Some Lessons Learned from Leading a Research Group

Laurence Tratt

King's College London
Software Development Team
2017-03-06
Adapting career advice is hard.
Adapting career *advice* is hard.

Hearing others *experiences* can be invaluable.
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Obtaining funding requires persistence

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(back l-r) Naveneetha Krishnan Vasudevan, Jasper Schulz, Edd Barrett, Sarah Mount
(front l-r) Laurence Tratt, Carl Friedrich Bolz, Lukas Diekmann
Management vs. leadership in research
Management vs. leadership in research

Management: getting things done.
Management vs. leadership in research

Management: getting things done.

Leadership: vision of what should be done.
First step: an ethos
Why do research? How? What’s good or bad?
Why do research? How? What’s good or bad?

No-one had told me, so I wrote my ideas down.
Our ethos

Scientific research is an art and a craft. It makes high demands of researchers and in return offers rich intellectual rewards. This document details the principles by which we should manage ourselves and our research team. The underlying philosophy is that **individuals must use their good judgement at all times.** This document is not intended to be prescriptive; it is not perfect; and it can never cover all eventualities. Rather, it intends to give a common framework for decision making so that - individually and collectively - we can be more efficient, daring researchers.

1. Overall ethos

1.1 Research quality

We are paid to identify interesting challenges and work towards addressing them. **The chief aim of our team is to identify important challenges and produce quality research when addressing them.** This is how we can best contribute back to the world and justify the privileged position we occupy.

The challenges that we address will be in the realm of "software development". This term is to be understood in its broadest fashion and we should not obsess unduly about its precise boundaries. Ultimately, we should expect our work, directly or indirectly, in the near or far term, to improve the development of software. Again, this expectation must be understood in its broadest fashion.

As a rule, quality work satisfies at least 2 of the following: it addresses one of our challenges; presents a novel idea; or is highly polished. We can also identify common characteristics of poor quality work: it is done for its own sake, with no concept of why or how it could be useful; or it focuses solely on outputs (e.g. "let's write a paper even though we don't have an idea"); or it is sloppy and impossible for others to interpret.

1.2 Research quantity

The quality of work produced is significantly more important than the quantity. An insightful idea coupled with a good implementation and a well written paper will have more impact than innumerable low quality papers. The quantity of outputs per researcher naturally varies from year to year e.g. when starting a new research strand. Papers also present work in varying stages of completion; one can more easily produce a tentative workshop paper than a fully polished journal paper. However, we
First step: an ethos
Pretentious? A bit.
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Understood fully by anyone but me? Doubtful.
First step: an ethos

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Understood fully by anyone but me? Doubtful.

Fully adhered to? Not quite.
First step: an ethos

Pretentious? A bit.
Understood fully by anyone but me? Doubtful.
Fully adhered to? Not quite.

But gave me a basis for making informed decisions.
Decision time frames

Aim:

Strategy:

Tactics:
Decision time frames

Aim: long-term, rarely changes.

Strategy:

Tactics:
Decision time frames

Aim: long-term, rarely changes.

Strategy: medium-term, changes occasionally.

Tactics:
Decision time frames

Aim: long-term, rarely changes.

Strategy: medium-term, changes occasionally.

Tactics: short-term, changes frequently.

The longer the time frame, the simpler the decision description.
Decision time frames

Aim: long-term, rarely changes.

Strategy: medium-term, changes occasionally.

Tactics: short-term, changes frequently.

The longer the time-frame, the simpler the needed description.
• Identify important challenges in software development.
Aims

- Identify important challenges in software development.
- Produce quality research to address them.
Aims

- Identify important challenges in software development.
- Produce quality research to address them.
- Be honourable and transparent.
The 2013 strategy:

- Play to our strengths: programming languages.
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- Initial challenge: language composition.

2017: Currently revising strategy.
The 2013 strategy:

- Play to our strengths: programming languages.
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- Two parallel strands of research:
  - Practical editing of composed programs.
  - Running composed programs fast.
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- Increase ‘quality’ of publication venue.
Strategy

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2017:
The 2013 strategy:

- Play to our strengths: programming languages.
- Initial challenge: language composition.
- Two parallel strands of research:
  - Practical editing of composed programs.
  - Running composed programs fast. ✅
- Increase ‘quality’ of publication venue. ✅

2017: Currently revising strategy.
Tactics

Try to automate and homogenise when useful; be open whenever possible. e.g.:

- All source code and papers in git (start).
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- Source code changes done by pull request only (2015).
Tactics

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- Common bibliography in its own repository (late 2016).
Tactics

Try to automate and homogenise when useful; be open whenever possible. e.g.:

- All source code and papers in git (start).
- Everyone in the team has write access to everything (start).
- Source code changes done by pull request only (2015).
- Common bibliography in its own repository (late 2016).
- Papers developed in the open (late 2016).
Second step: kick-off meeting

Develop a shared understanding of what we do and who we are.
Second step: kick-off meeting

Idea: develop a shared understanding of what we do and who we are.
Second step: kick-off meeting

My promise to the team

1. I will consult. I will listen.
2. I will consider the team’s needs carefully.
3. I will answer queries promptly.
4. I will not unduly burden you with work.
5. I will seek funding to support you.
6. I will try and protect you from unnecessary distractions.
7. I will provide opportunities to further your career.
8. I will provide the best possible reference when you move on*.
Second step: kick-off meeting

Your promise to the team

1. You will use your common sense at all times.
2. You will consider the team when acting.
3. You will focus on quality research.
4. You will focus sufficient time on your research.
5. You will not unduly delegate upwards.
6. You will react promptly to requests.
7. You will reserve the phrase “I don’t have time” for serious cases.
Second step: kick-off meeting

Convinced people that I cared about them.
Second step: kick-off meeting

Convinced people that I cared about them.

Though one small part almost led to catastrophe.
Second step: kick-off meeting

Our structure

- Flat hierarchies are good hierarchies.
- But I (generally) shoulder the greatest burden.
- The model: primus inter pares.
- Remember: not every decision can make everyone equally happy.
Leader or equal?

Problem: Research groups where only the leader thinks.

Solution: Every one should be a leader.

13/17 HTTP://SOFT-DEV.ORG/
Problem: research groups where only the leader *thinks*.
Leader or equal?

Problem: research groups where only the leader *thinks*.

Idea: everyone should be a leader.
Problem: research groups where only the leader *thinks*.

Idea: everyone should be a leader.

Solution: rely on powers of persuasion.
Leader or equal?

Problem: persuasion works badly for intangibles.
Leader or equal?

Problem: persuasion works badly for intangibles.

Initial result: slow progress, slight lack of quality.
Problem: persuasion works badly for intangibles.

Initial result: slow progress, slight lack of quality.

End result: gridlocked discussions.
Leader or equal?

Insight: “Make a decision so we can move on.”
Leader or equal?

Insight: “Make a decision so we can move on.”

Leadership requires decisions and taking responsibility.
People are the best part of the job.
People are the best part of the job.

Aim: remove distractions and enable quality work.
People are the best part of the job.

Aim: remove distractions and enable quality work.

Strategy: I trust and respect by default.
Generally: lead by intent.
Generally: lead by intent.

When necessary: manage in detail.
Generally: lead by intent.

When necessary: manage in detail.

Important meetings followed by back-briefings.
Takes about 18 months for new staff to reach full productivity.
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Lesser part: learning the area.
Takes about 18 months for new staff to reach full productivity.

Lesser part: learning the area.

Greater part: lack of belief in their own abilities.
The well-intentioned forces of mediocrity
From supporters:

“Don’t get your hopes up”

“The route you’ve chosen is very hard”

“You’ll live to regret it”
The well-intentioned forces of mediocrity

From supporters:
“Don’t get your hopes up”
“The route you’ve chosen is very hard”
“You’ll live to regret it”

From staff:
“I don’t think we can do it”
“This is too hard”
“You’ve promised something we can’t deliver”
My outer role: continual determination and optimism.
My outer role: continual determination and optimism.

My inner role: continually trying to tackle mediocrity.
A research group is a small business

Though training staff to move on is a good thing!
A research group is a small business

Though training staff to move on is a good thing!

Matching funding to people is a continuous task.
A research group is a small business

Though training staff to move on is a good thing!

Matching funding to people is a continuous task.

A fulfilling job doesn’t have to dominate my whole life.
Summary

• PLANNING IS EVERYTHING.

• BELIEVE IN PEOPLE, EVEN WHEN THEY DON'T BELIEVE IN THEMSELVES.

• SUCCESS IS NOT FINAL, FAILURE IS NOT FATAL.

17/17 HTTP://SOFT-DEV.ORG/
Summary

- Plans are nothing; planning is everything.
• Plans are nothing; planning is everything.
• Believe in people, even when they don’t believe in themselves.
Summary

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