Differentiation and Segmentation in Swiss Higher Education

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1. Introduction and Problem

In comparison to other modern industrial nations, the expansion in higher education and the resulting differentiation processes of the tertiary educational sector started to develop late in Switzerland. The institutionalization of the universities of applied sciences at the beginning of the 1990s is, beside the Bologna reform, the most far-reaching development of the Swiss system of higher education. The developing process of the universities of applied sciences was advanced by the initiative of different occupational groups, representatives of professional secondary schools and political actors. The legislator implemented these ideas rather quickly. Programmatic structural requirements by the federal government (Bund) and the cantons thus govern the development of the universities of applied sciences (cf. Zosso 2006).

In the middle of the 1990s a total of eight state accredited universities of applied sciences emanated from 80 professional secondary schools and are since then characterized by a huge growth. The degree programs of the universities of applied sciences consist of the "traditional" fields of the former professional secondary schools (e.g., technology and IT, economy, architecture, civil engineering and planning) as well as "newcomer" fields[2] (e.g., health, social work, design, music, theatre and other arts) that have increased the variety in special fields. The origin of this new academic type structures the Swiss higher education anew and led to a dynamic development of the whole tertiary sector. Basically, universities and universities of applied sciences should be "equal, but yet different“ in teaching, research and advanced training. This view is associated by the fact that the monistic university system shall change to a binary system (cf. Arnet 1997). All together the institutionalization of the universities of applied sciences is viewed as a success (EFHK 2002; Pätzmann 2005; Huber 2006).

[1] This paper is based on first results from the project "Programmatik und Entwicklung der Fachhochschulen in der Schweiz" which is supported by the GEBERT-RÜF-Foundation.

[2] We are looking at the so-called "newcomer" fields from the perspective of the universities of applied sciences. They are characterized by the fact that they are neither integrated into the institutional development of the vocational training system nor exist, or only selectively, at university level. Only under pressure of the cantonal legislator have the "newcomer" fields been ranked at university level. In contrast to the "traditional" fields the "newcomer" fields cannot look back on a long past.

The paper will compare the nominal condition of the universities of applied sciences, as it has been defined at the beginning of the 1990s, with the current situation today. At the same time the universities are consulted as a benchmark. The paper will be structured along the following two questions:

(1) Which programmatic goals were planned by the legislator at the national level for the staff and students at universities of applied sciences?

(2) To what extent have the universities of applied sciences realized the programmatic goals of the legislator until this day?

To be able to answer these two questions, we first take a look at the programmatic ideas of the legislator. We report the quintessence of the political discourse with regard to the objectives of the development of the universities of applied sciences. Further we analyze data by the Federal Office for Statistics (FOS) about staff and students that allow for conclusions about the current situation regarding the universities of applied sciences. We contrast the universities of applied sciences to universities on a few selective points. This allows to recognize differences or common characteristics of both university types. Finally, we look at the results in the whole context of the academic system and draw first conclusions.

To answer the questions we draw upon the theoretical framework of Pierre Bourdieu's (1988) "Homo academicus". He defines the structuring of the academic field as "a universe" of its own with an extremely specific interest structure (Illusio) and functional logic (Nomos). Different actors with different interests get involved in the developing process and thus form the structure of the field. These assumptions clearly reveal themselves in case of the universities of applied sciences. The representatives of the "traditional" fields tried to reach a revaluation of their own discipline and its certificates while it became possible to the "newcomer" fields to first-time position their discipline in the academic system. Furthermore, it can be assumed that with the institutionalization of the universities of applied sciences, the political actors pursued the plan to re-structure the academic landscape all together and sought to differentiate it at the same time. By establishing the universities of applied sciences, more and more fields emerged which differentiated themselves against each other and partially organized themselves hierarchically. This becomes

clear when looking at the different functions and performance mandates (Leistungsauftrag) of the two university types.[3]

Following, we take up two aspects of this complicated development. Thereby we focus on the indicators "staff" and "students" which have turned out to be the key dimensions in the analysis of both university types in our research project "Programmatik und Entwicklung der Schweizer Fachhochschulen". The following characteristics of the two indicators are of interest: (1) The admission requirement of the students, and (2) the qualification structure of the scientific staff. In accordance with the theoretical considerations we assume that education on an academic level is the result of an interaction between the human capital of teachers and students and is viewed in the context of the respective learning goal. We ask how students and scientific staff position themselves in the academic system. On the one hand, the entry qualifications of the students and the question, to what extent the "Berufsmaturität" (higher vocational school leaving exam) has become the most common way to the universities of applied sciences is of deeper interest. On the other hand, the scientific staff is an indicator for the application of resources in higher education, but also for the structure of the division of scientific labor which is relevant for teaching, research and advanced training (cf. Dürstler / Knecht 2005; Vellacot 2006; Jaberg / Koller 2008). In this context, the qualification of the scientific staff is of pivotal interest. We also look at the degree of employment of the scientific staff. Finally, we discuss the question how teaching at an academic level is divided between the different personnel categories. We assume that students and scientific staff position themselves in the system of higher education by means of their degrees.

2. Programmatic Goals of the Legislator

In the preparliamentary process, access qualifications of the students as well as the qualification prerequisite of the scientific staff were discussed. Human capital of the students at universities of applied sciences and universities is influenced by the

[3] While universities offer a scientific education and pursue basic research, the curriculum of universities of applied sciences is oriented towards practice and is to a large degree tied to the vocational training. The performance mandate of the universities of applied sciences was extended by applied research which should assure knowledge transfer between science and practice.

admission requirements to the respective studies. In the message (Botschaft) to the law of universities of applied sciences (Fachhochschulgesetz), the following distinction is defined with regard to the admission to both university types: "The admission to the universities of applied sciences results from the "Berufsmaturität" while the admission to universities primarily results from a "gymnasiale Maturität" (general school leaving exam). (29. Bundesblatt 1994, p. 804). The meaning of a professional previous training for a study at a university of applied sciences is underlined in the whole legislation process at a national as well as a cantonal level. On the one hand, this is ascribed to the fact that a practical previous training is viewed as an unavoidable prerequisite for the application-oriented teaching at universities of applied sciences (cf. DIS 1990, Botschaft FHSG, 29. Bundesblatt 1994). On the other hand, these circumstances can be explained by the attempts to strengthen the professional training. The decline in apprenticeship relations and the occurrence of a lack of skilled labor shall be countervailed by the creation of attractive educational possibilities for manual workers at an academic level (Pätzmann 2005, Zosso 2006). A general admission (Regelzugang) to the universities of applied sciences is created by the creation of the "Berufsmaturität" for technical, economic and formative occupations in 1993. Access to the universities of applied sciences for students with a "gymnasiale Maturität" is tied to at least one year of occupational experience.

Nevertheless, a general admission to higher education by a "Berufsmaturität" is only intended for the technical, economic and formative universities of applied sciences being subject to the law of universities of applied sciences. Within the limits of arrangements with the federal government, the cantons softened the rules for educational, paramedical, social and artistic universities of applied sciences. For example, no "Berufsmaturität" existed in the area of social work, educational science (Sozialpädagogik) and social animation (Sozialanimation) until 2003. Accordingly, all school leaving certificates on the secondary level II (Sekundarstufe II) were and are generally accepted for admission ("Berufsmaturität" of all specialization, "gymnasiale Maturität", certificate secondary school, commercial secondary school).

The message (Botschaft) also stresses, for the scientific staff, the difference between university of applied sciences and university teachers: "Teachers at universities of applied sciences must dispose of a university diploma and enough labor market experience; their teaching obligation amounts – according to the recommendations of

the common conference of cantonal educational and economic directors (Erziehungs- und Volkswirtschaftsdirektoren) – to an average of 16 to 20 lessons per week, and the main focus of their activities lies with teaching and the supply of services. In contrast, teachers at universities must provide proof of a university degree and successful activity in fundamental research; teaching obligation for lecturers at a university level amounts to six to eight lessons per week, their main focus is on teaching and research.“ (Botschaft FHSG; Bundesblatt 1994).

Neither this message nor the law of universities of applied sciences clearly defines what is meant by "a completed university degree". It therefore remains open whether it concerns a university of applied science degree or a university degree and whether such a degree is on a master ("Lizentiat") or a doctoral level (Ph.D.). Basically, the discourse in the preparliamentary and the parliamentary process shows that graduates of a university of applied sciences as well as university graduates can be appointed as teachers at universities of applied sciences. Besides, the law of universities of applied sciences states that teachers at a university of applied sciences must not just dispose of sufficient, but of several years of occupational experience. Moreover, the teachers should demonstrate didactic qualifications.

Table 1 summarizes the most important normative aspects by which students and scientific staff of both university types can be characterized.

Table 1: Students and Staff at Universities of Applied Sciences and Universities in the Law of Universities of Applied Sciences

	UNIVERSITIES (FHSG)	UNIVERSITIES OF APPLIED SCIENCES (FHSG)
Human Capital of Students	**General Admission** "gymnasiale Maturität" **Additional Qualifications** Examination in general education (graduates with "Berufsmaturität") [4]	**General Admission** "Berufsmaturität" **Additional Qualifications** One year of occupational experience (graduates with "gymnasiale Maturität" only)
Human Capital Teachers	**Requirement Profile** University degree Successful fundamental research	**Requirement Profile** University degree Didactic qualifications Several years of occupational experience
	Functional Specifications Teaching and research	**Functional Specifications** Teaching and supply of services
	Teaching Obligation 6-8 lessons per week	**Teaching Obligation** 16-20 lessons per week, reduction with engagement in research, development, knowledge and technology transfer

Source: Law of universities of applied sciences. Own illustration.

3. Descriptive Analyses of University Level Data

We look at different human capital characteristics for both university types for 2007 to be able to analyze the admission requirements of students and the personnel structure at universities of applied sciences (always in comparison to the universities).

3.1 Admission Requirements for Students in Higher education

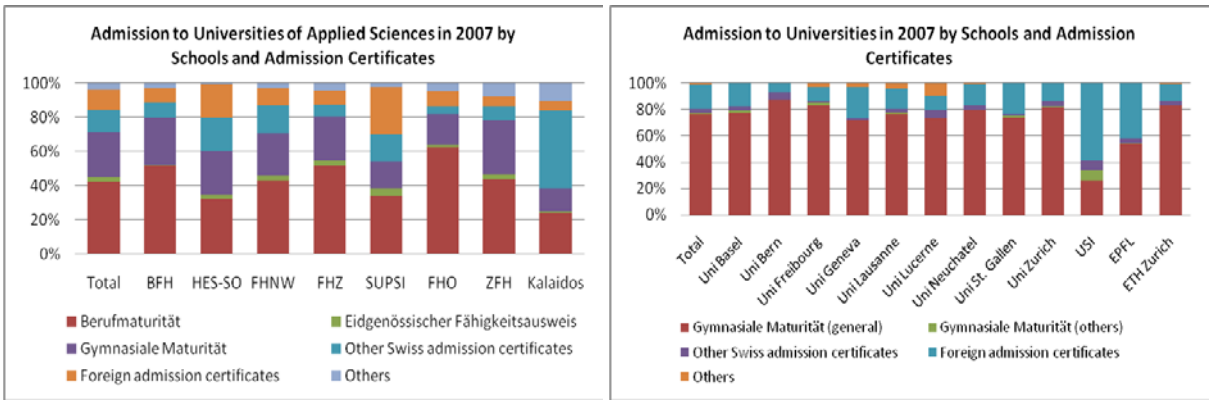
The students' admission certificates[5] document to what extent students with the same or different certificates enter higher education. The figures show that both

[4] By-law about the acceptance of the "Berufsmaturität" for the admission to higher education from December 19, 2003 (valid as of February 3, 2004).

[5] The Federal Statistical Office defines the different admission requirements as follows: "People who merely own an "Eidgenössisches Fähigkeitszeugnis" (EFZ) obtained at the end of their occupational apprenticeship, can, under certain circumstances, start their study at a university of applied sciences after having taken an admission examination. Owners of a “gymansiale Maturität” must demonstrate that they followed an internship prior to their training at a university of applied sciences. People who

university types[6] have different structures in their admission requirements. The universities of applied sciences have a huge variety in accepted admission requirements at different levels with a relatively low share of foreign students. For universities, the "gymnasiale Maturität" unambiguously is the degree for an admission to a specific study. In relative terms, more foreign students start their academic education at universities.

Picture 1 + 2: Admission to Universities of Applied Sciencesand Universities in 2007, differentiated by Type and Admission Certificates



Source: Federal Statistical Office 2009. Own calculations.

It appears that less than half of the freshmen students at universities of applied sciences in 2007 indicated a "Berufsmaturität" as their admission certificate. Relatively large fractions of students enter the universities of applied sciences with a "gymnasiale Maturität"[7]. In addition, the fraction of other Swiss admission certificates is rather high.

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have acquired other certificates on the level of secondary education II (Sekundarstufe II) can also be admitted to studies at universities of applied sciences under certain conditions (entrance examination, proof of equivalent qualifications etc.). These forms of admission requirements are summarized, with the exception of foreign certificates, under "other admission certificates"." (www.bfs.admin.ch). Students with foreign certificates coming from abroad to study in Switzerland thus have acquired their educational achievement outside Switzerland.

[6] University of Applied Sciences: Berner Fachhochschule (BFH), Haute Ecole Spécialisée de Suisse occidentale (HES-SO), Fachhochschule Nordwestschweiz (FHNW), Fachhochschule Zentralschweiz (FHZ), Scuola Universitaria Professionale della Svizzera Italiana (SUPSI), Fachhochschule Ostschweiz (FHO), Zürcher Fachhochschule (ZFH), Kalaidos Fachhochschule (Kalaidos).
Universities: University of Basel (Uni Basel), University of Bern (Uni Bern), University of Fribourg (Uni Fribourg), University of Geneva (Uni Geneva), University of Lausanne (Uni Lausanne), University of Lucerne (Uni Luzern), University of Neuchatel (Uni Neuchatel), University of St. Gallen (Uni St. Gallen), University of Zurich (Uni Zürich), Università della Svizzera Italiana (USI), ETH Lausanne, ETH Zurich

[7] Data from the Federal Statistical Office show that different transitional patterns prevail between both maturity types. 80% of all "gymnasiale Maturität" graduates directly pass into university, while merely half of the "Berufsmaturität" graduates pass into universities of applied sciences directly after their

The share of different admission certificates varies between the different universities of applied sciences. The private Kalaidos University of applied sciences sticks out due to a extremely high share of students with other admission certificates. Moreover, it is remarkable that both university types in the Ticino and French-speaking Switzerland show large shares of foreign students.

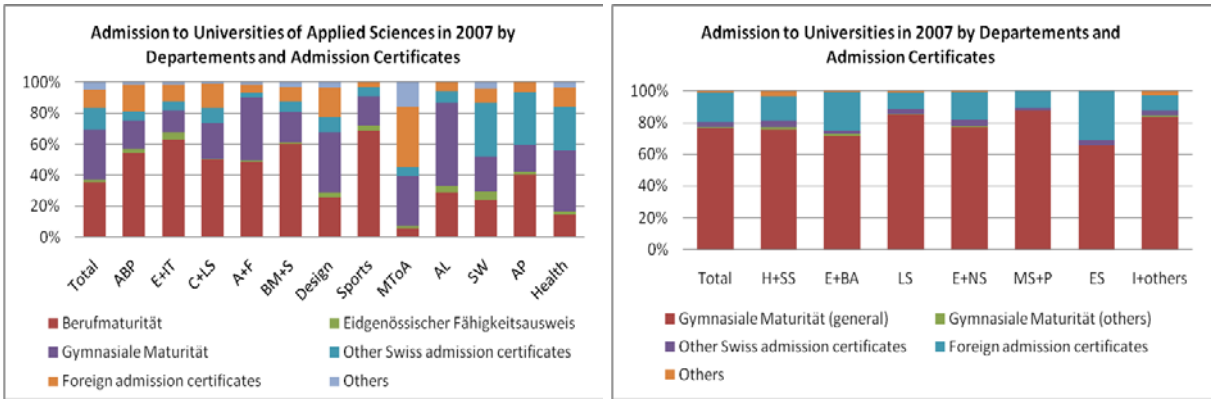
The admission qualifications of students at universities of applied sciences are all together only partly comparably to the qualifications of the students at universities. The admission requirements of universities are obviously managed consistently and hardly deviate from the norm of the “gymnasiale Maturität”. On the other hand, the universities of applied sciences show more variation. This actually deviates from the legislator's goal that the "Berufsmaturität" should become the general way of admission to the universities of applied sciences. For a large part of the students at a university of applied sciences, their study thus is not rooted in a secondary education II (Sekundarstufe II) followed by a vocational training and then a "Berufsmaturität". The close combination of a professional previous training and a study at a university of applied sciences is thus often not guaranteed. Besides, for numerous of "gymnasiale Maturität" graduates, a study at a university of applied sciences has become an attractive alternative to a study at a university. On the one hand, this suggests a certain flexibility in the transition between the secondary education II (Sekundarstufe II) and higher education. On the other hand, this also means that the students start their academic education with rather different prerequisites regarding their general educational degree. Consequently, the qualification of the students at universities of applied sciences is very heterogeneous and it must be supposed that this will reflect itself in teaching.

Along with the differentiation of specific universities, we can compare the students' admission certificates between respective departments[8].

"Berufsmaturität". A possible explanation for this fact is the alternative job market opportunities for "Berufsmaturität" graduates. Because of their previously completed vocational training, they most likely more often choose an employer-employee relationship over higher education, an option not available for "gymnasiale Maturität" graduates. The data also show that two years after completing the "Berufsmaturität", admission to universities of applied sciences rise again. This entails that the average age of students at universities of applied sciences is higher than the average age of students at universities (see www.bfs.admin.ch 2009).

[8] For the UAS: Architecture, Building and Planning (ABP), Engineering and IT (E+IT), Chemistry and Life Sciences (C+LS), Agriculture and Forestry (A+F), Business Management and Services (BM+S),

Picture 3 + 4: Admission to Universities of Applied Sciences and Universities in 2007, differentiated by Department and Admission Certificates



Source: Federal Statistical Office. Own Calculations.

The universities again show a homogeneous picture regarding the admission certificates for the different departments. The universities of applied sciences are characterized by a clearly more manifold composition. However, a separation between the afore mentioned "traditional" and "newcomer" fields is visible.

The fraction of students (with a general qualification for university admission) with a professional or a general-education degree is large and the fraction of other admission degrees is small in the "traditional" fields of the universities of applied sciences. The strong coupling of the "traditional" fields to the vocational training becomes obvious, such that the "Berufsmaturität" carries more weight. In addition, the "traditional" fields constitute alternatives to a university study which explains the relatively large fraction of "gymnasiale Maturität" graduates. The structure of the "traditional" fields fits in at the structures as they have been defined by the universities so far. From this follows a process of vertical differentiation of educational degrees in higher education (university, university of applied sciences, professional secondary school and degrees in the higher vocational training). It is assumed that the knowledge and skills necessary to achieve these degrees can be organized hierarchically, that is, they are differently demanding. For example, engineers educated at the Swiss Federal Institute of Technology (ETH) are capable to solve problems of higher complexity than engineers educated at universities of applied sciences. This fact is accepted by both institutions. The hierarchization of degrees

Design (Design), Sports (Sports), Music, Theatre and other Arts (MToA), Applied Linguistics (AL), Social Work (SW), Applied Psychology (AP), Health (Health).
For universities: Humanities and Social Sciences (H+SS), Economics and Business Administration (E+BA), Law Schools (LS), Exact and Natural Sciences (E+NS), Medical Schools and Pharmacy (MS+P), Engineering Sciences (ES), Interdisciplinary and others (I+others).

thus also expresses a hierarchy of knowledge and therefore reflects an organization of knowledge in the higher education system.

Another trend becomes clear in the "newcomer" fields. New disciplines are forming in these new fields which have neither been embeded within the vocational training nor at the university level but seem appealing to a wide range of students. Accordingly, less students with an "Berufsmaturität" start studying in these fields. In addition, such "newcomer" fields can mainly be studied at universities of applied sciences. Such studies at universities of applied sciences become attractive in particular for people with a general maturity and other admission certificates. For subjects like applied linguistics or design, the "gymnasiale Maturität" becomes the predominat admission certificate to the field of study. In fields like music, theatre and other arts foreign admission certificates dominate. In contrast to the "traditional" fields, the "newcomer" fields have no "point of departure" in a respective vocational training or university field (or just a selective one at most). In this respect the degrees need not integrate into a given hierarchical and legitimized structure. Occupational groups and schools thus have more options open to marketing their education. There is no need for them to distinguhish themselves from universities. They can therefore present themselves very "academically" and provide, for example, access to doctorate studies at foreign universities (cf., social work).

The admission qualifications of students at universities of applied sciences are altogether very manifold. Many different educational degrees allow for the admission to the universities of applied sciences. Therefore, the "Berufsmaturität", as already mentioned before, has only partially become the general admission to universities of applied sciences. From this variety arise specific structures of the system of university of applied sciences which, on the one hand, adapt to the structures of the universities but, on the other hand, distinguish itself from it.

3.2 The Scientific Staff in Higher education: Positions, Qualifications and Functions

We are further interested in how positions, qualifications and functions of the scientific staff at both types of university differ from each other. We expect different profiles with respect to the scientific staff for universities of applied sciences and universities.

First we look at the positional structure of the scientific staff consisting of professors, lecturers and mid-level faculty as well as scientific personnel at universities of applied sciences and universities. 47% of all scientific staff at universities of applied sciences are professors while this category only makes up for 13.96% of the scientific staff at universities. The mid-level faculty is clearly more distinctive at the universities while it is relatively weak at universities of applied sciences. However, the universities of applied sciences employ more lecturers than the universities.

Table 2: Scientific Staff at Universities of Applied Sciences and Universities with respect to Personnel and Type of Higher education in 2007 (full-time recompenses)

	University of Applied Sciences		**Universities**	
	full-time recompenses	share in %	full-time recompenses	share in %
Professor	3127	46.67%	2793	13.96%
Lecturer	1649	24.61%	2614	13.06%
Mid-level-faculty / Sciences Personnel	1924	28.72%	14607	72.98%
Total	**6700**	**100%**	**20014**	**100%**

Source: Federal Statistical Office. Own Calculations.

The positional structure at both university types differs considerably with regard to the strength of the mid-level faculty on the one hand and thus accordingly regarding the importance of the professors and the lecturers. The different function logics of both university types can be adduced as an explanation. The function logic of the universities is aimed at to socialize young academics and to replicate the different disciplines. In addition, universities direct more personnel resources towards research. The universities of applied sciences follow the function logic of a occupation-qualifying and practically oriented education for students who enter the labor market after their study. To safeguard this practical orientation, people who can fall back on best-practice-experiences are recruited excessively. Research remains relatively marginal such that academically qualified staff at mid-level faculty is only partly required.

In connection with this finding, the question regarding the highest educational attainment of the scientific staff in higher education arises.[9] At universities the composition of the scientific staff is structured hierarchically. The conditions of

[9] There is no detailed information available from the Federal Statistical Office regarding the highest academic degree of the academic staff at universities such that we are limited to the analysis of the staff at universities of applied sciences.

employment for certain positions are regulated clearly, are orientated by selected academic degrees and allow the integration into the hierarchy structure (master's certificate for an academic assistance, habilitation or equivalent prerequisite for the professorship etc.). A different view appears for the universities of applied sciences. If we consider the highest educational attainment of three personnel categories at universities of applied sciences we once more find an astonishing diversity. To a large degree, professors at universities of applied sciences are recruited from university graduates (predominantly without doctorate) and to a much lesser degree from the universities of applied sciences. One fifth of the professors have a degree on the level of a higher vocational training and a small fraction just owns a secondary education II certificate (Sekundarstufe II). A similar picture appears for the lecturers whose highest educational degree, however, is mostly not known.[10] For the mid-level faculty we find a strong heterogeneity. Most people own a degree from a university of applied sciences or a university. More than 10% of the mid-level faculty has a secondary education degree only (Sekundarstufe II). It becomes clear that a relatively big share of the scientific staff at all hierarchy levels at universities of applied sciences does not dispose of the preferable degree as it was stipulated by the legislator.

Table 3: Highest Educational Attainment of the Scientific Staff at Universities of Applied Sciences in 2007

	Professor	Lecturers	Mid-level-faculty Scientific Personnel
Mandotory Schooling	0.13%	0.08%	0.34%
Secondary Education II	1.72%	3.81%	12.90%
Tertiary Education (without UAS and University)	20.45%	14.43%	15.10%
UAS Diploma	7.97%	9.48%	37.69%
University Degree (without Ph.D / Habilitation)	43.96%	22.99%	24.23%
Ph. D / Habilitation	24.90%	9.88%	5.37%
Unknown	0.85%	39.33%	4.37%
Total	100%	100%	100%

Source: Federal Statistical Office. Own Calculations.

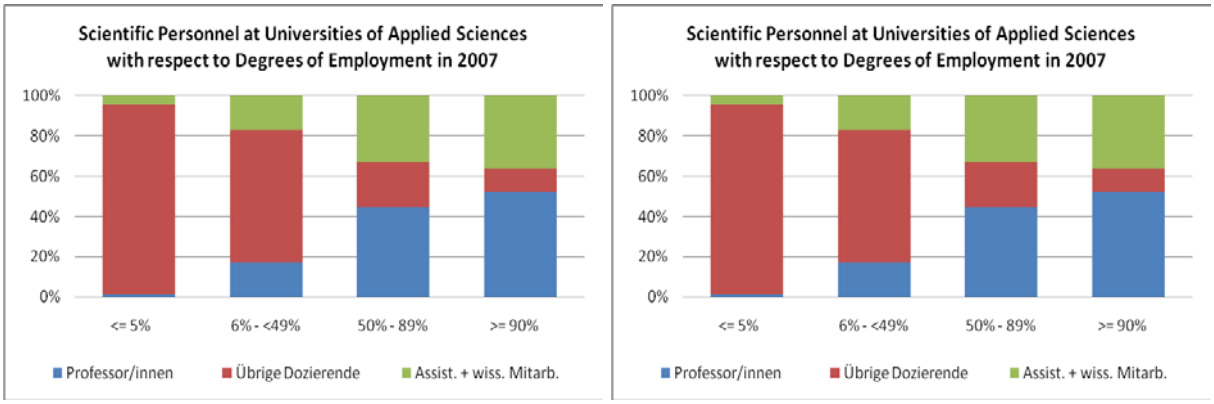
The following conclusions can be drawn from these figures. Neither a hierarchically structured positional structure nor respective career tracks for the scientific staff at universities of applied sciences can be clearly identified. The huge diversity of educational degrees in all personnel categories leads to the point that universities of

[10] This can be attributed to the fact that the highest educational attainment of employees with an occupation of 5% or less need not be reported to the Federal Statistical Office.

applied sciences show no uniform pattern for the qualification structure of their employees. The intermediate steps of qualification existing at universities are often skipped or even omitted. Career advancements from a non-academic or a lower university degree directly into a professorship are easily possible. Numerous university graduates are employed by the universities of applied sciences, also because universities educate more young academics than they need themselves. Therefore, a new labor market for university graduates opens up. In view of our theoretical considerations the data allow for the following conclusions. The brisk expansion of the universities of applied sciences has led to the point that no well-established rules exist for the positioning of the scientific staff in the domain of the universities of applied sciences. Accordingly, university graduates and people with non-academic educations profit above all. Excellent status chances have arisen in the past for people with different educational degrees.

Another attribute are the levels of employment of the scientific staff. They vary between universities of applied sciences and universities. The universities of applied sciences occupy a noticiable share of employees on all hierarchy levels for just a low degree of employment. Astonishingly, in comparison to universities there often exist part-time professors. The lecturers at universities of applied sciences are predominantly hired with an occupation degree of 5% or less. The scientific staff and the mid-level faculty at universities are mostly employed with a degree of 50% or more. This also holds true for the respective category at universities of applied sciences.

Figure 5 + 6: Scientific Personnel at Universities of Applied Sciences and Universities with respect to Degrees of Employment and University Type in 2007



Source: Federal Statistical Office. Own Calculations.

Altogether the personnel structure of the universities is substantially more stable than those of the universities of applied sciences. It is characterized by relatively high levels of employment that allow for maintaining a job presence and continuity in work progress. In addition, an engagement in the university's self-government and the development of the universities is therefore possible. Vice versa, the universities of applied sciences heavily rely on part-time employment. The question remains to what extent a continuous development of the universities of applied sciences is possible under these conditions. The huge shares in part-time employments bear the danger of a multiple identification. It can thus be assumed that large parts of the scientific staff at universities of applied sciences hold other employments as well and that there is no exclusive concentration on their job at the university of applied sciences. This situation affects further development of the universities of applied sciences, in particular with regard to research.

Finally we look as the different personnel resources and how they are used in teaching in the respective university type. Because, as we have already pointed out, the personnel structure in both types of universities clearly differs, we suppose that these structural differences also affect teaching. On the basis of full-time recompenses[11] it can be shown which personnel categories supply which percentage of teaching.[12]

Table 4: Personnel Resources in Teaching with respect to Personnel Category and University Type in 2007

	University of Applied Sciences		**Universities**	
	full-time recompenses	share in %	full-time recompenses	share in %
Professor	2556	54.08%	1383	17.96%
Lecturer	1523	32.23%	1667	21.65%
Mid-level-faculty / Sciences Personnel	647	13.69%	4649	60.38%
Total	**4726**	**100%**	**7699**	**100%**

Source: Federal Statistical Office. Own Calculations.

The distribution of personnel resources in both types of universities indicated above is also reflected in teaching. 54.08% of all teaching at universities of applied sciences

[11] The Federal Statistical Office differs between "people" (staff) and so-called full-time recompenses (FTR) to describe human resources in different personnel categories in higher education. The Federal Statistical Office defines FTR as a unit for the working hours that are performed by a full-time employed person during one year. However, "people" are defined as all staff employed in higher education regardless of their level of employment.

[12] Universities make a distinction between teaching on a basic level and deepening level. For our analyses we have summarized both categories to one.

is supplied by professors. Put differently, every other hour of teaching at universities of applied sciences is given by professors. At universities, only one out of six hours of teaching is given by professors. A different picture reveals with regard to the mid-level faculty and the scientific staff. It is easily seen that about two thirds of all teaching at universities is provided by mid-level faculty. This can be explained differently. Universities are dedicated – as has been mentioned already – to train young academics and to thus reproduce the different disciplines. Universities of applied sciences, however, stress the education of their students. Scientific staff is recruited predominantly for teaching for which a prior well-defined academic career is no necessity. Rather, multiple criteria like professional practice and teaching experience play a larger role as well as the fact that the universities of applied sciences partially originated from professional secondary schools.

4. Conclusion

With the institutionalization of the universities of applied sciences, the political requirements by the legislator were orientated towards the creation of a clearly differentiated binary university system. The analyses of the statistical data have shown that this goal was not reached but a notable variety has originated in the academic system. The federal demands stated in the law of universities of applied sciences (Fachhochschulgesetz) were softend within the federalistic structure in Switzerland, in particular in the area of the "newcomer" fields.

There has originated a structure in the academic system which charactrizes itself by a differently strong segmentation. The universities are highly segmented concerning the admission qualifications of their students and the qualification structure of the scientific staff. Students as well as the scientific staff can only gain access to universities on basis of clear regulations. On the contrary, these regulations are only weakly distinct for the universities of applied sciences. The "traditional" fields of the universities of applied sciences are, in the comparison, segmented only moderately.

These differences in magnitude of segmentation point towards specific driving forces behind the development of the tertiary education sector. The development of universities is pushed on by science and suitable standards. In particular this takes

care that strong criteria obtain with regard to the admission process and students are admitted to universities under specific conditions only.

In contrast, the development of the "traditional" and the "newcomer" fields at universities of applied sciences is pushed stronger by market demands or respective occupational groups. The enforcement of science-based teaching and research is not the main goal, but rather the adequate positioning of graduates from universities of applied sciences on the job market. Therefore, the system of the universities of applied sciences is more open and offers access to different groups.

It becomes clear that the patterns of legitimization hinge on different references for both university types: the universities are orientated towards science, the universities of applied sciences are more orientated towards demands from students and towards the job market.

The structural differences between universities of applied sciences and universities are evident. The developments in the tertiary educational sector point towards a differentiation of the vertical structure in higher education. Human capital of both university types and the respective differentiation in teaching, research and advanced training follows a different pattern from which a vertical (hierarchical) segmentation arises. The development of the universities of applied sciences as well as the academic system as a whole has not yet been completed. Whether forces with a dynamic of its own or the governmental policies on higher education will excert more influence need be answered by future development processes.

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