2019

15

Education and science

Neuchâtel 2021

Statistics of higher education institutions

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1 Introduction

This brochure provides a statistical overview of Switzerland's higher education landscape.

The institutions of higher education are[1]: the ten cantonal universities and the two federal institutes of technology (ETH/EPF) which together constitute the universities (UIT), the seven universities of applied sciences (UAS) and the 15 universities of teacher education (UTE) and several other special teacher training institutions. The UTE are responsible for the education and continuous training of teachers. The UAS provide basic professional skills at tertiary level with a practice-based focus, whereas the UIT are committed to a combination of teaching and (foundational) research. All institutions of higher education provide consultancy and other services to third parties.

This brochure presents statistics on students, diplomas, the teaching staff of higher education institutions and the funding of higher education institutions, in each case with current data from the academic year 2019/20 or from the calendar and financial year 2019. To show changes in higher education institutions over a ten year period, data from 2010/11 or 2010 included for comparison. In addition to the total number of students, the number of new enrolments is also listed. For the UAS and the UTE, Bachelor's and Master's degrees are mentioned separately and at the UIT, a distinction is made between basic tertiary education and more advanced education (usually a doctorate). All figures on higher education staff and financial resources have been rounded[2].

Further information on higher education statistics can be found on the FSO website at www.education-stat.admin.ch

The sites of higher education institutions

The following graphs show the sites of higher education institutions. Please note that universities of applied sciences in particular are made up of several specialist schools, which may be located at different sites.

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1 For a list of the institutions of higher education, see Chapter 8.

2 The higher education staff statistics are based on administrative (personnel) data, sent to the FSO by each higher education institution and the higher education costs statistics are based on data from cost accounting. As a result, information about the costs and activities, due to general difficulties in isolating costs, are approximate values.

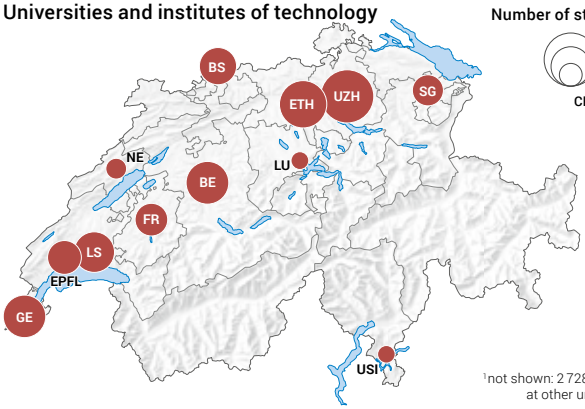
Students at universities, 2019/20 G 1

Universities and institutes of technology

Number of students[1]

27 280
15 000
5 000

CH: 156 669



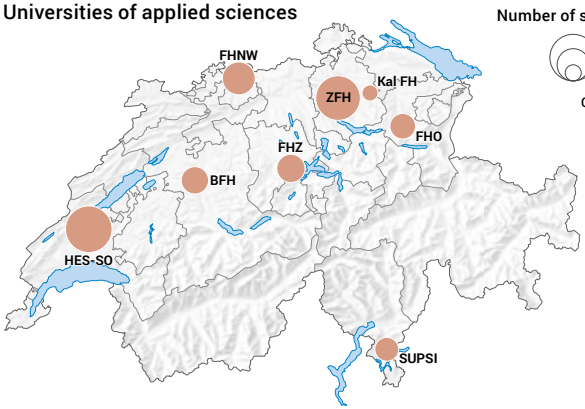
[1]not shown: 2 728 students at other universities

Universities of applied sciences

Number of students

20 942
10 000
2 500

CH: 79 821

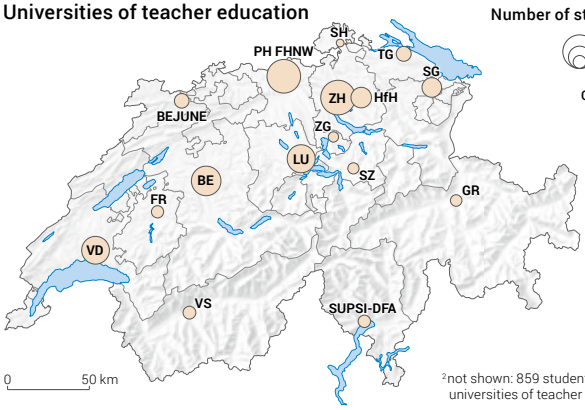


Universities of teacher education

Number of students[2]

3 399
1 500
500

CH: 21 586



[2]not shown: 859 students at other universities of teacher education

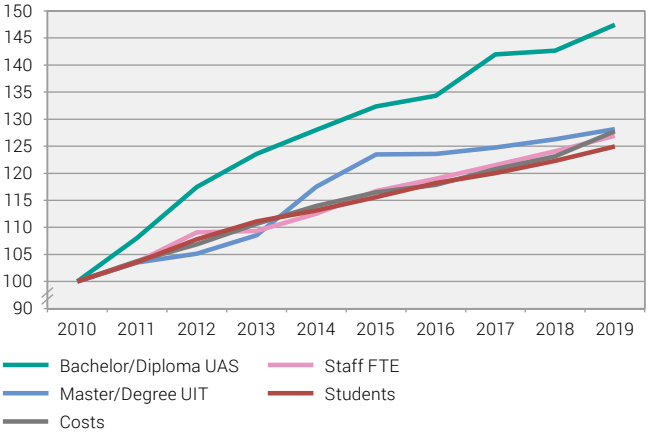
Source: FSO – SHIS-studex

2 Overview

The number of students at the UIT, UAS and UTE has risen constantly over the past 10 years to more than 258 000. The number of diplomas has consequently risen too. Staffing and financial resources also increased continuously from 2010 to 2019. Graph G2 shows the growth rate compared with the base year 2010 (=100).

With regard to basic tertiary education (Bachelor/Diploma at the UAS, Master/Degree UIT at the universities and ETH), the increase in the number of degrees awarded at the UAS was particularly strong, with almost 50% growth in 2019 compared to the same year in 2010; at the UIT, this increase is almost 30%. The growth in costs has been only slightly higher than the growth in student numbers and the number of teaching staff. In 2019, more than 95 000 personnel were employed or 63 226 full-time equivalents[1]. Higher education costs totalled CHF 12 billion.

Students, graduates, staff and cost of higher education institution: development **G2**



Source: FSO – SHIS

[1] A full-time equivalent is equal to a work-time percentage of 100% during 12 months. A part-time job of 50% during 6 months is equal to 0.25 of a FTE.

3 Students, entrants and final examinations

During the 2019/20 academic year, more than 258 000 people were in education at a Swiss higher education institution. 61% of students were enrolled at a university or institute of technology (UIT), 31% at a university of applied sciences (UAS) and 8% at a university of teacher education (UTE). Numbers have regularly increased over the years. In the course of a decade (2010–2019), an increase has been seen of 19% at the UIT, 31% at the UAS and 53% at the UTE.

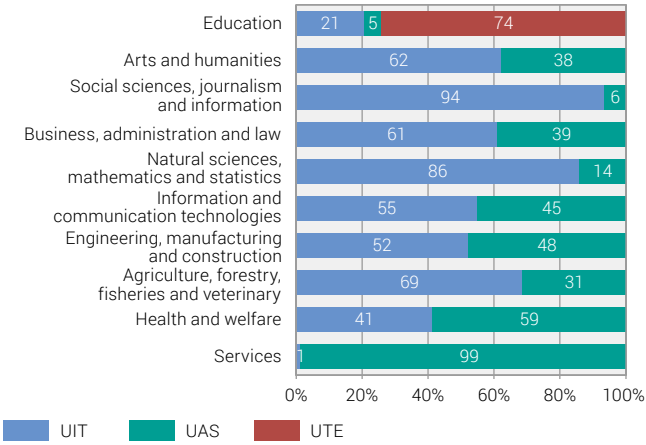
3.1 Students at higher education institutions

The distribution of students in basic tertiary education and training (licence/diploma/bachelor/master) in the different types of institutions varies considerably by field of study. For comparisons, graph G3 shows this distribution by the ISCED fields[1]. Logically, we have also seen a predominance by UTE students in education (74%). Fields such as social sciences, journalism and information (94%), natural sciences, mathematics and statistics (86%) are essentially taught at UIT while courses in health and welfare (59%) and services (99%) in particular are mainly taught at the UAS. There is a more equal balance in the distribution of students between the UIT and UAS in the fields of technology and engineering.

Among students at Swiss universities, there has been parity in numbers of male and female students since around the last decade. In 2019/20, women accounted for 51% of students. However, numbers do vary considerably according to the type of institutions and in particular according to the field of study.

[1] The International Standard Classification of Education (ISCED) of the UNESCO provides a comprehensive framework for organising education programmes and qualification by applying uniform and internationally agreed definitions to facilitate comparisons of education systems across countries.

Distribution of students in basic training curriculum by ISCED fields[1] and type of institutions, 2019/20 G3



[1] The "filed unknown" area, 1884 students only at the universities and institutes of technology, is not contained in this graph.

Source: FSO – SHIS-studex

The international character of higher education

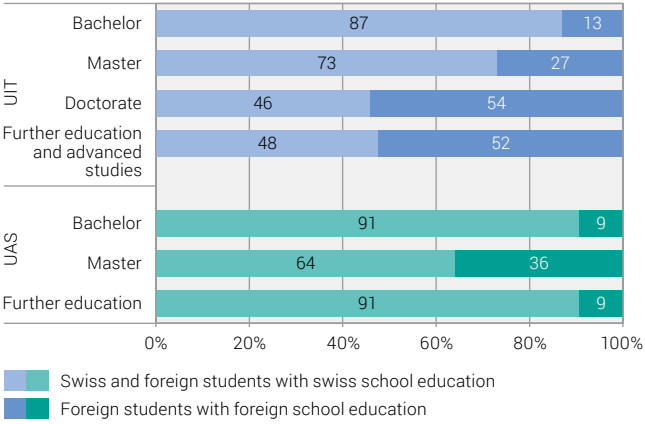
In 2010/11, the share of foreign students educated abroad before starting their studies was 18% in all higher education institutions. In 2019/20, it exceeded 20%. In terms of growth, this represents an increase of 39% in ten years.

The share of foreign students educated abroad has increased every year in the three types of institutions.

There were more foreign students educated abroad at the UIT (26% in 2019/20) than at the UAS (13%) and at the UTE (6%). At the UIT, this population is mainly found at doctorate level (54%) and in other university postgraduate courses (52%; see graph G4). At doctorate level, foreign students educated abroad are specifically under-represented in engineering sciences (76%), exact and natural sciences (72%) and economics (62%).

Students at UIT and UAS by level of education and place of education, 2019/20

G 4



The share of foreign students with foreign school education at the UTE is 4% to 10% depending on the level.

Source: FSO – SHIS-studex

If generally the share of foreign students educated abroad varies considerably by level of study, this is particularly the case at the UAS. While foreign students educated abroad account for 10% of students at bachelor level, they make up 36% of students at master level. In actual fact, master courses in artistic fields particularly appeal to foreign students educated abroad. For example, they account for the majority of students in music, theatre and other arts (60%) and make up 43% of design students.

3.2 Higher education entrants

An entrant is a person starting a bachelor (or licence/diploma) course for the first time at a Swiss higher education institution.

In 2019/20, there were more than 20 000 UIT entrants, 27% of whom studied humanities and social sciences. Meanwhile, there were more than 18 000 UAS entrants, 35% of whom studied business, management and services. At the UTE, more than 4000 students started a bachelor, with most doing so in order to have the right to teach at pre-primary and primary levels. Nonetheless, this number excludes future teachers for the upper secondary levels starting a UTE course after having obtained a bachelor or master degree.

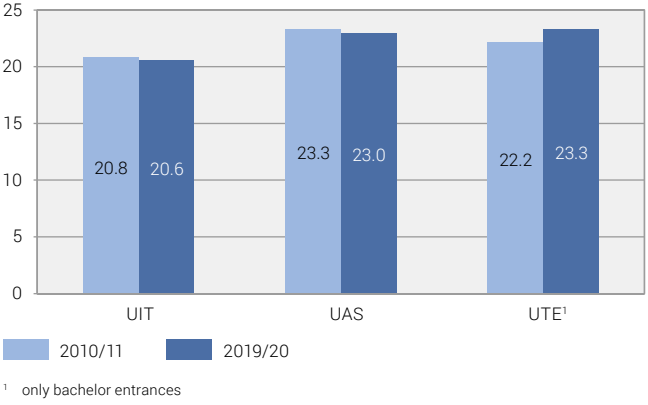
Average age on entry

The age on entry to higher education at UIT (20.6 years) is identical for men and women. By contrast, women are younger than their male colleagues when they enter at UAS (22.7 years for women versus 23.2 years for men) and at the UTE (22.9 years versus 24.8 years). The average age does however vary considerably depending on the type of institutions (see graph G5).

With a total average age of 20.6 years, the UIT had the youngest entrants in 2019/20. Compared with their UIT counterparts, UAS entrants were 2.4 years older when starting their bachelor courses. This gap exists firstly because the vocational baccalaureate, the main certificate granting access to the UAS, tends to be obtained later than the academic baccalaureate and secondly the transition from the vocational baccalaureate to the UAS is slower than the transition from the academic baccalaureate to the UIT. The average age of UTE entrants at bachelor level (23.3 years) is higher to that of UAS entrants and is therefore higher than that of UIT entrants. One of the factors that explains this age difference compared with UIT bachelor-level entrants is the possibility of retraining that is open to persons already working.

At the UIT and UAS, the average age of entrants was lower in 2019/20 than it was ten years previously. This decrease can be seen in most fields of study at the UIT whereas at the UAS it can be seen in particular in applied psychology (–5.9 years). At the UTE, a reverse trend was observed: the age on entry increased from 22.2 years in 2010/11 to 23.3 years in 2019/20 a rise that is partly due to an increase in entrants changing careers.

Average entrance age at bachelor and diploma levels by type of institutions G5



[1] only bachelor entrances

Source: FSO – SHIS-studex

Certificates before the start of studies granting access to higher education

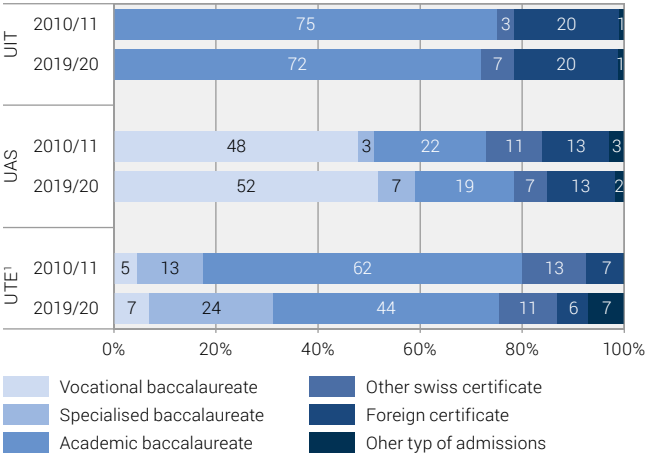
The transition from upper secondary level to education at a Swiss higher education institution essentially takes place following completion of a baccalaureate.

As shown by graph G6, the Swiss academic baccalaureate was the main route to the UIT (72% of all entrants in 2019/20 and 90% of entrants with a Swiss certificate granting access to higher education). The 7% of UIT entrants holding another Swiss certificate granting access to higher education were mainly those who had passed the UIT-vocational baccalaureate transition examination. Persons who access a UIT with a foreign certificate account for a major part of UIT entrants (20%).

The UAS mainly open their doors to holders of a vocational baccalaureate (52% of entrants in 2019/20) but also to those who have obtained an academic baccalaureate (19%). For around eight years, it has also been possible to access certain UAS courses with a specialised baccalaureate (7%). The other types of Swiss access certificates that enable UAS entrants to start their course are mainly professional college degrees, followed or not followed by a university entrance test. There were nonetheless fewer UAS entrants holding Swiss certificates other than the baccalaureate in 2019/20 (7%) than ten years previously (11%).

The UTE welcome in particular holders of the academic baccalaureate (44% of entrants in 2019/20), followed by those with a specialised baccalaureate (24%).

Entrants at bachelor and diploma levels by type of institutions and type of university entrance qualification G6



[1] only bachelor entrances

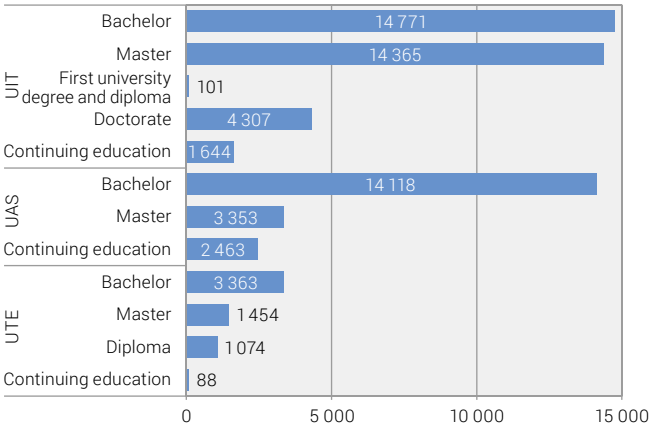
Source: FSO – SHIS-studex

3.3 Final examinations at higher education institutions

This chapter looks at diplomas at different graduation levels issued by higher education institutions. The subject of the study is the diploma and not the person obtaining the diploma who may successively or simultaneously obtain several qualifications in the same civil year.

The UIT award bachelor degrees, essentially to enable their students to continue a second cycle, i.e. a master degree. They also issue master degrees, doctorates and continuing education diplomas. The UAS mainly award bachelor degrees. The master degree courses on offer have developed over the years but still remain less extensive than the number available at bachelor level. At the UTE, the type of diploma obtained depends on the education level at which students later wish to teach. The graph G7 provides an overview of the number of qualifications awarded in 2019 by each type of higher education institution for the different examination levels.

Number of diplomas in relation to the type of institutions and the level of graduation, 2019 **G7**



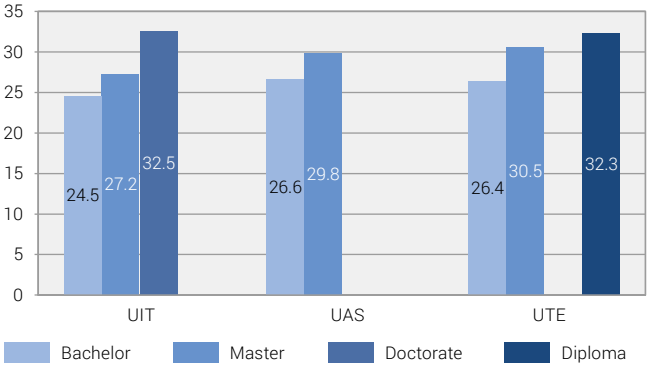
Source: FSO – SHIS-studex

Age on obtaining diploma

In 2019, the average age on obtaining a UIT bachelor degree was 24.5 years. The average age on obtaining a master degree was 27.2 years. A doctorate was obtained at the age of 32.5 years. The average age of the holder of a UAS bachelor degree was 26.6 years and that of a UAS master degree 29.8 years. At the UTE, the bachelor degree for pre-primary and primary education was obtained on average at the age of 26.4, the master degree for lower secondary education at 30.5 and the diploma for upper secondary education (academic baccalaureate) at the age of 32.3.

The age on obtaining the baccalaureate and thus entering higher education provides one explanation for the age at which a first diploma is obtained from a higher education institution.

Average age at graduation by type of institutions and level of graduation, 2019 G 8



The UTE special education fields of study are not considered.

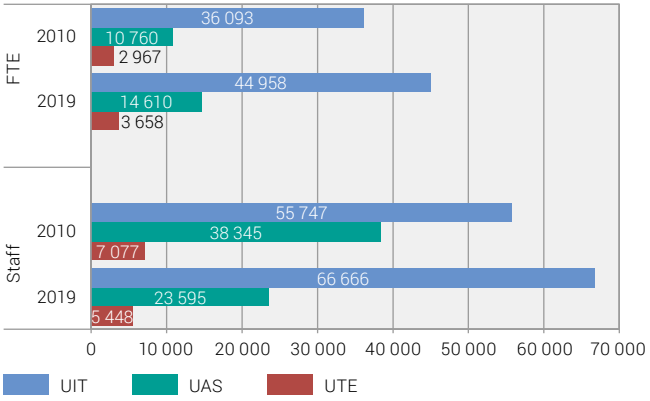
Source: FSO – SHIS-studex

4 Staff at higher education institutions

The task of higher education staff depends on the level at which they are teaching: At the UAS and UTE, the communication of practical skills in basic tertiary education and continuing education and training is important, at the UIT it is a combination of teaching and research. This requires different things of teaching and higher education staff: what they have in common is that today they must have completed their education at a higher education institution.

4.1 Staff numbers

Development of number of staff and full-time equivalents by type of institutions G9



Source: FSO – SHIS-PERS

At the end of 2019, higher education institutions were employing a total of 95 709 people, of whom 66 666 (or 70%) worked in the UIT, 23 595 (or 24%) in the UAS and 5448 (or 6%) in the UTE. Higher education staff includes all people who were employed at a UIT, UAS or UTE on the reference day, 31.12.19. If staff are considered as a resource instead of persons, these resources are measured in full-time equivalents (FTE). This variable measures effort for the whole calendar year.

Expressed in FTE, 63 226 units were available to the Swiss higher education institutions in 2019. Almost three-quarters of these personnel resources (44 958 FTE or 71%) were used at the UIT. UAS personnel accounted for 14 610 FTE (23%) and UTE personnel 3658 FTE or 6% of personnel resources in higher education. The difference between the number of persons and the number of FTE illustrates the large share of part-time employees.

The number of staff rose between 2010 and 2019. This applies to the UIT, UAS and UTE in equal measure. However, due to changes in the survey method, the rate of increase cannot be deduced exactly. During revision of the survey on higher education personnel, the AHVN3 was introduced as a personal indicator, identifying and eliminating the double counting of persons. In addition, the reporting period and personnel categories were standardised for all types of higher education institution. For the UAS and UTE the reference day approach was introduced to ascertain the number of employed persons, making it difficult to make a ten-year comparison of the number of UAS and UTE personnel. For this reason, the FTE is a better variable for demonstrating growth.

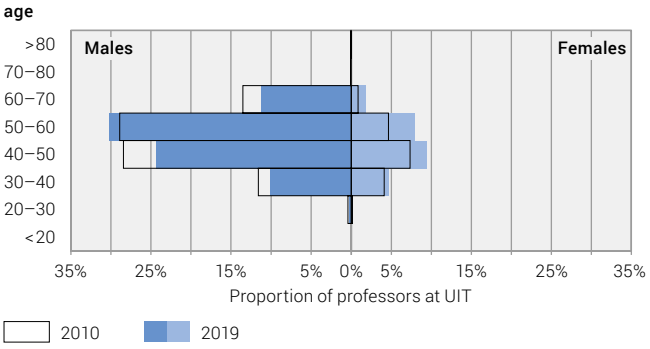
4.2 Age pyramid

The median age is used as key data to describe ageing in a given population[1]. Overall it rose in all types of higher education institution and in almost all personnel categories between 2010 and 2019. Ageing is more marked in the UAS and UTE than in the UIT with men tending to be older than women.

Graphs G 10, G 11 and G 12 show the age distribution of professors (UIT) and lecturers with management responsibilities (UAS and UTE) in a comparison of 2010 and 2019. Professors and lecturers with management responsibilities are the highest level of an academic career at a UIT, UAS or UTE. Younger teaching staff are given an opportunity to further their careers in temporary posts as junior professors, at least at the UIT. An increase in the proportion of female staff is also stated as an objective at most higher education institutions.

[1] In statistics the median is a middle value and location parameter that denotes a value at the midpoint of values sorted by size. The median age of higher education staff is, therefore, the age that divides personnel into two groups, with 50% of staff being younger and 50% older than that age.

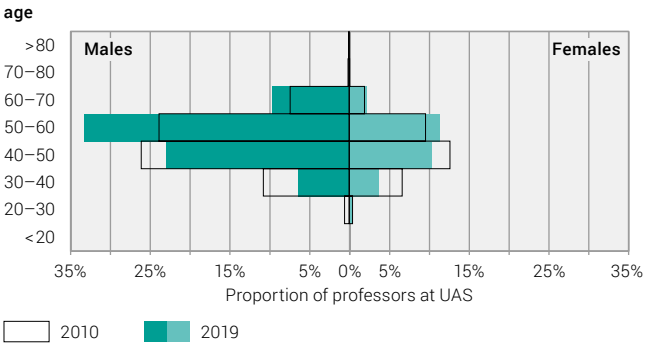
Professors (UIT) by age and sex, 2010 and 2019 G10



Source: FSO – SHIS-PERS

The median age of female professors at the UIT was 46 in 2010 and 48 in 2019. The median age of male professors was 51 in 2010 and 52 in 2019.

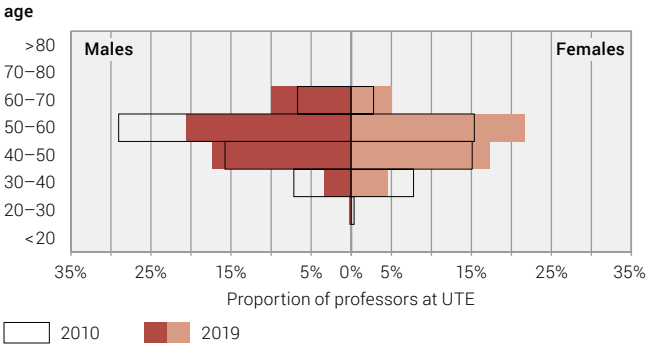
Professors (UAS) by age and sex, 2010 and 2019 G11



Source: FSO – SHIS-PERS

The median age of female UAS lecturers with management responsibility was 47 in 2010 and ten years later 50. The median age of male lecturers with management responsibility was 49 and 53 respectively. Considered collectively, therefore, management staff at the UAS have become “older”.

Professors (UTE) by age and sex, 2010 and 2019 G12



Source: FSO – SHIS-PERS

The same applies to staff with management responsibility at the UTE, where the median age of women was 49 in 2010 and 51 in 2019, that of men 53 and 53.5 respectively.

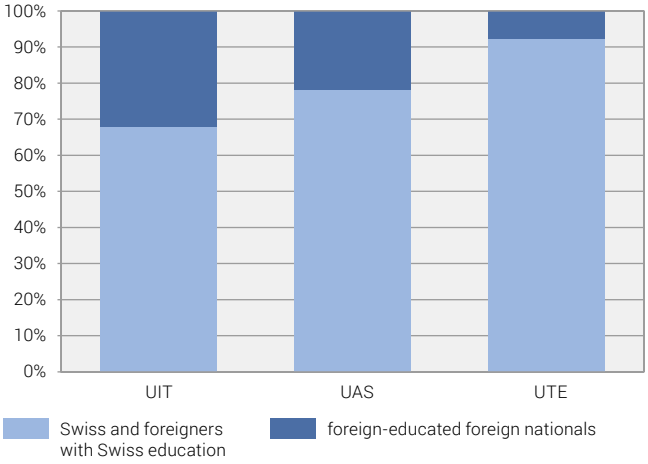
Overall, the three age pyramids indicate a shift towards the upper age groups, especially at the UTE. They also show that at the UIT, professors are predominantly male, whereas the ratio at the UAS and in particular at the UTE is somewhat more even. The age pyramids also show that women – with the exception of the UAS – were able increase their proportion in almost every age group.

4.3 Educational background

The origin of the higher education entrance qualification held by higher education staff who graduated from a Swiss higher education institution varies greatly between the different types of institution. The original qualification may have been obtained in Switzerland or abroad; people who obtained the qualification in Switzerland are designated “Swiss-educated”, those with a foreign higher education entrance qualification “foreign-educated”. The graph shows graduates from the years 2015–2019, who were working at a higher education institution in 2019, by the origin of their higher education entrance qualification.

At the UIT, 68% of these graduates had obtained a baccalaureate or comparable qualification in Switzerland. At the UAS, the percentage of Swiss-education graduates was 78% and at the UTE 92%.

Staff at universities by university entrance qualification in the university graduating classes of 2015–2019 **G13**



Source: FSO – SHIS-PERS

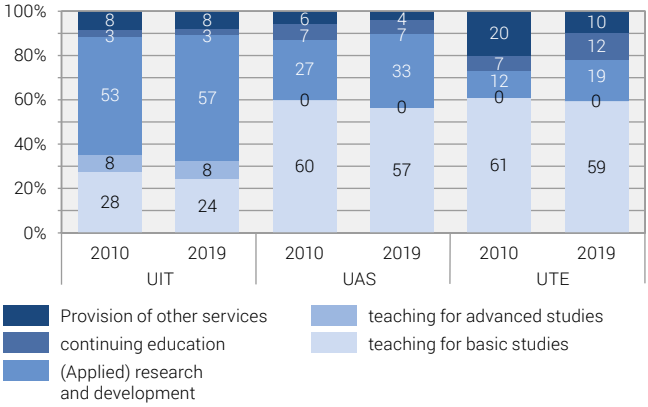
4.4 Staff by type of activity (in FTE)

The remits of each different type of higher education institution are reflected in the distribution of staffing resources by type of activity.

At the UIT, research and development (R+D) uses up more than half of the staffing resources and has risen from 53% in 2010 to 57% in 2019 over the period under consideration. The UAS and UTE have also increased their share in applied R+D (from 27% to 33% and from 12% to 19% respectively) at the cost of staffing resources used for teaching. The latter will amount to about 59% in 2019, which is about 2% less than in 2010.

Only the UIT offer advanced educational courses (doctorate) on which they use just under 10% of their resources (2019: 8%, 2010: 8%). Continuing education courses (e.g. Master of Advanced Studies) are available at all types of higher education institution: at the UTE 12% of available resources were used for this in 2019 (2010: 7%), at the UAS 7% (2010: 7%) and at the UIT 3% (2010: 3%). Services such as scientific analyses for the public sector or private businesses, are also provided by all types of higher education institutions, although the proportion of resources used has declined in comparison with 2010. Overall, the proportions of the various course types in the three types of higher education institutions remained similar throughout the ten years from 2010–2019, with a relative increase in the ratio of research to teaching.

Distribution of human resources by type of institutions and by type of activities, full-time equivalents (FTE) **G14**



Source: FSO – SHIS-PERS

4.5 Staff by category (in FTE)

The following graph G15 shows the distribution of FTE by institution type and personnel category in 2019 and 2010.

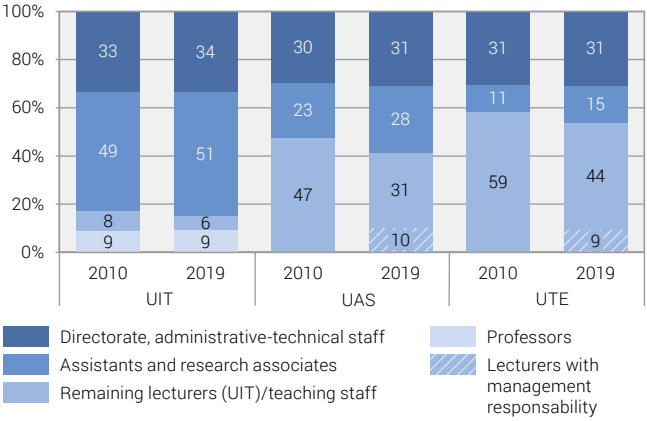
This distribution remains almost unchanged in the UIT; in the other institution types major changes can be observed. Some of the changes can be explained by a revision to the data collection method. At the UIT the distinction between professors and other lecturers is clear from the appointment practice alone. In the UAS and UTE a distinction has been made since 2013 between lecturers with and without management responsibility (comparable to professors and other lecturers) in order to enable better comparability of management across all institution types. To make a ten-year comparison for the UAS and UTE it is best to look at the teaching staff as a whole.

With 59% the share of FTE at the UTE (2010: 61%) and with 57% at the UAS (2010: 60%) is greater than at the UIT with 24% (2010: 28%). In 2019 and in 2010, professors at the UIT represented 9% and at the UTE and UAS 10% of FTE.

Research associates and assistants who undertake research and teaching (often described as non-professorial teaching staff), accounted for over half of the staffing resources at the UIT in 2019 with 51% of FTE, whereas at the UAS and UTE they used only 28% and 15% respectively of staffing resources. The FTE among non-professorial teaching staff rose in the UAS and UTE between 2010 and 2019 by roughly 5 percentage points. This was mainly due to an in increase in research activities.

In all higher education institution types the management staff responsible for the coordination and management of the higher education institutions, and the administrative and technical staff that are mainly responsible for the administration and running of the institutions, accounted for approximately 30% of the staffing resources.

Distribution of human resources by type of institutions and by category of staff, FTE **G15**



Source: FSO – SHIS-PERS

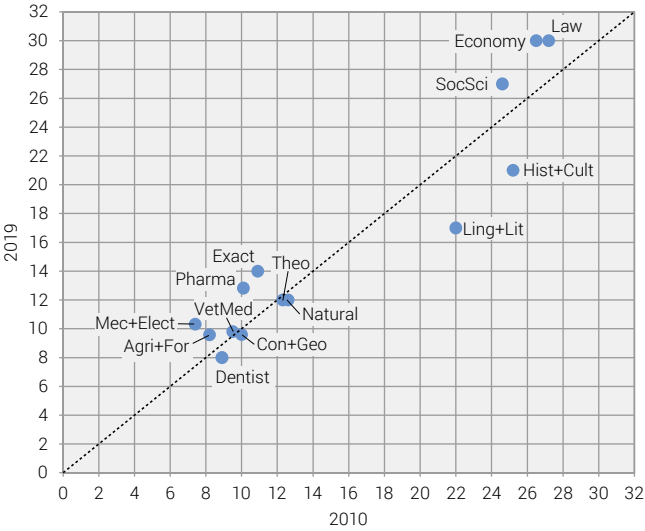
4.6 Student-teacher ratio (in FTE)

If the ratio between the two main protagonists at higher education institutions – students and teaching staff – is measured, indications can be obtained about the conditions of study. The number of students in basic tertiary education per FTE of academic staff teaching in basic tertiary education is the student-teacher ratio presented here (S-T ratio II).

The graphs G16 and G17 show the student-teacher ratio in 2010 compared with that of 2019. Values above the diagonal line correspond to an increase in the number of students per member of teaching staff.

At the UIT, the number of students per teacher rose for all faculties except for language and literature, for dentistry and history and cultural studies. Student numbers per teacher also rose at the UAS and UTE in all faculties except for agriculture and forestry.

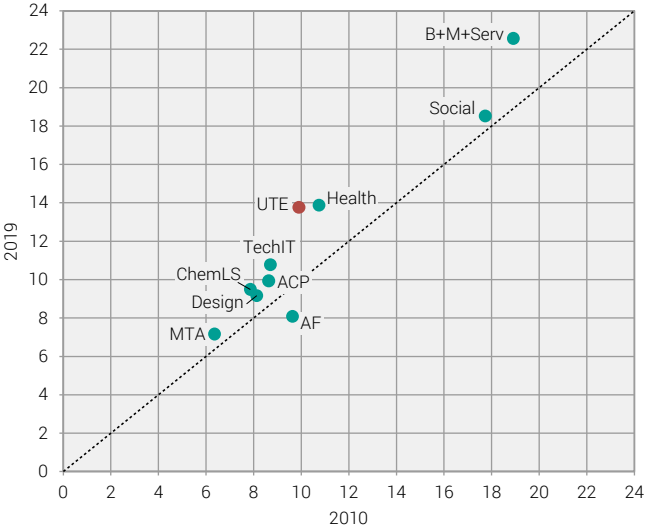
Student-to-staff ratio at universities (UIT) G16



Abbreviations of the faculties. See chapter 8

Source: FSO – SHIS

Student-to-staff ratio at other universities (UAS and UTE) G17



Abbreviations of the faculties. See chapter 8

Source: FSO – SHIS-FIN

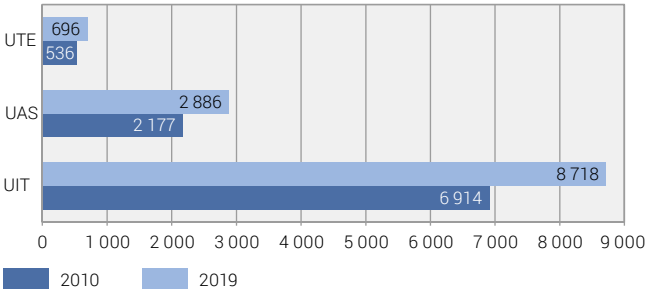
5 Finance of higher education institutions

The following information has been taken from the cost calculations of the respective higher education institutions. It is based on the absorbed costs of a calendar year and shows the operating costs for the individual higher education institutions, separated into staff, material and infrastructural costs. The cost calculations also provide information on revenue and the funding of all services.

5.1 Cost trends

Since 2007 – the first year of the introduction of cost calculations for all types of higher education institution – the total costs have continuously increased (G18). Costs for the UIT grew by 26% since 2010 and exceeded the CHF 8.7 billion CHF in 2019. During the same period, the costs of the UAS increased by 33% to CHF 2.8 billion. The costs of the UTE in 2019 were CHF 696 million, i.e. an increase of 30% since 2010.

Development of costs in CHF millions by type of institutions **G18**



Source: FSO – SHIS-FIN

The distribution of costs between the departments of universities and institutes of technology has hardly changed. At the UAS costs in the departments of technical sciences and information technology (IT), music, theatre and other arts have also increased proportionately at the expense of all other departments.

5.2 Types of activities

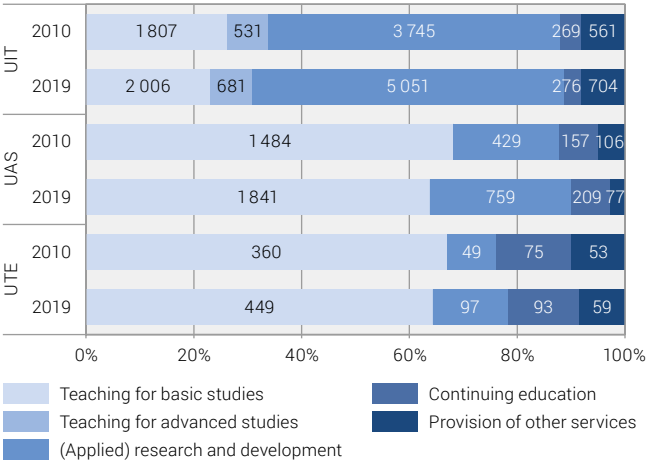
The universities (UIT) perform five types of activities: Teaching for basic tertiary education, teaching for advanced studies, research and development (R&D), continuing education and services. For this type of higher education institution, R&D accounts for the largest budgetary item with over half of the costs. This is the only sector that increased its share between 2010 and 2019. Teaching for basic tertiary education followed in second place, accounting for around a quarter of the costs of universities.

The universities of applied sciences (UAS) and the universities of teacher education (UTE) are the courses designed to teach skills for a specific occupation. They provide practice-based education, which is why basic education accounts for the main activity at both of these types of higher education institution with around two thirds of the total costs. The applied R&D is the second largest and the only proportionately increasing expense of the UAS, accounting for a quarter of their costs. At the UTE, research costs have also increased compared to 2010 (G 19).

Type of activities by type of institutions 2010 and 2019

In CHF million

G 19



Source: FSO – SHIS-FIN

The costs for all activities at all types of higher education institution increased in absolute terms; lower costs were only incurred for activities at the UAS.

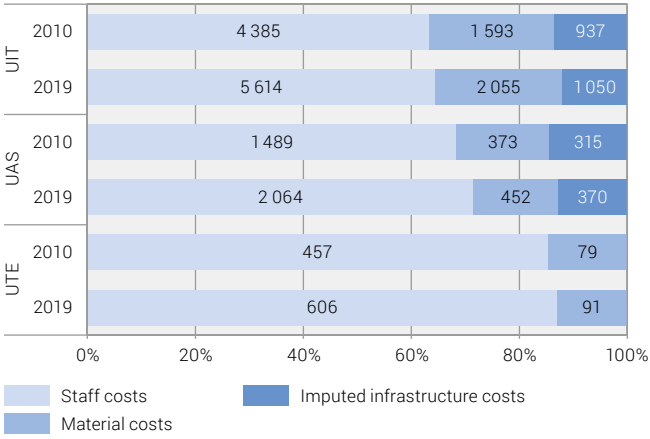
5.3 Type of costs

The ratio of operating costs to infrastructural costs hardly changed between 2010 and 2019 for the UIT, while at the UAS the share of infrastructural costs in the total costs decreased slightly over the same period. For the UTE, there was no change in the relation between staff and material costs. Infrastructural costs are not published in detail due to differences in handling by the supporting cantons and lack of comparability.

Cost categories by type of institutions 2010 and 2019

In CHF million

G 20



Source: FSO – SHIS-FIN

Staff costs account for 64% of operating costs at the UIT, 72% at the UAS and 87% at the UTE. The higher material costs at the UIT and the UAS are likely to be associated with greater research and development (G 20).

5.4 Costs per student

The cost indicator considered here is calculated as the ratio of costs for basic tertiary education to the number of students in basic education (headcount).

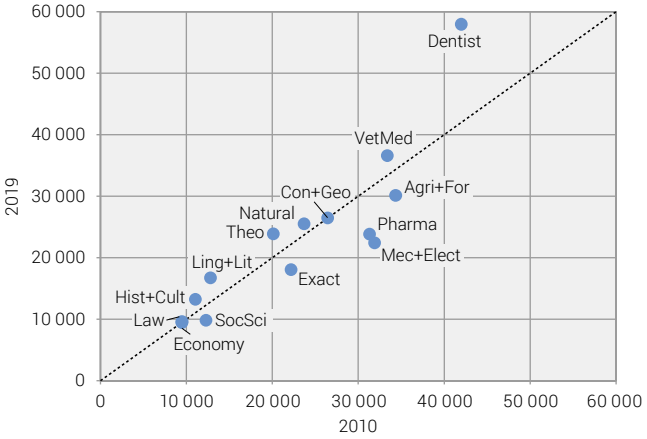
The graphs G 21 and G 22 show the costs per student in 2010 compared with 2019. Values below the diagonal line equate to a decrease in costs per student.

The cost indicator increases between 2010 and 2019 for 8 of 14 UIT departments. There was a decrease in costs for the departments of social sciences, economic sciences, exact sciences, pharmacy, mechanical and electrical engineering and agriculture and forestry. At the UAS the value of the indicator decreased for all departments, except for music, theatre and other arts.

Costs per student UIT, 2010 in comparison with 2019

In CHF

G 21



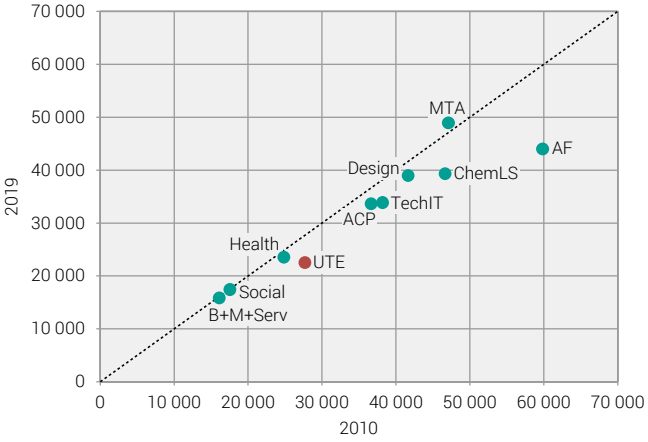
Abbreviations of the faculties. See chapter 8.

Source: FSO – SHIS-FIN

Costs per student UAS and UTE, 2010 in comparison with 2019

In CHF

G 22



Abbreviations of the faculties. See chapter 8.

Source: FSO – SHIS-FIN

Costs per student and student-teacher ratio in 2010 and in 2019

In the graphs G 23 and G 24, the change in costs (in CHF) per student (in basic education) is shown against the student-teacher ratio (academic staff for basic education in FTE) between 2010 and 2019 using an arrow.

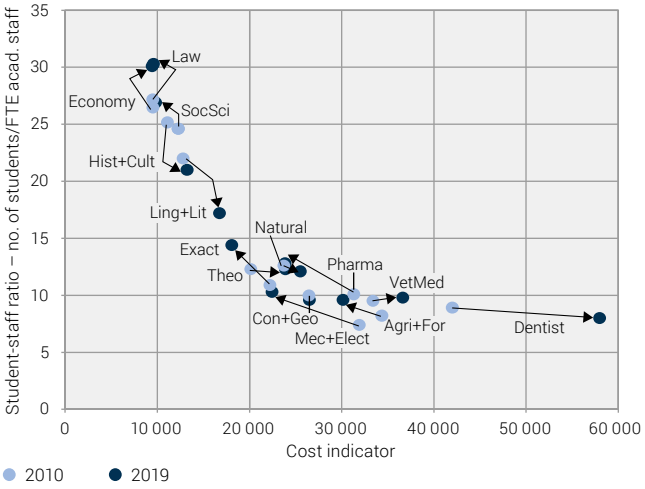
The start of the arrow shows the value in 2010 and the end of the arrow the value in 2019. An arrow represents a department.

The combination with the student-teacher ratios at the UIT shows that the increase in costs per student is largely accompanied by a decrease in the number of students per teacher. The exceptions: Per person, students of law and veterinary medicine generated more costs and had more students per teacher (FTE).

Fields of studies at UIT: Costs per student and student-to-staff ratio

Basic training curriculum

G 23



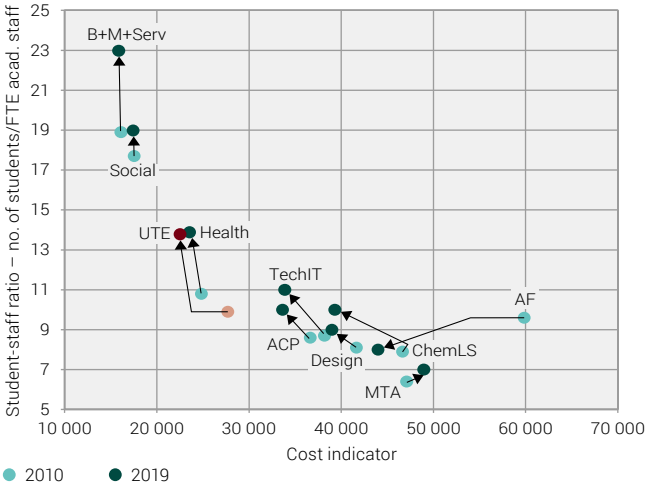
Abbreviations of the faculties. See chapter 8.

Source: FSO – SHIS-FIN

Fields of studies at UAS and UTE: Costs per student and student-to-staff ratio

Basic training curriculum

G 24



Abbreviations of the faculties. See chapter 8.

Source: FSO – SHIS-FIN

The combination with the student-teacher ratios at the UAS shows that the decrease in costs per student is consistently accompanied by an increase in the number of students per teacher. There are some exceptions in the department of agriculture and forestry in which there were a decrease in costs per students and in the number of students per teacher; and the department of music, theatre and other arts in which the increase in costs per student generated an increase in the number of students per teacher (FTE).

6 A look at STEM degree courses

Due to the economic importance of the STEM degree courses mathematics, informatics, natural sciences, and technology and the numerous initiatives intending to promote education in these subjects, it would also be useful to consider the change in students and diplomas for these degree courses and the resources used for these in higher education.

6.1 Students and final examinations

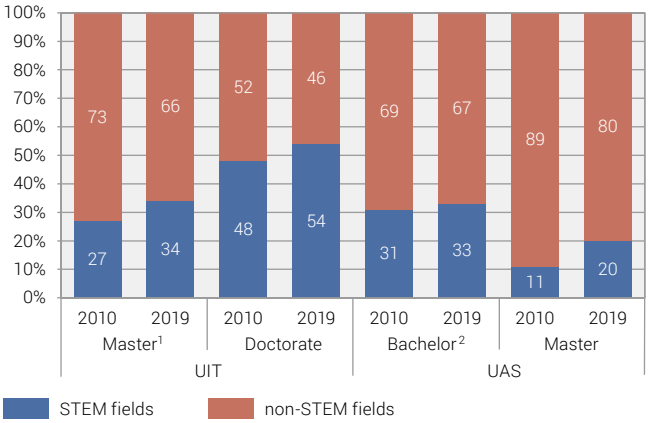
In 2019/20, around 78 000 students were following a course in the STEM subjects, i.e. just under a third of the total number of students. More than two thirds were enrolled at a UIT. Half of STEM students were concentrated in the fields of engineering, chemistry and life sciences. Women were also unevenly distributed in the STEM subjects. Their presence was particularly important in the field of chemistry and life sciences (55% at the UIT and 46% at the UAS). In contrast, women were under-represented at the in both engineering (23% at the UIT and 12% at the UAS) and IT (17% at the UIT and 15% at the UAS).

Final examinations in the STEM subjects

In 2019, the UIT awarded just more than one third of master degrees (around 5000 diplomas) in STEM subjects. The highest share of STEM qualifications was seen at doctorate level. Within a decade, the share of STEM doctorates increased from 48% in 2010 to 54% in 2019, i.e. positive growth of 33%.The field of chemistry and life sciences was generally the field in which the UIT awarded the largest number of STEM qualifications. A third of bachelor degrees (4700 diplomas) awarded in 2019 by the UAS were in the STEM subjects. The share of masters in STEM subjects was lower (20%, i.e. 672 diplomas). Most STEM bachelor and master degrees at the UAS were in the field of engineering.

Proportion of qualifications awarded in STEM and other fields by type of institutions and level of graduation

G 25



[1] former licentiate degrees/diplomas included
[2] former diplomas included

The UTE do not offer any STEM fields

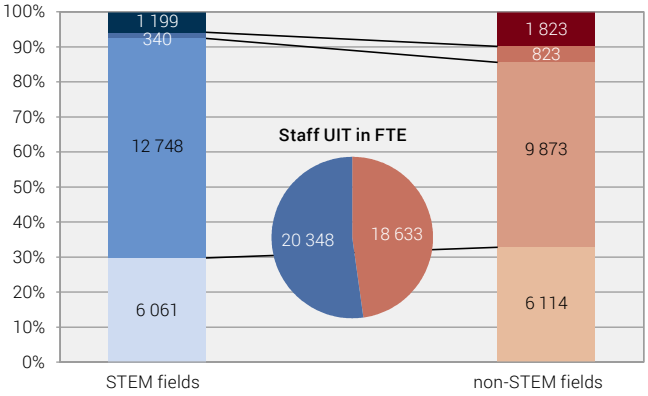
Source: FSO – SHIS-studex

6.2 Staffing resources

In 2019 52% of staff at the UIT are employed in the STEM subjects. Most staff worked in research and development (R&D) whereby the share in STEM subjects was 63% and thus far higher than in the non-STEM subjects (53%). Teaching staff accounted for the second-largest share (STEM subjects 31% and non-STEM subjects 37%). Service staff accounted for around 6% of staff in the STEM subjects and was thus far lower than that of the non-STEM subjects (around 10%). For both subject groups, the share of R&D increased proportionately compared with other activities.

At the UAS, the staff ratio remained stable (44% STEM subjects, G 27). Teaching staff (basic tertiary education and postgraduate degree programmes) accounted for the largest share (STEM subjects: 47% and non-STEM subjects: 62%). In the STEM subjects, the share of staff in applied research and development (applied R&D) followed with 43%. In non-STEM subjects, the share of staff in applied R&D and other services was just equally high (19%). Staff performing other types of services represent 10% in the STEM compared to 18% in the non-STEM.

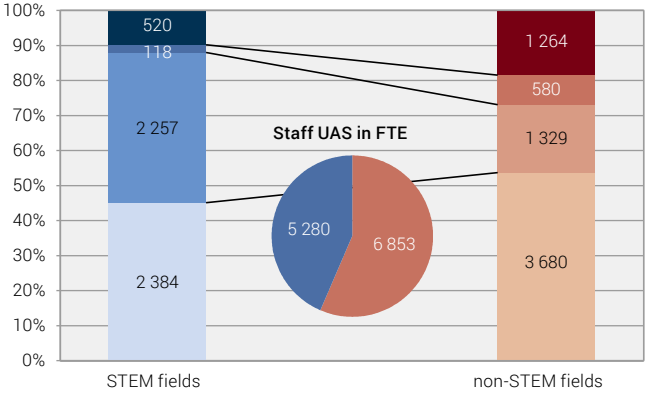
Staff of STEM and other fields at UIT, 2019[1] G 26



[1] excluding central field staff

Source: FSO – SHIS-PERS

Staff of STEM and other fields at UAS, 2019[1] G 27



[1] excluding staff from non-attributable fields

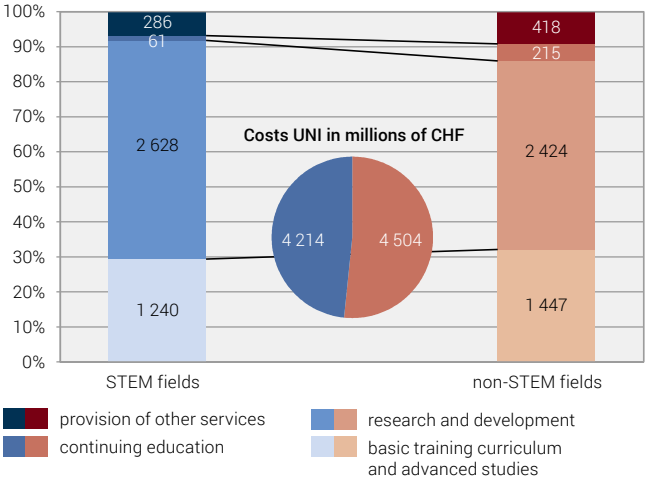
Source: FSO – SHIS-PERS

6.3 Costs

STEM area subjects contributed to 48% of UIT costs (G 28). R&D had the largest share of the costs: in the STEM subjects this amounted to 62% and was thus higher than in the non-STEM subjects (54%). R&D was followed by teaching in the STEM-subjects which accounted for 31% of costs (compared with 37% in the other subjects). Costs for services accounted for around 7% in the STEM subjects and were far lower than in the non-STEM subjects (9%).

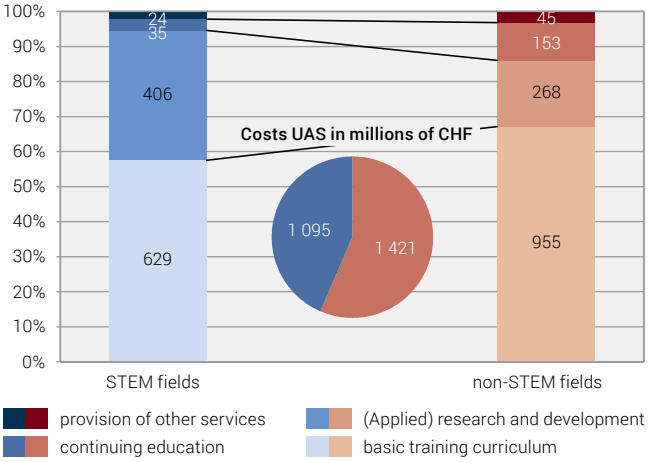
At the UAS the focus continued to be on teaching however the share of applied R&D at the UAS also increased by 7 to 6 percentage points compared to 2010. STEM area subjects contributed to 44% of costs. Teaching accounted for the largest share (STEM subjects: 61% and non-STEM subjects: 78%). This was followed by applied R&D with costs in STEM subjects making up 37% of the total costs, i.e. over twice as much as in the non-STEM subjects (19%). Costs for services were between 2 and 3% for both subject types.

Costs of STEM and other fields at UIT, 2019 **G 28**



Source: FSO – SHIS-FIN

Costs of STEM and other fields at UAS, 2019 G 29



Source: FSO – SHIS-FIN

The ratio between the STEM and non-STEM subjects evolved between 2010 and 2019 to the benefit of the non-STEM subjects (2010: 45%). This was largely due to new courses.

7 Sources

SHIS: The Swiss university information system (SHIS) was created at the beginning of the 1970s to meet the growing need for coordination and planning by the Confederation and the cantons in university sector and to provide Swiss statistics on the higher education institutions.

Higher education students and diplomas: The Swiss university information system's student and graduate database (SHIS) provides information on the study situation, how courses are run and various socio-demographic factors. All persons enrolled have an individual identification number that enables personal data to be treated anonymously and flow analyses to be carried out. The database serves as the basis for the scientific analysis of courses at Swiss higher education institutions. The FSO uses these to calculate the university indicators and to make forecasts about trends on the number of students. Since the academic year 2012/13, the OASI number (NAVS13) has enabled longitudinal analyses to be made for all levels of education and training.

University staff statistics: A statistical survey of university staff has been carried out at universities and federal institutes of technology since 1980, at universities of applied sciences since 2005 and at universities of teacher education since 2005. The survey concerns the administrative data contained in the university staff registers. The university staff statistics were revised in 2012. Since this revision, the NAVS13 has been used in the statistics to identify persons which will enable the educational path of students to be studied in the mid-term. The reference periods were also modified: since 2012, the data on persons relate to a reference date (31.12) whereas the data in FTE relate to the civil year for all types of higher education institution. Staff categories have been harmonised.

University financial statistics: In the higher education sector, analytical accounting provides information on the costs and activities of the three types of higher education institution. It indicates both public and private sources of funding (funding of student tuition fees, R&D mandates of enterprises, etc.). The expenses of universities have been surveyed by the FSO since the 1996 financial year and their costs surveyed since 2006; the costs of universities of teacher education have been surveyed since 2008. The costs of universities of applied sciences are compiled by SERI[1] (data compiled since 2000).

[1] SERI – State Secretariat for Education, Research and Innovation

8 List of higher education institutions and departments

Universities and institutes of technology	
Uni Basel / Bâle	BS
Uni Bern / Berne	BE
Uni Freiburg / Fribourg	FR
Uni Genf / Genève	GE
Uni Lausanne	LS
Uni Luzern / Lucerne	LU
Uni Neuenburg / Neuchâtel	NE
Uni St. Gallen / Saint-Gall	SG
Uni Zürich / Zurich	UZH
Università della Svizzera Italiana	USI
EPF Lausanne	EPFL
ETH Zürich / Zurich	ETHZ
Institut de hautes études internationales et du développement	IHEID
Universitäre Fernstudien Schweiz	FS CH

Departments of universities and institutes of technology	
theology	Theo
linguistics and literature	Ling+Lit
history and cultural studies	Hist+Cult
social sciences	SocSci
economic sciences	Economy
law	Law
exact sciences	Exact
natural sciences	Natural
dentistry	Dentist
veterinary medicine	VetMed
pharmacy	Pharma
construction and Geodesy	Con+Geo
mechanical and electrical engineering	Mec+Elect
agriculture and forestry	Agri+For

Universities of applied sciences

Berner Fachhochschule	BFH
Haute école 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*	KAL
HES Les Roches-Gruyère*	LRG

Departments of universities of applied sciences

Architecture, Construction and Planning	ACP
TechIT Engineering and IT	TechIT
ChemLS Chemistry and Life Sciences	ChemLS
Agriculture and Forestry	AF
Business, Management and Services	B+M+Serv
Design	Design
Music, Theatre and other Arts	MTA
Social work	Social Work
Health	Health
UTE Teacher Education (UTE)	UTE

Universities of teacher education

Interkantonale Hochschule für Heilpädagogik Zürich	HfH
Haute école pédagogique BEJUNE	BEJUNE
Haute école pédagogique du canton de Vaud	VD
Haute école pédagogique du Valais	VS
Haute école pédagogique Fribourg	FR
Pädagogische Hochschule Bern	BE
Pädagogische Hochschule Luzern	LU
Pädagogische Hochschule Schwyz	SZ
Pädagogische Hochschule Zug	ZG
Pädagogische Hochschule Thurgau	TG
Pädagogische Hochschule Schaffhausen	SH
Pädagogische Hochschule Graubünden	GR
Pädagogische Hochschule des Kantons St. Gallen	SG
Pädagogische Hochschule der Fachhochschule Nordwestschweiz	PH FHNW
Pädagogische Hochschule Zürich	ZH
Dipartimento formazione e apprendimento	SUPSI-DFA
Schweizer Hochschule für Logopädie Rorschach*	SHLR
Eidgenössisches Hochschulinstitut für Berufsbildung*	EHB

* No financial information available; not included in finance statistics.

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