

An Roinn Oideachais agus Scileanna
Department of Education and Skills

Subject Inspection of Mathematics
REPORT

Ardcoil na Tríonóide
Athy, County Kildare
Roll number: 68077S

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A N R O I N N | D E P A R T M E N T O F
O I D E A C H A I S | E D U C A T I O N
A G U S S C I L E A N N A | A N D S K I L L S

REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN MATHEMATICS

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Ardscoil na Tríonóide. 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 deputy principal and subject teachers. The board of management of the school was given an opportunity to comment in writing on the findings and recommendations of the report, and the response of the board will be found in the appendix of this report.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

The mathematics department in Ardscoil na Tríonóide benefits from energetic and insightful leadership, is proactive in its approach to Project Maths, and engages in self evaluation and review. A strategic plan, for the department is currently being developed. The purpose of the plan is to ensure that the department is fully prepared to implement Project Maths and to guarantee that there is sufficient capacity within the department to meet its evolving needs. The department is currently comprised of sixteen teachers, many of whom teach Mathematics to just one class group. The strategic plan should, therefore, lead to a reduction in the number of teachers involved in teaching Mathematics and to increasing the size of the core group having Mathematics as their main teaching subject. This will ensure that all of the members of the department will have Mathematics as their primary focus and will, therefore, serve to ensure greater consistency in curriculum delivery.

Timetabling provision for Mathematics is in need of review. While the amount of time allocated to Mathematics is generous and the scheduling of the classes allows students to follow the highest level possible for as long as possible, there are a number of instances where students have Mathematics on only three days of the week. This anomaly should be addressed in future timetables perhaps through the creation of two bands within each year group with concurrent timetabling within the bands.

Procedures for facilitating the transfer of students into first year and for establishing their educational and other needs are well organised and student centred. All incoming students sit appropriate standardised tests and mixed-ability classes, based on the outcomes of the assessments, are established for the duration of first year. These classes follow a common mathematics programme and, following analysis of their performance in a series of common assessments and consultation with the class teachers, mathematics classes are set at the end of first year. While the standardised tests used at the point of entry successfully establish the abilities of the incoming students their influence on the content and delivery of the first-year mathematics

programme is less significant. In order to address this, it is recommended that the existing entrance assessments be bolstered by a mathematics competency test and that the analysis of the outcomes focus on the curricular areas where the students exhibit significant weaknesses and strengths. The common programme in first year should then reflect the outcomes of the analysis.

Students with special educational needs or in need of learning support are identified during the transfer programme and very good links are maintained with the feeder primary schools to ensure that the outcomes of the entrance assessments accurately represent the students' needs and abilities. In first year, learning support in Mathematics is provided during withdrawal from subjects other than Mathematics. However, this is cumbersome and is disruptive to the students' timetables. It would be preferable, therefore, if other interventions including in-class co-operative support and team teaching were utilised at least for the duration of first year. In second and third year, small classes, timetabled in parallel with the mainstream Mathematics classes, are established. Lesson content closely models that being covered in the mainstream classes with the needs of the students being addressed through differentiated teaching and the use of suitably modified resources. Feedback from the learning-support department and from the students suggests that this model is working very well.

In addition to the provision for the less able students, additional interventions, including enhanced co-curricular provision, to support and challenge those students with exceptional abilities in Mathematics should be put in place. In planning these interventions, reference should be made to *Exceptionally Able Students - Draft Guidelines for Teachers* available from www.ncca.ie.

The mathematics department has access to a wide range of resources to facilitate the teaching methods advocated by Project Maths and to the school's extensive information and communication technology (ICT) infrastructure. Resource and ICT integration were in evidence in the majority of lessons observed during the inspection. As part of the department's strategic plan, one of the teachers should be appointed to act as ICT co-ordinator for the department. The role of ICT co-ordinator will involve identifying appropriate resources, recommending strategies for their integration into teaching and learning and sourcing appropriate training.

PLANNING AND PREPARATION

Subject department planning in Mathematics is very well advanced and is characterised by a spirit of collaboration and co-operation. A co-ordinator with clearly defined roles and responsibilities is in place and regular meetings are held. The minutes of all departmental meetings are contained in the subject department plan for Mathematics. In order to ensure a smooth transition to Project Maths, it is intended that the current co-ordinator will remain in place until Project Maths is fully embedded in the school. The decision to suspend the rotation of the role of co-ordinator for this period reflects the thoughtful and reflective manner in which the departments operate.

A very good subject department plan for Mathematics has been developed. The plan is well constructed and provides a very robust structure to support the department's activities. Individual schemes of work, prepared by each member of the department, are also contained in the plan. These schemes vary in quality and should be reviewed. One of the existing schemes, written in terms of learning outcomes and including strategies for resource integration in lesson delivery is an exemplar of best practice and should inform the review. The schemes that evolve from the review should also feature agreed approaches for carrying out key mathematical operations.

Transition year (TY) is optional and at the time of the inspection there were three mixed-ability class groups in TY. Discussion in relation to the structure and content of the TY mathematics programme is ongoing and consideration is being given to the formation of streamed mathematics classes in TY. It is recommended that mixed-ability setting in TY remain in place and that the programme which evolves from the current discussions feature a core of material, which will enhance the students' competence in carrying out key operations and underpin their existing mathematical knowledge. The core should be augmented by a number of modules to provide enhanced opportunities for active learning, exploit cross-curricular links and facilitate investigation and project work. The materials chosen for the different modules should reflect the strengths and interests of the members of the department and the needs of the students and should be reviewed annually.

In the vast majority of cases, the quality of individual teacher lesson planning was very good. Appropriate resources, prepared in advance of the lessons were successfully integrated into teaching and learning, and provided the students with visually stimulating and intellectually challenging learning experiences.

An analysis of student performance in the state examinations is carried out annually by the principal and deputy principal. A summary of their findings is presented to the school's board of management. While this is very good practice, it is advised that the mathematics department assume responsibility for this activity. Analysis of the trends of student performance and in the rate of uptake of higher, ordinary and foundation level should form part of this analysis. The outcomes should be submitted to management and included in the subject department plan for Mathematics.

TEACHING AND LEARNING

The quality of teaching observed during the inspection was, in the vast majority of cases, very good. In the best instances, the intended learning outcomes were agreed at the beginning of the lessons and a review of the content was conducted prior to the lessons' conclusion. These lessons also featured a good range of teaching methods, innovative resource integration and student-centred classroom activities. In one instance where the quality of the teaching was of a lower quality, the lesson was entirely teacher led and there was an overemphasis on teaching to the examination and on the use of the textbook as the primary teaching resource.

A striking feature of the very best lessons was the emphasis placed by the teachers on the principles underlying the techniques being used in the lessons rather than merely focussing on the outcomes. This approach which served to enhance the students' understanding of the material in hand and appreciation of Mathematics generally should be captured in the revised schemes of work mentioned earlier in this report.

Classroom management and student behaviour and engagement were very good. The atmosphere in the classrooms was warm, and the rapport between the teachers and students was respectful and contributed to a positive and purposeful learning environment. Very good use was made of directed teacher questioning, which served to involve all of the students in the lessons and to maintain a clear focus on the lesson content. The use of higher-order questioning was less common. Opportunities for students to propose alternative approaches to problem solving, and to explain their reasoning evident in some instances, should be more widely adopted as an integral element of lesson delivery.

The quality of student learning was, in almost all cases, very good. The students responded readily to teacher questioning and were well able to carry out any tasks assigned by the teachers. The quality of the students' written work was very good and the performance of the students in class tests and in the state examinations was also of a very high quality.

ASSESSMENT

Practices in relation to assessing student performance in Mathematics are very good. Homework is regularly assigned and corrected and the students' homework copybooks are well maintained. However, the degree to which the copybooks are monitored varies from teacher to teacher. Therefore it is recommended that the department implement an agreed approach to monitoring homework copybooks and for providing written feedback to students regarding their performance. This will involve customising the school's homework policy to reflect the particular needs of the mathematics department. The amended policy should address the role of homework in providing opportunities for individual and shared learning and should specify the responsibility of students in amending their own work while it is being corrected in class.

Students in non examination classes sit formal examinations at Christmas and prior to the summer holidays. Common assessments, within levels, are provided where appropriate. Students in third and sixth year also sit examinations at Christmas and sit the mock examinations during the second term. The papers produced for formal examinations are of a high standard and utilise graphical material to assist the students in interpreting the questions. The papers also featured very thought-provoking context-based questions. This encourages the students to apply their knowledge and develops their problem-solving skills and is in keeping with the approach promoted by Project Maths.

Practices in relation to monitoring student attendance and attainment in class and formal examinations are very good. Roll call is taken at the beginning of each lesson and the results of class and formal tests, and compliance with homework assignments, are kept in the teachers' diaries.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- The mathematics department is very well led and operates in a collaborative fashion. Subject department planning and individual teacher planning in Mathematics is very well advanced.
- The mathematics department is well supported by management and is very well resourced.
- Learning-support in Mathematics is well managed and very good links are maintained with the feeder primary schools and with the mathematics department.
- The quality of teaching and learning in Mathematics is very good.
- Formal assessment of student performance in Mathematics is very well managed and feedback to parents is delivered in a thorough and timely fashion.

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

- The scheduling of Mathematics classes should be reviewed and instances in the existing timetable where classes have Mathematics on just three days of the week should be avoided in future timetables.
- The content, structure and assessment of the first-year mathematics programme should be informed by a mathematics competency test conducted as part of the entrance assessments.
- The mathematics department should implement an agreed approach to monitoring homework copybooks and to providing written feedback to students regarding their performance.
- The TY mathematics programme should continue to be delivered in a mixed ability setting and should consist of a core augmented by a number of modules designed to exploit cross-curricular links and to facilitate active learning, investigation and project work.

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

Appendix

SCHOOL RESPONSE TO THE REPORT

Submitted by the Board of Management

Area 1 Observations on the content of the inspection report

The Board of Management would like to thank the Maths Inspectors for their positive comments in relation to the provision of Mathematics in our school. Our Maths Department received very affirming feedback from the Inspector at the end of the Inspection and in relation to any recommendations that were given to the school at the time the following actions have been taken:

1. The Transition Year Programme is currently made up of two mixed ability classes. The T.Y. Programme has been comprehensively revised with a renewed emphasis on Geometry, Trigonometry, Problem Solving, Project Work and Remediation.
2. The timetabling, provision for mathematics in the school has been improved with a greater spread of classes throughout the week. This has been achieved by removing some of the limitations placed on the timetable previously. It has also been helped by the splitting of second year into two groupings which has also provided for an extra Learning Support class.
3. The year plans have been revised and upgraded as per the recommendations of the report.
4. An assessment test has been given to the first year group. The results of this test have been analysed and a report given to the first year teachers, Learning Support Department, Career Guidance Department, Year Head and Deputy Principal and will be used for future planning with this year group. In the future all incoming students will be given an assessment test.
5. A member of the Maths Department has agreed to take responsibility for I.C.T.
6. As and from this year the Maths Department will be carrying out an analysis of both the Junior and Leaving Certificate results.
7. The areas that the Maths Department will be giving priority to this year will include:
 - a) A Homework Policy to include an agreed approach to monitoring students' work.
 - b) A common approach to teaching methodologies.
 - c) The upgrade of the year plans.
 - d) I.C.T.

Overall the Maths Department found that the visit by the Department Inspector was a very positive experience and provided very useful feedback, some of which has been implemented already with other ideas providing a focus for future planning over the course of the next two years. It is the intention of the Maths Department in the school to provide a high level of mathematics education in all of our classes with particular focus on problem solving delivered in an interesting and challenging manner to motivated students.