

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Technical Graphics and
Design and Communication Graphics
REPORT**

**St Mogue's College
Bawnboy, County Cavan
Roll number: 70360C**

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**AN ROINN | DEPARTMENT
OIDEACHAIS | OF EDUCATION
AGUS SCILEANNA | AND SKILLS**

REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN TECHNICAL GRAPHICS AND
DESIGN AND COMMUNICATION GRAPHICS

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in St Mogue's College. It presents the findings of an evaluation of the quality of teaching and learning in Technical Graphics and Design and Communication Graphics and makes recommendations for the further development of the teaching of these subjects in the school. The evaluation was conducted over one day, during which the inspector visited classrooms and observed teaching and learning. The inspector interacted with students and teachers, examined students' work, and had discussions with the teachers. The inspector reviewed school planning documentation and the teachers' written preparation. Following the evaluation visit, the inspector provided oral feedback on the outcomes of the evaluation to the principal and the subject teachers. The board of management was given an opportunity to comment in writing on the findings and recommendations of the report; a response was not received from the board.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

St Mogue's College participates in the School Support Programme of Delivering Equality of Opportunity in Schools (DEIS), the Department's action plan for educational inclusion. It caters for 158 students, 87 males and 71 females. Technical Graphics (TG) is offered to first-year students as one of the optional subjects studied for the Junior Certificate examination and, currently, students must choose either TG or Business Studies. Students are given the opportunity to sample both of the subjects for a period of three weeks before being asked to make their final subject choice. Students are supported by the guidance counsellor and subject teachers during the sampling period. The opportunity to sample subjects provides a good support for students' decision-making. Parents are supported in the matter of subject choice by the provision of an information night at the time of enrolment. The guidance counsellor makes a presentation on subject choice to parents at that meeting and is available to answer questions. Information is also sent out to parents by post. To further improve on these arrangements it is suggested that at the end of the sampling period students should be asked to fill in a subject option choice form which would be then signed by parents. This would provide a more formalised arrangement for confirming subject choices.

In the senior cycle the Transition Year (TY) programme is provided as an option and all other students follow the Leaving Certificate Vocational Programme (LCVP). Students moving to the LCVP are offered a choice of Design and Communication Graphics (DCG) or Business. Students and parents receive support at this important decision-making time by means of separate information sessions which are attended by senior management, the guidance counsellor, subject teachers and the TY and LCVP programme co-ordinators.

Students of both genders are almost equally represented in the school yet the number of females studying TG and DCG is lower than the gender profile of students taking these subjects nationally. At the time of the inspection there were only three female students studying TG at junior cycle with no females studying DCG at senior cycle. It is recommended that the subject department and senior management seek ways to encourage more females to study the subjects. A survey of all the female students in the school to determine their knowledge of the subjects and their related attitudes would be a useful initial step in attempting to increase the uptake of the subjects among female students. The provision of an information booklet on optional subjects should be considered with input from past female students or from women in business or graphic design or other related careers within the local area. Presentations given to parents and students relating to subject choice should be reviewed and amended if necessary so as to better promote the subjects among female students. Furthermore female students currently studying the subjects should be invited to contribute to such presentations thus providing a broader perspective of the subjects.

All year groups receive an appropriate time allocation for TG and DCG. Junior cycle students are provided with two double class periods per week while senior cycle students are allocated two double and one single class periods per week. All students in transition year study a full year DCG module and are allocated a double and single class period per week. This is a good arrangement as it allows students who may not have studied TG in the junior cycle to get a flavour of DCG at senior level. The provision of a year-long module also ensures continuity between junior and senior cycles.

Two rooms are available for the teaching of the subjects. The Materials Technology (Wood)/Construction Studies room is used for the teaching of all drawing board related lessons. This room is bright and clean with a well organised storage system for student portfolio work. There are some subject-specific models on show such as models on the planes of projection, the hyperbolic paraboloid and the hyperboloid of revolution. However, this room does not have any information and communications technology (ICT) equipment available to aid the teaching and learning of the subjects and it is recommended that the room be provided with a data projector and computer as soon as possible.

The second room, which has recently been refurbished to accommodate information and communications technology (ICT) equipment, is used to teach all areas of the syllabus related to the use of the *SolidWorks* computer-aided design software and the DCG project. This room is well laid out and contains twenty desktop PCs for student use as well as a data projector and screen for teacher use. The desks being used to house these computers are of a particularly good design. Senior management and the subject department are to be praised for the continuous work in upgrading the facilities for the teaching of the subjects.

One of the teachers has attended all the subject-specific inservice provided by the technology subjects support service (T4). The sharing within of the resources provided and the good practices learned during these training days should be a priority within the subject department. Co. Cavan Vocational Education Committee has also provided recent whole-school inservice related to assessment for learning (AfL) as part of its continuing professional development (CPD) programme. Management is commended for supporting and facilitating this in-career development of the teaching team.

PLANNING AND PREPARATION

Subject department planning meetings are facilitated at the beginning of each term. Minutes are kept of these meetings and these are retained in the subject planning folder. It is recommended that copies of these be provided to senior management as a guide to ongoing developments in the subjects. In recent years additional meeting time for planning has been made available. The support provided for subject planning is commended.

Schemes of work were made available for inspection for both subjects. The schemes indicate the different topics to be covered with classes during the course of their study and are broken down into half-term time frames. This good practice facilitates the accurate tracking of progress through each programme of work. As a next step in the development of these plans, it is recommended that each topic be examined in detail to establish the precise learning outcomes to be achieved by the students from that unit of study. Reference should be made to the teaching methodologies to be used, the resources available for the teaching of the topic and the planned methods of assessment. This approach would help integrate the important elements of the schemes of work.

The subject department plans, of which the schemes of work are only a part, would benefit from further development. The best practice would be to have the planning folder as a comprehensive document which details all information relating to the teaching and learning of the subject in the school. It should include reference to student access to the subject, class organisation, homework and subject department policies. Further information on what should be included in a subject department plan is available on the school development planning initiative (SDPI) website (http://www.sdpi.ie/subject_planning.html).

The TY plan focuses on introducing the students to parametric modelling using the *SolidWorks* software package. The series of projects outlined in the plan introduce the students to the commands and techniques needed for the computer-aided design element of the Leaving Certificate DCG project. This is good practice. It was reported however that many of the female students in transition year found this work tedious as the year progressed. Efforts should therefore be made to vary the learning experiences of the students so as to help maintain high levels of motivation across all learners. Consideration should be given to broadening the content of the transition year scheme to include the development of students' freehand sketching and rendering techniques. Furthermore some of the objects currently selected for modelling using *SolidWorks* are male oriented. Care should be taken when selecting objects to be modelled that they are gender neutral. It is recommended that a project be introduced, towards the end of the year, which involves research, parametric modelling, freehand sketching and design modification in order to tie the various elements of the course together.

The subject department has access to ample wall space in one of the classrooms and also along the corridor. Consideration should be given to the display of students' class work, past DCG projects, solutions to examination questions modelled using *SolidWorks*, as well as some of the posters and worksheets that are available on the T4 website (www.t4.ie). This would introduce some added colour into the classroom and would create points of interest for the students. Furthermore such displays can provide those students whose work is displayed with a sense of fulfilment and achievement while simultaneously raising awareness amongst students as to what the subject involves. A similar display, outside the classroom, could assist in raising the profile of the subjects amongst the whole-school cohort. It is suggested that a display of work by some of the female students studying the subject would assist in addressing the gender imbalance that currently exists in the uptake of the subjects in the school.

All TG and DCG classes are of mixed ability and access to higher and ordinary level is accommodated within class groups. An analysis of students' outcomes in certificate examinations is carried out by senior management every year with results compared to national norms. The subject department, parents and the board of management are informed of the outcomes of this analysis. The subject teachers should use this analysis along with the marking schemes and the chief advising examiner's reports issued by the State Examinations Commission (SEC) to inform future planning for the subject.

TEACHING AND LEARNING

All lessons observed had clear learning intentions which were, in most cases, shared with the students at the beginning of the lesson. This strategy provides an early focus for students on the specific objectives of the lesson. To further build on this good practice, the proposed learning outcomes for the lesson could be written on the chalkboard and ticked off as each is achieved. They could be used to keep the work focussed and at the end of the lesson to assist reflection on the progress achieved.

Students were quick to get set up for their drawing lessons and had well established routines. Questioning was used to good effect to link lessons to previous learning. Questioning strategies proved particularly effective in instances where there was a good balance between directed and open style questioning to assess individual levels of student learning. Correct answers were often repeated and further developed by the teacher and this fostered a deep understanding of the concepts involved. As is good practice the teachers focussed on the underlying principles of each problem before progressing to the mechanics of solving them.

The chalkboard, which is central to the teaching of graphics, was used effectively in the lessons observed. Drawings were usually built up by the teacher as the lesson progressed and care was taken to ensure that students followed the different steps involved. Chalkboard drawing instruments and coloured chalk were used to enhance these presentations resulting in very high quality work. It was particularly notable, in the junior cycle lessons observed, that the teacher's care and attention to neatness, accuracy and good draughtsmanship while producing chalkboard work was reflected by similar care and attention in the students' work. This modelling of good practice is highly commended.

Freehand sketching was regularly used on the chalkboard as a quick means of illustrating difficult concepts and this worked well as a means of developing students' visual-spatial reasoning. From the observation of students' portfolio work, however, it was clear that students would benefit from developing their own freehand sketching techniques further. Freehand sketching is now an important element of the Leaving Certificate DCG syllabus and it is recommended that opportunities be taken to promote the development of this skill among students. Students should be encouraged to sketch possible solutions to problems and to sketch 3-dimensional explanations of these solutions. Furthermore the use of freehand drawings should be encouraged from the beginning of first year as a quick means of deciding on sheet-layout. This would help students to develop their visualisation skills while also improving their proficiency in graphic communication.

In addition to using the chalkboard for the presentation of work it is recommended that the use of information and communications technology (ICT) be increased to support student learning.

During lessons observed on orthographic projection, rotations, truncated solids and the oblique plane there were many opportunities where the use of a data projector would have improved the students' experience and understanding of the material being taught. The modelling and presentation by the teacher of solutions to such questions using *SolidWorks* would further support and reinforce learning.

Teachers used and emphasised the terminology associated with TG and DCG during lessons and this allowed students to assimilate subject-specific language while working on their own drawings. This good practice enhanced both teaching and learning and ensured that students could communicate with their peers, with the teacher and with the inspector in the language of the subjects. The pacing of lessons was generally very good with students working diligently to complete the set tasks. In the senior cycle lesson observed however there were several occasions when the pace of the lesson was too slow. This was not helped by the fact that the double period lesson was split across lunch break which resulted in some time being lost. It is vitally important that all students are kept actively engaged throughout lessons so as to cover the syllabus material comprehensively and to maintain student motivation and interest.

There was good teacher movement throughout the classroom during the different lessons observed. This helped to keep students on task and allowed students receive appropriate individual tuition where required. Teachers provided appropriate developmental guidance and were affirming of students' efforts. Teacher-student interactions were engaging, purposeful and mutually respectful and this contributed to a good classroom atmosphere where discipline was sensitively maintained at all times.

ASSESSMENT

All year groups have examinations at Christmas. Junior Certificate and Leaving Certificate students have 'mock' examinations in spring with all other year groups having end-of-year examinations. Reports are sent home to parents after each set of examinations and parents of students in each year group are invited to attend one parent-teacher meeting during the year. These arrangements are satisfactory. Interim reports are prepared for students who are perceived to be having difficulties or are at risk. Such reports, once completed, are discussed with the individual student and with parents. This system, combined with the use of a student journal and an assembly for all students once per week represents a good support structure for students. Students' attendance, attainment and progress were recorded meticulously by the teacher in most lessons. These records form the basis of reports to parents following formal school assessments and at the annual parent-teacher meetings.

Students' portfolio work is checked and initialed on a regular basis, which is good practice, and occasional sheets are awarded marks. To further improve on this system it is recommended, in line with assessment for learning (AfL) principles, that teachers provide regular written formative and constructive feedback on students' work. This monitoring should recognize whether drawing sheet space has been utilized effectively and comment on the standard of neatness, accuracy and draughtsmanship. It is also recommended that a proportion of the marks awarded to students at Christmas and summer house examinations should be based on portfolio work. This arrangement would reward students for their work all year round and would further encourage them to keep their portfolios in good order.

An examination of student journals and discussion with the teachers indicated that the majority of the homework allocated in classes focuses on the type of short questions found at the beginning of the certificate examination papers. It is recommended that homework includes full drawing

problems on a regular basis to all year groups and in particular to examination classes. Homework should also be allocated that nurtures the student's freehand sketching and rendering skills. Such homework would support the student's work in school and would allow the teacher to assess student understanding and to diagnose and address individual and class learning needs.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- First year students are given the opportunity to sample each of the optional subjects before they are asked to make their subject choices.
- Time allocation to the subjects is good with the classes well distributed across the week.
- The subject department has access to two rooms, one of which has been recently refurbished to a high standard to accommodate information and communications technology (ICT) equipment.
- The lessons observed were well structured with good continuity and links to previous learning.
- There were good routines evident during lessons for the management of work.
- Questioning techniques were used effectively to assess individual levels of student learning.
- The chalkboard was used well to model the development of solutions.
- The rapport between students and the teacher was found to be very good.
- Students' portfolio work is monitored regularly.

As a means of building on these strengths and to address areas for development, the following key recommendations are made:

- The subject department and school management are urged to seek ways to encourage more females to study the subjects.
- The subject planning documentation needs development and should follow the SDPI template.
- Efforts should be made to display more subject-related material in the classrooms and along the corridor.
- Schemes of work should be modified to include the proposed learning outcomes for each topic as well as the teaching methodologies to be used, the resources available and the proposed methods of assessment.
- There should be an increased use of ICT to support student learning.
- A greater emphasis on the development of students' freehand sketching skills is encouraged.
- Homework in the form of full drawing problems should be given on a regular basis to all year groups.

Post-evaluation meetings were held with the teachers of Technical Graphics and Design and Communication Graphics and with the principal at the conclusion of the evaluation when the draft findings and recommendations of the evaluation were presented and discussed.

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