



# Chemical Education

## Division of Chemical Education

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### Vocational Education and Training

Cornelia Frei

\*Correspondence: C. Frei, Email: info@aprentas.com

Aprentas, Communications Department, Mauerstrasse, CH-4002 Basel.

**Abstract:** Vocational education and training in Switzerland provides many career opportunities, also in the field of chemistry. The system is very successful, but faces challenges.

**Keywords:** Education and training · Innovation · Market-oriented professions · Permeability · Practical skills

The Swiss education system is characterised by two paths: One being general education, leading to a baccalaureate and then on to university; and the other is the path *via* an apprenticeship: vocational education and training (VET), as shown on the left side of Fig. 1. Vocational education and training combines theory and practice and provides apprentices with a solid foundation in a given occupation. It is labour market driven. Apprenticeship positions need to be applied for like regular jobs, with a company or an institution as the employer.

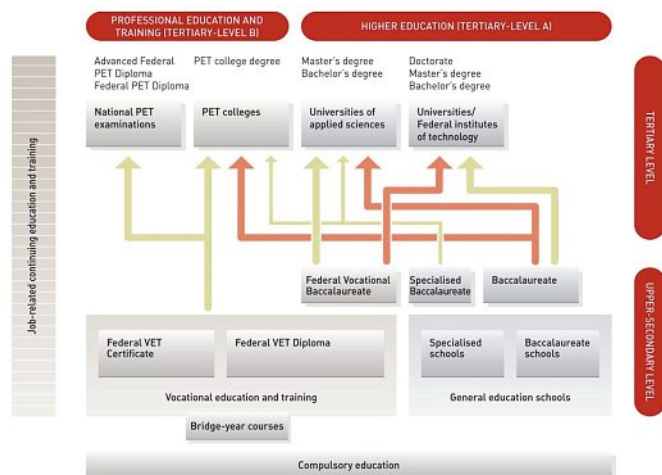


Fig. 1. The Swiss education system (source: SERI).<sup>[1]</sup>

### Professions in the Field of Chemistry

There are VET professions in the laboratory and in chemical and pharmaceutical production. Laboratory technicians choose among four different specialties in basic vocational training: chemistry, biology, paint and varnish, or textiles. After three years of apprenticeship, they graduate with a Federal Diploma of VET.

A chemical and pharmaceutical technologist's apprenticeship also spans three years and leads to a Federal Diploma. At a less demanding school level, a Federal Certificate of VET as

a chemical and pharmaceutical assistant can be obtained within two years.

Lab technician is one of the most demanding VET programmes with high standards, regarding theory as well. The positions are also sought after by ambitious and high-performing pupils. This often leads to a great diversity in class. 15-year-old teenagers just out of compulsory school meet 20-year-olds who have attended a general education school; some of them even with a baccalaureate, having decided for a more practical path instead of university studies. What unites them is a passion for the laboratory. For apprentices and teachers, this diversity is both a challenge and an enrichment.



Fig. 2. Laboratory technician apprentice, specialty chemistry.

### Getting Ahead in a Permeable System

The Federal Vocational Baccalaureate (FVB/Berufsmaturität), which can be completed in parallel to or after obtaining a VET diploma, opens the way to Swiss universities of applied sciences (Fachhochschulen). As Fig. 1 shows, there are other options of continuing education and training that do not require an FVB. This also applies for the laboratory and chemical production professions.

The Swiss education system is very flexible: learners may pursue more advanced education and training opportunities, switch from vocational/ professional pathways to general education/ university pathways, and *vice versa*, with relative ease. Fig. 1 illustrates this by the green arrows showing the direct, and (in red) also other possible pathways to certain continuing educations. For pupils who wish to go to university or to a federal institute of technology (ETH Zurich or EPFL Lausanne), for instance, graduating in a baccalaureate school would be the direct way to get there. For those who are aiming to study at a university of applied sciences, however, which is more practice-oriented, a VET with a Federal Vocational Baccalaureate is ideal. With a General Education Baccalaureate, one can also get to a university

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Please contact: Prof. Catherine Housecroft, University of Basel, E-mail: Catherine.Housecroft@unibas.ch

of applied sciences, but only after several months of internship, in order to keep up with the practical skills of students with a VET background. On the other hand, VET diploma holders with an FVB who want to go to university or to a federal institute of technology, can do that too. The extra step they have to take is the University Aptitude Test (UAT/‘Passerelle’).

### How VET is Managed

In Switzerland, vocational education and training is managed within a public-private partnership between the federal government, the cantons and professional organisations. In the role of the latter, scienceindustries, the business association for the chemistry, pharma and life sciences industry, has transferred the mandate for representing interests on vocational training matters throughout Switzerland to *aprentas*. *aprentas*, a training association for basic and further vocational training for scientific, technical and commercial professions, is therefore responsible, among other things, for revising the education regulations in the corresponding professions. It also deals with educational policy matters and is committed to developing and helping to design vocational training in Switzerland.



Fig. 3. Chemical and pharmaceutical technologist apprentices.

### A Success Story and its Challenges

Two-thirds of all young people coming out of compulsory education in Switzerland enrol in vocational education and training. This mostly leads to a win-win situation with many advantages both for the employers and the apprentices. For employers it is a way of tackling a specific skills shortage in their company at its roots. Apprentices receive their first wages instead of having to pay for a school. Vocational education and training is a valuable chance for those who do not qualify for a baccalaureate to find a place in the labour market, with opportunities for further development.

Vocational education and training is undoubtedly a success story, very well organised, deeply rooted and respected in Swiss society, but faced by challenges: With increasing internationalisation and mobility in the labour market, more and more decision makers are unfamiliar with the concept of VET and have to be convinced of the system's advantages. In addition, many young people, and their parents, consider general education and a university degree more prestigious than the VET path. Furthermore, technologies and also the needs of the labour market change constantly and so does the demand for new skills. Keeping pace with these changes is definitely a challenge, but also an opportunity regarding innovation.

### Innovation

When it comes to the connection between education and innovation, often only the importance of universities is emphasised. A study published by the University of Zurich in 2019,<sup>[3]</sup> compiled as part of SERI's 'Research and Innovation in Switzerland 2020' report,<sup>[4]</sup> takes a different stance and states that in Switzerland, vocational education and training contributes significantly to innovation. Broadly trained and also equipped with the necessary social skills, VET graduates are seen as flexible, mobile and therefore ready to contribute to and drive innovation in companies. Accordingly, the study found companies providing VET to be more innovative than those that do not. It states that, as vocational and academic skills complement each other, companies with a broad skills mix, where graduates of basic vocational training programmes, universities of applied sciences and universities work together, have an advantage over companies with purely academically qualified staff in this respect.

### Acknowledgement

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- [5] Further information: [www.sbf.admin.ch](http://www.sbf.admin.ch); [www.aprentas.com](http://www.aprentas.com); [www.scienceindustries.ch](http://www.scienceindustries.ch)