

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Mathematics
REPORT**

**Coláiste Chríost Rí
Capwell Road, Cork
Roll number: 625600**

Date of inspection: 30 November 2010



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

REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN MATHEMATICS

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Coláiste Chríost Rí. It presents the findings of an evaluation of the quality of teaching and learning in Mathematics and makes recommendations for the further development of the teaching of this subject in the school. The evaluation was conducted over two days during which the inspector visited classrooms and observed teaching and learning. The inspector interacted with students and teachers and examined students' work. The inspector reviewed school planning documentation and teachers' written preparation. Following the evaluation visit, the inspector provided oral feedback on the outcomes of the evaluation to the principal and subject teachers. The board of management of the school was given an opportunity to comment on the findings and recommendations of the report; the board chose to accept the report without response.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

The timetabling provision for Mathematics is very good. All junior cycle classes have five periods each week and in senior cycle this increases to seven in fifth year and six in sixth year. Transition Year (TY) is optional but a large majority of students choose to follow the course. TY classes have five periods of Mathematics each week. In addition to this, classes are generally spread evenly throughout the school day and the school week with all students having contact with the subject each day. Mathematics classes in senior cycle are timetabled concurrently to allow separate classes for higher-level and ordinary-level students. In the interests of maintaining high levels of continuity, the good practice of teachers remaining with the same class groups from first year to third year and from fifth year to sixth year, where possible, is followed.

The teaching of Leaving Certificate higher level Mathematics is currently the responsibility of two members of the team. In light of the anticipated increase in the numbers taking the subject at this level and to ensure that the school retains the ability to deliver the programme at this level it is suggested that the school, over time, increase the number of teachers capable of delivering the programme at this level.

Incoming students are assessed on the basis of pre-entry assessments. On entry, based on their performance in these assessments a cohort of students are assigned to two set classes which generally follow the higher-level course for three years as stand-alone groups. The remaining students are assigned to a band of classes which are timetabled concurrently for Mathematics and taught on a mixed ability basis in first year. The concurrent timetabling for this band continues during their junior cycle allowing for the formation of higher and ordinary-level classes during second year and into third year. This method of assigning students to classes is currently under review and this has resulted in some concurrencies between the set classes and the banded classes in third year. It is recommended that Mathematics be concurrently timetabled for each year group of students, starting in first year. Currently mathematics classes in TY, fifth and sixth year are formed on the basis of the performance of the students in the Junior Certificate examination. It is recommended that the overall structure of assigning students to classes would be reviewed. A

more flexible system that would respond to the needs of each yearly cohort of students, having the goal of mixed-ability groupings within levels at its core is recommended. Mixed-ability teaching within levels takes account of varying rates of student development and exploits the correlation between levels of teacher expectation and levels of student achievement.

Incoming first-year students are assessed prior to entry to the school in a number of areas including Mathematics. Students who find the subject particularly challenging are identified through this pre-entry assessment and teacher monitoring and assessment during first year. These students are generally supported through the creation of an extra class group in the banded classes in each year up to Junior Certificate. In addition to the generous time allocation at senior cycle, students are also withdrawn from classes other than mathematics classes for extra tuition at foundation level.

The provision of information and communication technology (ICT) equipment has increased recently and is currently used to a limited extent in classroom teaching. All classrooms are now networked and have had data projectors installed. It is suggested that, in order to support the teaching and learning of the subject, strategies to integrate ICT more directly into lessons should be discussed and included within future reviews of the team's plan.

The school has a strong record in the Team Maths competition and has taken part in Irish Junior Mathematics Competitions along with other mathematical competitions. Those involved in organising this very good practice are praised as it allows students to have an interest in Mathematics outside of the classroom, raises the profile of the subject within the school, gives students the opportunity to enjoy Mathematics and see it applied to problem solving in a new and stimulating way.

Management is commended for supporting the continuous professional development (CPD) of teachers by facilitating opportunities to attend in-service in Mathematics during school time. All teachers have attended, and plan to attend, a range of in-service courses organised by the Project Maths Development Team.

PLANNING AND PREPARATION

The mathematics department structure, established in the school in recent years, is co-ordinated on a voluntary basis by a senior member of the team. To allow each member of the team to gain a deeper understanding of the issues involved in the workings of their subject department and to share the workload, it is recommended that the role of co-ordinator should be rotated among members of the team, on an agreed basis.

Formal planning and review meetings are scheduled around staff meeting and school planning days and occur at the beginning and end of the school year. It is recommended that a record of these meetings would be included in the mathematics plan. Informal discussions between small groups of teachers also take place on a regular basis.

The mathematics team have made some progress in planning. The department plan includes organisational details of classes and teachers and outline programmes of work for each year group and level in the form of chapter headings to be covered each term. It is recommended that the plan be expanded to include topics and subtopics to be covered in the form of learning outcomes linked to resources, methodologies and assessment. The plan should also include a description of provision for students with special educational needs. Procedures for homework, assessment,

record keeping and reporting along with a list of CPD courses attended by teachers in recent years and a note on the availability of ICT facilities and other resources in the school should also be included.

The TY plan for the school is differentiated according to the groups following the programme. While it is good to note that a module of Applied Mathematics is available to students who have an interest in following that course the remainder of the programme contains much material closely associated with the current Leaving Certificate programme. There is a need for more cohesion in terms the TY programme than is currently in evidence. It is therefore recommended that the mathematics department review the TY plan to ensure that there is a clear distinction between Leaving Certificate material and the TY mathematics programme.

The teaching team do not currently conduct an annual review of uptake rates and achievement in the certificate examinations. Such a review is a useful tool in reviewing progress and informing future planning. It is recommended that such a review be undertaken on an annual basis.

All teachers made individual planning and preparation materials available during the inspection. Included in these materials were termly schemes of work, examples of worksheets and handouts, common examination questions and solutions. A folder containing a selection of these resources is available to members of the team on the school computer system. This level of co-operation and preparation for teaching is good.

TEACHING AND LEARNING

Work set during lessons was clear but challenging and students responded well to the level of their teacher's implicit expectations. Teachers were well prepared for their teaching and students were attentive and engaged in the work at hand. Teachers were aware of and attentive to the needs of individual students and devoted class time to working with students who were experiencing difficulty. There was mutual respect evident between teachers and students and generally good student behaviour facilitated an effective classroom management style conducive to learning. Students' progress and effort were affirmed in an atmosphere that created confidence and encouraged students' use of appropriate mathematical language.

Lessons generally began with the correction of homework at the board by the teacher. The topic of the lesson was then shared with the students. This is good practice as it stimulates interest in the lesson and captures students' attention. Teaching was then predominantly conducted through the presentation of work at the board by the teacher followed by the setting of similar problems from the textbook for individual students to practice what they had observed. This allowed time for the teacher to provide attention to students who might be experiencing difficulty. Within this traditional style, teaching was effective and lesson content was in line with agreed programmes of work and syllabus requirements.

To complement this general, whole-class, teacher-directed teaching style it is recommended that a wider range of teaching methodologies be explored and developed, to engage students more fully in their own learning. The inclusion of a variety of strategies in the purposeful lessons observed should help to integrate into lessons the widely accepted benefits for students of being actively involved in their own learning and also take account of and utilise students' different preferred learning styles to a greater extent. Some examples could include investigation, pair work, consolidation activities, practical work, discussion, group work, quiz activities and appropriate use of ICT. The teaching and learning plans available on the Project Maths Development Teams'

website www.projectmaths.ie should not be overlooked when exploring alternative teaching strategies, along with the sharing of the good practice seen in many lessons.

Interactions between teachers and students typically took the form of brief answers to questions posed to individual students or to the class group by the teacher on finding the next steps in a solution. In some instances, students were encouraged to connect previous learning or their own experiences to new material being presented. There were also some good examples of teachers encouraging students to justify their methods and in some instances, of the posing of more challenging questions to encourage students to probe new material being presented. The use by all teachers of some probing questions in mathematics lessons should appropriately challenge students and assist them in developing their skills in the area of problem analysis, mathematical thinking and mathematical communication. There were also examples of students asking questions, reflecting their engagement with learning in the lessons.

Particular examples of good practice in mathematics teaching observed, included the affirming of students' efforts, reviewing appropriate procedures and previous learning prior to introducing a new topic, the linking of learning to students' experiences, the use of clear methods in the teaching of transposition, the appropriate use of mathematical language by both teachers and students, appropriate use of ICT and high levels of attention to individual students. The use of a *bingo* type activity to stimulate interest in a review of algebraic concepts was enjoyed by the students as well as being particularly effective as a revision tool. Such good practice help to ensure that students are encouraged to work to the best of their abilities and to engage with the learning activities in lessons.

In interactions with the inspector, the students were able to demonstrate understanding of the concepts they had learned and how to apply them to problems. They could make connections to previous learning and displayed clear mathematical knowledge. Learning was evident as students were able to apply procedures, learned in class, to similar type problems from the textbook.

In a minority of classrooms, displays of students' work and posters were used to enhance the visual-learning environment. The display of such posters and students' project work can be effectively used to motivate students and remind them of key mathematical concepts or formulae. It is suggested that more use be made of students' own work, such as projects or examples of high quality work, to highlight the quality of learning and to engage students further.

ASSESSMENT

Formative assessment of students is carried out on an ongoing basis by questioning in class, through correction and monitoring of homework and student work during lessons. Students are regularly assessed at the completion of topics and teachers retain records of students' achievements in these assessments. Summative assessment occurs as all students have in-class tests at the mid-term and are formally assessed at the end of the first term and also have formal examinations at the end of the school year or, in the case of examination classes, sit their 'mock' examinations during the second term.

The school maintains good communication with parents. Annual parent-teacher meetings are held for each year group. Three school reports are issued for each student during the year. Additionally, the student diary can be used as an effective means of communication between the school and home and vice-versa.

The banded classes in first year are commonly assessed at the end of first year and early in second year prior to the formation of higher-level and ordinary-level classes. Other assessments are generally set and monitored by individual teachers for their own classes. It is recommended that the mathematics team move towards more common assessments or assessments having a common core of questions with agreed marking schemes within levels. Common examinations enable comparisons to be made across the student cohort. It can also serve a useful purpose in informing students' choice, or in providing advice to students, in relation to levels.

Lessons generally began with the correction of homework, and an examination of students' copies and journals revealed that homework is regularly assigned. This is good practice. Copybooks contained work that was appropriate, relevant and well presented. There was evidence that teachers are monitoring students' copies and that students also have a role in monitoring their own work. This is good. In some instances the good practice of using positive comments to encourage students' efforts was noted.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- The time allocated to Mathematics is very good.
- Students who find Mathematics challenging are well catered for in the school.
- Teachers were well prepared for their teaching and students were attentive and engaged.
- The mathematics department encourages participation in co-curricular activities related to Mathematics.
- Teachers had high expectations of the students and the students responded accordingly.
- Students' progress is monitored on a regular basis.
- The level of communication with parents is good.

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

- The school should review the process through which students are assigned to class groupings.
- Teachers should broaden the range of teaching methodologies used in lessons and include strategies that involve students more and make them more active participants in their own learning.
- Yearly schemes of work should be reviewed to include topics and subtopics to be covered. These should be written in a format where learning outcomes, resources, methodologies and modes of assessment are linked.

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

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