

**– A SERMON –**  
**Loosely inspired, among other things,**  
**by project-centered learning**

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# **Introduction**

**You are in a time of change, facing new things – this is always a time of stress.**

**In times of stress one seeks help – that's what seminars like this aim to do, help prepare you for new situations, responsibilities – yet no one can help you, because no one knows the answer.**

**If not help, then at least it is possible to offer you consolation – hence the sermon.**

**However, the sermon will, in fact, do more to agitate than console – so be prepared.**

**The reasons:**

- **Wake you up**
- **Get you to think about the true problems that face you**
- **Jar you into finding your own solutions**

**The following 45 minute lecture (itself an illustration of the use of the Socratic method) will be followed by a 45 minute discussion session.**

**We begin with the posing of a fictitious problem...**

# **The problem**

**We have difficulties with getting children to understand colors.**

# **Expert solutions**

- 1. Make a more ambitious curriculum, teach them more facts...**
- 2. Children should play more, enjoy themselves. Are colors relevant to their everyday lives?**
- 3. Old teaching methods outdated. Train teachers in new methods, open their eyes...**

# **Problematic solutions**

**They are all essentially unscientific. Each group sees that the solution of the problem is in its area of expertise (or its area of economic interest).**

**None of these solutions isolate the true source of the problem.**

# **Source of problem**

**Children don't understand colors because colors are being explained to them by teachers who can't see.**

**The blind are teaching the blind.**

# **Rough numbers**

- **10 million – total population**
- **100 thousand – teachers**
- **10 thousand – high school teachers**
- **1000 – true experts**
- **10 – true experts in given field**

**Thus, there are a dozen or so people in the whole country who could teach children about color.**



# However...

**We need to educate hundreds of thousands of children each year (understanding color is relevant to their everyday lives).**

# Resolution

The blind must teach the sighted. To do this they must be:

- **Aware of their limitations.**
- **At ease with the fact that while they will never be able to see most of their students still have the potential to open their eyes.**
- **Be aware of their strong points.**
- **Approach each child differently.**

# ***Mea culpa***

**The previous example was meant to wake you up (rudely) to a key problem:**

**“The Emperor has no clothes!”**

**However, the example is a caricature:**

- Understanding is not an either or situation (e.g. blind/sighted). There are different types of understanding, different levels. Even without truly understanding one can appreciate and hence motivate others...**
- Each of your students has different potentials to appreciate and understand what you are teaching. Colors are relevant to all of them but not in the same way.**

# Questions

- **Who are you teaching?**
- **What are your and your school's goals?**
- **What are your strong points and limitations?**
- **What are you going to teach and why choose those specific areas?**
- **How are you going to teach and motivate the different types of children you face?**
- **What are your school's and your personal criteria of success?**

# **Why the questions?**

**You are no longer in a centralized and rigid “one size fits all” educational system. The price of freedom is that you now have all of these questions to answer.**

**Freedom is great in the long run. However, it is also terrifying to those who are not used to it.**

**You now take personal responsibility. You are solo singers now – no longer safely hidden in the last row of a choir. If you do poorly there is no one else to blame, everybody sees your blunders.**

**Most of you will do poorly and will drop out (i.e. return to the choir). A small number will prosper.**

# Methods

**Only now, after you have answered all those questions, are you in a position to choose what teaching methods to use.**

**Having been freed, you shouldn't exchange one set of shackles for another. The old teaching methods you know aren't always the wrong choice. The new methods offered are not a panacea.**

**Most often the new methods are taught as a dogma – this can be useful for training singers in a choir but it is harmful for soloists. Learn about different tools but use them as you see fit.**

# Example

- I'm teaching a beginning course in physics and want to begin talking about motion, energy...
- This is a good place on which to illustrate some general ideas at the heart of science (experiment, analysis, isolating relevant effects, what is simple and what is not).
- Most of my students think that physics is either boring, or predictable, or hard. I wish to expose them to something counter-intuitive, that will grab their attention.
- I'll choose something that looks simple, but in fact is not, something that I myself don't quite understand – to show them that the teacher doesn't always need to know the "right answer".

# Demonstration

- Show how the Celtic stone works.
- Discussion: What have the students noticed?
- Why is this interesting / strange / unexpected?
- Divide into groups: Isolate what are the relevant effects that cause this motion.
- Teacher winnows down the options but doesn't give the final answer.
- Brief lecture: Physics deals with simple systems, how can simple system display complex behavior.
- Hands-on experience with the Celtic stone.
- Discussion: Think about what and how to measure, how to change the object's behavior.



# **Follow-up activities**

## **Follow-up lectures:**

- 1. Rudiments of rotation and oscillation**
- 2. Energy conservation and when it applies**
- 3. Motion through a fluid: lift and drag**
- 4. How this ties in to modern research in physics, or to other sciences.**

## **Activities and projects (according to interests):**

- 1. Plan, design and implement measurements, analyze results**
- 2. Write an essay on why planes fly based on additional textual and/or video material given**
- 3. Free-form activities (draw picture, texts or plays based on biographies of relevant people, etc.)**

# Results

- **What have different groups of students gotten out of this?**
  - **Motivation**
  - **Knowledge**
  - **Skills**
  - **Creativity**
  - **Participate in discussions**
  - **Work and interact in groups**
  - **Relevancy to their everyday lives**
- **What does the teacher get out of this?**
- **How to tie this up to the other topics that have been or will be covered, or to other subjects?**

# **The End**

**As you can see we've talked about everything but Project-centered learning...**

**Best to leave that for the discussion session that follows.**