

Oral examinations / presentations

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1 Introduction

One of the most striking differences between the UK educational system and most of the other European educational systems is the importance given to oral examinations. This is quite surprising to many outsiders given the importance that communication skills have in many aspects of professional life. I personally studied at the University of Geneva (Switzerland), so that I will heavily draw on my experience there. It follows however from numerous discussions with European

colleagues that the German and French systems do not differ significantly in that regard from the Geneva system.

The purpose of this essay is to give a short comparative study of oral versus written examinations in order to highlight the advantages and disadvantages of both systems. I will try take into account not only academic but also practical as well as social considerations. For the sake of honesty, I have to warn the reader that although I tried to argue as objectively as possible, I am probably biased in favour of oral examinations and that part of the present essay will consist in a discussion on how one may imagine give oral examinations a greater role at the University of Warwick.

During the preparation of this project, I was quite surprised to find that there seems to be very little existing literature on this subject, especially in the framework of Mathematics studies. It seems however that engineers are acutely aware of the importance of oral presentation skills and this is reflected by the relatively large literature covering this topic (see for example [1] and references therein). As a general rule, the overwhelming majority of the publications in the field focus on the lecturing process rather than the assessment process. There are of course some exceptions (see for example [9, 8, 5, 6]), but I was unable to find any comparative study between oral and written assessment. Since oral examinations are an integral part of the curriculum of many medical schools in the UK, the examination board of the Royal College of General Practitioners commissioned a study of the fairness of this type of examination [7]. The results of this study will be commented upon in Section 5 below and its relevance to the context of Mathematics studies will be discussed.

2 What are oral examinations?

People who experienced an educational system that does not give much importance to oral examination do not always have a very precise idea on how oral examinations work. This section reviews the different possible ‘modus operandi’ of oral examinations and comments on their relative strengths and weaknesses. Broadly speaking, one can group oral examinations according to the following three categories:

1. **Guided examination with preparation time.** A stack of question cards of approximately equal difficulty is prepared in advance by the examiner. The student draws one of the questions at random. He then has about half an hour of preparation time during which the previous student passes the examination. After this, he has half an hour to give an answer on the blackboard to the question(s) he drew. A typical question card would have one theoretical question (for example ‘prove the fundamental theorem of

calculus') and one exercise (for example 'show that $\sum_{n=1}^{\infty} 1/n^2 = \pi^2/6$ ').

2. **Guided examination without preparation time.** In this case, the examination starts as soon as the student enters the examination room. Typically, the examiner would ask a quite generic question (for example: 'tell me about Lebesgue integration') and let the student take the initiative on which precise aspects of the question to treat.
3. **Free examination.** In this case, the examiner would ask the students to prepare a half an hour presentation on some aspect of the lecture and to present it during the examination.

From a more practical point of view, a common characteristic of all oral examinations is that (primarily in order to make the procedure more fair, but also for legal reasons) there is always more than one examiner present in the room. Usually, Universities require oral examination to have a *minimal* duration (20 minutes or half an hour) in order to give the student the opportunity of demonstrating his knowledge of the course. Practical considerations usually impose a maximal duration of about 45 minutes.

For most undergraduate Mathematics lectures, it seems to me that guided examinations with preparation time are the most appropriate (and the most common) form of oral examination. The presence of a preparation time allows the examiner to test the student's ability to perform some moderately complicated technical work. The preparation time also allows the student to gather his thoughts and to overcome the initial surge of stress.

Guided examinations without preparation time are appropriate when the examiner wants to check whether the student assimilated the important concepts of the lecture, without going too much into technical details. In a way, such an examination is very close to a discussion between two scientists, not unlike the discussions held in the Institute's common room (but of course with a more formal flavour). In general, I have the impression that this type of examination is more popular with Physicists or Chemists than with Mathematicians, since one of the main *raisons d'être* of Mathematics is formal rigour and one can hardly demand this without preparation time.

Free examinations are much closer to oral presentations. Students tend to like them for several reasons. First, they are not so stressful because the student knows (or at least thinks he knows) what to expect. They are also considered rather fair because there is not so much randomness involved. The student can choose what he wishes to talk about and is not constrained by a randomly chosen question. This allows the student to show himself from the best possible side. From the point of view of the examiner, this does not mean that it becomes difficult to distinguish between students, it just raises the bar. The students are of course aware of the fact that if they choose to present a very easy and minor point of the course, the

examiner will push them into surrounding areas and force them to explore a wider subject. The best way for the student to remain in control is to give a rather broad presentation that covers the main points of the lecture. This forces the student to understand the links between these points, which is of course precisely the examiner's intention. A very common misconception among students is that free examinations are easier than other types of assessment.

3 The point of view of the student

In order to get a better idea of what students here in the UK think of oral examinations and oral presentations, I asked both my first year Analysis I students and my fourth year students to fill in a questionnaire on this subject.

The questionnaire handed out to the Analysis I students should be put into the following context. The Analysis I lecture consists of one hour of traditional lecturing, plus four hours of example classes per week. During the first two hours of example class (Monday morning), the students would be handed out a workbook which they are expected to complete during the week. At the beginning of the last two hours of example class (Thursday afternoon), I would ask some of the students to come to the blackboard and to explain one of the exercises from the workbook to the other students.

3.1 First year students

28 students filled in the questionnaire. The raw results are as follows:

- **Did you present an exercise / assignment at the blackboard during this term?** 71% Yes, 29
- **Did you ever have to give an oral presentation before?** 89% Yes, 11% No.
- **Do you think it was a useful exercise to you?** 75% Yes, 21% No, 4% No reply
- **Do you think it was a useful exercise to others?** 64% Yes, 25% No, 7% Undecided, 4% No reply
- **Qualifications for oral presentations.** 28% found presentations easy, 7% found them moderately difficult, 42% found them difficult, 25% found them embarrassing, 7% found them moderately enjoyable and 17% found them enjoyable.
- To the statement, **Oral presentations are a way for weaker students to be aware of their mistakes and to get advice from fellow students / the teacher**, 82% agreed, 14% disagreed, and 4% had no opinion.

- To the statement, **Weaker students are publicly humiliated by oral presentations**, 46% agreed, 50% disagreed, and 4% had no opinion.
- To the statement, **It is useful to listen to oral presentations given by stronger students because they explain the exercise differently from the supervisor / teacher**, 82% agreed, 14% disagreed, and 4% had no opinion.
- To the statement, **It is useless to listen to oral presentations given by stronger students because they only take it as an opportunity to show off**, 0% agreed, 96% disagreed, and 4% had no opinion.
- All students without exception answered 'Yes' to the question **Do you think communication skills in general will be useful in your work after graduation?**
- **How good do you believe that your personal communication skills are?** 39% said 'Good', 35% said 'Average', and 26% said 'Poor'.
- **Would you like to see more emphasis put on oral presentations during your studies?** 14% said 'Yes', 14% said 'Yes' with some reservations, 10% had no fixed opinion, and 62% said 'No'.
- **Did you ever have to pass an oral examination?** 57% Yes, 43% No.
- **Do you think oral examinations are harder or easier than written examinations?** 85% Harder, 7% Easier, 8% Without opinion
- **Do you think oral examinations are fairer or less fair than written examinations?** 78% Less fair, 7% Equal fairness, 4% Fairer, 11% Without opinion.

3.2 Fourth year students

7 students filled in the questionnaire. The raw results are as follows:

- **Did you ever have to give an oral presentation?** 5 Yes, 2 No.
- **Do you think it was a useful exercise to you?** 5 Yes
- **Do you think it was a useful exercise to others?** 1 Yes, 2 No, 1 Undecided
- **Qualifications for oral presentations.** 2 found them both difficult and enjoyable. 1 found them neither easy nor difficult, 1 found them 'Daunting until you get into it', 3 had no opinion.
- To the statement, **Oral presentations are a way for weaker students to be aware of their mistakes and to get advice from fellow students / the teacher**, 5 agreed, 1 disagreed, and 1 had no opinion.
- To the statement, **Weaker students are publicly humiliated by oral presentations**, 1 agreed, 3 disagreed, and 3 agreed to some extent.

- To the statement, **It is useful to listen to oral presentations given by stronger students because they explain the exercise differently from the supervisor / teacher**, 4 agreed and 3 had no definite opinion.
- To the statement, **It is useless to listen to oral presentations given by stronger students because they only take it as an opportunity to show off**, all disagreed.
- All students without exception answered 'Yes' to the question **Do you think communication skills in general will be useful in your work after graduation?**
- **How good do you believe that your personal communication skills are?** 5 said 'Good', 1 said 'Average', and 1 said 'Poor'.
- **Would you like to see more emphasis put on oral presentations during your studies?** 1 Yes, 4 No, 2 Without opinion.
- **Did you ever have to pass an oral examination?** 3 Yes, 4 No.
- **Do you think oral examinations are harder or easier than written examinations?** 2 Harder, 1 Easier, 2 Same difficulty, 2 Without opinion
- **Do you think oral examinations are fairer or less fair than written examinations?** 6 students think that it is about the same, 1 thinks that they are less fair.

3.3 Analysis of the results of the questionnaires

Concerning oral presentations, most first year students seem to have a rather positive attitude towards them. In particular, a clear majority of the first year students thought that they were useful both to the student who presents the exercise at the blackboard and to the other students who listen to the presentation. The most surprising result (to me) concerning this part of the questionnaire is that almost half (46%) of the students agree with the sentence 'Weaker students are publicly humiliated by oral presentations'. This seems to stand in stark contrast with the fact that three quarters of the students believe that oral presentations were a good exercise to them.

Closer inspection of the data shows that 17% of the students actually claim that they agree with the stated sentence 'sometimes' or 'mildly' and 14.5% of the students agree with the sentence but actually didn't perform any oral presentation during the term. This leaves 4 students (14.5%) who definitely agree with this sentence and who did indeed perform an oral presentation during the term. Two of them are probably not speaking for themselves since one considered the presentation to be an enjoyable experience and is content with his communication skills and the other one, even though he found the presentation a difficult and embarrassing exercise, would like to have more emphasis put on oral presentations

during the studies. The two remaining students both believe that this was not a useful exercise to them. Even though this is after all a very small minority, it would be interesting to see what exactly are the reasons for which they did not consider this a positive experience.

Generically, my feeling is that most of the students that are not so comfortable with oral presentations have a certain lack of self-confidence that is then exacerbated by being in a situation of publicly having to admit a lack of knowledge. It may be that some of these students considered Mathematics a rather 'safe' subject where, compared to some other subjects, academic achievements are deemed much more important than self-confidence and communication skills. On the other hand, I believe that the opposite effect can also arise, *i.e.* students that are shy to speak in public have their self-confidence boosted by being able to give a good performance on a mathematical subject. This is backed to some extent by the fourth year student who claims that oral presentations are 'daunting until you get into it'. I also experienced this with one of my second-year tutees who always had first class marks but was quite nervous about the oral presentation of his essay (he claimed that he was very shy and hated to speak in public). He eventually gave a very good and relaxed performance.

Concerning the fairness and the difficulty of oral examinations, an overwhelming majority of the first year students consider them harder and less fair than written examinations. The main reason they give for oral examinations to be unfair is that they test the presentation skills and the general level of confidence of the student, instead of his mathematical skills. It is interesting to see that the fourth year students have a much less clear cut opinion. They still believe on average that oral examinations are harder than written ones, but most of them (6 out of 7) think that they are about equally fair. It is unclear to me what the cause of this difference in attitude between the two groups of students is. One factor may be that the group of fourth year students contains quite a high proportion of students from continental Europe (Germany and Italy). The question of fairness will be discussed in detail in Section 6 below.

4 Stress

It is commonly accepted that oral examinations are more stressful than written examinations. The main reason is that they force the student to think quickly and to provide immediate feedback to the questions, whereas a written examination allows the student to sit back and think about a problem for a relatively comfortable period of time before writing down an answer. On the other hand, oral examinations are much closer to the majority of real-life situations. If a top manager faces a difficult question from the board of trustees of a company, it is of course

inconceivable for him to reply 'I'll answer this in half an hour once I've had a good think about it'. Having to provide an immediate answer is more stressful, but after all the aim of University studies is to prepare students for real life and not to give them a sheltered environment which never tests them in a tough way.

The downside is that stress can have a very adverse effect on the performance of some students that are not used to cope with it. It happened occasionally during my undergraduate studies that a student would break down crying in the middle of an oral examination (and therefore end up with a very low mark that does not necessarily reflect what he could have achieved otherwise). In this sense, I believe that it is fair to say that oral examinations do not only judge the academic abilities of a student but also his ability to cope with stress. It is up to discussion whether this is a desirable feature of a University examination or not. One way in which many European Universities lower the impact of stress-related factors in the student's overall evaluation is by being much more flexible with failure. Failing one examination is not considered to be a catastrophe and students have three attempts at each examination. This releases some of the psychological pressure (at least at the first two attempts).

Another way of relieving stress is to organise free oral examinations. In this case, the students feels more in control of the situation and knows how to start the examination. During my studies, I found such examinations to significantly reduce the amount of stress.

5 Language

One major problem of oral examinations in a University with students from a very diverse background is the language. It is perfectly possible to pass a written Mathematics examination with a very minimal knowledge of the English language. This is of course much more difficult for oral examinations, and this concern is voiced by one of the first year students. The problem of the language was studied in detail in a recent work [7] published in the British Medical Journal. This article studies the mastering of the English language as a discriminating factor in the oral examinations to enter the Royal College of General Practitioners. The authors conclude that 'The hybridity and complexity of the oral examination puts additional hidden demands on both examiners and candidates. These stem from the fact that the oral examination seems to assess candidates professional discourse but does so through institutional discourse or a hybrid of all three discourses. This can lead to misunderstandings, mismatches, and cross purposes reinforced by the difficulty of managing any oral examination or selection interview where both time pressure and the social pressures of face to face interaction must be taken into account.'

The authors' main argument is that the medical discourse can be classified into three categories. The 'personal discourse', the 'professional discourse', and the 'institutional discourse'. Over the course of an interview, the 'conversation' can shift in a subtle way between these three discourses. An interviewee who does not master the English language perfectly may miss such a shift and find himself 'out of phase' with the examiners. This will then of course have a negative impact on his results. Other problems pinpointed by the authors are the problem of cultural differences between the examiner and the examinee that may cause them to have different views on controversial issues and the problem of being able to convey which areas of uncertainty arise from the interviewees lack of knowledge and which ones arise from the lack of current understanding of the subject.

Most of these arguments are quite specific to the medical profession and do not apply to the case of Mathematics (or other technical disciplines like Engineering, Physics or Chemistry) examinations. In particular, it seems to me that there is only one type of discourse (one may call it 'technical') used during such an examination. Furthermore, none of the topics discussed during a Mathematics examination has any direct social impact that would be open to different interpretations depending on the person's cultural background. Concerning the problem of negotiating between the limits of student's knowledge and the limits of the general field's knowledge, this can certainly be a problem in interviews for research grant applications or a PhD viva. I do not see however how this could arise in the context of an undergraduate examination since there, the lecture would usually cover material that is well accepted in the relevant community and whose proof can be explained at an undergraduate level.

However, any oral examination will inevitably end up giving slightly more credit to a student who is very articulate. The reason for that is that an articulate student will find it easier to lead the discussions to a subject that he feels comfortable with and avoid areas that he doesn't master very well. In order to avoid any unwanted discrimination against students with poorer communication skills, the examiner should be aware of this and make a positive effort to cover as broad an area as possible, irrespective of the student being examined. In particular, it is important for the examiner not to lose control of the conversation during guided oral examinations.

The main cause for misunderstanding in a Mathematics examinations concerns the level of rigour required when asking for the proof of a theorem. It turns out that this problem is actually exacerbated rather than diminished by written examinations. It is indeed easy for an examiner during an oral examination to ask the student for more detail at one point in the proof or, on the contrary, to ask the student to skip a few unimportant technical details. In written exams on the other hand, it is important for the examiner to formulate the question in such a way that it is very clear which level of rigour is expected. If the question is formulated in

a slightly ambiguous way or if a student does not understand it clearly, there is much less the examiner can do about it *a posteriori*, once the scripts are handed in.

6 About the question of fairness and difficulty

An overwhelming majority (97%) of the first year students agrees that oral examinations are less fair than written examinations. This criticism is not to be taken lightly and it is my belief that this shared preconception is central to the reasons for giving oral examinations so little importance in the UK. It actually raises a much more important question which is: what does it mean exactly to assess a student's performance 'fairly'?

From a certain point of view, written examinations have several attributes that seem to make them much fairer than their oral counterparts:

1. **Consistency of grading.** It is reasonable to argue that, given a student's script and a marking scheme, two different examiners will obtain roughly the same mark.
2. **Anonymity.** Most universities in the UK enforce anonymous marking, whereby the lecturer does not know who wrote the script that he is marking. This ensures that the lecturer is not unconsciously biased in favour or against the student he is marking because of gender or race considerations.
3. **Accountability.** In case of a dispute over a student's mark, it is possible to either ask another lecturer to re-mark that script or to show the script to the student and argue for the appropriateness of the mark.

These attributes can be demonstrated objectively and are therefore suitable for justifying the University's examination procedure to the general public. Whether they achieve greater fairness is however not so clear. Let us start with the consistency of grading. The fact that all students answer the same set of questions achieves a certain extent of equal treatment for students taking the examination. Furthermore, if all the examination scripts are marked by the same lecturer, it is reasonable to expect that two scripts with the same mistakes will get the same grade. A more subtle question arises when one is forced to compare two scripts with a completely different set of mistakes. A typical example of a 'tricky' question is one that asks the student to prove a certain statement that was proven by the lecturer during one of the lectures. It is expected that the student will produce the same proof as the lecturer, but any other correct proof is of course perfectly acceptable. It regularly happens that a student revised his lecture notes quite assiduously but didn't quite understand how the proof actually works. Such a student would then often produce a 'proof' that is superficially very similar to the one given by the lecturer, but contains several subtle reasoning mistakes (typically

two inverted quantifiers) that, from a purely formal point of view, completely invalidate the reasoning. It also happens quite often that a student understood in intuitive terms why the statement is true, but does not remember how the proof presented by the lecturer works. Such a student may go off in a completely different direction which in principle allows to prove the statement, but is much less direct than the one presented in the lecture. Because of the lack of experience and/or technical skills, he would then get stuck in the middle of the proof and be unable to continue. It is very difficult to mark such answers in a way that would be universally considered as 'fair'. Some examiners may give more credit to the second student on the grounds that he shows original thinking and some understanding of the statement. On the other hand, one may argue that the first student 'knew' the answer and that he only made a couple of very small mistakes because his memory failed him, whereas the second student did not know the answer and just tried to make something up.

The main problem here is that the script handed in by a student at a written examination is final and one can only guess the origin of the student's mistakes. Of course, similar problems may arise during oral examinations, but it is easier there to find out the true causes of the student's mistakes and to assess them fairly as a consequence. In the case of the first student for example, the examiner would have no difficulty in asking a couple of questions that would make it clear whether his mistake is caused by a moment of confusion or if it is caused by a true lack of understanding. In the case of the second student, it is also quite easy for an examiner during an oral examination to check whether the student has enough insight to see how to push his argument through without going into technical details or not.

This aspect of oral examinations does not seem to be well documented, but is taken for granted by many of my colleagues who studied in a system that uses oral examinations. It is interesting to note that the Department of Chemistry at Concordia College (Minnesota, USA) reintroduced oral examinations as part of their curriculum a few years ago. The experience documented at

<http://www.cord.edu/faculty/ulnessd/oral/oral.html>

seems to have been overwhelmingly positive and backs much of the arguments given above.

Anonymity can of course not be achieved during an oral examination by definition. This puts the examiner in a more difficult situation because he is open to claims of consistently discriminating against (or in favour of) a group of students, based on considerations other than purely academic. One would of course hope that the University only hires academic members of staff who have a strong sense of professional integrity and who would never consciously let such considerations affect their marking. It is however not impossible to rule out that some examiners

may unconsciously discriminate unfairly against some group of students. This problem is to a large extent prevented by anonymous marking (except maybe for gender discrimination since it is after all possible in many cases to distinguish between a male and a female handwriting). On the other hand, oral examinations are always assessed by two examiners and one would very much hope that they do not in general share the same preconceptions. Ultimately, this is a problem of trust between the students and the lecturers. I believe that the lack of anonymity of oral examinations causes no problem whatsoever if the students trust the professional judgement of the examiner. This is determined to a large extent by group dynamics and by previous experiences of the students, but it is certainly possible to build a positive relation between examiner and examinee. If on the other hand there is a tense relation between the lecturer and the students, an oral examination is likely to only exacerbate it.

The main problem with the question of accountability is that there is no written record from the part of the student. This again puts the examiner in a difficult situation in case of a dispute because he cannot provide any 'hard' evidence to support his assessment of the student's performance. The same is true from the point of view of the student, so that it may be difficult for a student to challenge a result if he believes to have been treated unfairly. The examiners are of course encouraged to take notes during the examination and to keep these notes for some time afterwards, but these notes are not produced by the student and can therefore hardly count more than the examiner's word. One possible way of circumventing this problem may be to videotape the examinations. It is unclear however how comfortable the students would be with such a procedure. Many of them are already nervous during oral examinations and videotaping them would certainly not do anything to relieve their stress. As with the question of anonymity, this again boils down ultimately to a question of trust in the examiner, both by the students and the University administration.

To conclude the discussion about the relative fairness of oral and written exams, I would like to make the point that free oral examinations are usually regarded by the students taking them as much fairer than other types of oral or written examinations. This is because they are the only method of assessment that allows the student to show the best side of himself by concentrating on those areas of the course that he understood best. One way of comparing the degree of fairness achieved by a written examination with that achieved by a free oral examination is to resort to the terminology employed by Grisay in [4] (see also [3]). It was developed mainly in the context of the reduction of inequalities in the French educational system, but to a certain extent it can be employed here. Grisay distinguishes between four types of equality (numbered 1 to 4). In a nutshell, equality 1 represents equality of opportunities for people with comparable potential. Equality 2 represents equality of treatment for everybody. Equality 3 represents the

equality of academic success, whereas equality 4 represents the equality of social accomplishment. The main point of Grisay is that there is no universally accepted notion of 'equality' (and thus of a 'fair treatment') and that striving towards the achievement of these various types of equality yields contradictory results. Free oral examinations are fair in the sense of 'equality 1' in that they allow students with comparable potential to make the best of it. Written examinations on the other hand are fair in the sense of 'equality 2' since every student gets the same set of questions and is treated in exactly the same way. The case of guided oral examinations is less clear-cut and depends to some extent on the examiner.

Let us finally examine the question of difficulty. Most of the first year students who answered my questionnaire share the perception that oral examinations are harder than written examinations. Since most of the first year courses given at the University of Geneva are assessed by both a written and an oral examination, this question can be investigated objectively. The data in Appendix A shows the marks obtained by 35 students for both the written and the oral examination for the same lecture. (The data actually covers two different lectures from two different years.) Note that grades in the Geneva system range from 1 to 6 with the pass grade at 4 (since grades are rounded up to the nearest half-integer, this means that the average grade of both exams must be at least 3.75 in order to pass the course).

The average grade for the written examinations was 4.57, whereas the average grade for the oral examinations was 4.89, with 8 students performing better at the written examination, 16 students performing better at the oral examination and 11 students obtaining the same grade at both examinations. Even though oral examinations tend to be perceived as 'hard', this could be put down to either a lack of first-hand experience or to an increased perceived difficulty due to the stress, since most students end up having a better grade in their oral than in their written examination. This data also partially addresses the question of fairness. It shows that for 27 students out of 35 (i.e. 77%), the oral and the written grade differ by less than 1 mark. Note that one would not expect in general the oral and the written mark to be exactly the same, since they are not intended to assess the same set of skills. The written examination is focused entirely on problem-solving, whereas half of the oral examination consists in explaining the proof of a theorem. This brings us to the next part of this essay, which concerns precisely the difference in scope between oral and written examinations.

7 Scope of examinations

The purpose of any examination is to assess both the student's *understanding* of the subject and his *knowledge* of the subject. My experience in both passing and setting exams first as a student and then as an assistant / lecturer is that it is easier

to test the knowledge of a subject with a written examination and to test the understanding of a subject with an oral examination. For example, a typical question for an oral examination on ergodic theory could be ‘state and prove Birkhoff’s ergodic theorem’. Such a question is impossible to ask in a written examination. It is indeed quite possible to ask students to state the theorem, but writing a correct proof of it would be impossible for most of them. Even if they understood the proof, remember what the main ideas are, and how they are put together, it would probably take them too long to reconstruct the proof and write it down correctly. They would also almost certainly get stuck on a technical detail at some point or the other. During an oral examination on the other hand, the examiner can give hints to the student when he gets stuck and ask him to skip technical details after making sure that the student has an idea on how to handle them.

On the other hand, a question like ‘compute the fixed points of that differential equation and analyse their stability’ is much more suitable for a written examination. It is indeed likely that a student needs some time to reread his answers in order to find and correct computational mistakes. Many students confronted with this type of question during an oral examination would make a few computational mistakes from the very beginning, which then immediately undermines their self-confidence. Especially weaker students would consider the question to have been unfair because they feel that their lack of strong technical skills prevented them from having the opportunity to demonstrate their understanding of the problem.

Up to a certain extent, a guided oral examination with preparation time allows to ask both types of questions, since the student has some time to perform the computations beforehand. Oral examinations without preparation time should stay away from technical questions where it is easy to make computational mistakes, especially under pressure. In this case, it makes sense to either have marked assessments during the term or to have a written examination as well, in order to test the technical abilities of the students, together with their understanding of the subject.

8 Grading oral examinations

The standard practice in all the oral examinations that I attended either as a student or as an examiner was the following. There are two examiners asking questions. Usually, one of the examiners is the lecturer for the course in question and he would be leading the interview. The other examiner would also occasionally ask questions, but its main role is to work as an independent reference. If the course has a support class, the second examiner can be the graduate student running that class.

During the interview, both examiners would make notes of the student's answers and give a grade at the end of each examination. At the end of the half-day, both examiners would discuss the performances of the individual students and compare their grades. Most grades would differ by very little and the examiners would settle for the average grade. In cases where the grades differ significantly, both examiners would explain to each other the rationale behind their grades and they would try to understand where the divergence in their grades originates. Usually, a consensus emerges rather quickly from such discussions. As already discussed, the main problem is the problem of accountability. This seems to be considered much more of a problem in the Anglo-Saxon culture than in continental Europe, prompting remarks like "[oral exams] are usually time-consuming, too anxiety provoking for students, and difficult to score unless the instructor tape-records the answers" [2].

9 Oral presentations

Students and academics alike are acutely aware of the fact that oral communication skills are essential to many aspects of professional life after University studies. This is in line with the well accepted fact [1] that oral communication skills are of utmost importance, even in technical professions. It was therefore surprising to me that even though 60% of the first year students covered by my questionnaire rate their own communication skills as 'average' or 'poor', 62% of the students are clear about the fact they do not wish to have more emphasis put on oral presentations during their studies. The fourth year students have similar opinions, even though they tended to rate their own communication skills somewhat higher.

The current curriculum gives students the opportunity of writing a second year essay which is followed by a 15 minutes oral presentation. MSc students furthermore have a mandatory fourth year essay which is also followed by an oral presentation. I believe that this is appropriate, but it may be a good idea to make the second year essay compulsory. In my experience with second year students, 15 minutes is a very short time for an oral presentation and many students have to be interrupted in the middle of their presentation. I have not had any first hand experience with fourth year essays yet, but since they are more substantial than second year essays, I would expect this time constraint to be even more of a problem there. It may be a good idea for lecturers to extend the standard presentation time to 20 or 25 minutes, even though I realise of course that this is considered as 'wasted time' by lecturers who often have already quite a tough schedule.

Concerning more informal oral presentations during support classes, the experience I had with my first year Analysis students was on the whole very positive.

The fact that they were not assessed made them an informal and rather relaxed exercise that was regarded by many students to be ‘fun’. The main obstruction to making this type of exercise more commonplace are the resources required. When a lecture has only one hour of support class, it is understandable that students would like to spend this hour in an efficient way and get the solutions to the assignment sheets in a ‘predigested’ form. If on the other hand there were sufficient resources for two hours of support class per lecture, one could imagine to have blackboard presentations by students on a regular basis.

10 Resources required

Oral examinations and presentations require in general a larger amount of resources per student than written examinations, but have a much smaller overhead. They therefore make no sense (in my opinion) for large classes. However, for classes of 20 students or less, the amount of resources required for both types of examinations becomes more comparable.

11 Conclusion

This project aimed at covering a variety of aspects of oral examinations and to compare them to written examinations. The main negative aspects of oral examinations emerging from the discussion is the problem of accountability and the possibility of unconsciously discriminating against students with poor language or communication skills. The main positive aspects are that oral examinations allow for a more complete assessment of the student’s skills and that they provide the student with an opportunity of talking in front of an audience, which is a skill that is highly demanded in the majority of professions. It is possible to argue that when an oral examination is carried out by a skilled examiner, it can be fairer than a written examination, contrarily to the perception of many people unfamiliar with oral examinations.

In the particular case of the Mathematics Department at the University of Warwick, the current student intake makes it unrealistic to contemplate the possibility of oral examinations in the first three years. It could however be used as an alternative assessment tool in fourth year or MSc courses.

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Appendix A Comparison of marks between oral and written exams

Written	Oral
6	4.5
6	6
5.5	6
3.5	4.5
3.5	5.5
4.5	3
1.5	1.5
6	6
2	1
4	6
5.5	6
5.5	6
6	6
6	5.5
2.5	4
3	4.5
5.5	4.5
5.5	5.5
5.5	6
5	6
6	6
3	6
4	4
3	2
6	6
2.5	2.5
4.5	6
5	6
4.5	3.5
4.5	5.5
5	5
3.5	2.5
6	6
5	6
5	6