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BRAZIL

Technical report: Advising on CAD for woven textiles*

Prepared for the Government of Brazil

by the United Nations Industrial Development Organization,

acting as executing agency for the United Nations Development Programme

Based on the work of Leslie Miller
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BRIEF.

To make recommendations concerning the education and training requirements for textile design students.

To provide training for CETIQT personnel in the practical use of computer-aided woven design systems, covering both dobby and jacquard weaving.

To assist in the installation of software drivers for the Howtech scanner and the Mitsubishi thermal printer.

To give a lecture to an invited audience, covering the application of CAD to woven textile design, the practical limitations imposed by CAD systems, and discuss the implications for the training of designers.

WORK DONE AT CETIQT.

In accordance with my brief I began by updating the woven-design software at Cetiqt, and interfacing the scanner and the printer. Both these peripheral items are located with the Lectra system in an adjacent room, and connections were made through a hole in the wall. The printer connection was established without difficulty, and problems encountered with the scanner interface proved to be due to the high speed of the 486 host system. It was found necessary to turn off the Turbo feature on the PC during the scanning operation, but apart from this minor inconvenience the scanning facility is now fully operational.

Nevertheless it is not particularly satisfactory having the two design systems (ScotWeave and Lectra) sharing the same printer and scanner, necessitating as it does going from room to room to change switches and plugs. It is certainly to be recommended that a small Sharp A4 scanner and a Sharp inkjet printer be obtained for the ScotWeave system (total cost about $5000) as this will provide complete independence for the two design stations.

It is understood, however, that there are plans to re-position the weave system, and it is to be expected that this will provide the opportunity to acquire the additional peripherals.

The ScotWeave Professional Design system was updated, and the software is now fully up to date, covering both Dobby and Jacquard weaving.

During the first week of the mission four members of Cetiqt staff were given continuous training in the use and

application of the software (a fifth member attended part-time.) All are now reasonably competent in using the system, but it must be emphasised that these skills are rapidly lost unless they are applied on a frequent and regular basis. This really means that trained staff must have - not only opportunity - but also justifiable cause to use the system in connection with their day to day work. Providing occasional demonstrations to visitors is not enough to keep staff proficient in the use of such software. This problem relates to the intended use of the design system within Cetiqt, and this is considered later in the report.

During the second week a four-day course was provided for personnel from industry, covering the use and application of the woven-design software, plus several lectures on computer graphics systems, yarn count systems, and basic yarn weight calculations. About nine people attended the course, travelling from various regions in Brazil. There were three problems associated with the course which are probably worth highlighting for future reference.

1) Any course involving practical "hands-on" experience can only be successful if there is sufficient equipment to permit each participant reasonably continuous access to a system. In my experience, expertise on CAD systems can not be obtained if there are more than two people per machine, and ideally there should be individual workstations for each participant.

   In this course, with up to nine people and only one design system, practical application of CAD was very limited. This is not intended as a criticism, but is simply a comment on the realities of running such training courses.

2) Attendance at the course throughout the week was rather eratic, in some cases due to having to return to the factory to deal with day to day problems. On the opening morning of the course, some were ready to start at 8.30am whilst others, due to travel distances, arrived at 10.30am. It is particularly important on a course covering new subject matter that the initial introductory material is heard by all, as anyone missing this aspect of the course could find problems in understanding what follows. It is strongly recommended that the starting time for the first day of such a course be set for a time convenient to all attending, and that the importance of being present for the opening be emphasised.

3) The third difficulty was simply due to my inability to speak Portugese. We were fortunate in that one of the attenders spoke good English (only one !) and was able to translate most of the time, but there were occasions when he was not present - although fortunately two of the Cetiqt staff who had already been trained were able to help out.

In spite of these problems the course seemed to be quite successful and those attending appeared to get some stimulation from the subject.

On one evening in the second week an illustrated talk was given to an invited audience in CETIQT's newly furbished auditorium. An audience of about one hundred were present, and the talk was followed by about one hour of questions. The talk was entitled "Desiging Woven Fabrics - by Computer" and Cetiqt provided printed translations of the paper for those attending, and my thanks are also due to Racquel at Cetiqt for translating during the presentation.

USING CAD AT CETIQT.

For any computer-design system to be effective in an educational environment it must be seen to produce an output that is of practical value to the user. In other words, its function should not stop with a screen image or a paper printout, but should be directly linked to an end-product. For the weaver the end-product should be a piece of fabric. A fabric design system which is not used to produce fabric is seen simply as a high-tech toy.

There is a danger that the ScotWeave system at Cetiqt could fall into this category. It is important therefore, in order to make the most of the system, that some links with fabric production are established. Such links would also provide Cetiqt staff with purposeful work to do on the system, and would develop their expertise in its operation.

In dobby weaving the simplest and most obvious link is with an electronic dobby, and Cetiqt have a Staubli dobby on one of their looms. But unless this loom is being used for design work, with changing warps, weaves, and patterns (and I suspect it is not) then the occasions on which the CAD system can be applied to the loom will be very limited.

Electronic dobbys are also available on handlooms - AVL and Harris looms - and for educational work these probably provide the better answer. However, the use of handlooms (electronic or otherwise) for the creation of fabric designs implies the provision of Textile Design courses, something which Cetiqt do not run at present. (I would draw attention again to the recommendations made in my report of 18th August 1991 concerning the provision of Design courses, and would again recommend that serious thought be given to undertaking a study of the Brazilian textile industry's needs in terms of Design Education.)

In jacquard weaving the link between electronic design and weaving is much more firmly established, as computer-design systems provide considerable savings in time and cost. As an educational tool an electronic sample loom such as the Dataweave provides a direct link between design station and loom, enabling students to see their designs in actual fabric in a matter of minutes. In jacquard weaving computer-design stations are no longer a luxury, they are a necessity.

Whilst there are no design courses at Cetiqt it would be difficult to justify the cost of such a loom, but if the recommendations concerning Textile Design courses are ultimately implemented then very serious consideration should be given to the installation of an electronic sample loom for the production of student design work.

As mentioned earlier, it is only when the CAD system is being used on a regular basis - by staff as well as students - that staff will become fully competent on it, and that it will be seen as anything other than a demonstration system.

SUMMARY OF RECOMMENDATIONS

1) Provision of Sharp A4 scanner and Sharp Inkjet printer to support the ScotWeave system.

2) Regular access (and cause for access) to the system by the four members of staff who have now been trained.

3) In running courses on CAD, consideration should be given to the number of CAD stations available in relation to the number of students (recommend a maximum of 2 students per station.)

4) When running courses for industry it is important to stress the need for a committment to regular attendance, otherwise full value will not be obtained from the course.

5) Serious consideration should be given to the practical application of the CAD system to the business of making fabric, so that it is not seen in a detached world of its own but in relation to fabric production. Such considerations must relate to Cetiqt's future role in providing Design education for FABRIC designers, and I strongly commend that my earlier report and recommendations be given serious thought (these recommendations are shown in the Appendix following).

Appendix - Recommendations from report of August 1991.

RECOMMENDATIONS.

1) A study should be undertaken to assess the present and future needs of the Brazilian textile industry in terms of fabric design. This study should investigate current marketing policy in all areas of textile production, and should establish clearly the position of design within the industry, and the present recruitment and training methods for designers. The study should also address the aspirations of fabric producers in relation to broadening their markets, and establish whether the provision of well-trained creative designers would be an asset to the industry. The study should assess the three areas of weaving, knitting, and printing separately, as the design requirements for each area will be different, and should attempt to assess the number of design graduates per annum likely to find posts in South America.

2) If the study above provides reasonable grounds for considering the provision of Design courses at CETIQT, then a Course Coordinator should be appointed who will be responsible for establishing the course requirements. It is recommended that the Course Coordinator should make a study tour of several established design schools (Scotland, Italy, France for example), and should establish a Consultative committee from the Brazilian industry. His prime function should be to produce a full proposal for the provision of the Design courses, with details of the requirements in terms of student numbers, staffing, accomodation facilities within CETIQT, technical facilities and equipment, and annual running costs.

3) In parallel with 2) above, it is recommended that a study should be carried out to assess the qualities that could be classed as "Brazilian" in relation to fabric marketing. This study should look at current Brazilian textiles, traditional Brazilian design (in all areas), fibres and fabric finishes that may provide unique marketable characteristics, and it should also look at the wider scope of "South American" design as distinct from being exclusively Brazilian. The study should aim to provide a clear indication of the design basis on which Brazilian textiles could be exported to the international markets.

4) The outcome of these studies should provide CETIQT with a clear mandate for the provision of Design courses for fabric design.

Appendix. Summary of Lecture given at Cetigt, April 92.

DESIGNING WOVEN FABRICS - by computer.

An assessment of the effect of computer graphics on woven-fabric designers.

by
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There is now a wide selection of computerised fabric design systems available, ranging in price from $12,000 to over $150,000, and all of them offer fundamental facilities for designing and simulating fabric, covering selection of colours, entering warp and weft patterns, and creating a weave structure, the resultant fabric being shown on the screen.

Justifying the cost of a system over a three-to-five year period will depend on the way in which the company intends to make use of computer simulations. Some companies today seem to expect the system to virtually replace fabric patterning, and in such circumstances the savings could justify a substantial outlay, considerably more than the annual patterning costs. Such a requirement however is dependant upon the system providing printouts of extreme precision in terms of colour, scale, and textural appearance, and at present, as colour-printer technology has still a long way to progress, the hope of achieving this requirement is doubtful.

On a world-wide basis there is a growing acceptance of the need to use computer design systems for fabric design, but the one principle obstacle to their complete acceptance is a constant insistence that hard-copy print-outs on paper must be an 'exact' match to the fabrics they represent. This requirement seems to be based on the desire to totally replace the fabric sample with the paper print-out, and a refusal to see any advantage in electronic design if this requirement cannot be met, in spite of the fact that considerable savings can be made by simply reducing the amount of patterning to those designs that are likely to be bought.

But in the next few years we will see continuing improvements in the quality of output from colour printers, to the extent that, without any doubt, it will be possible to produce precise printouts, from which buyers will place their orders. Initial patterning will all be done on a suitable design system, and design ideas will be marketed in the form of printouts. This has already happened in the mail-order market, where customers select and buy from photographic representations of clothing, carpets, and furnishings.

All CAD systems are nevertheless subject to the restrictions imposed by current technology, mainly in terms of colour output (governed by printer technology) and resolution or fineness of detail (governed by both printer and monitor technology). With screen detail limited by the pixel density on the monitor, it is not possible to depict an infinitely variable range of fabric densities. Most design systems make some attempt to achieve a compromise in this matter, but usually at the expense of showing some corruption in the fabric simulation.

In the meantime, however, CAD still offers tremendous potential in all areas of weaving, and, with the advent of electronic jacquard looms and the resulting growth in jacquard weaving, the advantages to the jacquard weaver are not just considerable but essential.