安東研究室 中間発表会

How to Enlarge Our Scientific Outcomes?

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Introduction

Motivation

· The number of our research outputs was the largest in the last FY. Great!!

· On the other hand, there may be rooms for improvement in terms of achieved level.

· Examples
  * Komori-kun's Ph.D thesis: 80%
                (Average of survey. # of samples = 3)
  * Kawasaki-kun's Master thesis: ~40%
  * Takano-kun's Master thesis: ~40%

· How can we improve the achievement level?

修士論文

年度	著者	題名
2018	川﨑拓也	巨視的量子系の実現に向けた鏡の光学浮上方法の研究
2018	Ooi Ching Pin	Mechanical Loss of Crystal Fibres for Torsion Pendulum Experiments
2017	和田祥太郎	巨視的量子力学の検証に向けた光輻射圧による浮上手法の開発
2017	武田紘樹	ローレンツ不変性検証のためのモノリシック光学系の開発
2017	酒井譲	光リング共振器の連続回転による片道光速の異方性探査
2016	有冨尚紀	ねじれ型重力波望遠鏡TOBAのためのモノリシック干渉計の開発
2016	下田智文	ねじれ型重力波望遠鏡TOBAのための地面振動雑音低減法の研究
2015	桑原祐也	巨視的量子現象の観測に向けた光輻射圧による鏡の支持方法の開発
2015	小森健太郎	巨視的振動子の遠隔光冷却

How to Enlarge Our Scientific Outcomes?

What are the problems?

What we can do to improve the achievement level.

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Do not Have to be Perfect?

· Some (most?) of U-Tokyo students of are good at effective use of their efforts. When they achieve a satisfactory level, 80% score for example, they will not spend more effort. They do not have to achieve 100% to pass an exam.

* This way of thinking is useful. You can use these effort for more important activities.
* However, if research is one of the first priority activities in your life, you will sometimes aim at more than 100%.
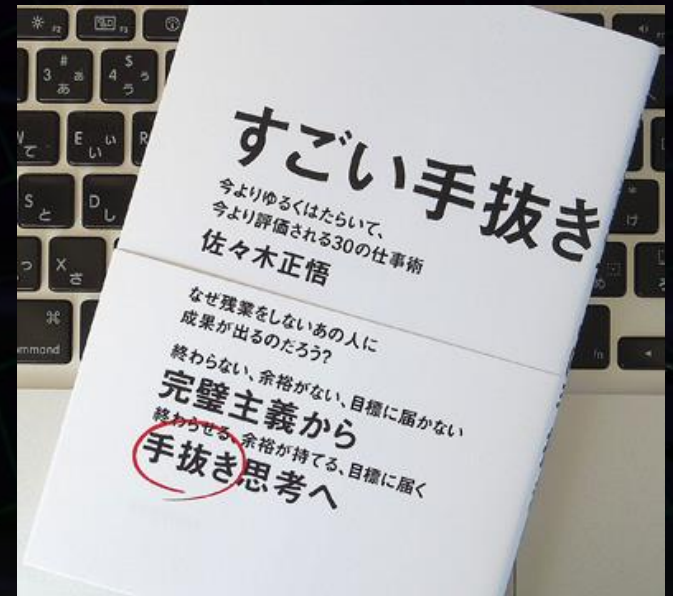
Do not Have to be Perfect?

· It is tough to reach near to 100%. There will be no perfect goal in science.

· Therefore, a completed work is highly evaluated and respected.
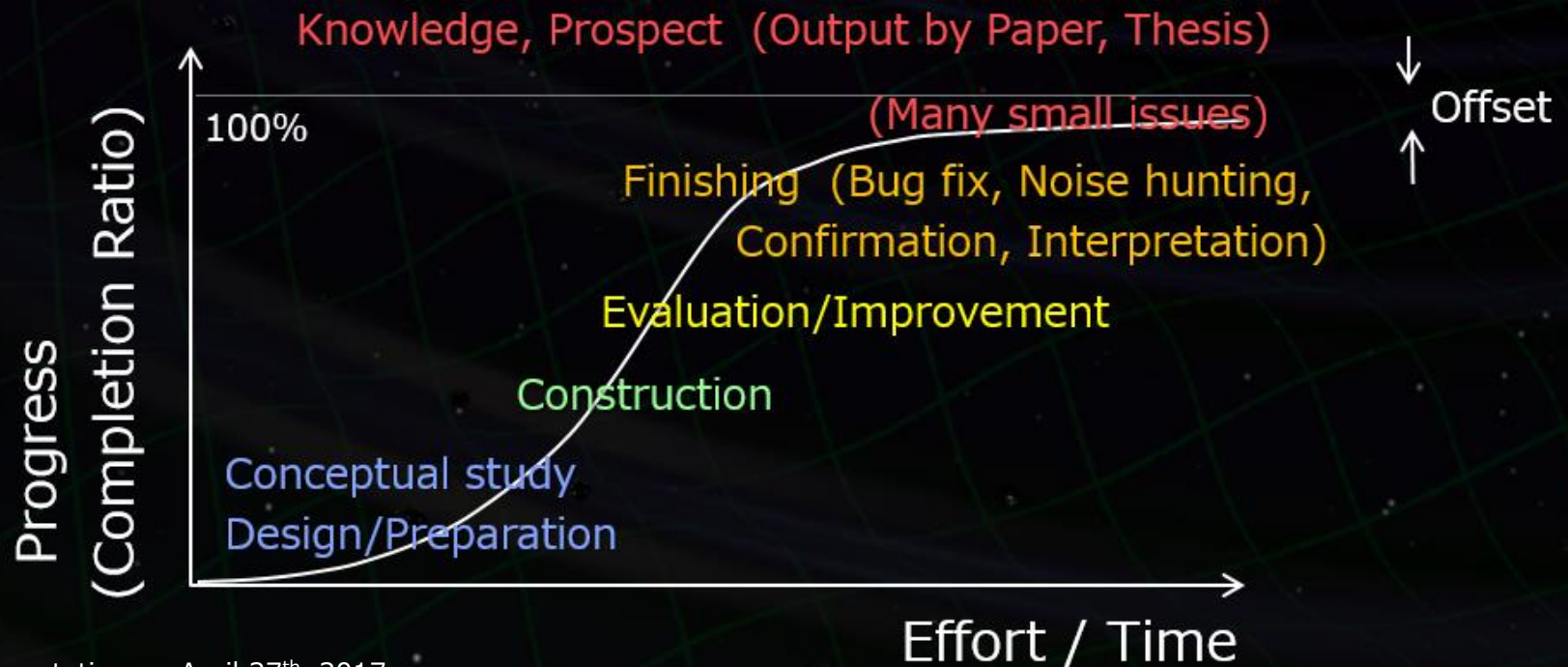
Presentation on April 27th, 2017

Solution 1: Effective Use of Heritages

·Research know-hows are often dissipated in time
or graduation of students.
→ Effort and time consumption by same mistakes.
⇨ Continuous activities with proper hand-over.
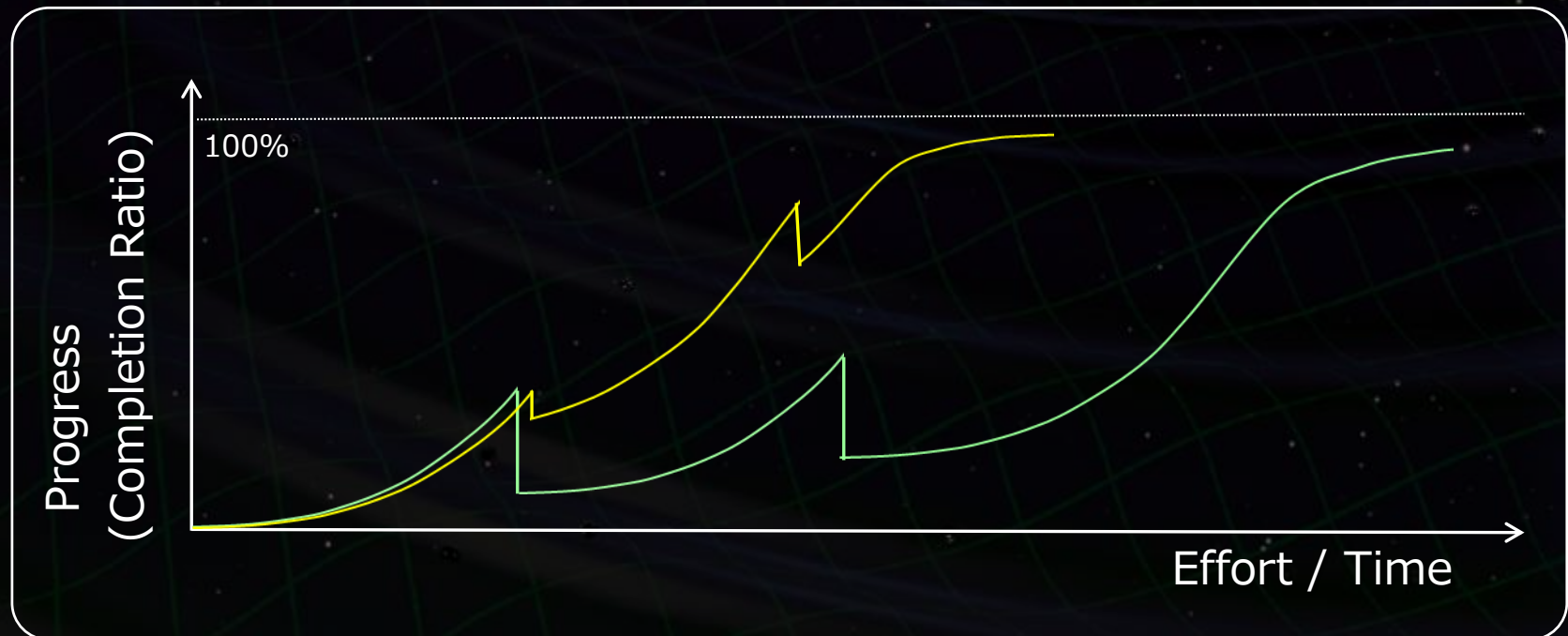
Solution 2: Efforts Concentration

- Project-oriented organization:
  * Limit the number of research topics in our group, and focus more on these topics with more systematic organization and division of tasks.
  * Such an organization scheme is often adopted by world-leading science groups.
  * On the other hand, this way of organization may spoil the strong point of our group, which is variety of emerging ideas coming up from wide visions of self-motivated students.

Proposal:
A Venture Company in Our Group

The Idea

· You do not have to build everything from scratch, though such experiences are important from educational point of view.

· How about using stocked basic components to accelerate the starting phase?

Make It a Product

·The idea and Target

  * Base-up of research environment by summarizing know-hows as 'products', which can be commonly used in our group.

  (Ex) Photo sensor module, Actuator module,
         Commonly used electric circuits, ···

  * A series of such products will shorten the start-up phase (design and preparation phase) of new experiments. It will reserve time for final hard phase to achieve the scientific target.

Make It a Product

- Implementation as a System
  - * Instead of asking everyone to make re-usable product, I propose to make a system by ask ~10% of everyone's time for a coherent activity to improve the research environment.
    - → an in-group venture company.
  - * The target of the company is to summarize our know-hows as 'products', which can be commonly used in our group.

In-Group Venture Company (1/2)

・Preliminary concept of the company
  * The company complete products which can be
    commonly used in our group. Documents (user
    manual, design) are released together.
  * Time scale to complete one product is rather
    short, such as 2-4 months.
  * The company activity is basically engineering.
    Scientific research should NOT be included.
  * A team is formed by one team leader (or CEO)
    and a few members. The leader manages the
    team activities (budget, schedule, manpower, …).
  * Product to be developed will be decided by the
    team with proper survey of the needs.

In-Group Venture Company (2/2)

* Joining to the company is NOT a duty.
* Budget for development and salary (as RA or TA) will be allocated from the group budget (basically from the Q-LEAP budget).
* The activity time is clearly scheduled, such as every Friday afternoon. Members spent that time only for the company activities.
* After completion of the development of a product, budget for mass production will be considered separately.

Predicted Problems

·'If you cannot rise at least three predicted problems, the solution is not considered fully'
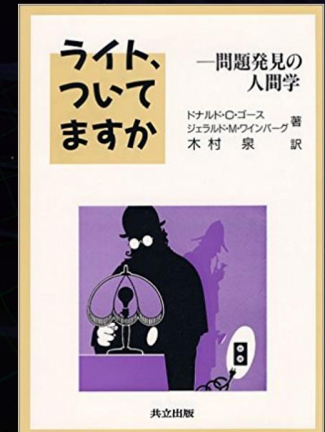
⇩

Let's consider problems which may happen.

A Book: Are Your Lights On?

日本語翻訳版

ライト, ついてますか

ドナルド・C・ゴース, G.M.ワインバーグ (著), 木村 泉 (翻訳)

1987年刊行. 2017年時点で第72刷.

ライト, ついてますか
―問題発見の人間学
ドナルド・C・ゴース
ジェラルド・M・ワインバーグ 著
木村 泉 訳
共立出版

中間発表会（2018年5月9日, 東京大学）   9

Presentation on May 9th, 2018

Possible Problems (1/4)

・<u>No good product which can be commonly used</u>.
 Too general product cannot be used for anything.

⇨ Survey of needs and proper setting of the specification is important, like commercial products. Flexibility for customize will be important as well.

・<u>No product is completed within the scheduled time</u>.

⇨ Initial goal setting and management of the team leader will be critical. Short production cycle will be helpful. Accumulation of experiences in multiple cycles will improve the situation gradually.

· <u>Everyone is too busy to reserve time for the company</u>.

   ⇨ Postpone the start of the activity until some students have free time.

· <u>Fairness of service activities</u>:

  You all are naturally contributing to the group activities in various ways (cleaning of room, etc.), which are not payed. It looks unfair.

   ⇨ I hope you are broad-minded enough to avoid such a complaint. Or, the concept of salary can be deleted.

Possible Problems (3/4)

· <u>Spoil of Internal motivation.</u>

A Tale told in a motivation theory.
   * An owner of a small shop was suffering from
     young boys, who comes and play a joke on him.
   * He thought, and told the boys:
       'Please come and play a joke. I will pay 10-Yen
        to you every time.'
   * Then the boys came every day to receive 10-Yen.
   * Some days after that, he told the boys:
       'I have no more money. I will not pay from
        tomorrow'.
   * The boys never come from the next day.

Possible Problems (4/4)

· You are doing research mainly with your internal (self) motivation, I believe. External motivation, such as money, may spoil the internal motivation.

⇨ Clearly separate the company tasks and usual scientific research activity.
   * Project limited only for engineering.
   * Separated working time.

Expected By-Products

・There will be by-products through these activities.
* Experiences of success. In a scientific research, problems always remain. By completing a product, one may gain confidence.
* Training of system engineering: definition of the goal, planning (break down to tasks and schedule), and execution based on schedule.
↑ Currently, one usually experiences this for the first time at the master thesis.
* More experiences of team work:
Team comprised of different members from one's research topic.

How Do You Think?

・Do you want to join such an activities?

・Are there any concerns?

・Are there any idea to enlarge our scientific outcomes?

・Are there more effective ways to invest Q-LEAP budget?