Experiences with CAD at the Hogere Technische School te Heerlen

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The institution of the "College of Advanced Technology".
In comparison with the educational institutions abroad, the Hogere Technische School can be translated in " Higher Technical School". In Germany it would be "Fachhochschule". The highest level of education at the H.T.S. is similar to the level in the second year at the university.
Contrary the university study, the study at the H.T.S. is directed at the professional practice.
The education is pasted in 7 branches of science namely:

- building engeneering
- civil engeneering
- mechanical engeneering
- electrical engeneering
- technical phisics
- chemical technics
- informatics

The H.T.S. has about 1750 students and 110 people personal.
To my function at the H.T.S. there is to say that I have been appointed since one and a half year as teacher of practical applications. The main task is to control the in september started " Computer Aided Design"-centre.
Mister Zelissen is the coordinator of the Computer-centre, of which the CAD-centre is a part.

Education in Computer Aided Design.
The H.T.S.-Heerlen is national well-known because of her education of CAD-instructions. At the moment CAD-instruction is best developed at the department of building engeneering. This department delivers a select group of engeneers, who has a specific knowledge of CAD and of making CAD-software. These building engeneers find already emploiment before they finish their study. From this fact you can lead that this group of engeneers are very wanted at the labour market.
In Holland the H.T.S. is the only institution which attends to this education at a high level.

The development of the CAD-teaching.

The first steps on the domain of computer aided design brings us back to 1981. In this year the Prime computer-system was installed at the H.T.S. The most important user of the system was the department for informatics then. In the other departments only some programming in Pascal was applied. But after the the implementation of programs like Bible, Goal and Genisis, of which I assume they are general known, the building and civil section could realy do something about CAD.

Mister Zelissen who gave the programming lessons, saw it as his job, to make more public the earlier named applications among the group of teachers. His enthusiasm spread to the group of the teachers, so that they looked for oppertunities to put the programs into their lessons.

With this fact the fundation of a prosperous rise of CAD-education, in the sections, was layed. Three years ago, the home-computer was introduced in teaching. For the students this was a unic opportunity to do a greater lot of study at home.

At the moment the programming lessons were realised on the home-computer, a third link appeared in the development of CAD-education. By the cooperation, in specific at the domain of CAD, between the HTS and the Academy of Architecture Maastricht, it became possible for the HTS to have disposal of a real CAD-system.

The CAD-centre, where the equipment was placed, gave a new stimulans to the CAD-education within the HTS.

Other sections as building and civil engeneering were interested by the things that happened in that CAD-centre.

The department of mechanical engeneering had a main interest and became the next section which works with CAD nowadays.

Today we are at the beginning of a new period of quick developments on the domain of CAD in education. It is produced by the intro of little cheap personal computers. This p.c. is the Atari 520 ST, with good software and a new interface between human beeing and machine.

A real CAD-program is availeble for that machine and is called ARKEY. This application is the same as the ARCOS-program on the heavy computer-systems. The program is developed by a Dutch software-house, called ARCADE O.HARRIS in Woerden.

We think that this application has a great future.

The cooperation - HTS and Academy of Architecture -

Within the framework of an experiment, the Dutch government placed CAD-systems on three academies in Holland. Because of the coorporation between Academy and HTS Heerlen, the Academy of Maastricht was choosen as one of the three. The HTS has disposal of people who have technical knowledge and experience with computer-systems. The Academy is only interested in CAAD and has no experiences with computers. This consideration has lead to the placing of the equipment at the HTS. The start for the set up of a CAD-centre was given.

So the Academy is capable of bringing CAAD into their education at a responsible way, because of the technical support by the HTS and the long experience of the HTS in teaching CAD.

Mostly all the times I mentioned CAD you can replace this by CAAD. For good understanding my background is architecture and town-planning at the Technical University of Eindhoven.

The CAD-centre.

The equipment of the first start is nowadays enlarged with a second computer-system (trademark Stride). Both systems are coupled by a Local Area Network and have Unix 5 as operating system. The number of graphic color terminals, with high resolution (1024*780 pixels) and tablet, is increased from 2 to 5. Also the CAD-centre has disposal of a A0-digitizer, some little plotters, a A0-plotter and some normal equipment. The capacity of the computer-systems together is 3 Mb intern-memory and 150 Mb background-memory. The costs of this heavy equipment are FL 100.000 per workstation.

Five little systems are coupled to the big system. These sytems, with a monochroom high resolution screen (640*400 pixels) and intern-memory of 1 Mb, are a break-through in the world of computers.

Because of the favourable price/performance ratio they are utmost suitable for the education environment. Price today is 3,500 guilders.

The latest asset is an IBM AT of FL 80.000.

The available software contents:

on STRIDE
- -unix 5
- -compilers C, Pascal, Fortran
- -GKS library
- -ARCOS, as most used apllication
- -Movie.byu

ATARI
- -compilers as above
- -ARKEY, the same program as ARCOS
- -spreadsheets
- -drawing-progrars for design

IMB AT
- -Cadvance
- -Autocad, to compair

In the near future the tasks of the cad-centre will be shift some, because the sections of building and mechanical engeneering will have their own little centres with Atari's and the fenominal CAD-program Arkey. The conventional drawing lessons will be replaced by drawing and design on these personal computers.
The CAD-centre will be directed more to program-development and experiments in a CAD-environment. Futher the main support to the sections on the domain of CAD will stay.
It is evident that the CAD-centre takes a unic place within the Higher Professional Education Istitutions in Holland.

The tasks of the CAD-centre.
The following will give an overview of the tasks.

1. The main dutie is directed to the CAD-teaching and futher development of it at the different departments. The support for the teachers comes from the CAD-centre. With this goes also the research of programs for suitebility in teaching.
2. Support to the Academy of Architecture in Maastricht and stimulations for new developments.
3. Support to trade and industry, in specific to little and mean undertakers, who want information about CAD. The main target is to investigate the possibilities for a company to start with CAD. This can be done for example by an experimental CAD-project, on the equipment of the centre, with the company. This facility will improve the pecunairy resources to invest in new equipment.

4. An other main task is the taking care of a post-HBO-course "CAD for building and civil engeneers", the only one given in Holland at this time. This year it is the second time.
The authorities support this initiative of HTS Heerlen and press to give a national course.
5. Experimental projects with Computer Aided Design.
At the moment we are working on a video-project in coorporation with the Technical University of Eindhoven. With this project the possibilities are researched to merge synthetic pictures of a design from a CAD-program with video-pictures of a real environment.

Management and control.

For the reason of good progress, it is a necessity to have a good and regular manegement and control for such a centre. Otherwise there would be no research which is necessary for an education environment. Also it is expected that the number of tasks will increase enormously in the near future.
The management is in good hands with mister Zelissen. The daily control is my task.
My work is to control the computer-systems and administrations for it. An other task is to manage the use of the CAD-equipment by users.
The constant presents of a personal member garanties best results with users. When problems appear the students must can consult the super-user for solutions. Not only problems with the operating system of the computer will ask for direct solution but also problems or questions about the CAD-applications are to solve.
Therefore it is necessary that the super-user is acquainted with the professional domain of the users.

An example of a professional CAAD-program.

The program is developed by an former student of Architecture of the Technical University of Delft. An independent Dutch office made a compairison among the great and well-known CAD-systems. The greater systems had mostly more facilities than this CAD-program.
But this program was the big winner in the price/performance ratio.

Today there are inserted more utilities into the program without loss of its friendlyness to users.
The name of that enormously apllication, you already guessed, is ARCOS or ARKEY on Atari.
The most important reason for use in education is the friendlyness of the program to users. Especialy because there is no need for a long learning process, to get acquainted to the program. Otherwise the program as a great number of facilities which you never find in autocad.
Arcos is two and a half dimensional (this summer it will come with a real 3 dimensinal version).
An other facility is the possibility to build components and put them in a library, so can always use them again. With this components is also possible to work at 118 different sheets to compose drawings of a building with diffrent kinds of information for the different patners in the building process.
To make an estimate of the design is also possible. You can hang prices to the components and the program gives you the counting result of components and multiply this with the prices to give you a total result.
The efficiency of an investment in this program is high, because of the low price of the program (to industry about fl 25.000).
The higher the efficiency is for that program on Atari with, ofcourse, an adapted price to the price of the Atari.

My expectations for the near future.
The break-through of the Atari on the computer-market will force other computer-companies to go this direction too. What effect this will mean for the integration of the computer in education and in social living is not yet to see. What sure is, that is, that Computer Aided Design is a commen subject within 5 years.