

Innovative methods in didactics

1. Very short introduction on the fundamentals of Didactics, including Physics

Part I: *Didactica Magna*

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In any science we should define

- The **researcher** (the subject: professor, student, pupils, physician, amateurs etc.)
- The **object** (atoms, galaxies, plants, medioeval manuscripts etc.)
- The **instrument** (microscope, scanner, UV camera, particle accelerator,)
- The **methodology** (deductions, nature observations, artificial tissues, induction, comparison, tomo-graphy, radio-tracing etc.)

A traditional definition says that

- didactics, from Greek *diactos* – I learn, is the science on teaching and learning.
- But such a statement is a tautology – the definitions that gets defined by itself:
- butter consists of butter*

- *We should rather say that butter is a saturated emulsion of milk fat (82%) and water; a higher percentage of fat is not possibly to obtain without refining. This is similar to the production of ethyl alcohol which arrives to the maximum contents of 96% $\text{C}_2\text{H}_5\text{OH}$ in a standard distillation.

„Dydaktyka”

- Didacto (z gr.) „uczę” I teach
- **Dydaktyka** <gr. *didaktikós* = nauczający, pouczający> teaching
 1. dział pedagogiki, nauka o metodach nauczania i uczenia się.
Subdivision of pedagogy dealing with methods of teaching and learning
 2. pouczanie, moralizowanie (dull) correcting, moralising
- Didactix – te metody, czyli praktyka nauczania
These methods, i.e. practices of teaching
- dīdūco [dīdūco], dīdūcis, diduxi, diductum, dīdūcere
verbo transitivo III coniugazione transitive verb of III conjugation
 - 1 allargare (widen), aprire (open), staccare (detach), distendere (extend, explain)
 - 2 disgiungere (separate), separare, dividere (divide)
 - 3 sciogliere (solve), disfare (deconstruct), rompere (brake), strappare (tear)

→ Search for the meaning in the dictionary of the languages you know



Jan Amos Comenius in „Didactica Magna” (1657) defined it differently:

- „DIDACTIC signifies the art of teaching”
- Didactics is such a teaching that is:
 - durable
 - efficient (i.e. fast and cheap)
 - pleasant

18. *Correction of the deviation.*—It follows, therefore, that the desire to learn should be thoroughly awakened in the pupils, and that the general conception of the subject should be thoroughly got into their heads. Until this has been carefully done a more detailed exposition of the art or language should not be attempted.

„Great Didactic”

GREAT DIDACTIC

OF

JOHN AMOS COMENIUS

TRANSLATED INTO ENGLISH AND EDITED WITH
BIOGRAPHICAL, HISTORICAL AND CRITICAL
INTRODUCTIONS

BY

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„Great Didactic”

GRE

JOHN

TRANSLATED
BIOGRAPHY

M.

READER

The Great Didactic

Setting forth

The whole Art of Teaching
all Things to all Men

or

A certain Inducement to found such Schools in all
the Parishes, Towns, and Villages of every
Christian Kingdom, that the entire
Youth of both Sexes, none
being excepted, shall

Quickly, Pleasantly, & Thoroughly

Become learned in the Sciences, pure in Morals,
trained to Piety, and in this manner
instructed in all things necessary
for the present and for
the future life,

„Great Didactic”

G T

Become learned in the Sciences, pure in Morals,
trained to Piety, and in this manner
instructed in all things necessary
for the present and for
the future life,

A c

in which, with respect to everything that is suggested,

TRA

ITS FUNDAMENTAL PRINCIPLES are set forth from the essential
nature of the matter,

B

ITS TRUTH is proved by examples from the several
mechanical arts,

ITS ORDER is clearly set forth in years, months, days, and
hours, and, finally,

Becc

AN EASY AND SURE METHOD is shown, by which it can
be pleasantly brought into existence.

the future life,

<https://archive.org/details/cu31924031053709/page/n7>

John Amos Comenius

John Amos Comenius (Czech: Jan Amos Komenský; 1592 - 1670) was a Czech philosopher, pedagogue and theologian from Moravia who is considered the father of modern education.



- He served as the last bishop of the Unity of the Brethren (see Jan Hus, 1372-1415) before becoming a religious refugee (in Leszno, Poland).
- He is one of the earliest champions of universal education, a concept eventually set forth in his book *Didactica Magna*. As an educator and theologian, he led schools and advised governments across Protestant Europe through the middle of the seventeenth century (Sweden, Poland, Hungary, Netherlands)
- He left Leszno in 1656, moving to Amsterdam

John Amos Comenius

- applied effective teaching based on the natural gradual growth from simple to more comprehensive concepts, supported lifelong learning and development of logical thinking by moving from dull memorization, presented and supported the idea of equal opportunity for impoverished children, opened doors to education for women, made instruction universal and practical.
- These texts were all based on the same fundamental ideas:
 - (1) learning foreign languages through the vernacular;
 - (2) obtaining ideas through objects rather than words;
 - (3) starting with objects most familiar to the child to introduce him to both the new language and the more remote world of objects;

[GK: neo-realism, hyper-constructivism]

- (4) giving the child a comprehensive knowledge of his environment, physical and social, as well as instruction in religious, moral, and classical subjects;
- (5) making this acquisition of a compendium of knowledge a pleasure rather than a task; and
- (6) making instruction universal.

<https://en.wikipedia.org/wiki/Comenius>

„Great Didactic”

Let the main object of this, our Didactic, be as follows : To seek and to find a method of instruction, by which teachers may teach less, but learners may learn more ; by which schools may be the scene of less noise, aversion, and useless labour, but of more leisure, enjoyment, and solid progress ; and through which the Christian community may have less darkness, perplexity, and dissension, but on the other hand more light, orderliness, peace, and rest.

God be merciful unto us and bless us, and cause his face to shine upon us ;
That thy way may be known upon earth, thy saving health among all nations.—Psalm lxvii. 1, 2.

These are exactly what we would expect from the modern school.
More: these are what we would expect from **modern society**.
(It need not belong to any particular cultural orientation).

„Great Didactic”

Let the main object of this, our Didactic, be as follows: To seek and to find, a method of instruction by which teachers may teach may be the but of m through un ness, perp light, orde

God be n
shine
That thy
amor

3. We venture to promise a GREAT DIDACTIC, that is to say, the whole art of teaching all things to all men, and indeed of teaching them with certainty, so that the result cannot fail to follow; further, of teaching them pleasantly, that is to say, without annoyance or aversion on the part of teacher or pupil, but rather with the greatest enjoyment for both; further of teaching them thoroughly, not superficially and showily, but in such a manner as to lead to true knowledge, to gentle morals, and to the deepest piety. Lastly, we wish to prove all this *a priori*, that is to say, from the unalterable nature of the matter itself, drawing off, as from a living source, the constantly flowing runlets, and bringing them together again into one concentrated stream, that we may lay the foundations of the universal art of founding universal schools.

„Wielka Dydaktyka”

16. Jeśli nauczyciele będą wymowni i uprzejmi, a surowością nie będą odstęczali od siebie umysłu, lecz przeciwnie będą przywabiali do siebie przychylnością ojcowską, słowami i gestykulacją; jeśli nauki, jakie wykładają, zalecać będą z powodu ich doskonałości, przyjemności i łatwości; jeśli pilnych niekiedy będą chwalili (a pomiędzy mniejszych niekiedy rozdawali jabłka, orzechy, cukierki); jeśli ich do siebie przywołają i pokażą (albo u siebie albo podczas publicznej nauki) rycinę tego, czego kiedyś mają się uczyć, obrazy, instrumenty optyczne albo jeometryczne, globusy i tym podobne rzeczy, które zdołają ich zadziwić; далej, jeśli niekiedy będą uwiadamiali rodziców o ich postępach – jednym słowem, jeśli mile będą obchodzili się z dziećmi, to łatwo zdobędą sobie ich serca, tak dalece, że pobyt w szkole będzie im milszy niż w domu.
17. Sama szkoła powinna być miejscem miłym, wabić oko a tak wewnątrz jak i zewnątrz. Wewnątrz ma być sala wysoka, widna, ozdobiona ze wszech stron rycinami; rycinę te mogą obejmować postacie znakomitych mężów, krajobrazy jeograficzne, wypadki historyczne albo też symbole. Zewnątrz zaś nietylko powinno się znajdować swobodne miejsce do zabawy i przechadzki (albowiem nie trzeba tego zabraniać młodzieży, jak się to pokaże poniżej na właściwym miejscu), lecz powinien być także ogród, do którego od czasu do czasu wpuszczać należy uczniów i pozwolić im cieszyć się widokiem drzew, kwiatów i krzewów. Jeśli szkoła będzie tak urządzona, to prawdopodobnie młodzież z niemałą do niej uczęszczać będzie przyjemnością, tak jak chętnie uczęszcza na jarmarki, gdzie spodziewa się zawsze ujrzeć lub usłyszeć coś nowego.

Didattica Magna, cont.

(i.) The desire to know and to learn should be excited in boys in every possible manner.

(ii.) The method of instruction should lighten the drudgery of learning, that there may be nothing to hinder the scholars or deter them from making progress with their studies.

14. The desire to learn is kindled in boys by parents, by masters, by the school, by the subjects of instruction, by the method of teaching, and by the authority of the state.

15. By parents, if they praise learning and the learned in the presence of their children, or if they encourage them to be industrious by promising them nice books and clothes, or some other pretty thing; if they commend the teachers (especially him to whom they entrust their sons) as much for their friendly feeling towards the pupils as for their skill in teaching? (for love and admiration are the feelings most calculated to stimulate a desire for imitation); finally, if, from time to time, they send the child to him with a small present. In this way they will easily bring it about that the children like their lessons and their

drudgery *n* hard dull humble uninteresting work (Longman Dictionary of Contemporary English)

Didattica Magna, cont.

17. The school itself should be a pleasant place, and attractive to the eye both within and without. Within, the room should be bright and clean, and its walls should be ornamented by pictures. These should be either portraits of celebrated men, geographical maps, historical plans, or other ornaments. Without, there should be an open place to walk and to play in (for this is absolutely necessary for children, as we shall show later), and there should also be a garden attached, into which the scholars may be allowed to go from time to time and where they may feast their eyes on trees, flowers, and plants. If this be done, boys will, in all probability, go to school with as much pleasure as to fairs, where they always hope to see and hear something new.

18. The subjects of instruction themselves prove attractive to the young, if they are suited to the age of the pupil and are clearly explained; especially if the explanation be relieved by a humorous or at any rate by a less serious tone. For thus the pleasant is combined with the useful.

19. If the method is to excite a taste for knowledge, it

Iohannes Amos Comenius

Orbis sensualium pictus

hoc est

Omnium principalium in Mundo Rerum, et in Vita Actionum,
Pictura et Nomenclatura



Pueri solent ludere vel *Globis fictilibus*,
1. vel iactantes *Globum*, 2. ad *Conas*,
3. vel mittentes *Sphaerulam* per *Annulum*,
5. *Clava*, 4. versantes *Turbinem*, 6. *Flagello*,
7. vel iaculantes *Sclopo*, 8. et *Arcu*
9. vel incedentes *Grallis*, 10. vel super
Petaurum, 11. se agitantes et oscillantes.



Sunt quinque externi *Sensus*;
Oculus, 1. videt *Colores*, quid album vel atrum,
Auris, 2. audit *Sonos*, tum naturales, *Voces* et *Verba*;
Nasus, 3. *olfacit* odores et foetores.

Lingua, 4. cum *Palato* gustat *Sapores*, quid dulce aut
amarum, acre aut acidum, acerbum aut austerum.

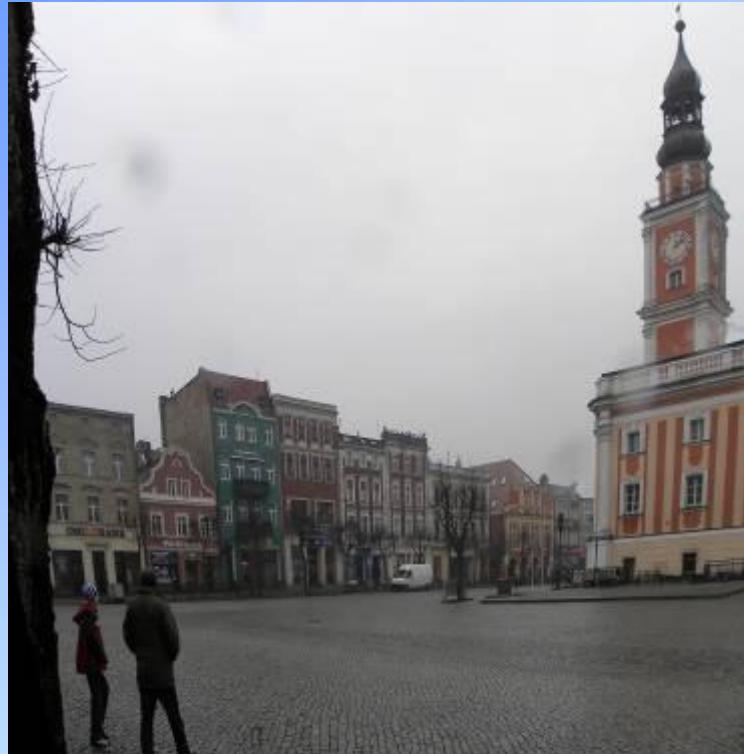
Manus, 5. tangendo dignoscit quantitatem et
qualitatem rerum; calidum et frigidum, humidum et
siccum, durum et molle, laeve et asperum,
grave et leve.

Sensus interni sunt tres;

Sensus Communis, 6. sub *sincipite* apprehendit res
perceptas a *Sensibus* externis. *Phantasia*, 7. sub
vertice, dijudicat res istas, cogitat, somniat.

Memoria, 8. sub *occipitio* recondit singula et depromit:

Leszno: a forgotten cultural heritage



Nancy, the capital of Lotaryngia of Prince Stanisław Leszczyński

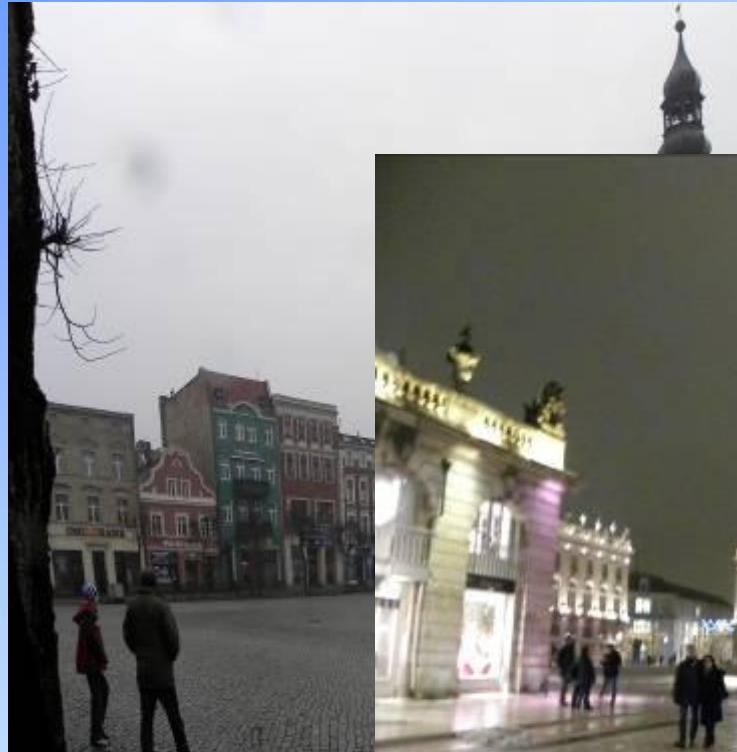
Leszno, a „sleeping” town

PWSZ im. Komeńskiego in Leszno

Foto Maria Karwasz

„Going downhill”

Leszno: a forgotten cultural heritage



Leszno, a „slee



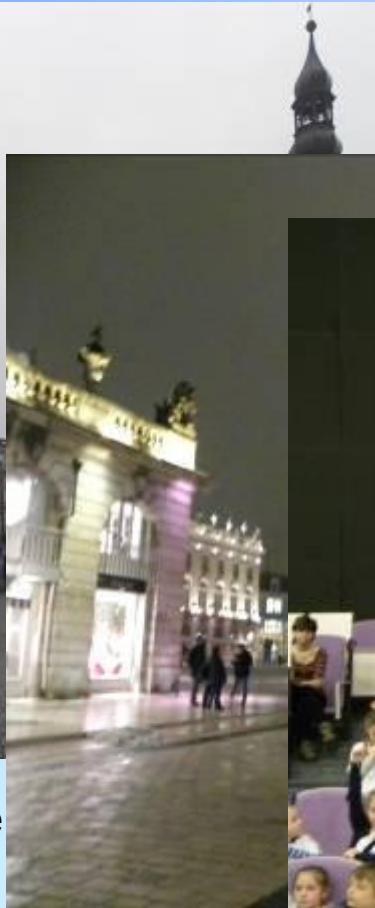
Foto Maria Karwasz

Leszczyński, from Leszno, after having failed in Polish royal elections, became Prince of Lotaryngia (1727). He constructed hospitals, schools, libraries. Till now cafeteria, rues, pharmacy is called by his name.

Leszno: a forgotten cultural heritage



Leszno, a „slee



Nancy, the capital of Lotaryngia of Prince Stanisław Leszczyński



Now in Leszno much complementary to great universities, „high professional school” PWSZ im. Komeńskiego exists: my lesson for Kids University

Leszno: a forgotten cultural heritage



„Going down-hill” is intended to teach in an interactive and funny way the principles of mechanics. In great aula over 100 children aged 6-12 yrs.
(Scenarios and lesson GK, photo and assistance Maria Karwasz, 2012)

So, our definition of didactics is

- theoretical and practical science, studying the *processes* of apprehension, reasoning and learning, able to find *nodal difficulties* in these processes, and proposing practical solution to overcome these difficulties.
- Didactics is acting in observing possible educational deficiencies not only in school, but also in cultural and social projections of education (see the above given cultural example).
- Its importance goes far beyond mere teaching or learning.
- Resuming Comenius: our aim is to make teacher work less and the student learn more.
- Learning should be 1) joyful and pleasant, 2) fast (and cheap), 3) permanent and useful in the whole life

Lecture 1 continues...