ISTA Questionnaire on Junior Certificate Science

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Members of the ISTA may recall that our Association recently distributed a questionnaire to all its members to ascertain the views of Junior Certificate Science teachers on coursework A and B. I wish to thank each of you who took the time and effort to complete these questionnaires and return them to the Association. I am sure that many of you awaited the results of this piece of research with great interest.

The ISTA Junior Science committee was requested to undertake this survey by the Council of the ISTA. At several Council meetings, various branch representatives expressed views on the effect that Coursework A and B was having on their teaching of science. Hence, Council decided that it was important to try to quantify the feelings of the membership of the ISTA regarding Coursework A and B. The questionnaire was designed by members of the ISTA's Junior Certificate Science subcommittee, in particular Mr. Jimmy Jennings, Ms. Yvonne Higgins and Dr. Declan Kennedy. The completed questionnaires were subsequently analysed by Mr. Patrick Curtin, as part of his project work for his Masters Degree in Science Education in UCC. On behalf of the ISTA, I wish to thank Patrick Curtin for the huge amount of work he carried out in the analysis of the completed questionnaires.

A total of 310 completed questionnaires were returned from the ISTA members, i.e. a response rate of 31.4%.

I firmly believe that it is vital that Junior Certificate science teachers' experiences of coursework be taken into account at a time when senior syllabi are under review. These experiences are especially relevant to the proposed introduction of a second mode of assessment at senior cycle. The aim of this article is to summarise the main findings from the analysis of the questionnaires.

Of the 310 respondents who completed the questionnaire, 300 (99%) teach or had taught the revised Junior Certificate science syllabus. 26.8% of the respondents worked in VEC schools, 55% worked in voluntary secondary schools, 15.6% in community or comprehensive schools, 3% worked in fee paying schools. This largely reflects the national distribution of schools by sector.

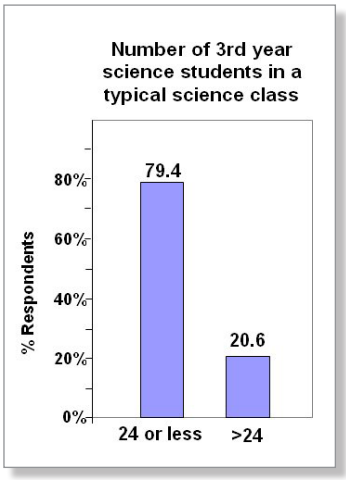
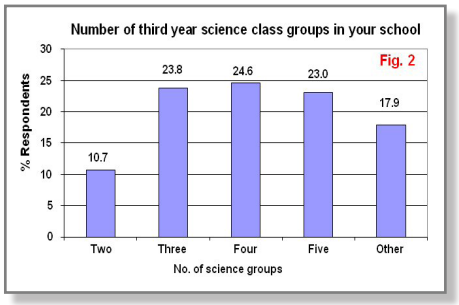
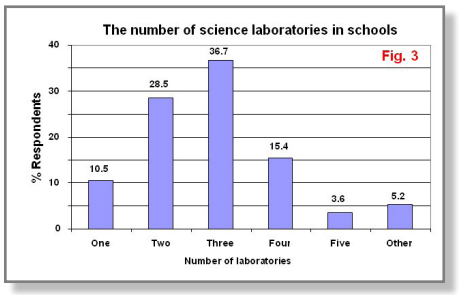


Fig. 1 indicates the average number of students in a third year science class. For health and safety reasons, it is generally agreed that a teacher should not have greater than twenty four students in a practical science class. Thus, it is disturbing to note that 20.6% of third year science classes have more than this number. Teachers also indicated the need for technical and supervision assistance for the preparation and clean up of the laboratory when working with these large numbers of students.

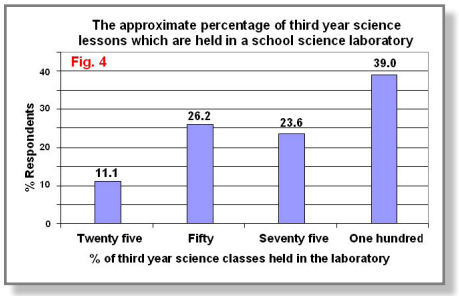
Another important factor that puts pressure on resources within a science department is the number of third year science groups. Figure 2 shows that the majority of schools had between three and five science class groups in third year. The 'other' indicates schools that have six and seven class groups of Junior Certificate science students. A total of 65.5% of respondents indicated that there are four or more science classes in a third year group.



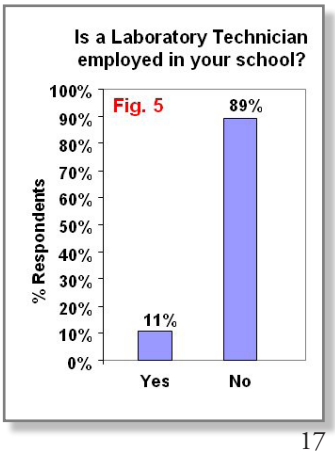
However, while 65.5% of respondents indicated that there are four or more third year science groups within their school, 75.7% of respondents stated that there are three or less laboratories in their school (Fig. 3). This discrepancy clearly means that not all third year science groups have equal access to laboratories.



This point is addressed in the results illustrated in Fig. 4. Only 39% of third year science groups held all their classes in a laboratory. Furthermore, 37.3% of third year science groups hold half or less of their classes in the laboratory.



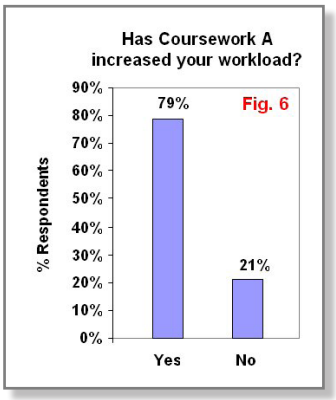
When teachers were questioned about the availability of technical assistance, the results in Fig. 5 show that only 11% of the respondents have access to a Laboratory Technician within their school.



The lack of Laboratory Technicians and the issue of access to laboratories are two factors that may partly explain the fact that 79% of respondents indicated that the introduction of Coursework A has increased their workload (Fig. 6).

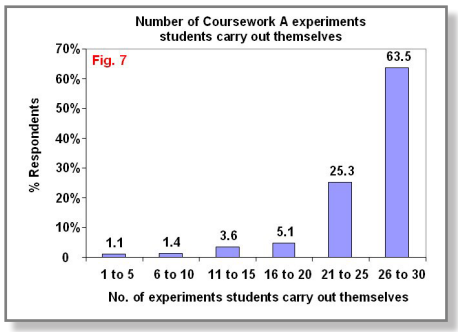
Further light is thrown on this matter by the following explanations given by teachers:

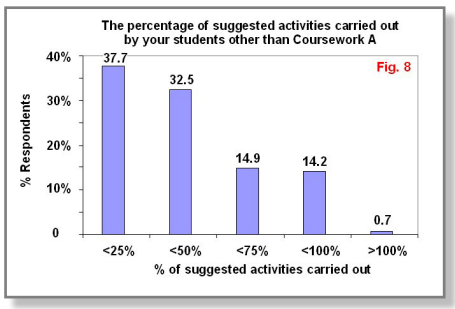
- The writing up of the practical activities takes up a huge amount of time.
- There are too many mandatory experiments to be undertaken.
- Preparation and cleaning up after practical work take a lot of time
- Students' absences from class require experiments must to be repeated.



The preparation for laboratory work and cleaning and tidying up of the laboratory after laboratory work was the main reason why teachers felt their workload had increased with the introduction of the new revised Junior Certificate Science syllabus. Teachers also found that because of the necessary preparation and clean up of the laboratory they had to sacrifice the majority of their free time. Some teachers reported that they either had to come to school in the morning one hour before school began or else they had to work an hour or more after school in the evenings.

In spite of these difficulties, it is very encouraging to see that 63.5% of respondents indicated that their students carry out 26 to 30 of the mandatory coursework A investigations themselves (Fig. 7). Another 25.3% stated that their students complete between 21 and 25 of the investigations themselves. 11.2% of respondents indicated that their students complete 15 or less of the coursework A experiments themselves. This may be explained by lack of access to the laboratory or a lack of resources.

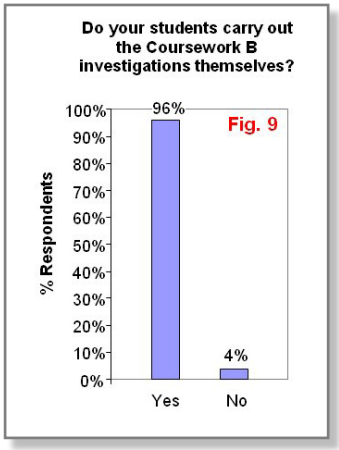




The revised science syllabus includes a number of suggested activities as well as the mandatory Coursework A investigations. The questionnaire also addressed the numbers of these activities carried out by students. 70.2% of respondents indicated that students carried out 50% or less of the suggested activities.

Some of the reasons for not carrying out all of the suggested activities by teachers may be summarised as follows:

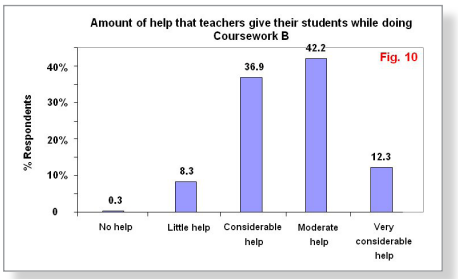
- Lack of time
- Lack of resources
- Lack of technical support
- Health and safety reasons

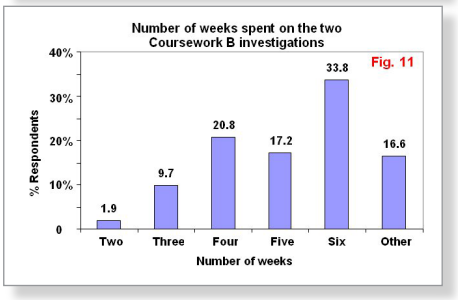


With regard to coursework B, 96% of respondents stated that students carry out these investigations themselves (Fig. 9). This high percentage is probably related to the fact that this coursework is worth a total of 25% of the marks in the Junior Certificate Science examination.

While, it is very encouraging that such a high percentage of students carry out the investigations themselves, it is clear from Fig.10 that the majority of teachers give a considerable to very considerable amount of help to their students.

The amount of time spent by students completing coursework B investigations is illustrated in Fig. 11. This indicates that 71.8% of



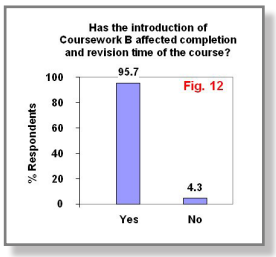


respondents spend between four and six weeks completing the coursework B investigations.

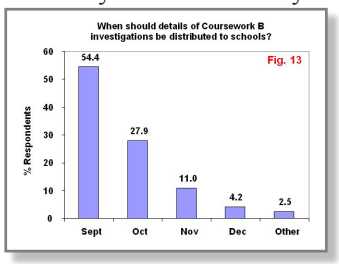
Some of the key comments made by the respondents to explain the length of time spent completing the investigations may be summarised as follows;

- The students need a lot of help and guidance.
- They find the language in the green pro-forma booklet difficult to understand and this must be explained to them.
- The amount of time spent depends on the ability range in the class
- Health and safety issues – the experiment must be explained in detail.
- Brainstorming takes time.
- Apparatus is set up for the class and helped through the investigation.

However, it is clear that the amount of time spent by students on coursework B has impacted on the course in other ways. A very high percentage of teachers (95.7%) expressed the opinion that the introduction of coursework B has affected the completion and revision time of the course (Fig. 12).



The number of weeks of revision time affected by the introduction of Coursework B varied from two weeks to ten weeks. Over 20% of the respondents stated that three weeks were affected, while over 28% agreed that four weeks were taken up with the completion of Coursework B. It is worrying that over 20% of the teachers surveyed stated that they lost six weeks in the revision of the syllabus. Over 5% of the respondents said that up to seven, eight and nine weeks had been affected with revision.

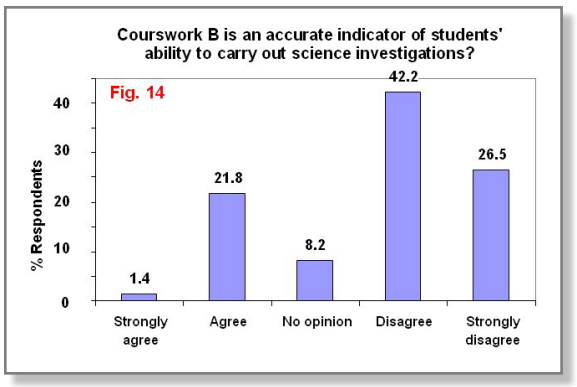


With regard to the distribution of details of coursework B investigations to schools, 82.3% of respondents expressed the opinion that these should arrive in schools in either September or October (Fig. 13).

The most frequent comments given by teachers in relation to the early distribution of the titles of the three investigations include

- "The sooner the better" – as the revision and the completion of the course can begin when Coursework B is finished was mentioned by 67% of respondents.
- 9% of respondents suggested getting one of the investigations carried out in second year as this would reduce the pressure in third year.
- 13% said it gives time to order plan and budget especially when sharing equipment.
- Just under 10% of the teachers surveyed mentioned 'never'. Some teachers found it a waste of valuable time that students could be using for revision purposes.

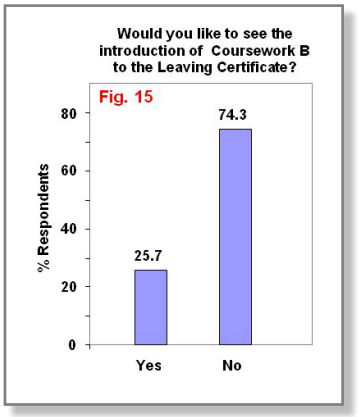
When teachers were asked to indicate their level of agreement with the statement "Coursework B is an accurate indicator of students' ability to carry out science investigations", 68.7% of respondents either disagreed or strongly disagreed with this statement. On the other hand, 23.2% agreed or strongly agreed that coursework B is an accurate indicator of students' ability to carry out science investigations (Fig. 14).



Teachers gave the following comments in relation to their disagreement of the question

- One student does the investigation the weak students just copy it down.
- No marks going for skills learned
- A green booklet cannot examine a skill perfected, it only tests the students' ability to write and present information neatly.
- Coursework B is a test of the teacher, not the student.
- Students receive help from others, e.g. parents, relatives and fellow students. example parents, cousins

When questioned as to whether they would like to see coursework B introduced to Leaving Certificate science subjects, 74.3% of respondents disagreed with such a proposal, while 25.7% of respondents agreed (Fig. 15)



The main comments given by respondents to explain why they did not want to see coursework introduced into the Leaving Certificate were as follows;

- It discourages the Junior Certificate science students from further study of science.
- It's a waste of time – it is not a measure of a student's ability
- An external examiner should monitor a practical exam
- The syllabus is too long
- More work for the teachers and more time taken up doing it. Teachers will give lots of help to the candidates and it would not be a fair exam.
- Lab facilities are inadequate and no availability of lab technicians

On the other hand, the 25.7% of teachers that agreed with the proposal, made the following comments;

- Its more appropriate to this age group
- Good for the weak students. Takes pressure off the 100% exam
- Give marks for the mandatory write ups they do

The last section of the questionnaire provided respondents with the opportunity to address any issues not dealt with earlier in the questionnaire. Some of the main issues that arose included:

- Remove coursework B as it is turning students off Junior Certificate science. A practical examination monitored by an external examiner would be more appropriate and would be a better indicator of scientific method.
- If the coursework is introduced into the Leaving Certificate, the syllabus needs to be reduced. This type of examination is only testing literacy and presentation skills, it is not a fair test as teachers will help their students or they will get help in grind schools.
- Laboratories, adequate laboratory equipment and lab technicians need to be made available to schools along with the reduction of teaching hours for science teachers. The reasons for the reduction of teaching hours is because teachers' free time is spent in the lab preparing or washing equipment for classes or carrying out mandatory experiments for students who were absent when doing them.
- Coursework B type investigations are more suited to this age group as they are more mature, they have chosen the subjects they want to study for their leaving certificate and most practical subjects have a practical component. However, experience in the UK goes against this type of assessment.
- The Junior Certificate science examination is punishing the top student and favouring the weak student. This gives the weak student a false idea of his/her ability. A choice needs to be introduced into the written examination.
- The green pro-forma book needs to be redesigned as weak students find the language in it extremely difficult. The write ups are so boring for the students it turns them off senior science. Numbers taking senior chemistry and physics appear to be decreasing.

Clearly, the results of this questionnaire raise many issues of concern for those involved in the revision of senior science syllabi. It highlights the need for the provision for adequate laboratory resources and Laboratory Technicians to science departments in second level schools around the country, if all second level science students are to be provided with equality of opportunity in state examinations.

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