

EDITORIAL

A Matter of Achievement

The two students had not realized I was overhearing their conversation. They were speaking of their thesis supervisors.

“Mine has not yet written my first paper”, was complaining the younger one. “Well, mine has been quite efficient over the past couple of years with three papers accepted for me in refereed journals”, said proudly the other one. “And he promised to have my dissertation ready next month. He is also struggling to get a post-doc position for me before my grant expires. I hope this will not be too far away, otherwise he will have a hard time with my wife.” This composite conversation is made of real pieces. How was it at the time of your own PhD?

“Perhaps”, as was saying recently a foreign colleague, “things were too harsh in the past, but now we are definitely going too far in pampering students. And it would be about time we settle for a more balanced situation”.

In some countries, the least that can be said indeed is that the context dramatically evolved since the time when (not so long ago actually) students considered as an honor to be accepted for a PhD thesis without automatically getting “money” for it. Not rarely, the PhD candidates had to assure their own income themselves, often by teaching. In those times too, a PhD work was declared completed upon reaching a certain level of quality, which implied methodologies mastered, results obtained, experience gained and expertise demonstrated.

Nowadays the bell ringing the end of the party is generally triggered by the expiration of a grant, which means that, in many cases, money has been provided – in principle a good thing *per se*. But this may have also distorted the whole perception of the exercise, by providing an exaggerated feeling of easiness.

You may have seen some of those places where PhD students enjoy recently refurbished individual offices and high-tech modern flat screens

while senior scientists tend to be grouped in old offices where they challenge their aging eyesight on outdated flickering terminals.

It is not unusual to meet students who state that, for some reasons, they know better than specialists in the field what would be good or not as a theme for a PhD dissertation. It has also become commonly expected that the degree be bestowed somehow automatically at the expiration of the grant¹.

When gently told that results have to be achieved, some students get deeply offended as they consider their qualifications and aptitudes at research are unacceptably questioned that way. But they find quite natural to provide the University with ratings of their own teachers and supervisors, somehow *de facto* turning upside down the evaluation process!

The “system” itself can be pernicious. The student population of universities has exploded and has generated enormous teaching requirements often to the prejudice of other fundamental missions such as research. In some places, purely scientific positions have disappeared, with some teaching mandatory for every scientist. But teaching can only be carried out – and positions justified – if there are students in the discipline. This leads to some demagogic attitudes to attract and retain students.

Furthermore, the teaching and coaching of students have become important criteria for career progress, sometimes at the same level as the scientific production itself. Doctoral supervision can also bring in additional money, very much appreciated in a context of stagnation for academic salaries. Who could then blame a dynamic and ambitious scientist to take as many PhD students as possible?

But what can a scientist who realizes he/she accepted coaching someone who is not up to the job then do? Firing that student? Well, first, firing students as such does not seem to be part of the culture everywhere; second, on administrative and legal grounds, it might be a long process, harmful for all parties involved since the scientist might have to admit he/she made a mistake when accepting the student; third, this would mean losing the extra money and a line in the cv.

This explains why some supervisors prefer quietly finishing the work for the student, something that can lead to the kind of situation commented in the opening anecdote. You will of course harbor your own conclusions regarding the arrival on the market of such PhDs and on the corresponding impact on the devaluation of degrees.

¹The phenomenon is more general. Instructors of driving schools for instance explain that examiners are more and more frequently aggressed when they refuse to grant the precious paper – the candidates considering that, since they have paid for the lessons, they have the right to get the license.

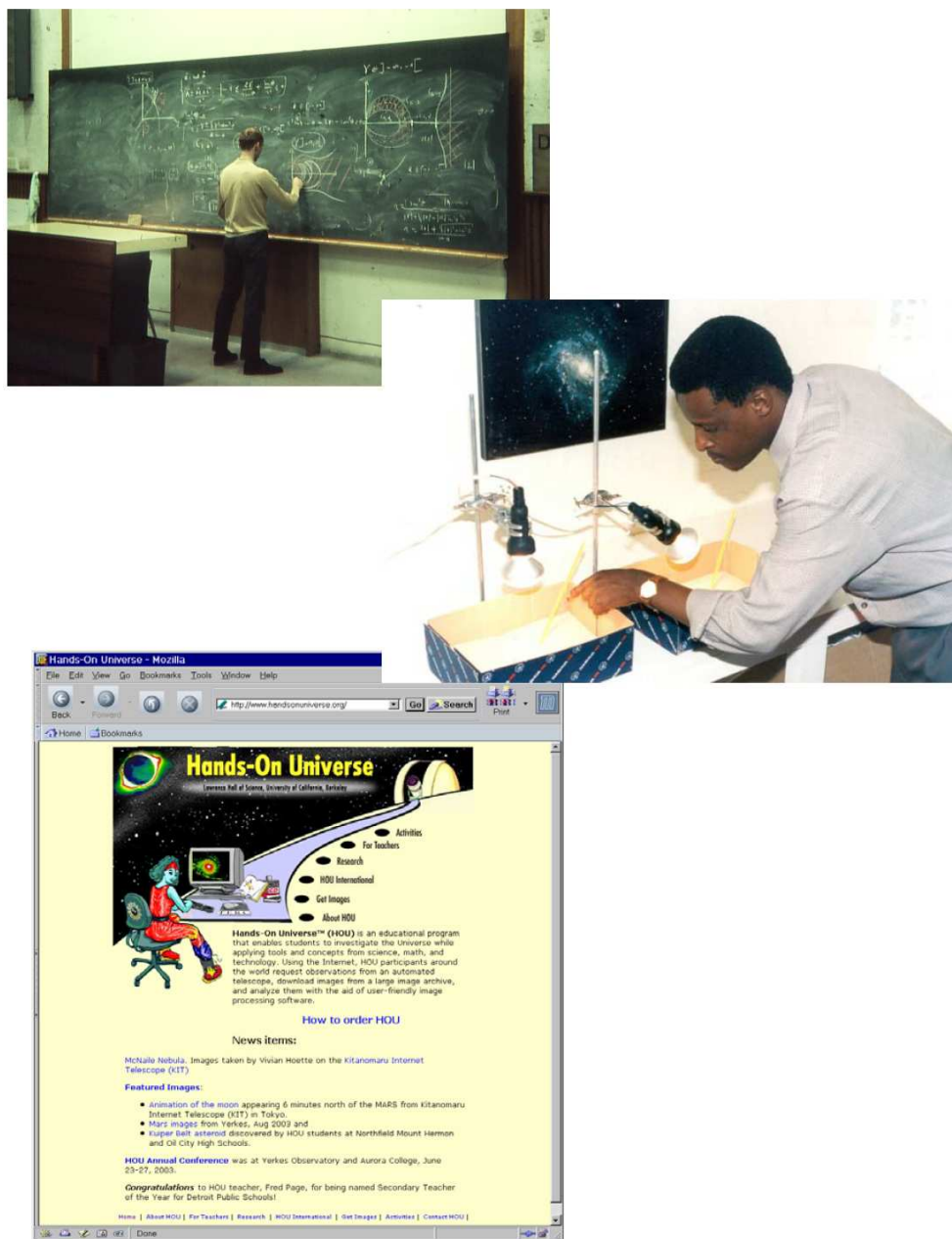


Figure 1. Several of the many facets of astronomy education: classical teaching (top, photograph by the editor), practical demonstrations (middle, courtesy C. Rijdsdijk) and web sites such as the Hands-On Universe (HOU) project (bottom, <http://www.handsonuniverse.org/>) pictured here. See Boily (2003/OSA 4) for concerns on education through the web, Heck (2003a) for a review of the astronomy professional communication, and Rijdsdijk (2003) for examples of innovative resources for promoting astronomy in a developing country.

A Matter of Maturity

A full discussion of the shortcomings of the current educational system is outside the scope of this editorial², be it only because they frequently take root well before students reach the university levels. This is the case, for instance, for the dramatic decrease of the average maturity of students³.

Ludic education, often confused with attractive teaching and experimented in some countries or states⁴, has largely shown its limitations. In spite of these, it continues to be broadly advocated. Extrapolated to research, as tackled for instance through a PhD work, it can lead to unfortunate misunderstandings.

Research calls for creativity, imagination, intuition, as well as response to challenges, but also rigor as opposed to game playing. Research calls for a sense of purpose and a feeling of responsibility towards society at large. As is still the case in many countries (see below), the salaries and expenses for scientific projects are financed by the taxpayer's money.

Of course, popular culture does not always help. Just take those multitudinous movies where scientists are portrayed "almost invariably [as] mad, evil, antisocial, clumsy or eccentric" characters (Pollack 1998), or pursuing wild ideas in the crystal towers of their mind.

As experienced repeatedly in the heart of Africa, intelligence and maturity have nothing to do with ludic education nor with sophisticated educational means. It has much more to do with exemplary teachers (often working single-handedly with mixed-age classes), supported by parents respecting and encouraging educational valorization. I have witnessed there complex scientific questions, asked by teenagers in evening classes given in the light of oil lamps, that would put to shame the lightmindedness of some of our university students.

As far as astronomy is concerned, we should probably spend more time talking to our graduate and post-graduate students about the way we work, we collaborate, we collect data, we communicate results, we set up projects, we compete for funding, we lobby for positions, and so on. Our astronomy-related life and its context are probably as important, humanly speaking, as the scientific developments themselves that students can always find in books.

Participating, even briefly, to our professional activities can be an unforgettable experience, and a really educating one whether or not they wish to subsequently enter the profession. Years after they went to high-school

²Specific chapters have been and will continue to be presented in the OSA series.

³Again this is more general. European military officers for instance were recently confessing this was also a major problem they were facing with their young recruits.

⁴For instance in some German *Länder* as a reaction to the period of nazi authoritarianism.

teaching, I met past students who had been very close witnesses of a comet discovery at a large European observatory. This was still *the* experience of their university studies. Year after year, they were describing enthusiastically to their own pupils what was the real life at a professional observatory, the routine of observations, the phases of a discovery, including the doubts, the requirements for verification, the excitement of the public announcement, not to forget the subsequent hassle by the media and by disturbed people ...

Maturity does not prevent fun, but, contrarily to what some of our colleagues tend to imply in order to attract PhD students, research is not exclusively fun. As any other creative process (see *e.g.* Heck 2001/OSA 2), scientific research certainly involves excitement of pioneering, satisfaction of progress and sometimes the fireworks of discovery, but it has also its share of pains, frustration and difficulties linked to a context which is highly competitive and subtle. It also takes maturity to appreciate and accept this!

Rare are the brilliant (or lucky) scientists whose names will pass into the History of Science. Most of us will quietly bring our modest stone to an *opera*, the full grandeur of which we shall never be able to assess, somehow like the cathedral builders of the past centuries. This must also be brought to the attention of our idealistic students, and as gently as possible in order not to kill their enthusiasm for a science which a significant number of them still approach in a romantic manner. For, once the degree has been secured, they will have to face the realities of the world.

A Matter of Evaluation

The real world will be out there indeed. The globalization of liberal economy is seriously challenging the way traditional universities are run. In the logics of the day, these have to get reorganized towards self-financing, without the generous support of a state or of the taxpayers' money. Plans of privatization abound, which means a real revolution in some countries.

The same applies to research at large. Industrial and financial tycoons tend to envisage research only if it is well programmed and benefiting to their activities. Is research, our fundamental research in particular, apt to be programmed? Can the most rewarding discoveries be programmed? This is again a long debate outside the scope of this editorial.

What seems to be sure though is that evaluation of research will become steadily more challenging. We shall have to communicate well about facts in order to avoid misleading interpretations. In an alleged comment⁵, psychoanalyst and cigar-smoker Sigmund Freud is quoted as having retorted

⁵No source has ever been found for that quote, very likely part of the Freudian folklore.

to a daring student that a cigar was sometimes nothing more than just ... a cigar. In other words, facts should first remain facts. When involved, statistics should be interpreted most carefully, not to forget that sometimes they might be buggy⁶. In spite of its half century, Huff's book (1954) remains an advisable reading for both students and confirmed scientists!

If astronomy generates a lot of public interest⁷, it should be kept in mind that, when it is time to spend money, the public nowadays tend to favor other priorities (such as environment, health, security, unemployment) than space investigations or cosmological perceptions.

Communicating realistically and securing well-focused evaluations should however enable us to continue safely our most noble task: the fundamental understanding of mankind's position in the universe.

The OSA Books series

This book is the fifth volume under the title *Organizations and Strategies in Astronomy (OSA)*. These OSA Books are intended to cover a large range of fields and themes⁸. In practice, one could say that all aspects of astronomy-related context and environment are considered in the spirit of sharing specific expertise and lessons learned.

Thus this series is a unique medium for scientists and non-scientists (sometimes from outside astronomy) to describe their experience and to discuss points on non-purely scientific matters – albeit most often of fundamental importance for the efficient conduct of scientific activities.

This book

This book starts with M.G. Burton detailing the specificities of astronomical research in Antarctica as well as the many projects carried out on the continent. Then P.A. Whitelock completes the recent history of optical astronomy in South Africa initiated in the OSA 3 volume by M. Feast.

The next two chapters deal with astronomy in the Canary Islands: – the history and rôle, in leading the development of Spanish astrophysics, of the Instituto de Astrofísica de Canarias by its founder and director F. Sánchez;

– the historic and scientific context of the Isaac Newton Group of telescopes,

⁶*Cf.* for instance the recent incident involving impact factors (see *e.g.* Abt 2003/OSA 4, Abt 2004, Heck 2003b, and mainly Sandqvist 2004 in this volume) beyond the arguable exact meaning of bibliometry (see for instance the discussion in Heck 2002/OSA 3, as well as the references listed therein).

⁷See for instance various chapters in Heck & Madsen (2003), as well as Christensen (2003/OSA 4) and Christian (2004, this volume).

⁸See for instance <http://vizier.u-strasbg.fr/~heck/osabooks.htm>



Figure 2. Transportation means can exemplify the organization of scientific research: for instance, rigid paths (trains), limited number of arrival points (aircraft), flexibility of routes and aims (cars and parent vehicles). Taken globally, car driving, with its topology (incl. exploration out of established roads and itineraries) and phenomenology (incl. initiatives, mistakes and wrong choices by drivers), can be seen as one of the best examples of a distributed intelligence modelling dynamic research. (Photographs by the editor.)

with a look towards the future, under the joint authorship of R. Rutten & J. Méndez.

Further North, E.J.A. Meurs offers then an overview of the development of astronomy in the Republic of Ireland, from the earliest times till the present.

Emphasis on experience sharing is the main feature of the two following chapters: M. Golay tells us of his activity in leading Switzerland into organizations such as the European Space Agency (ESA) and the European Southern Observatory (ESO), while F. Comerón focuses on the observing in service mode as carried out at ESO's Very Large Telescope.

W.R. Dick & B. Richter then detail the International Earth Rotation and Reference Systems Service (IERS), its activities and its future prospects. Subsequently the evolution of astronomy, astrophysics and cosmology at the Max Planck Society is described by J. Trümper.

Moving to more sociological themes, S. Débarbat comments statistics on the percentage of women in the International Astronomical Union (IAU); Å. Sandqvist discusses the unfortunate experience with impact factors of the journal *Astronomy & Astrophysics (A&A)*; C.A. Christian describes a study on the impact of the Hubble Space Telescope (HST), essentially towards the US public; and N.A. Grice tells us of her work devoted to bringing astronomy to visually-impaired people.

The last three chapters deal with the impact of astronomy on society at large: C. de Jager & M. Drummen details the exemplary popularization of astronomy in the Netherlands; N. Cramer beautifully documents⁹ the visionary and fascinating work of L. Pešek as a space artist; and finally G.V. Coyne discusses what may be a matter on meditation for many Christians.

The book concludes with the updated bibliography of publications relating to socio-astronomy and to the interactions of the astronomy community with society at large.

Acknowledgments

It has been a privilege and a great honor to be given the opportunity of compiling this book and interacting with the various contributors. The quality of the authors, the scope of expertise they cover, the messages they convey make of this book a natural continuation of the previous volumes.

The reader will certainly enjoy as much as I did going through such a variety of well-inspired chapters from so many different horizons, be it also because the contributors have done their best to write in a way that is understandable to readers who are not necessarily hyper-specialized in

⁹See also the CD going with this book.

astronomy while providing specific detailed information and sometimes enlightening ‘lessons learned’ sections.

I am specially grateful to Caty Pilachowski, President of the American Astronomical Society 2002-4, for writing the foreword of this book and to the various referees who ensured independent and prompt reading of the contributions.

Finally, it is a very pleasant duty to pay tribute here to the various people at *Kluwer Academic Publishers* who are enthusiastically supporting this series of volumes.

The Editor
Piedrasluengas
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