

Lab management: ***the art and the science***

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"Faculty are hired largely on the basis of their own research accomplishments and their ability to articulate their ideas," explains biochemist Thomas R. Cech, president of HHMI. **"But their ultimate success depends to a large extent on a very different set of skills: their ability to hire the right technicians, students, and postdocs and empower them to do their best work."**

<http://pubs.acs.org/cen/education/8047/print/8047education4.html>

The makings of a successful lab

(from K. Barker, At the Helm: laboratory navigator.
Cold Spring Harbor Laboratory Press, 2002)

- **Good science**
 - Motivates lab members
- **Political Savvy**
 - Vision of where you want to go, how to get there
- **Funding**
- **Smart and enthusiastic people to work in the lab**
- **A leader (you)**

Good management does not impede creative science

- **It can be subtle, but it has to be there**
- **A good teacher / manager will not let the student know that they are helping to balance the bicycle... or when they let go**
- **Give good students / techs freedom, but don't let them flounder**

You are the PI now:

Choosing a lab culture

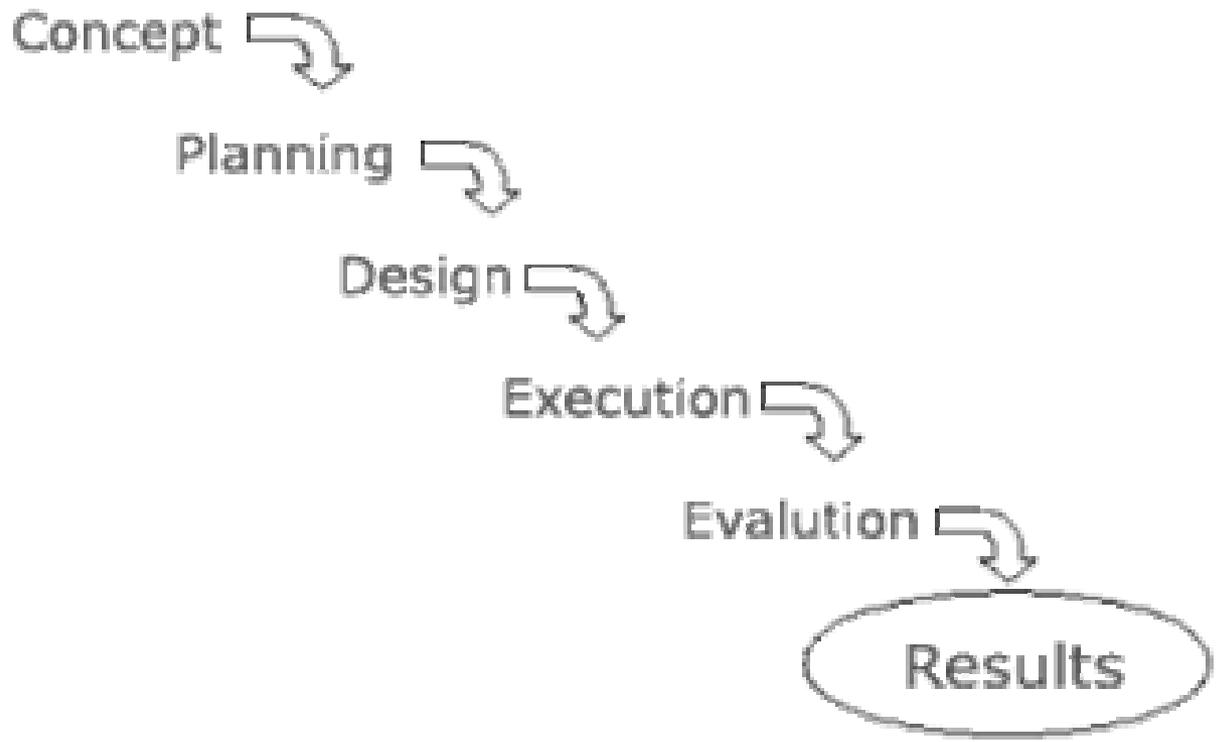
- **set the tone**
 - Work ethic
 - Attention to detail
 - how relaxed ?
 - Intensity level?
- **size ?**
- **composition**
 - Undergrads
 - Grad students
 - Post-docs
 - M.D. fellows

What is a ‘good lab’?

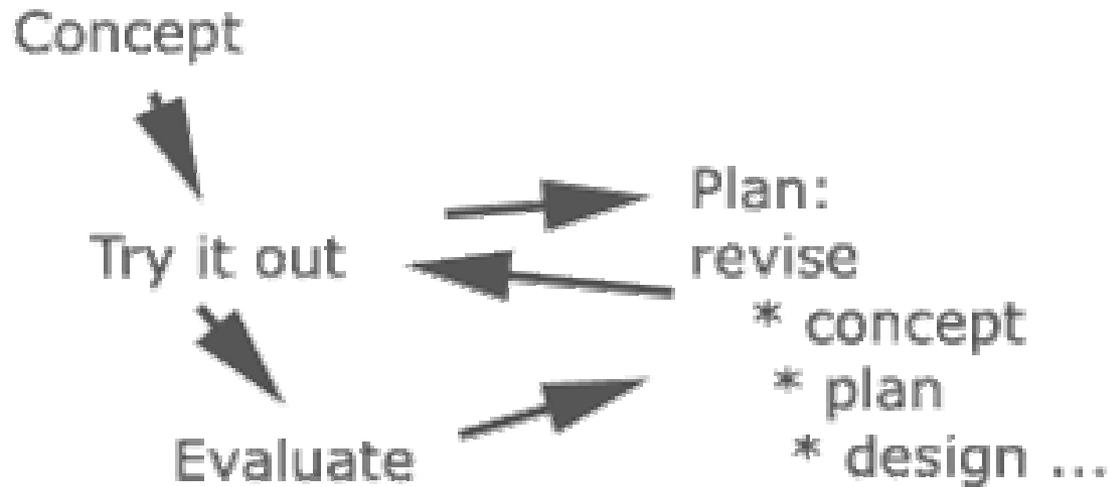
What did you like/dislike about you previous labs?

What is your personal style – will it work for your ‘ideal’ lab culture?

What is realistic with the resources you have?



Traditional sequential project approach



Adaptive Approach

"In some cases adaptive frameworks encourage you just to go ahead and try something rather than devote a lot of time to detailed planning. You may learn more from the experience of trying than you could ever learn by thinking about it hard in planning."

i.e. PRELIMINARY EXPERIMENTS!!!

Decisions that make a difference.... Among others:

- **Where should your office be??**
- **Dress code**
- **Hours enforced/monitored?**
 - Let folks know expts sometimes take longer than expected
- **How often do you talk to each lab member?**

And figure out how to convey....

- **Be safe and careful**
- **Be honest / earnest**
- **Share stuff / help out /
be generous / teamwork**
 - Toys
 - Work load

What is your leadership style:

how to let folks know you are the boss but they can shape their daily lives/work/project

- **Highly Structured ?**
- **Hierarchical?**
- **Laid back / Teach by example**

Your scientific knowledge provides the nucleus of your position as leader

***IMPLICATIONS OF THESE RULES FOR
LAB MANAGEMENT STYLE— the style that
you choose should depend on:***

Where you want to go

How fast?

How much risk you can tolerate

How much time you have

- *till tenure*
- *due to other obligations*
 - *family*
 - *teaching*
 - *adminisration*

How to hire research assistants/select students?

- **Paper qualifications / technical know-how**
- **New college grad or experienced ‘career tech’**
- **Personality match / gut feeling**
 - (do they laugh at my jokes ?)
- **Work hours – preferences**
- **How much do you want them to think?**
 - Can they think?
- **Earnestness factor**
- **Learning style**
- **Working style**
 - Rigid vs. ‘adaptable’
 - Like to work out / troubleshoot or ‘follow protocol’

Once they arrive in the lab, you must consider training issues:

- **Learning styles**
 - Motivation defined
 - dynamic (likes trial and error, active learner)
 - innovative (seeks meaning – listens, shares ideas)
 - common sense (learn by testing logical possibilities)
 - analytical (seeks facts, learn by thinking through ideas)
- **Watch me do one expt, I watch you do it, do one on your own**
 - give a standard protocol
 - encourage to take notes
 - Individual writes protocol that makes sense to them
 - **X-check**

Fried rule: Make sure everyone knows how to calculate molarity, **what I am obsessive about and that data fixes (even small ones) keep me happy.**

How things drift... and go wrong

As you get busier...

- Lab members will teach other lab members... guard against 'telephone' errors in common procedures and experimental designs
- Try to find time to spend in the lab... set aside at least a few hours per week to hang out in lab ... help with mundane tasks, troubleshoot and chat
- At a minimum.... do rounds at least several days a week at 'random' times

Six common lab management mistakes

(from *The Scientist*, 11:14, 1997)

- **Not delegating enough responsibility to employees**
- **Insensitivity to the goals of students**
- **All work and no play**
- **An overemphasis on competition**
- **Lots of projects, but no papers**
 - Plot out outline of papers from the get-go

How to choose student projects

- **Menu of projects vs. student deriving one**
- **Fit student to project and see if they 'attach' to it – *if not change it***
- **Safe vs. risky**
 - Undergrad. vs. Masters vs. Ph.D.
 - style ?
 - motivation ?
- **Make it clear to everyone that each person has a primary project and will get credit for 'helping out' on others**

Get and give feedback on progress

- **If necessary, go do the expt (with or without the student/tech) to trouble shoot**
- **Stop projects that aren't working**

How to best communicate with lab members / monitor progress of projects?

- **Consider and Adapt to individual needs / preferences**
 - one on one meetings
 - regularly scheduled
 - ‘please stop by’/open door policy
 - group meetings
 - GOALS
 - reinforce ‘stories’
 - Learn how to analyze data ‘by osmosis’
 - STYLE
 - Formal
 - Informal
 - **Rounds**

Do you spend more time with people whose projects are going well, or going badly??

- **“A lesson I learned was that in research one must leave people alone especially good people.”**
- **“The better the students, the more important is to leave them to themselves. Occasionally, the lazy ones need to be pushed or the neurotic ones reassured...”**

Luria quoted in “At the Helm”, p159

Trouble with a method or personnel problem?

- Ask a colleague
- Visit a lab where a method works
- Ask for reagents
- **Use your NETWORK!!**

Create the right intellectual atmosphere

- *constructive deconstruction and learning by example*

- **Journal clubs (your own lab or with colleagues)**
 - Who presents?
 - Screen papers?
- **Data clubs / lab meetings**
 - Shared with colleagues to get critical mass

Maintaining team spirit

- **Celebrate victories (papers, comps passed, birthdays)**
- **Lab members should see PI look silly and having fun**
 - Parties
 - games

Practical stuff that can drain your own and your lab's time and energy

- **Ordering**
 - figure out what you need / common resources
 - Don't forget about the water
 - find a system to track orders, who orders, etc.
 - Find someone who likes to do this
- **keeping track of budget / multiple grants**
 - communicate that your lab should be careful about not wasting money
 - Determine how you and your staff interface with administrative office
 - Find out how much administrative support will you get

Budget (alot of) time to deal with:

- **Biosafety regulations**
 - How to learn about
 - How to keep current
 - How to enforce with your lab
- **Human/animal subject issues**
 - IACUC
 - IRB/HIPAA

Other issues

- **Determining authorship**
- **How and when to terminate an employee or student**
- **Collaboration**
- **Ethics**
- **Lab books / patents**

Other issues...

- **Minimize negative moods... Vent to your colleagues, not to your lab**
- **Lab members.... Probably best to not be your friends**

Fried's rules:

1st derivative of DiGirolamo's rules

- 1) You gotta have a **plan**
- 2) You gotta be **focused**
- 3) You gotta be **organized**
- 4) You gotta be **in touch with reality**

(with thanks to Mike Hamm)

And...a few that my labs hear me saying:

Thou shalt:

- **make data summaries**
 - (early and often)
- **write everything down**
- **ask questions whenever in doubt**
- **take pleasure** in good duplicates and linear standard curves *(and you will live a long scientific life)*
- **be kind** to fat cells and your labmates

***And a few 'rules' that are unspoken
but I hope are learned by example
(because of my own style)***

- **Work hard**
- **Read read read**
 - (this is only pointed out if deficient)
- **Think / observe while working**
 - Ok to do little experiments on the side
 - Ok to look at your data and think about a little while before you show to me
- **Clean up after yourself**
 - MOPS YOUR MESS, THANKS HEPES
 - (from Ulupi Jhala)

Conclusion

Develop your own Management Plan and goals for your lab

Adaptive model probably best

and of course.....

Focus, Organize and....

Stay in touch with reality (get feedback)