TEXTBOOKS VALUE TWICE WHEN ALIGNED WITH A GOOD CURRICULUM AND EFFICIENT ASSESSMENT

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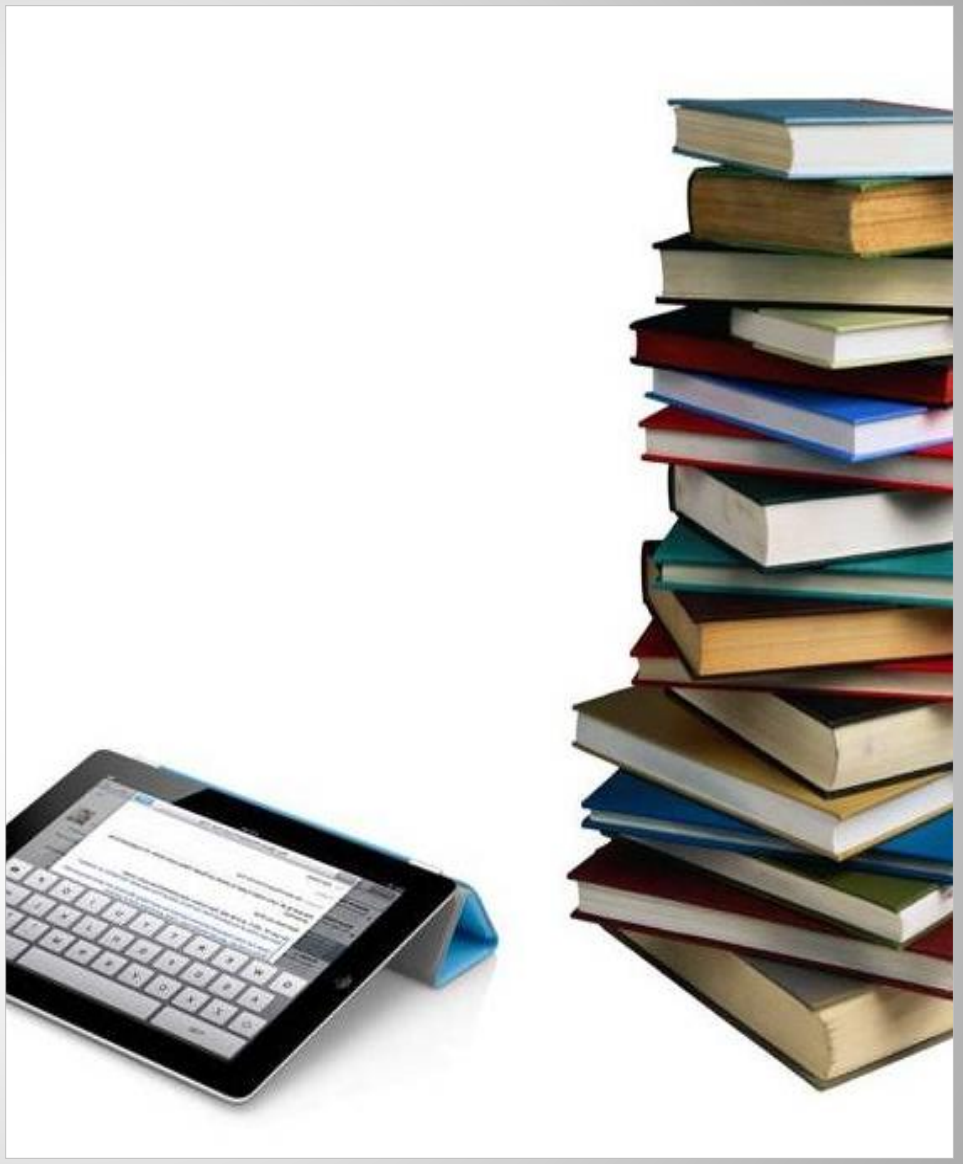
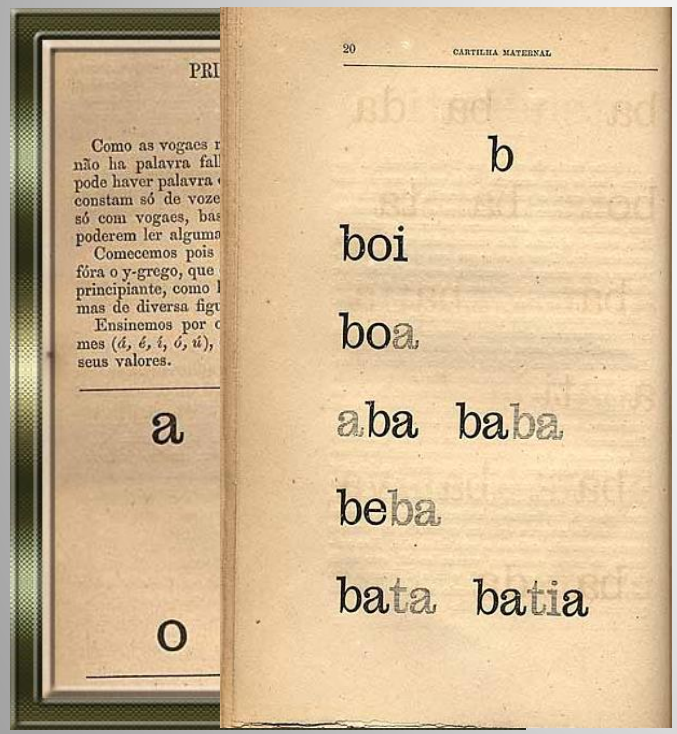
I'll sustain that a good textbook has an intrinsic value, as an organized conveyer of knowledge, as a structured presentation of a discipline, as a reference, as a teacher's and parents' tool, and, obviously, as a student's learning tool.
But I'll also sustain that its value is doubled when aligned with a knowledge-rich curriculum and a rigorous assessment system.



We are all here because of textbooks

First letters



Como as vogaes
não ha palavra fal
pode haver palavra
constam só de voze
só com vogaes, bas
poderem ler alguma
Comecemos pois
fóra o y-grego, que
principiante, como
mas de diversa figu
Ensinemos por
mes (*á, é, í, ó, ú*),
seus valores.

a

o

20 CARTILHA MATERNAL

b

boi

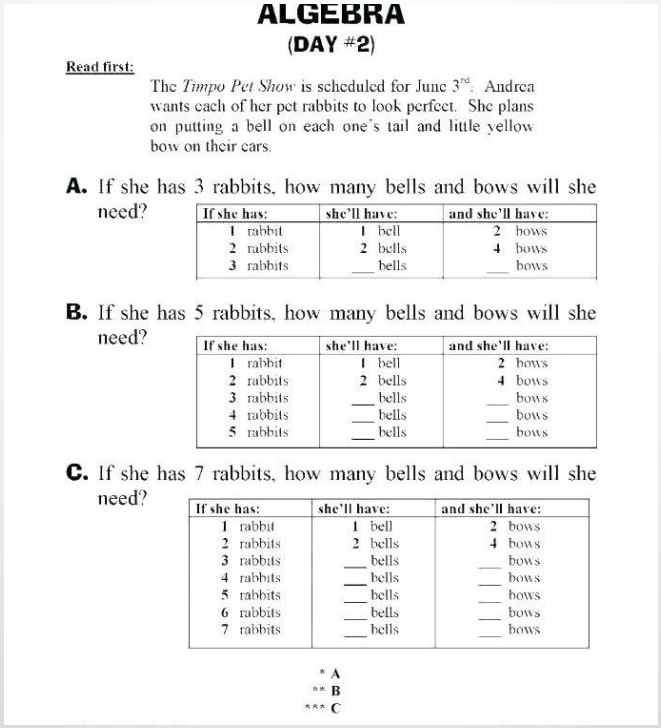
boa

aba baba

beba

bata batia

At middle and high school



ALGEBRA
(DAY #2)

Read first:

The *Timpo Pet Show* is scheduled for June 3rd. Andrea wants each of her pet rabbits to look perfect. She plans on putting a bell on each one's tail and little yellow bow on their cars.

A. If she has 3 rabbits, how many bells and bows will she need?

If she has:	she'll have:	and she'll have:
1 rabbit	1 bell	2 bows
2 rabbits	2 bells	4 bows
3 rabbits	___ bells	___ bows

B. If she has 5 rabbits, how many bells and bows will she need?

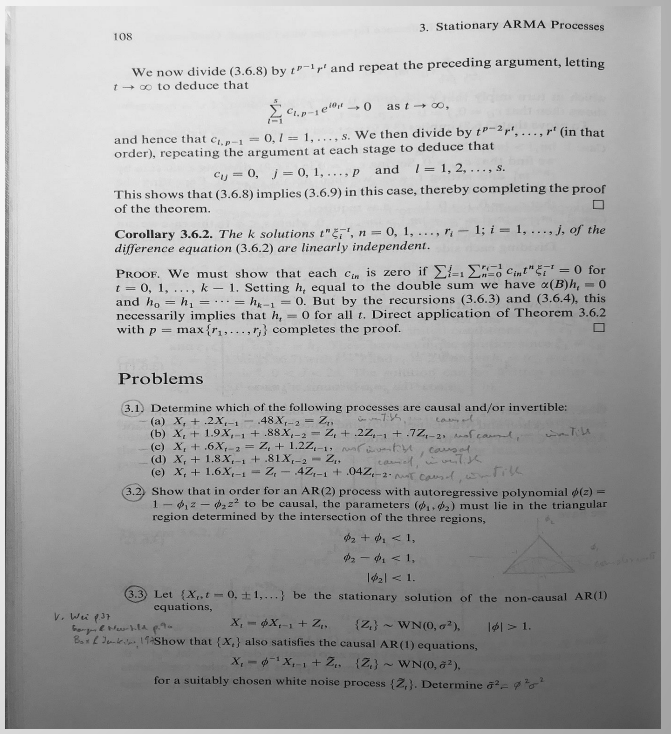
If she has:	she'll have:	and she'll have:
1 rabbit	1 bell	2 bows
2 rabbits	2 bells	4 bows
3 rabbits	___ bells	___ bows
4 rabbits	___ bells	___ bows
5 rabbits	___ bells	___ bows

C. If she has 7 rabbits, how many bells and bows will she need?

If she has:	she'll have:	and she'll have:
1 rabbit	1 bell	2 bows
2 rabbits	2 bells	4 bows
3 rabbits	___ bells	___ bows
4 rabbits	___ bells	___ bows
5 rabbits	___ bells	___ bows
6 rabbits	___ bells	___ bows
7 rabbits	___ bells	___ bows

* A
** B
*** C

At college



We now divide (3.6.8) by $t^{p-1}r^t$ and repeat the preceding argument, letting $t \to \infty$ to deduce that

$$\sum_{l=1}^{s} c_{l,p-1} e^{i\theta_l t} \to 0 \quad \text{as } t \to \infty,$$

and hence that $c_{l,p-1} = 0$, $l = 1, \ldots, s$. We then divide by $t^{p-2}r^t, \ldots, r^t$ (in that order), repeating the argument at each stage to deduce that

$$c_{lj} = 0, \quad j = 0, 1, \ldots, p \quad \text{and} \quad l = 1, 2, \ldots, s.$$

This shows that (3.6.8) implies (3.6.9) in this case, thereby completing the proof of the theorem. □

Corollary 3.6.2. *The k solutions $t^n \xi_i^{-t}$, $n = 0, 1, \ldots, r_i - 1$; $i = 1, \ldots, j$, of the difference equation* (3.6.2) *are linearly independent.*

PROOF. We must show that each c_{in} is zero if $\sum_{i=1}^{j} \sum_{n=0}^{r_i-1} c_{in} t^n \xi_i^{-t} = 0$ for $t = 0, 1, \ldots, k-1$. Setting h_t equal to the double sum we have $\alpha(B)h_t = 0$ and $h_0 = h_1 = \cdots = h_{k-1} = 0$. But by the recursions (3.6.3) and (3.6.4), this necessarily implies that $h_t = 0$ for all t. Direct application of Theorem 3.6.2 with $p = \max\{r_1, \ldots, r_j\}$ completes the proof. □

Problems

3.1. Determine which of the following processes are causal and/or invertible:
(a) $X_t + .2X_{t-1} - .48X_{t-2} = Z_t$,
(b) $X_t + 1.9X_{t-1} + .88X_{t-2} = Z_t + .2Z_{t-1} + .7Z_{t-2}$,
(c) $X_t + .6X_{t-2} = Z_t + 1.2Z_{t-1}$,
(d) $X_t + 1.8X_{t-1} + .81X_{t-2} = Z_t$,
(e) $X_t + 1.6X_{t-1} = Z_t - .4Z_{t-1} + .04Z_{t-2}$.

3.2. Show that in order for an AR(2) process with autoregressive polynomial $\phi(z) = 1 - \phi_1 z - \phi_2 z^2$ to be causal, the parameters (ϕ_1, ϕ_2) must lie in the triangular region determined by the intersection of the three regions,

$$\phi_2 + \phi_1 < 1,$$
$$\phi_2 - \phi_1 < 1,$$
$$|\phi_2| < 1.$$

3.3. Let $\{X_t, t = 0, \pm 1, \ldots\}$ be the stationary solution of the non-causal AR(1) equations,

$$X_t = \phi X_{t-1} + Z_t, \qquad \{Z_t\} \sim \text{WN}(0, \sigma^2), \qquad |\phi| > 1.$$

Show that $\{X_t\}$ also satisfies the causal AR(1) equations,

$$X_t = \phi^{-1} X_{t-1} + Z_t, \quad \{Z_t\} \sim \text{WN}(0, \tilde{\sigma}^2),$$

for a suitably chosen white noise process $\{Z_t\}$. Determine $\tilde{\sigma}^2$.

We now divide (3.6.8) by $t^{p-1}r^t$ and repeat the preceding argument, letting $t \to \infty$ to deduce that

$$\sum_{l=1}^{s} c_{l,p-1} e^{i\theta_l t} \to 0 \quad \text{as } t \to \infty,$$

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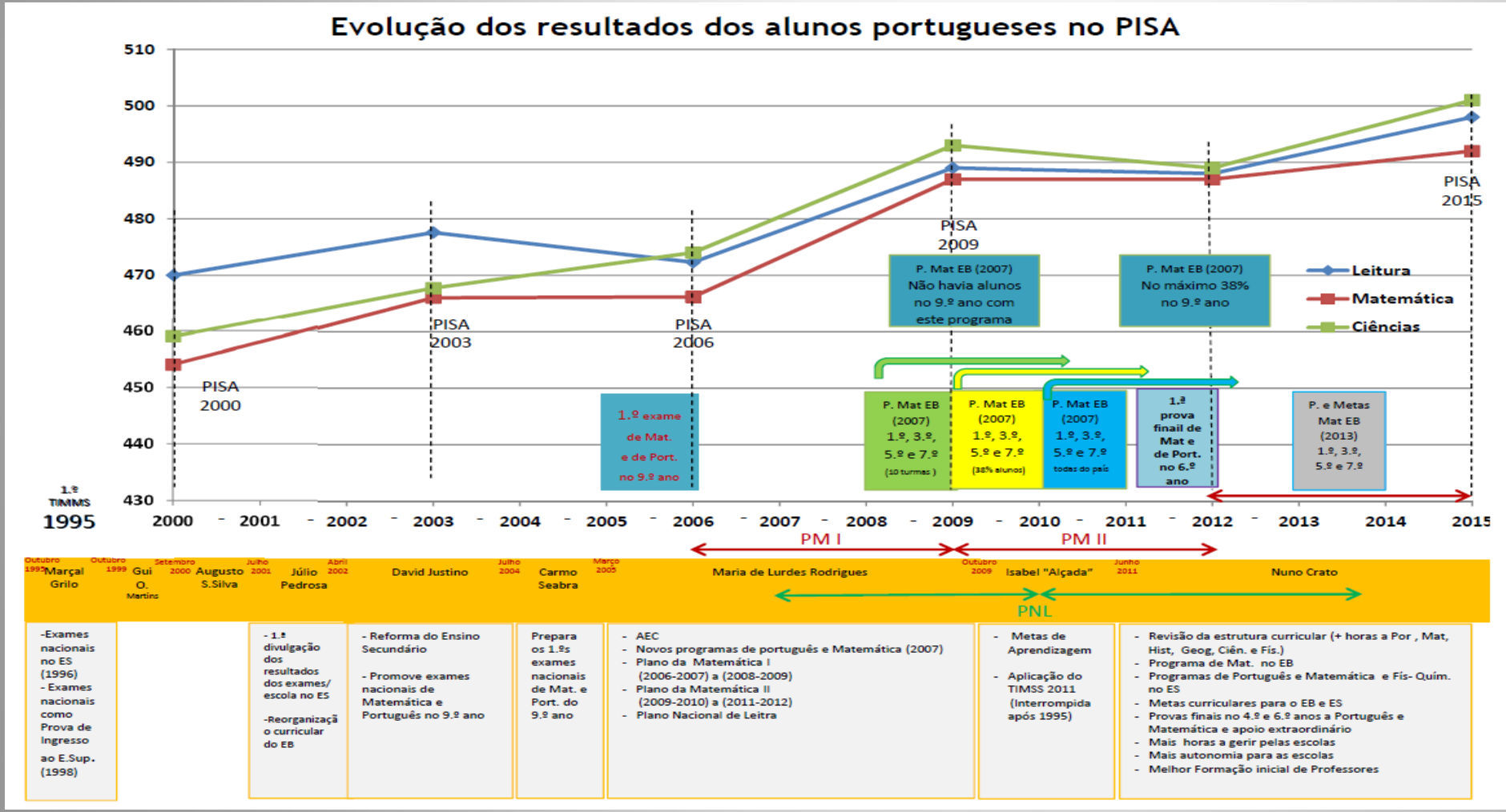
for a suitably chosen white noise process $\{\tilde{Z}_t\}$. Determine $\tilde{\sigma}^2$.

IN THE LAST YEARS WE HAD SOME SUCCESS

PISA, TIMSS

and textbooks played a role in it

authoritarian times 1933 - 1974	"romantic" era 1974 - 1995/2005	pragmatic times 2005 - 2011	knowledge curriculum 2011 - 2015	???? 2015 - …



Two different countries:

1995 - 2000

2001 - 2015

Specific factors

2001: School results
2005: Evaluation 9th grade
2006: Assessment 4th 6th action programs, PAM
2007: Textbook evaluation
2011: Competences end, knowledge-based standards start
2012: Better standards
2012: Evaluation 4th 6th
2014: Textbook evaluation

A short history of textbooks in Portugal

authoritarian times 1933 - 1974	"romantic" era 1974 - 1995/2005	pragmatic times 2005 - 2011	knowledge curriculum 2011 - 2015	???? 2015 - …
"livro único" One textbook only, chosen by the ministry	Almost total freedom Schools or teachers choose freely No systematic control	Textbook evaluation and certification starts (DL261/2007) Certifying centres Two-stage process: - analysis + correction - certification	Textbook evaluation and certification with *standards* (DL5/2014) Evaluation helped by standards	

TEXTBOOK GOALS

To guide students

To be read and used by students

It it has to be correct

To highlight the unity of a discipline (maths, history,…)

To help teachers

- Structure
- Define
- Promote activities
- Quality learning: enrich knowledge

To help parents

To help examiners

For students' future reference

Where else to know what you need to know? Through hand-written notes?

Don't we want students to get used to follow through an argument, a text, an

Think *x*, …

"Science is built of facts the way a house is built of bricks: but an accumulation of facts is no more science than a pile of bricks is a

A set of notes, xeroxed copies, and internet references is as much a reference as a set of bricks is a house

"Prove that log *xy* = log *x* + log *y*"

What do you mean by "holistic"?

- TEXTBOOK EVALUATION PRINCIPLES

- Pedagogical freedom – different perspectives
- Correction
- To check for coherence & cohesion
  - Avoid contradictions
  - Consistency in definitions and notation
  - Sequencing, progressiveness
  - Concept reinforcing
  - Summarizing
- To guaranty conformity to standards

Facilitate what overwhelming evidence on teaching and learning supports:

- Spaced practice
- Interleaving
- Retrieval
- Questioning for elaboration
- Concrete examples
- Dual coding

Also…

- Worked examples
- Good references
- Complementary developments

If our goal is to prepare students with structured knowledge, and knowledge-based skills and attitudes, we need structured textbooks and structured text references

… but if we have the illusion that skills, for instance, the so-called critical thinking and other so-called "21st century skills" can be developed in a vacuum, then we don't need knowledge and we don't need good textbooks

THANK YOU!