Vocational Education for Engineers shown on the TGM

(Technologisches Gewerbemuseum – The School of Technology)

[for presentation see separate file]

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Abstract:

The Vocational Education System in Austria and its importance for economic development in this country and others will be presented. This efficient Education System should be introduced to other countries, specifically to the new EU- members. With this in mind, this report should serve as a guide to copy this system and furthermore it should encourage insight for this education system and announce the qualification of students who passed this system. Details will be shown on the example of the TGM (Technologisches Gewerbemuseum) in Vienna, especial on the example of the Electronic Department. Nevertheless common validity of the explained facts will be pointed out.

In this report construction, origin and structure of an optimal organisation should be visualised. It will be shown how widely spread the professionalism is and how advanced the way
of cooperation and complementation of science in theory and practical employment with tight contact to commerce and industry as an important factor, is. By this means, this system reached its importance especially in Austria.

The different educational sequences, courses of events and the educational methods as well as the different basics and accesses for this system will be explained.
1. History of Origins:

- Founded in 1879 by Wilhelm EXNER (1840-1931), the Director of the “Niederösterreichische Gewerbeverein” (Lower Austrian Trade Association). Exner, who started as a gymnasium teacher, leaded the TGM for 25 years and set also commercial activities for the World-fair in 1867.

- Model: Conservatoire des Arbs et Métiers in Paris, theoretical education in combination with practical application and demonstration. Museum ➔ collection of technical culture-goods, later (1918) this built the basic for the “Technische Museum” (Technical Museum) in Vienna.

- Oldest HTL (Technical High School) of Austria and - not only - therefore model for many other schools all over Austria. Leading to a strong development of this “school type” (sometimes by splitting-off different subject areas to other places). Serving as an example also for non technical vocational areas.

- In 1884 the TGM moved to the Währingerstrasse into the building of a former locomotive factory. Beginning with skilled training, always up to the mark of the age, like basketwork, wood-industry, furniture and building joiner, chemistry, dye-works, paper-industry, brewery-techniques, shoemaker, metalworking and so on.

- In 1896 already more than 1,000 students, joined the TGM and met to general acceptance not only in Austria, but also from abroad within shortest time.

- In 1905 the TGM got nationalised; in defiance of all timely caused backstrokes (World wars), the TGM managed to succeed, by courtesy of flexible customization to the actual requirements of economy and technical developments, without loosing the basic idea.
2. The Special Subject Areas:

- Outgoing from state owned experimental- and test- institutes, causing a very intensive connection to the vocational praxis and to trade and industry, leads among other things to an increase of the Austrian industry standards, which then were also exported to near and very far countries ("Technologenverband" - Club of graduate).

- In 1884 implementation of machine fitter, material technologies, treating technologies and improve courses took place.

- In 1887 the department of Electrical Engineering was founded.

- In 1888 Higher Departments (with matriculation standard) for engineer education were established.

- 1892 trade promotion → WIFI (Wirtschaftsförderungsinstitut)

- In 1913 the department for Radio-Techniques was founded.

- From this place (the TGM) in 1923 the first radio transmission in Austria took place and then

- in 1945 the first radio transmission after 2nd World war.

- 1925 Machinery

- 1934/37 Heat-, Ventilation- and Sound- Techniques

- 1935 Plastic Testing

- 1945 KFZ (Motor Vehicle) Techniques

- 1947 X-ray Techniques

- 1959 Ceramics- and Silicate- Techniques

- 1967 Atom Energy- Techniques

- 1970 Data- Techniques

- 2002 Information- Techniques
According to development some of these items were changed / renamed, cancelled or
developed (Radio- and Telecommunication [Radio- und Fernmeldetechnik] →
Telecommunication [Nachrichtentechnik] → Electronic → Communication- and Computer-
Techniques).
3. The Main Points in the Department of Electronics:

- Radio- Techniques
- Communications- Technique
- Electronic
- Data- Techniques
- Medicine- Electronics
- Mechatronic
- Bio Medicine
- Communication- Technology
- Computer- Techniques
4. More Subject Areas in other schools:
(not complete, names according to their meaning)

- Construction- Techniques (with many more or less similarly kinds, like High- and Deep- Construction)
- Carpentry
- Clothing
- Mountain- and Metallurgical Plant
- Busyness Management
- Chemistry (in particular Glass Manufacturing)
- Busyness Education with different main fields
- Data Processing
- Automation
- Dispose- and Recycling- Techniques
- Photography and Arts
- Service- Professions
5. The different Schooling Variations:

- Business- education as an alternative to apprentice- education
  (starting with 14 years, lasting 3-4 years)

- Higher Education with matriculation standard
  (starting with 14 years, lasting 5 years)
  education for a wide variety of technical requests
  business and industry – medium management

- Lecture Education for students which have already common  matriculation standard
  special technical matriculation standard (after pre education +2 years)
  For all those, who decided late to get a vocational education (since 1974).

- Seminars and courses for different education
  in addition to skills, teaching of special knowledge
  according to new developments

- All the above mentioned educations are also possible to be attended in the evening,
  this is especially offered for employed people since 1964.
6. Educational Basics, Educational Concept:

- Theoretical - science based Education
  + practical instruction of application in school- workshops and laboratories
  + praxis during holiday- times

- Professors and trainers are also engaged in companies, or work in test- and measurement- institutions; some of them even run their own companies. This ensures a wide spread and practise oriented education for the students.

- Excursions and study journeys to interesting factories and events
  - in addition to the theory
  - journeys at the end of a school year, or at the end of education.

- Unfortunately especially this part often suffers tremendous seasonal (often political caused) fluctuations.
  Savings on the wrong matters
  Although operational experience displays, that especially this kind of activities are extraordinary important and valuable.
7. Educational Methods – the Course of Events

● Basics and tools of the specific department field (techniques, business, or service)

● Some general education

● Praxis obtained during summer jobs

● Special education for a specific department field (again fundamentals and slightly small specialising)

● Project work

● Certificate- project, or 35- hours – project- work
8. Educational Methods – Structure:

- All matters are coordinated taught in theory and praxis (application)

- Inclusion with the sensible use of modern technical tools like Internet, notebook classes, electronic teaching and so on.

- Open-minded for all new developments like:
  Electro- Techniques
  Radio- Techniques
  Television
  Electronic
  Digital- Techniques
  Data- Techniques
  Micro electronic
  Network- Techniques
9. **Training Courses:**  
(on the example of the departments Electronics and Communications)

- Network- Techniques (CCNA, CCNP)
- IT Essentials
- Fundamentals of Voice and Data Cabling (FVDC)
- Fundamentals of Wireless LAN (FWL)
- Network Security

- But all these items are, more or less, only for a short time relevant knowledge!
10. Summary

- Wide spreading of specialist knowledge offers
- Flexible and convenient
- Tight contact to business and industry
- Different ways of intensity and accesses to education
- Combination of theory and praxis
- Basic: future oriented Tradition

- Widely free of charge!

Thank you for your attention!