidence” is as such “the title of a problem” (Husserl cit.: 215) which from time immemorial reveals to those who really confront with it “the enigma of the world,” of course, but more immediately “the greatest of all enigmas” (ibid.), i.e., that of their own subjectivity, of their thinking and doubting

oneselves, which since the first instant is confusedly but intensely intuited as the very source of the “problem” just perceived. Now, in what Heidegger (1938) called “the age of the world-image,” the “modern technical science” and its didactics/pedagogy even established themselves on the systematic denial and reduction to nonsense of that intrinsic inscrutability that any scientific evidence brings with itself, and consequently on the systematic expulsion of the learners’ thinking subjectivity from the domain of the really existing and interesting objects during the hour of mathematics.

This attitude of denial, however, not only gets rid of the “metaphysical” air that is gained by the scientific matters when they are regarded through the Philosopher’s eyes. No, if it were so, the crisis in question would not concern directly and from within the teaching of sciences, whereas it is just this crisis that is our concern. The point is that this censorship persists in obscuring a dimension of science – the creative and inherently dynamic, moving and evolutionary dimension – which covers, immediately reachable, the whole of its extension of surface – the “operations” that any pupil must learn to perform – just like its conceptual supporting structures. And that cannot but alienate the students’ subjectivity, and hence their attention and interest.

2. *The poison that must be neutralized is that of nonsense, as well as the fact that the latter is cynically and disenchantingly accepted by learners and teachers.*

Let me explain with an example, taken from an algebra handbook for secondary schools, where the author wants to give account for an incomprehensible eccentricity that has suddenly arisen to deny the apparent triviality of very well-known expressions such as “ $a^2=a \times a$ ” or “ $a \times 0=0$ ”:

(2) “Now suppose a^0 and consider the identity $a^0 \cdot a^n=1$. If in the equality that expresses the above-

cited property (the rule of the division between two powers with the same base as subtraction of the exponents) we establish that a^n : $a^n = a^{n-n} = a^0$, which is a formally meaningless writing. Since one has directly found a^n : $a^n = 1$, it is spontaneous to establish by convention $a^0 = 1$ ” (Chiellini-Santoboni 1980).

Given what we think to know about the “four operations,” “ $a^0 = 1$ ” is an enigma in at least three senses, which identify as many levels of its inner conceptual consistency:

1. In Husserl’s eminently philosophical sense, according to which *any* scientific evidence as such is an enigma.
2. In the above-cited Socratic/Fregean sense, according to which also “ $1+1=2$ ” is an enigma if only we decide to philosophize about its reason.
3. In the common sense for which everyone who understands the expression “ $1+1=2$ ” naturally winces in learning that “ $2^0=1$.”

Now, the immediateness of that spontaneous wincing would allow the author of the quoted text to lead the pupil, in few leaps, through all the three levels of the problem that has arisen. For once one has accepted to follow its thread, the question about the meaning – and hence about the origin – of an expression such as “ $2^0=1$ ” necessarily leads us to that about the meaning/origin of any other operational evidence, as much as apparently trivial. If $a^0=1$, then what does “to raise at the power” mean in general, and thus “to multiply,” “to add”... and what does the “zero” represent?... up to Dedekind’s “what is a number?” etc. A chain reaction that with as much necessity finally leads to the purely philosophical bottom of the Kantian question: “How is mathematics ever possible?”

However, the author takes great care not to permit such an efflorescence of questions and immediately neutralizes the just found enigma as

nonsense, instead of capitalizing on it for what it is: the *seed of a new sense*, the intimate engine of that inexhaustible *renewal of the sense* that is the very lifeblood of Science in its inherent evolutionary dimension.

Thus preventing the pupils from accessing the most inner life of the sciences which they must learn though fatally leads them to a complete disaffection for any form of knowledge and, on the specifically scientific ground, the final desiccation of their creative energies, of which the present world needs so much. So this is the poison that is to be neutralized.

3. *The mode of its neutralization is that of its transmutation into antidote.*

In light of what I have just shown, my proposal can be summarized as follows: cycles of lessons, in which everything that presently is dismissed as “nonsense,” “convention,” “mere model,” is restored to its irreplaceable dynamic/evolutionary function. An expression like “ $2^0=1$ ” is what I call a “negative evidence” as opposed to the corresponding positive evidence “ $2^2=4$,” which if taken alone is energetically “flat.” Thus the courses that I plan aim to develop the idea of exploiting the negative evidences which populate the operational surface of the sciences that are taught at present, like as many seeds of Socratic/Cartesian meditation, which are able to revive in the learners’ mind the curiosity, the love for science and a keen confidence in their own voice and in their natural capacity to raise interesting and meaningful questions.

The time in which I planned to pursue the aforementioned goal fortunately coincided with a parallel mobilization at the level of the major international institutions. In the 2000 both ONU/UNESCO and UE and OCSE responded to Husserl’s appeal, both claiming the renewed historical identity of our civilization in the name of Knowledge, and exposing the educational crisis that plagues our system of knowledge transmission.

Why this Silence?

Thus this new historical/political context made it possible the birth of *Eironeia* School of Philosophy the center of non-formal education that I created in 2003 and was the stage of the experiment that will be described below.

Our activities were targeted to an audience of secondary-school students in serious trouble at school, undergraduates/graduates who were interested in the scientific and philosophical thought as it is currently proposed and lived at the university and post-university levels, as well as adults who aimed to resume thinking and studying, but do not know where and how to begin.

These three categories of pupils shared the same condition of deep disorientation and distrust in front of what the world of – scholastic, academic and para-academic (adult education) – teaching and “popularization” are currently able to communicate about the very sense, and thus the ultimate utility, of learning something new.

“Why to learn?” was the most basic question which – implicitly or explicitly asked – resounded underneath any other question concerning how to do it. Especially in the case of the secondary-school students – phobic or quasi-phobic, and at any rate disgusted with school – simple techniques and methodologies of study turned out to be through and through ineffective to stir their spirit, which was deeply demotivated before an institution perceived as remote and extraneous due to the very fact that it offered to their lives nothing but the useful and norms of use, whereas their heart and their mind demanded in the first place the Good and, above all, the Meaningful. In all those cases, therefore, it was necessary to rekindle the very flame of Knowledge in its simplest and purest gratuitousness.

As I said, the general meaning of my proposal lies in reviving in our students that sense of wonder before the phenomena of the world and the human mind, which alone can bring into being a true love for Knowledge, and hence the desire of being involved in the progress of science.

In concrete terms, this general aim takes the form of a transdisciplinarity of the suggested lessons, which will have very strong outlines so to be easily implemented by teachers and distinctly assimilated by the learners, who will be led not only to make a living and personal experience of it during courses, but also to see it as the natural and non-negotiable feature of any event of true learning.

Let us remind that trans-disciplinary (Koizumi 2007) occurs when the taught notion looks like not as an “inert” conceptual place, which is a simple intersection among different disciplinary perspectives, but rather as the unexpected fruit of their vital fusion, i.e., conducive to a sense that is both unitary and irreducibly new in respect to the multi-disciplinary of the original elements.

Going back to our example, the state of wonder that overtakes us before a writing like “ $a^0=1$ ” carries us in no time to a place that rejects preconceived disciplinary distinctions. It is a state of wonder that is (1) mathematical, because its enunciation must hold its intra-operational origin: « $a^0=1$ “why” $a^n: a^n=1$ »; (2) philosophical, because that operational origin immediately turns into logical/ontological origin:... but if the “zero” is not a simple absence of objects, then where does it come out of?; (3) narrative, namely directed to its historical origin: Who was the first to think of the zero? How did it occur to him?”

It is clear that this relentless sequence of questions springs from one single place of the thinking mind, its most vital center that is the point of trans-disciplinary fusion of the whole system of the sciences: the only one from which courage and the very possibility of Innovation always come to life.

The tools that are already normally available in any high school: that is, an ordinary classroom, a blackboard – enriched of a projector, and if possible of an internet connection and a laboratory of physics and chemistry.