

Architectural drawing

Overview

This snapshot is derived from a four-week project which involved Stage 5 Technical Drawing students in producing 2D and 3D architectural designs.

The project combined both 2D and 3D presentations and was designed to promote students' creativity and innovation in the architectural field. It raised awareness of the use of computers in architecture and for client presentations.

Students were required to:

- produce a 2D architectural drawing of the plan view of an office
- produce a 3D colour image of the foyer of the office, suitable for showing to prospective clients with limited architectural knowledge.

Students used the computer to:

- produce the basic layout of a small office
- experiment with alternative positions of office furniture, using the functions of a computer-aided design (CAD) package
- import existing furniture icons into their 2D plan view of the office
- enhance the interim design of the 3D image by using spotlights
- suggest appropriate decor for the foyer, using the colour capabilities of the software.

Using CAD software, students realised their architectural drawings in a minimum time frame, got immediate feedback on the effects of their selection of materials and created a 3D colour image of the foyer to show to prospective clients.

Related subjects

Design and Technology

Industrial Technology

Food Technology

Information for teachers

The work samples in this snapshot were produced using *MicroStation Academic Suite* software. Students worked individually on networked computers. Stand-alone computers could be used.

The students in this class had previous experience in graphical communication using the computer for 2D and 3D designs. They were familiar with the menu and sub-menu items and had experimented with using the tool bar. Students understood the protocols for labelling and measuring elements of architectural drawings.

Experiences that develop computer-based capabilities

Students were engaged in activities that provided opportunities to:

- create 2D and 3D designs for a particular brief and audience (capability 2)
- reflect on how CAD has affected the use of the traditional drawing board in the architectural drawing industry (capability 3)
- assess the benefits of using CAD software for the development of architectural drawings (capability 4).

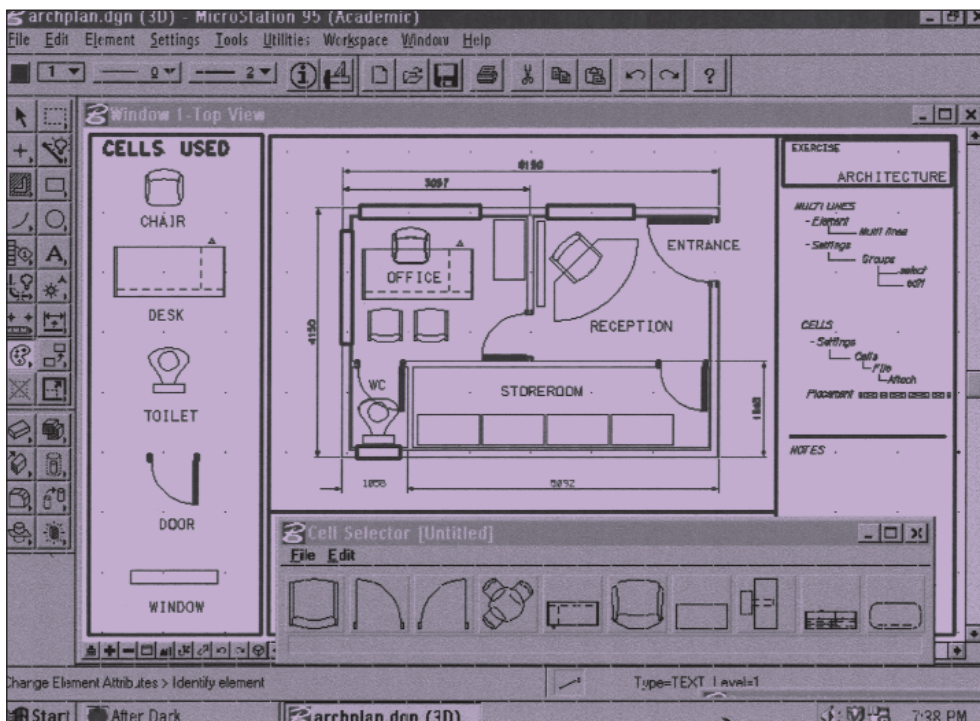
Activities using CAD for architectural drawing

Students investigated spaces and ways of representing them through a series of activities.

- Students were introduced to the concept of architectural design, using overheads of available plans from papers, magazines etc. They discussed issues of good and poor design.
- They developed some concepts and expressed their ideas for designing a given space by producing pencil drawings as solutions for the plan of an office.
- After researching and analysing an existing office, small-group discussions were used to establish common, basic principles of office design.
- Students explored real-world sizes by measuring and stepping out existing spaces in the school, including walkways, doors, windows and basic furniture.
- Each group was given project input, including the overall sizes of the office area, the number of people to be accommodated and their jobs within the office. The students used the computer to generate their ideas. This was done in a variety of ways but generally through experimentation. The CAD software enabled students to move, copy, rotate, delete etc. In many cases this eliminated the need for sketches.

Students followed a procedure where they:

- drew the basic overall shape of the office area
- drew and positioned internal walls
- drew or imported (depending on the software being used) the office furniture, doors and windows
- added the basic dimensions
- labelled the drawings
- printed or plotted their plan view at the appropriate size for the drawing (usually A4 or A3).



Sample of a student's initial 2D architectural drawing of the plan view of an office

3D activity: Enhancing 3D images

After students completed the 3D drawing of the office they needed to make the drawing as realistic as possible. To do this, the students added details of surface materials and lighting.

To produce this 3D colour image, students needed to develop an understanding of:

- lighting theory
- surfacing and materials
- importing and exporting models, e.g. plants
- mapping and surface reflection
- colour schemes and the effects of coloured lighting
- creating a mood or atmosphere using opaque and transparent settings on surfaces.

This 3D foyer is an example of what can be done using CAD software. The students:

1. drew the overall shape of the foyer
2. drew the furniture (desks, table) in 3D and moved it to appropriate positions
3. applied the appropriate materials (from a “materials library”) to walls, ceiling, floor and furniture
4. imported images into “frames”, positioned the pictures on the walls, drew the CADVISION sign and placed it on the wall
5. created the appropriate light (type, strength and colour) and tested various positions
6. placed a “camera” within the software and tested various positions to obtain the most appropriate view
7. applied several test renderings to determine the final appearance
8. rendered a final view
9. selected the most appropriate printing resolution and paper quality to print the final image.



The overall process allows students of all levels to achieve outstanding results. Their curiosity and interest were aroused and they were engaged with the program. Instant results mean that student self-esteem is raised.

Teachers may find that students excel at the actual design but need assistance in the aesthetics of the finished image, or vice versa.