



The Use and Effectiveness of Oral Tests in Physics

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Abstract

An end of topic written test is a very frequent assessment method used in Physics classrooms. The main aim of this study was to investigate whether students perform better in Physics if they are assessed through an oral test instead of a written one.

A sample of 26 Form 4 students (13 boys and 13 girls) from two state schools participated in this study. At the end of the topic 'Momentum', the two sets of students were given a written test and successively an oral test which followed the same pattern of the written examination and contained similar (but not the same) questions. Students were allowed a time period of 30 minutes to complete the written test while for the oral exam, which was carried out on an individual basis, students were allowed a period of around 10 minutes.

Following the tests, a questionnaire was distributed to every student to investigate their reactions and perceptions on oral examinations. Furthermore, interviews centred on the modes of assessment were held with four Physics teachers and with the relevant Officer at the national examinations organisation within the University of Malta.

From this research it was concluded that although both boys and girls performed better when they were assessed orally, they still find themselves more comfortable doing a written test, with 73.1% stating so in the questionnaire.

1. Introduction

1.1 Aim of the Research Study

The main aim of this research study was to investigate whether students can achieve better in Physics if they are assessed by means of an oral rather than a written test.

1.2 Physics and Assessment in Malta

Physics became a compulsory subject for all secondary school students in Malta in the early eighties (Bonnici, 1994). Concurrently, Physics also became a requirement for entry to studies at the post-secondary Sixth Form. Even though the requirement for Sixth Form entry was eventually amended to any Science subject (one of Biology, Chemistry or Physics), Physics is still compulsory in many State schools, mainly because of logistical reasons and the qualifications and training of the teachers employed.

Maltese students attending State schools are formally assessed twice a year through the mid-year and the end-of-year written examinations. In Physics, the duration of these written examinations is between one and a half and two hours, depending on school year. In the last year of secondary school, at the end of Form 5, students can opt to sit for the Secondary Education Certificate (SEC) level (16+) Physics examination. This is an external examination, by the Matriculation and Secondary Education Certificate (MATSEC) Board of Examinations of the University of Malta, done on a national level, and equivalent to the British GCSE. The final grade is based on global mark as follows: 85% for the written part (two papers) and 15% from school based assessment, i.e. 15 practical reports assessed by school-teachers.

1.3 Different Types of Assessment

The traditional types of tests and examinations are not the only way to assess learners. McColskey and O'Sullivan (2000) argue that traditional methods of assessment do not really challenge and involve the students. Moreover, Ahmed, Pollitt and Rose (1999) point out that written examinations cannot be effectively and successfully used with all students, and these examination types are not a good assessment tool for low achievers. As Black and Harrison (2004) explain, "If science teachers



want to find out what students understand in science rather than just what they know and can recite, then the learners need to be challenged by activities that make them think.” (p. 5).

There are a number of alternative modes of assessment, including: portfolios, journals, projects and lab reports, especially for science subjects (Rosenstein, 1996). McColskey and O’Sullivan (2000) mention other ways of assessment for students, such as interviews, which can be considered as oral examinations. Although not all methods can be effective in every situation, it is one’s responsibility to try, find out and use the right assessment tool/s for the particular students and class.

1.4 Oral Assessment

Oral examinations have a number of benefits. Waterfield and West (2005) explain that oral assessment is more inclusive than the traditional type of examinations. They are also more interactive and “. . . the opportunity in oral assessment to probe understanding through follow-up questions can encourage deep approaches to learning.” (Joughin and Collom, 2003, p. 2). Andreasson (2005) says that oral tests are more flexible as the teacher can give the student a second chance to answer correctly. Another important characteristic of oral assessment is that it prepares learners for future, real-life situations at work. Singh (2010) argues that there must be a link between assessment and real-life situations, and oral tests “enable the learner to identify with, interact with and therefore understand the material better because of the continual interaction and discussion with their peers and the assessors.” (Singh, 2010, p. 256).

Oral examinations can be used to get a better picture of the level and extent of understanding of their pupils. Above all, Gardner (1999) suggests that new modes of assessment should give more importance to the process of learning rather than the product and also to make use of the diverse tools available to test different forms of intelligences. Oral tests are definitely another assessment tool which can satisfy this statement.

2. The Methodology

The Maltese school system has State, Church and Independent schools. This research study was carried out in state schools, the main reason being that they are attended by a large number of students and so it was easier to get the desired number of participants. The participants were Form 4 male and female students, i.e. students in their fourth year (out of five) of secondary schooling.

The initial idea was to have a sample of 50 Form 4 students, 25 boys and 25 girls, for this study. Following the distribution of the information letters and the return of the signed consent forms, only 26 responses (13 boys and 13 girls) were valid. For a number of reasons, mainly logistical and organisational, it was decided to proceed with this number of participants.

The students had a traditional end of topic written test. The topic of the test was ‘Momentum’, chosen after discussion and consultation with the four class teachers involved. The participating students were informed one week in advance that they were going to have the test. Subsequently, one week following the written test, the same pupils had a ten (to 15) minute oral test, which was very similar to the written test. The written test was set and answered (as is the normal practice in Malta) in English. For the oral test, carried out on an individual student-by-student basis, the students were also given the opportunity to answer in Maltese.

Following the oral test, a questionnaire was given to each student. Moreover, a number of interviews on the use of oral assessment in Physics were carried out with the four class teachers and the Principal Subject Area Officer (PSAO) responsible for Physics within the MATSEC Board of Examinations.

The results of the written and oral tests were analysed in order to investigate any differences in outcome using the two assessment modes. The data obtained was treated using the Statistical Package for Social Sciences (SPSS) 21.0.0 software program. A coding scheme was used for the questionnaire data where the Likert scale responses were given the values 1 to 3, corresponding to uncomfortable to comfortable or disagree to agree, with 2 always representing a neutral stand.



3. The Results

3.1 Previous Experience of Oral Tests

Table 1: Summary of responses to 'Where you ever examined by an oral test?'

Response		Gender		Total
		Male	Female	
Yes	Count	5	3	8
	% within gender	38.5%	30.0%	36.4%
No	Count	8	7	15
	% within gender	61.5%	70.0%	65.2%

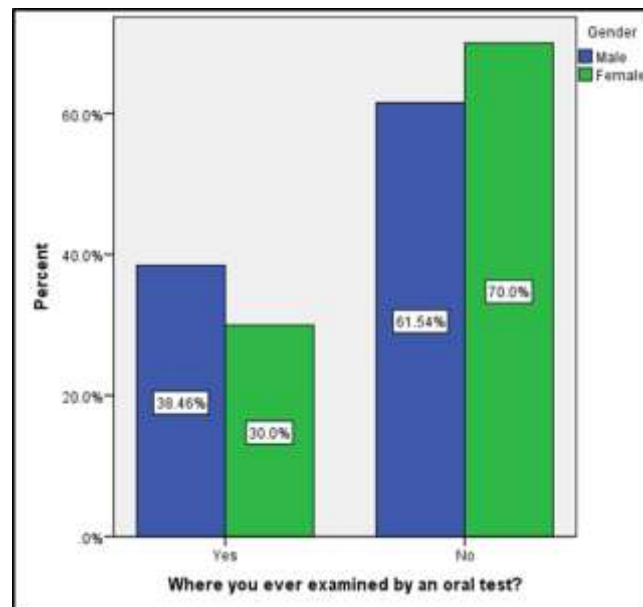


Figure 1: Summary of responses to 'Where you ever examined by an oral test?'

Almost two thirds (65.2%) of the participants had never been previously assessed through an oral test. On considering the participants by gender, 61.5% of males and 70.0% of females never had previous experience of oral tests (Table 1, Figure 1). The four class teachers who were interviewed stated that they had never set an oral examination for their students. A main reason – given by all the teachers – for not using oral assessment modes was because such activity is time consuming. This is in line with the arguments exposed by Andreasson (2005) and Huxham, Campbell and Westwood (2012) that most teachers do not do oral tests due to time constraints.

3.2 Mean Scores and Gender Differences

Overall, the participating students performed significantly better in the oral test with respect to the corresponding written paper: the mean scores were 41.5% and 20.7% for the oral and written tests respectively. Girls performed better than boys in both tests, as the former got a mean score of 31.5% in the written test and a mean score of 50.8% in the oral examination while the latter got a mean score of 9.9% in the written and a mean score of 32.1% in the oral. Such results contradict Cole's (1997) data that states that, although there is a reduction of the gap with respect to the past, males still performed slightly better in Science than females.

The written test was preferred by 30.8% of males and 53.8% of females. (Table 2, Figure 2) Thus one can conclude that the girls preferred written rather than oral examinations, as opposed to the boys.



Unfortunately not many candidates exposed the reasons behind their preference for a given mode of assessment, as only 11 out of the 26 explained their choice. The most common reasons for the girls' preference for written tests were that they express themselves better in writing and that they felt shy during the oral test. One male participant stated that he prefers oral examinations since the examiner reads the question for the candidate.

Table 2: Summary of responses to 'Which test did you find more comfortable?'

Response		Gender		Total
		Male	Female	
Written Test	Count	4	7	11
	% within gender	30.8%	53.8%	42.3%
Oral Test	Count	9	6	15
	% within gender	69.2%	46.2%	57.7%

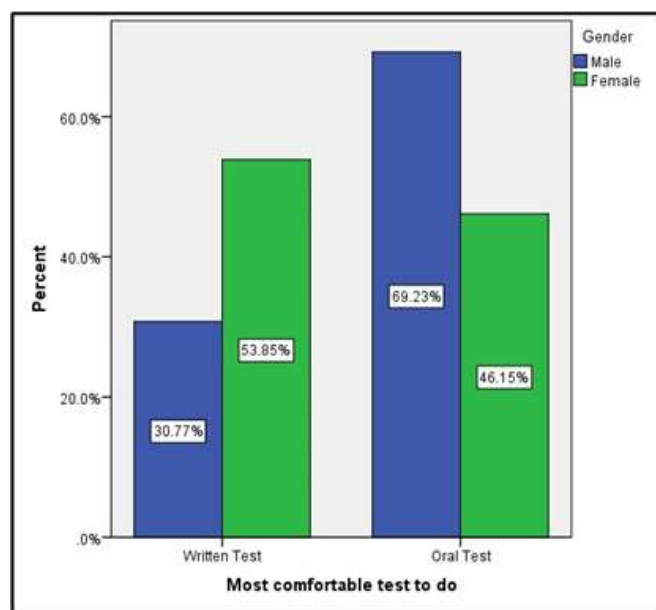


Figure 2: Summary of responses to 'Which test did you find more comfortable?'

3.3 Oral assessment in the Future

It was found, through one of the questionnaire questions, that only 44% of the participants preferred a higher use of oral examinations in Physics in the upcoming future. This is also in line with the ideas of the interviewees. Although many of the latter (who were either class teachers or people with indirect involvement within the educational and assessment process) highlighted the advantages of oral assessment, none of them agreed to have an examination with a 100% oral mode. It was also emphasised that it is not easy to change the present modes of assessment (that may be more effective and fruitful in given cases) especially when it comes to formal and high stakes examinations, as in the case of the 16+ SEC examination.

4. Conclusion

Although there was no clear and distinctive preference for oral assessment modes, a clear difference in performance emerged, especially by the lower achievers, in traditional written tests. Even though the participants in this study declared that they do not find any particular problems with written tests, a considerable 53.8% affirmed – in one of their responses to the questionnaire – that they felt comfortable being assessed orally. It may be high time to start making use of various modes for more effective and fruitful methods of assessment and educational measurement.



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