

HIGHER EDUCATION TO-DAY—A BILLION EURO MISUNDERSTANDING

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Abstract. We argue that a radical departure from the traditional mindset of European universities is required to serve the need for massive professional education in the 21st century.

In 1961, when Robert Gover first published his “educational” novel under the title of “A One Hundred Dollar Misunderstanding”, it was praised by people like Gore Vidal and Henry Miller, while the New York Times, shocked, refused to advertise the book. For the reader who has not been around at the time, here is a short synopsis [1]:

“College sophomore J.C. Holland, fortified by his father’s simplistic traditionalism, enters a ‘Negro house of ill-repute’ to meet Kitty, a fourteen-year-old prostitute. Slightly ashamed to be there, but feeling the need for the kind of educational complement such a place can provide, young J.C. flashes a gift from his aunt, a hundred dollar bill, to Kitty, who is just sure it is meant for her.— Misunderstanding from them both abounds, along with an insightful tour of the hypocrisy underpinning modern society.”

Higher education to-day also abounds with misunderstanding and false pretences, however here we are not dealing with a two person game: the misunderstandings are multi-dimensional and much more complex. Correspondingly, the price tag and the entrenchedness of the problem are much, much higher.

It is the resulting dramatic misdirection of public funds and waste of human talent and energy which justifies a new look at and a painstaking study of this complex system. Universities are an old social construct. About these the eminent German sociologist Helmut Schelsky [2] has said:

“Die höchst realen und unaufhebbaren Superstrukturen unserer Gesellschaft, insbesondere die großen bürokratischen Massenorganisationen der Daseinsfürsorge, fixieren und zementieren das Sozialbewusstsein ihrer Entstehungsepoche, abgelöst von ihrem eigenen Funktionswandel und den Strukturveränderungen der Gesamtgesellschaft. Wir erleben die Vorgänge einer modernen Mythenentstehung am eigenen Leib, aber wir sind auch die Neuprimitiven, die in dieser mythisch verstellten Welt als ihrer Wirklichkeit leben.”

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In translation: “The highly real, and irremovable superstructures of our society, in particular the big bureaucratic mass organizations of social welfare, fix and cement the social consciousness of the era of their creation, uncoupled from their proper functional evolution and from the structural changes of society as a whole. We experience ourselves the birth of myths¹, but at the same time we are the neo-primitives who live in this mythically obstructed world as our reality.”

In the terminology of economics one would add that Higher Education is locked into a false minimum of the cost function. The barriers of traditions turned into taboos block it from moving to a more cost effective and adequate position.

Just by way of a small historic example: In Germany the meagre amount of—at best—seven months of annual teaching is of course criticized. Politics and media amuse themselves periodically with a discussion which repeats itself almost verbatim every year, without the tiniest effect on university calendars. This particular feature of higher education is cemented by at least two myths:

- the professorial one is that scientific research would collapse without closing schools for five months each year (wrong: see e.g. the summer teaching at US universities)
- the student myth is that higher education can only be financed if students work odd jobs half of their time instead of investing all their time and energy into the progress of their studies (wrong, needless to say, if an adequate fellowship system is put into place).

It is interesting to go back to the origins. In the respected Meyer Encyclopaedia of 1888 [4] one reads that (my translation):

“...in recent times, for lack of firm regulations, university vacations have expanded greatly, to 1 1/2 or two months in the spring and three in the summer Various measures to stop this abuse are being contemplated but an effective one has not yet been found.”

This is how myths—“taken for granted as legitimate, apart from evaluations of their impact on work outcome”—and taboos are born out of abuses, and born to stay, it seems.

From the outside, universities are often criticized for not having the capacity (strength? will? insight?) for endogenous reform. Why is this so? Does not the academic community have all the know-how that it would take? Don’t we all share long lists of complaints, criticisms, ideas for improvement when we sit down with a colleague, over a cup of coffee or, even better, a glass of beer? But beyond this private exchange one does not hear the voice, or voices, of the academic community—and here I do not mean the meta-structures such as institutes for the research of research, or the like—but the general academe, people like you and me.

Why not attack more aggressively the obviously existing problems? Depending to the standing of whom you ask inside academia, the response is one of the following two:

- it is not worth the bother; “they” won’t change things anyway.

¹ “...the myths generating formal organizational structure...are highly institutionalized and thus in some measure beyond the discretion of any individual participant or organization. They must, therefore, be taken for granted as legitimate, apart from evaluations of their impact on work outcomes.” [3]

Or else:

- For heaven's sakes; if I said these things as directly as that, I would only get mobbed or penalized, and nothing else will come of it.

I do feel strongly that we should speak up a bit more, and get involved in spite of these obstacles.

1 Visions—Missions

Peter Glotz, in his book on the German university (“Rotten to the Core?”) [3] quotes that there are some 85 public institution which have survived fundamentally unaltered for the past 500 years, 70 of them are universities.

However universities as we know them now took their shape in the 19th century. Essentially, universities blossomed in parallel with the rise of bourgeois society. In Germany the educational debate even to-day is still dominated by the paradigms formulated by Wilhelm von Humboldt, Prussian minister of “Cult and Public Education” and founder of Berlin University in 1809. Further down we will have occasion to refer to his famous postulate of the “unity of teaching and research”.

Towards the end of that century the European bourgeoisie was confident that it had conquered the world, politically, economically, and also intellectually. European universities were the power houses of this intellectual conquest and were the model for higher education efforts in many other parts of the world.

1.1 1900: Universities Shining

In what follows I shall mainly base my analysis on the German system, primarily because I know it best. However, the transition from elite to mass education is a global one, and institutions, conditions, traditions and challenges are sufficiently similar to justify this presentation beyond the national confines.

In 1896 Germany had 34.698 university students, (and 1131 full professors, one for every 30 students).

Students numbered 0.06 % of the national population, marginally less than in France, slightly more than in Great Britain or in Austria.

The professorial role model was the solitary genius, sharing his wisdom with a handful of devoted disciples.

The model student roamed freely and independently among the academic treasures of culture and discovery.

Universities were seen and functioned brilliantly as national centres of Scientific and Cultural Excellence, providing the education of a small national elite, with a socio-culturally homogeneous student body.

Ministries were capable of massive strategic interventions to foment scientific innovation (see e.g. the sustained ministerial support for the emerging science of immunology and for v. Behring, first Nobel Prize winner in Medicine, 1901).

1.2 2000: Needs and expectations

In the year 2000 2 million students, or almost 3 % of the German population were enrolled in higher education, and there were now 12.500 full professors, one for every 160 students.

The student population had increased by a factor of almost 60 (the national population by 1.4, the number of full professors by a factor of ten).

National expenditure for Higher Education had risen to more than 18 billion euro annually, the drop-out rate to an average 21 %, with large spread: only one in eight philosophy students concluding his course.

The ivory tower role model for the professor has not changed significantly, while the real life professor is now requested to be as amusing as he possibly can be, to stir up some attention among a few hundred students in front of him, and will then get suggestions like: “Hey why don’t you first develop our motivation?” At a certain point the University of Hamburg estimated that between 30 and 50 % of incoming students were not really sure what they might want to study and was planning to offer an extra year of general introduction to fix this widespread lack of direction.

In relative terms the student segment of the age group has increased to some fifty times what it was a century ago.

This corresponds to the demand structure of labour market which has moved heavily from unskilled to white collar, skilled labour, and is becoming increasingly demanding regarding the educational level of the skilled professions.

This must have an important impact on the tasks and even on the definition of Higher Education. What is the direction of this impact? And: has the university system changed accordingly?

1.2.1 Needs:

There is a wide consensus on the following tasks. The higher education system should now:

- provide massive and professionally qualifying education for 40 to 50 % of the age group,
- take into account a wide spectrum of cultural and educational backgrounds, migration, minorities,
- as before, ensure excellent education of scientific, professional, and cultural elites which should be competitive on a global scale,
- integrate national centers of Scientific and Cultural Excellence.

1.2.2 Expectations:

Beyond these fundamentals, different groups have further and varying expectations regarding the role to be played by the institutions of higher education, such as

- A gateway to assured and/or well-paid careers
- A habitat for self-determined academic pursuit
- A source of economically fruitful innovation and social expertise
- A provider of Continuing Education

- A guardian of culture, national and beyond
- A bridge to foreign societies, cultures and economies: through their study but also through foreign students, research cooperations etc.
- A cost conscious, efficient operation
- A quality conscious service

Note that the services traditionally rendered by universities are still in demand to-day, there is no reason why, with due adaptations, the universities should not continue to render them.

The problems arise from the fact that in the past one hundred years there has appeared a vastly increased and still increasing demand for a work force with advanced and rapidly varying professional skills. Universities were not prepared and not enthusiastic to really address this massive new task—maybe rightly so—but on the other hand they did accept the growth and means which government showered on them in a feeble minded attempt to solve the problem..

In consequence we now have inflated mass universities but an extremely deficient and inefficient mass education; essentially we still base the education of up to one half of the age group on paradigms which worked fine for a very small and very different clientele.

This dysfunctionality amounts to an enormous waste of resources, public money ill spent, frustrated teaching staff, wasted years for our students, corresponding economic losses, and, rightly so, a disgruntled public.

1.2.3 Mismatches and Contradictions

Where do things clash? We observe numerous cases of conflicting expectations such as

- Cultural mission vs. economic valuation
- Societal demands vs. academic freedom
- Mass education vs. elite education and research quality vs. cost standardization of vs. competition in the system

And there are too many ill-adapted structures. Here are just a few examples.

- A massive need for academic teaching while the academic incentive system is based on research
- Tuition fees: by now considered necessary and even beneficial by an increasing number of representatives of all the sides involved, yet politically unacceptable, in Germany even banned by federal law
- Academic teaching at German law faculties has little to do with the requirements of state examinations and as little with those of professional practice: students must acquire much of their basic training from commercial tutors outside the university. A successful reform program was scrapped because of cost.
- Teacher education justifies much of the size and in some case the existence of (typically but not only) humanities departments. Yet these students are very badly served as far as their specific pedagogical preparation for school service is concerned.
- International standards of excellence vs. national mandarins as determinants of scientific development.

In summary: 19th century solutions for 21st century problems: the academic ivory tower is still relatively comfortable for (too many of) the neo-primitives, but completely unsuitable to perform its most pressing tasks.

2 Cutting the Knot

It is high time to rethink higher mass education. Clearly the size of the task and the amount of human and financial resources it involves call for a much higher level of stringency and discipline of all stakeholders:

- serious intensive study
- intensive and dedicated teaching, tutoring, counselling,
- adequate financing

Since this list borders on the politically incorrect, I hasten to say that any permutation of it is equally acceptable. Traditional universities are ill suited to face the ensuing challenges:

- Students submitted to a rigid regime of courses prescribed by a binding curriculum of e.g. four years?
- The (majority of) professors devoting their time and effort mainly to a rigid regime of teaching, relinquish their traditional privileges of auto-determination and the pretence that they are all predominantly doing important research with little time left for teaching?
- Are they ready to develop and implement curricula which will mainly be oriented towards an efficient professional training?

Of course there is also the political side. Will government

- have the courage to implement profound reforms, will it have the know-how to rethink ranking and remuneration for a new majority of professors who are no more to be gauged by the traditional peer review based on their research success?
- provide the financial means for intensive teaching and counselling so that students can concentrate on studying?
- develop steering instruments to prevent excessive mismatches between student enrolment and job market predictions?

Whatever the details of a suitable organizational reform may be, it is high time to rethink “from scratch”

- the provision of a massive higher, profession-oriented education, not as an exercise performed grudgingly by the traditional university system which was not designed to handle it. Rather, this is a task of pre-eminent socio-economic dimension which hence needs to be optimized without traditional obstructions.
- the articulation of this mass education with advanced, elite education, and research!

2.1 Bologna 1999: A chance in a Lifetime

A mountain had gone into labour and was groaning terribly. Such rumors excited great expectations all over the country. In the end, however, the mountain gave birth to a mouse. [6]

In 1999 the consecutive formation of Bachelors and Masters was flaunted and propagated from the European level down into the national systems as the most recent panacea. Its impact on higher education and beyond warrants a short look at its genesis. In the 1998 “Sorbonne Declaration” the cornerstones were laid by the Higher Education ministers of France (Allegre), Germany (Ruettgers), Italy (Berlinguer), and the UK (Blackstone). The first three were at the time confronted, respectively, with the glaring disparity between the elitist *Grandes Ecoles* versus severe quality problems of French higher education in general, with the unmanageable Italian university system, and with the pressing need for reform in Germany. As in many such cases where the courage for national action is lacking, legitimacy of intervention was to be derived from the European level and from the US role model; a “rationalized myth”¹ was born [7]. Its cornerstone postulates were first of all a two tier pre-doctorate system of Bachelor and Master, where the American four-plus-one year model was discarded in favour of three-plus-two upon intervention of the German minister who felt that the superior quality of European secondary schools would warrant a three-plus-two year schedule.

Nevertheless the three year Bachelor was postulated as ensuring employability of the graduates.

European student and teacher mobility were to be enhanced and a European quality insurance system put in place.

Technical features followed under the umbrella of the Bologna “myth”, such as the passage from courses to modules, with an international credit system (ETCS), and the emphasis on competences in place of knowledge as teaching, learning and exam essentials. In consecutive follow-up conferences, new politically desirable add-ons were launched, and consistently ministers radiated great satisfaction for having achieved European harmonization by what in reality was just a European patch on the old national systems whose own rationalized myths have in practice a considerable effect in counteracting the harmonization dogma. Just as one example, British schools do not feel that they should bow to the newcomers in the Bachelor-Master arena and their set of rules, and are much happier to recruit non EU students whose tuition fees are much more interesting than the much lesser ones that can be collected from a EU student. In the same vein, European harmonization is increasingly seen less in the light of European mobility but more and more as an asset in recruiting students from outside the EU.

One would not call this political actionism if it had been preceded by a careful study—discipline by discipline—of whether and how the new courses and degrees, can lead to the promised professional qualifications. Instead one German regional minister decreed early on that only 20 % of the bachelor graduates should be allowed to embark on a master’s course. Reason quickly prevailed, and by now more than half of the students find the bachelor insufficient² and opt for a master degree.

Hence maybe universities were not so ill advised in their tentatives to just cut their accepted curricula into two pieces, calling the first part a bachelor

¹For the role of rationalized myths in the elaboration of complex relational networks see [3]

²So does the organization of German physics departments KFP, and recommends that **all** physics students should take the two year master course. [8]

and the second a master's course: at least the packet of the two amounts to a proven and industrially viable curriculum.

In conclusion, the Bologna scheme

- would have required a much more careful implementation taking into account the specific necessities of a professionally qualifying first degree in different fields of study
- should have been used not to put yet another patch on a university system which is not structured to serve present needs, but instead as a unique opportunity to at long last, revamp the whole system according to the needs of a knowledge society and knowledge based economy.

In his most recent book “Wunschdenken” [9] (Wishful Thinking) and after a long active career in German and regional politics, Th. Sarrazin identifies what he calls the Five Original Sins of Politics as follows:

Ignorance: blinded by illusions with regard to realities, using models of reduced complexity that lead to erroneous conclusions

Arrogance: illusions with regard to the possibilities for intervention,

Recklessness: disregard of collateral damages

Egoism and deceit: getting the upper hand over truthfulness

Self-deceit: becoming the victim of one's own propaganda, starting to believe arguments which were launched merely for tactical purposes.

Sarrazin's expertise and experience is mainly in fiscal policy; let us hope and watch out that the politics of Higher Education will be as free as humanly possible of these afflictions.

Unfortunately the unique chance for a true restart under the European banner has been wasted, and it is hard to imagine how and when there will arise anew opportunity and the necessary political courage to truly adapt higher education to the needs of the 21st century¹.

3 Options

3.1 Professional Education by Polytechnic Schools instead of traditional Universities?

I will use the term polytechnic for the basic structure of higher education; more than the alternate term of undergraduate it can serve as a constant reminder of the professional qualification that it must provide.

In Germany, polytechnic schools are called Fachhochschulen. Characteristically, they could not resist the temptation to choose “Universities of Applied Science” as their English denomination. They offer stringent 4 year courses of study; curricula and the teaching staff are selected with the primary goal of providing a professional education. In disciplines where they offer comparable courses of study, they often do so at lesser cost and higher success rate. For years the German Science Council has been pushing to give them a larger role [10], with insufficient results. A remarkable exception when the Berlin state government announced a policy to increase the share of the polytechnics

¹These needs are highlighted by the fact that since 2013, more men and women in Germany opt for professional training through Higher education, than via the traditional dual job-plus-school system of apprenticeships.

in higher education. The compelling argument then was that the state of Berlin was close to bankrupt. Unfortunately this is what it takes to slaughter holy cows.

At present 41 % of the student population enters polytechnical schools, 58 % enter universities [11]. How exactly should this ratio be modified? This can only be answered by a careful study of demand (economic, but also societal, cultural,...). One very well informed observer has pointed out that top qualification positions amount to no more than 10 % of the work force in Germany. This would boil down to less than 25 % of the student body and would probably not be far amiss for a rational relative size of the universities as institutions of advanced studies and research. Another, more restrictive benchmark is provided by the fact that in the US some 12 % of the student population pass through the 125 listed research universities.

This underscores the extreme wastefulness of educating the bulk 75 % in exactly the same way as the top 25 %. If you offer to the professional trainee an educational environment which may be fitting for a brilliant future researcher, or vice versa, all sides will be ill served and they as well as society will pay a heavy price.

So the primordial challenge is to separate the tasks!

Why does this not happen, what is it that has to change?

- As in the defunct heavy industries of Eastern Europe, universities to-day are much too frequently gauged and financed by parameters reflecting quantity instead of quality. They could become much better if they were allowed to become much smaller without being penalized for it.
- A completely new appreciation and new incentive systems are needed to validate the polytechnic part of higher education. Instead of trying to be “like universities” they must be encouraged to develop and take pride in their specific task and strength. I.e. the political signal has to be twofold:
 - 1) you are not universities
 - 2) your job is different, but just as important and will be rewarded accordingly

A professorial prestige and reward system for these schools must be developed which is oriented by the quality of teaching, not by the ill-suited research paradigm handed down from traditional Higher Education.

- Correspondingly, polytechnic degrees must then give access to the same professional careers as the corresponding ones from universities, particularly in the public employment sector.
- Articulation with advanced studies needs to be tackled. At present each side is trying to fish in the other’s pond, effectively trying desperately to do things for which they are less qualified. The polytechnics would like to pride themselves with the privilege to produce PhDs; the universities try to bloat their portfolios with disciplines such as Nursing or fantastic new Bachelor courses such as “Applied History”, “Applied Literature and Culture Science”, “Culture Manager“, “Water”, “Popular Music and Media”, which have been sprouting like mushrooms at German universities¹, much to the amusement of the media.

¹On the website [12] offered by the German Rectors’ Conference one finds no less than 9.984 of such courses being offered as of this writing.

Sir Richard Livingstone, Oxford Vice-Chancellor in the Nineteen-Forties, is quoted with the observation: “The sign of a good university is the number of subjects that it declines to teach”. And we add that some such subjects may well be as important and sometimes more so than those taught at Oxford; they just do not belong there. But present conditions are such that neither side feels that it should better do what it knows to do best.

What is needed is the political courage for a clear definition and separation of tasks between professional and advanced education. Both have their intrinsic and indispensable merits and should be appreciated and furthered accordingly. But only if both sides “know their place” will the path be free from an unsound competition to a natural cooperation, only then will they be motivated to collaborate without infringing on the partner’s role and expertise.

3.2 Polytechnical Schools within Universities?

Can a dedicated professional education be embedded in the universities? This would go a long way towards an efficient articulation with advanced studies and research. In Germany, in the seventies, this has been tried as a graft on the traditional system, under the name of “Gesamthochschule” . The polytechnical courses and staff were included into what otherwise was the traditional university. These much acclaimed Gesamthochschulen were in fact very quick to introduce the title of University in ever larger font into their letterhead, and after 30 years the experiment was scrapped; it was recognized as an irreparable failure by the same political forces who had introduced it with so much fanfare one generation before.

What is it that went so dramatically wrong? In public declarations one finds that

- The name of Gesamthochschule is internationally an unknown and lacks acceptance
- The polytechnic and the university type courses were not well integrated
- Demand for courses offered was insufficient
- Research was not strong enough

None of these criticisms goes to the roots and causes; probably the failure was too fresh to admit a balanced investigation. The explanations that I have heard privately all had to do with the human factor. Academics with a university background were not willing to “settle for less” (one Gesamthochschul-Rector publicly disavowed the reform which he should represent, by declaring: “Where I am, there is University!”). On the other hand, professors with a polytechnic background either wanted to be considered “as good as the others”, with the right to grant PhDs and to neglect their proper teaching duties. There were also others who preferred to shut themselves off from contact, dialogue and interaction with the units of advanced studies.

All of this points once again to the mismatch between teaching needs and academic reward structures, and the lack of a clear division of tasks. Can these problems not be resolved? We better find out: just three years after these Gesamthochschulen were scrapped, another federal state was planning to incorporate an existing polytechnical school into a university.

In the American model, undergraduate colleges function efficiently by themselves, but also under the roof of large and prestigious universities. Pragmatic reward systems respond directly—critics will of course say: too directly—to the demands of the educational market.

In continental Europe, instead of such negotiated, demand driven settlements, the tendency is strong to entrust the state with the guardianship of socio-economic checks and balances.

As a result we run our universities as subordinate government facilities, under constant and detailed fine tuning of their day to day operations by the ministries of education. University autonomy, so called, becomes a political priority mainly in times of financial crisis, and only insofar as it offers a convenient possibility to shift the responsibility for painful financial cutbacks away from the political level, down to the universities. There were ministries that proudly went to the public with the happy news that from now on universities will be granted the right to fill professorships autonomously, without ministerial intervention. At the same time the same ministry will discretely advise the universities that for the foreseeable future they should not fill any vacant academic position, since salaries for replacements will be difficult to fund within the upcoming “autonomous” budgets. This is not part of a strategic breakthrough but rather yet another patch to fix the ailments of profoundly inadequate structures.

3.3 Is Paradigm Change possible?

Imagine yourself working within the traditional university, subordinate to the continuous fine tuning interventions of the ministry, with all the bureaucratic procedure and the feeling of helplessness and frustration that must naturally arise from such a system.

And then one day everything has changed:

- The ministry concentrates on strategic national issues of educational and research development.
- It implements these policies through three year service contracts with the individual universities.
- Your university and all the others in the country are independent, self-governing public sector enterprises.
- The universities (and not the state!) employ the staff they need to perform the tasks which the nation expects from them. Etc., etc., . . .

Utopia, you will say. But it is happening before our eyes. What I have listed are some of the cornerstones of Austrian university reform, in force since January 1 of 2002 [13].

These dramatic changes deserve our scrutiny. With all the talk about university reform and autonomy one is astonished how little attention this particular reform got in the public discourse. The message here is not that the ultimate solution has been found, but yes: bold steps are possible if enough political will can be mustered to undertake them.

Of course there are other myths which must fall for a successful new beginning; I mention only two.

3.4 Other myths

“You cannot quantify scientific excellence, you cannot compare”. Evaluation and Benchmarking cannot be discarded like this at a time of limited resources. Scarcity of funds makes a rational dispute over their distribution inevitable and important.

Peer review works remarkably well in the academic domain, and as a practical measure one should sort the outcry over evaluations roughly into two bins, using the comments of the highly qualified protesters to improve the system, and discarding the rest.

“Free Higher Education is a social added value”. Already Karl Marx new better when asked why poor people’s taxes should finance the higher education of those who are better off. The true social achievement is open access to Higher Education; but there is no good reason why the corresponding public expenditure should not later be reimbursed by those who have become economically successful, e.g. as an add-on to their personal income tax.

4 Summary

Let me summarize here the central challenges that any such reform must tackle:

- Professionalize massive undergraduate higher education, i.e. professionalize both the process and the content.
- Make advanced higher education thoroughly excellent. It is on this level where the often proclaimed unity of research and teaching still has its proper habitat.
- Ensure smooth transition of students and dialogue of staff between the two levels.
- Provide societal guidance through a strictly strategy-oriented ministry
- Provide for a professionalized and truly autonomous management of educational units.

Acknowledgement

This article is based on and updated from an article in the Portuguese “Gazeta de Física” [14]. We thank the editor for permission to use the material therein.

References

- [1] https://books.google.pt/books/about/One_Hundred_Dollar_Misunderstanding.html?id=CRNy6kuqQbUC&redir_esc=y
- [2] Helmut Schelsky: “Auf der Suche nach Wirklichkeit.” Goldmann, München, 1979.
- [3] John W. Meyer, Brian Rowan: Institutionalized Organizations: Formal Structure as Myth and Ceremony. Amer. J. of Sociology 83, 340–363 (1977).

- [4] Meyers Konversationslexikon, Eine Enzyklopädie des allgemeinen Wissens, 4. Auflage, Leipzig, 1888–1889, vol. 15, p. 1022. On-line at <http://susie-technik.uni-ulm.de:8080/meyers/servlet/index>
- [5] Peter Glotz: “Im Kern verrottet? Fünf vor zwölf an Deutschlands Universitäten.” Deutsche Verlags-Anstalt, Stuttgart, 1996.
- [6] Aesop’s Fables. A new translation by Laura Gibbs. Oxford University Press (World’s Classics), Oxford, 2002.
- [7] Jürgen Schriewer: “Bologna”—ein neu-europäischer “Mythos”?—Zeitschrift für Pädagogik 532, 182–199 (2007).
- [8] Konferenz der Fachbereiche Physik: Zur Konzeption von Bachelor- und Master-Studiengängen in der Physik (2010). http://www.kfp-physik.de/dokument/KFP_Handreichung_Konzeption-Studiengaenge-Physik-101108.pdf
- [9] Thilo Sarrazin: “Wunschdenken.” Deutsche Verlags-Anstalt Muenchen, 2016.
- [10] German Science Council (Wissenschaftsrat): See e.g. Empfehlungen zur Rolle der Fachhochschulen (2010): www.wissenschaftsrat.de/download/archiv/10387-10.pdf and Empfehlungen zur Rolle der Fachhochschulen in 2002: www.wissenschaftsrat.de/download/archiv/5102-02.pdf
- [11] Bildung in Deutschland 2016. W. Bertelsmann Verlag, Bielefeld 2016
- [12] http://www.hochschulkompass.de/en/degree-programmes/search/study-in-germany-advanced-search/search/1/studtyp/1.html?tx_szhksearch_pi1%5Bxtend%5D=1&tx_szhksearch_pi1%5Bsit%5D=1&tx_szhksearch_pi1%5Bsitenabled%5D=0&tx_szhksearch_pi1%5Bmaster%5D=0&tx_szhksearch_pi1%5Bpointer%5D=2
- [13] Universitaetsgesetz 2002
<http://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20002128>
- [14] L. Streit: Ensino Superior Hoje—Um Mal Entendido de Mil Milhões de Euros. Gazeta de Física 28, 14–21 (2005).