Subject Inspection of Mathematics REPORT

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REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN MATHEMATICS

SUBJECT INSPECTION REPORT
This report has been written following a subject inspection in Jesus and Mary College, conducted as part of a whole school evaluation. 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, examined students’ work, and had discussions with the teachers. 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.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Time allocated to Mathematics is very good and in line with syllabus requirements. In Junior Certificate (JC), four class periods of Mathematics per week are timetabled for first year and five class periods are allocated to second and third year groups. The Transition Year (TY) groups receive four mathematics lessons per week. In fifth and sixth year, students are allocated five class periods per week with a sixth class period allocated to higher-level mathematics in sixth year. All mathematics classes are of forty-minute duration. Class contact time is evenly distributed throughout the week and timetabled on a daily basis where appropriate, which is in line with best practice.

First-year students are assigned to one of three mixed-ability class groups. In each of the remaining year groups at junior cycle, two higher-level and one ordinary level class groups are formed. Students are assigned to one of these concurrent classes based on their performance in first-year assessments, teacher observation and discussion with parents and students. The school offers an optional TY programme and students are assigned to one of three mathematics classes based on their performance in the Junior Certificate. In the current school year, one higher-level and three ordinary-level class groups have been formed in fifth year, based on students’ performance in the Junior Certificate. Senior management facilities concurrent timetabling for all mathematics classes which is to be commended. This practice allows students to access a level most appropriate to their ability.

The mathematics department comprises six teachers. In the current school year, two students of Mathematics pursuing their Post Graduate Diploma in Education are being offered teaching experience in the school. Teachers are suitably qualified and are assigned to teach a level most appropriate to their specialism. Commendably, teachers rotate the teaching of programmes among members of the department. In general, the teaching of higher-level in the Junior Certificate is rotated among members of the department. This year higher-level Mathematics in senior cycle is being taught by one teacher. However, to increase the expertise within the department, a member of the Mathematics department is currently sharing the teaching of a higher-level grouping in TY. This initiative is to be commended and provides evidence of the department’s commitment to retain the high-level of expertise necessary to teach higher-level Mathematics and to meet the
changing needs of the Mathematics syllabuses in the coming years. It is department policy that teachers retain the same class group from second to third year and from fifth to sixth year. This continuity is also in line with good practice.

There is very good support by senior management for the ongoing professional development of teachers and for the provision of resources to support the teaching of Mathematics in the school. Management facilitates attendance at subject specific in-service courses. Requests for mathematics resources are acquired through the school’s acquisitioning system which includes the co-ordinator making such requests to the principal. Resources currently available include: teacher geometry sets, volumetric shapes and measuring equipment. Resources are centrally located and can be accessed readily by members of the department. To expand the current stock of resources, the Mathematics department is advised to collaborate and collectively identify further materials that will be necessary for the teaching of the subject.

In addition, the school has invested and is very well equipped with information and communications technology (ICT). All but one classroom visited had an interactive whiteboard, fixed data projector and laptop computer. The expertise and proficiency in the use of the technology varies among members of the department. The department is, however, planning some work in the area of ICT training. To advance work in this area, consideration should be given to teachers sharing their expertise in the use of the interactive whiteboards among fellow colleagues in the department. This should allow for optimum use of the resource as a teaching tool for Mathematics.

Students in need of numeracy support are facilitated through individual or group withdrawal from subjects other than Mathematics and receive this support from a qualified mathematics teacher. Other models of provision have been used in the past, such as in-class support, and the extension of such means of support should be considered for the future.

The use of a mathematics notice board which is centrally located provides opportunities to display students’ project work. This is commendable. This resource could also be used to highlight events in Mathematics that occur throughout the year. For example, the recent activities arranged in the school associated with Maths Week. In addition, mathematics competitions and other events that offer students the opportunity to engage with Mathematics in contexts other than classroom situations could be displayed on this board.

PLANNING AND PREPARATION

Subject department planning meetings are facilitated by senior management throughout the school year. In addition, many informal meetings take place on a more regular basis to discuss day-to-day issues. Informative minutes of department meetings are retained and indicate that clear progress on issues is made. The role of subject co-ordinator is rotated among members of the Mathematics department. This is good practice, as it allows teachers to gain expertise in this area.

Commendable work has taken place on the development of the plan for Mathematics. The Mathematics plan includes the aims, objectives, department policy on student access to levels and provision for students who experience difficulty with Mathematics. Additionally, schemes of work for each year group and each level and suggested timeframes are documented and included in the plan. However, these schemes are currently based on chapters of the text book rather than syllabus based. It is recommended that a review of the schemes of work should be undertaken so that all are based on the relevant syllabuses and topics are synchronised across levels. Furthermore, learning outcomes associated with the schemes of work should be included. It was
noted that the Mathematics plan, along with relevant resource material, will be uploaded onto the school’s intranet when this becomes available. This is good practice and should be advanced, as it would be an important resource which all teachers of Mathematics could access.

The TY plan for Mathematics tends to focus mainly on the preparation for the Leaving Certificate with some elements of innovative syllabus material. It is recommended that this plan be reviewed to ensure that there is a clear distinction between the TY programme and the corresponding Leaving Certificate syllabus as outlined in the *Transition Year Programmes, Guidelines for Schools*.

Individual planning documents made available at the time of the evaluation were based on the Mathematics long-term schemes of work. Of particular note is the development of electronic plans that include specific resources for each area of the scheme of work that has been developed by a teacher. The availability of the school’s intranet will facilitate the sharing of such valuable resources among mathematics teachers.

**TEACHING AND LEARNING**

Six lessons were observed during the evaluation including junior cycle, TY and senior cycle class groups across a range of levels. The predominant teaching style observed was traditional in approach and was of a good standard. However, on occasion, the use of teacher-directed approach did not allow for sufficient student engagement in some lessons. All lessons observed were well planned and teachers’ presented their work in a clear, confident and competent manner. Effective use was made of the available time. The establishment of an appropriate pace ensured that good progress was made in lessons.

Teachers were aware of the needs of their students and many spent time consolidating newly acquired skills and competence. Teachers skilfully assessed students’ readiness to progress with the lesson and in some instances undertook additional questions to reinforce the subject matter of the lesson. The appropriate use of subject specific terminology and symbols by both teacher and students is commended and suggested that students regularly encounter such terms and symbols during their study of Mathematics.

Teachers and students have developed very good relationships that foster a positive classroom atmosphere. Effective classroom management allowed good progress to be made in lessons and contributed to a positive environment that promoted student learning. Examples of good practice included clearly establishing learning objectives for the lesson from the beginning and continuity in learning from the previous lesson. In particular, the projection of the intended learning outcomes for the lesson via ICT was commendable. In this way, students were provided with a constant reminder of the main objectives of the lesson. Students were fully aware of what was to be achieved during the lesson, and were enabled to view Mathematics as a series of interconnected topics.

Teachers established high expectations for their students and they responded accordingly. Students’ learning in all lessons was appropriate to their ability and appropriate to syllabus requirements. Students were eager to learn and were well prepared with all necessary materials available and ready for lessons to progress. In many lessons, students regularly questioned their teachers about the topic in hand to ensure their understanding of the subject matter.
The traditional teaching style observed involved the teacher demonstrating a technique and students completing some examples to practise. Even though this style was of a good standard, it is recommended that a broader range of teaching methodologies be explored and developed. The inclusion of such strategies in lessons should complement the preferred learning styles of all students while providing opportunities for students to benefit from activities that allows for them to become more involved in their own learning. In instances when students were assigned class work, they were attentive and set to work in a diligent manner. However, when assigning tasks to students, teachers should ensure that specific timeframes are established to ensure that all students are encouraged to make sufficient progress with their work.

The use of a good range of questioning strategies was observed in many lessons. Initially, teachers used questions to stimulate recall of facts from the previous lesson and to ascertain students’ prior knowledge and readiness to progress with the topic or to address misunderstandings. In some lessons, teachers used higher-order questions to probe students’ understanding of the topic being studied or to link Mathematics with real-life situations or with topics within the syllabus. The skilful exploitation by teachers of questions posed by students is a highly commendable practice. Teachers used student questioning to encourage the class to think and provide solutions. This should become a regular feature in lessons.

Resources used in the lessons observed included the whiteboard, textbooks and, to a lesser extent, an interactive whiteboard. Effective use was made of the whiteboard to record key points, to correct homework or to address misconceptions. Many teachers chose to use a range of colours to highlight important points. Teachers had prepared differentiated worksheets, which allowed students to work at a pace appropriate to their ability. All such materials were prepared in advance of lessons and at hand. The use by a limited number of teachers of the interactive whiteboard allowed for the prior preparation of some elements of the lesson. Furthermore, it allowed for the preparation of examples of solutions ready to discuss and present in advance. This is good practice. Given the availability of interactive whiteboards within the school, all teachers are encouraged to use this resource, where appropriate.

In general, teachers are classroom based. However, there were a limited number of displays of Mathematics evident in classrooms. To enhance the learning environment in classrooms, teachers are encouraged to display project work developed by students and mathematical posters which are teacher designed or commercially produced.

**ASSESSMENT**

Formal assessments are held for all year groups at Christmas. Examination year groups have ‘mock’ exams in February and formal assessments take place for all other year groups prior to the summer holidays. Reports are issued following formal school examinations and parent-teacher meetings are held for each year group. Further communication between home and the school is maintained through the student journal, in which teachers record achievement by students in class tests and through letters and phone calls to the home, when necessary.

In addition to formal examinations, ongoing assessment takes the form of in-class questioning and teacher observation. It was evident from the review of student copybooks that the standard of work is high. During the evaluation, there was evidence that teachers provide both oral and written commendations on students’ work and that high standards in the presentation of work are encouraged.
Regular homework is assigned and corrected as part of the following lesson, which is good practice. In all lessons, the homework assigned was appropriate to the work encountered during the lesson and appropriate in terms of quantity. In line with best practice, students were encouraged to record their homework into their journal.

Practices in relation to the retention of student attendance and attainment in class and formal examinations are very good. It was observed that a roll is called at the beginning of each lesson and noted in the teacher’s diary. Students are encouraged to remain with the highest possible level for as long as they can. In the event that a student wishes to change level, clear procedures are in place. These require consultation with the class teacher, parents and senior management. This is good practice.

**SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS**

The following are the main strengths identified in the evaluation:

- Senior management is commended for the support offered to the Mathematics department in terms of timetabling arrangements for the subject, the provision of ICT and facilitating and encouraging the continuing professional development (CPD) of teaching staff.
- The initiative to increase the number of teachers available to teach Mathematics to the highest level is commended.
- Students were attentive in lessons and there was a very good rapport between teachers and students.
- There is evidence of collaboration among the Mathematics department and the proposed plan to share examples of good practice among teachers of Mathematics is very good.
- Homework, assessment and reporting procedures are in place and are being implemented effectively.
- There were many examples of good practice in Mathematics teaching, where teachers showed high expectations of students, and where students responded appropriately.

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

- It is recommended that teachers broaden the range of methodologies used in the teaching of Mathematics.
- To encourage greater interaction with students and to provide opportunities for students to become more involved in their own learning, it is recommended that teachers increase the usage of questioning strategies in lessons.
- It is recommended that the Mathematics department collaborate to review aspects of the long-term plan and Transition Year plan for Mathematics.

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

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