

INNOVATIVE USE OF TECHNOLOGY IN GRADING

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ABSTRACT

In the past, all grading meetings for the Singapore national examinations between the Singapore Examinations and Assessment Board (SEAB) and Cambridge Assessment were held in Cambridge. These meetings were held to determine the grade thresholds of subjects for various examinations.

In 2004, SEAB and Cambridge Assessment embarked on an innovative approach to conduct grading meetings through the use of video-conferencing technology. Although this may seem to be a simple approach to the use of Information Technology (IT), the successful implementation of such meetings required much preparation and the redesign of grading procedures.

This paper shares the experience of the use of video-conferencing technology for grading meetings for the 2005 GCE N-Level examination. It also discusses the success factors, benefits, issues encountered and some feedback from related personnel regarding the use of video-conferencing technology for grading meetings.

INTRODUCTION

The purpose of Grading Committee Meetings (GCM) relating to the Singapore national examinations operated jointly between the Singapore Examinations and Assessment Board (SEAB) and the University of Cambridge International Examinations (CIE) is to determine grade thresholds of syllabuses for various examinations, and maintain examination standards year-on-year. The grade thresholds and standards are discussed during the GCM conducted by representatives from CIE and SEAB.

The organisations have been working together in partnership for many years to provide Singapore students with national examinations which are widely recognised by local and overseas universities.

Before October 2005, almost all² Singapore syllabuses were graded annually in November (GCE N-Level³) and January (GCE O-, AO- and A-Levels) via formal grading meetings where representatives from both parties met in the UK. An innovative approach of grading meetings was pioneered through the use of video-conferencing (VC) technology for the 2005 GCE N-Level examinations.

¹ Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate, a department of the University of Cambridge. Cambridge Assessment is a not-for-profit organisation.

² Three small pilots of some GCE N and O-Level subjects were graded via video-conferencing from October 05 to January 05 to prepare for the full scale GCE N-Level grading via video conferencing in November 2005.

³ N-Level stands for Normal level course. Students in the N-Level course follow either the Normal (Academic) [N(A)] or Normal (Technical) [N(T)] curriculum. This 4-year programme leads to the GCE N-Level examination. On the 5th year, GCE O-Level examination is available to students in N(A) course who perform well in their GCE N-Level.

As in any high stakes business, such as the national examinations, incremental change [1] rather than drastic change is more manageable and acceptable to all stakeholders. The use of VC technology in grading meetings is therefore a good illustration of this. This paper describes the past and new grading practices, the preparation, success factors, issues encountered and some feedback on the pros and cons from related personnel regarding the use of VC technology for grading meetings.

PAST GRADING PRACTICES FOR N-LEVEL

We will focus our discussion on past grading practices on the grading for N-Level.

Duration

The GCM were held four to five weeks after the end of the examinations when almost all of the candidates' marks were captured in the Cambridge Assessment Examination Processing System (EPS) for each syllabus. The duration of the GCM usually took up three to four working days. Each syllabus was given about an hour time slot.

Officials who attend and their roles

The GCM for each syllabus comprised of Principal Examiners and Product Managers from CIE as well as SEAB representatives. The Principal Examiners are responsible for setting questions papers, supervising the marking and recommending grade thresholds to the GCM. The Product Managers manage the syllabus and work closely with SEAB officers on issues pertaining to the syllabus.

The Product Managers and Principal Examiners would attend the meeting for their own syllabuses. For syllabuses with small candidature, the Product Managers may represent the Principal Examiners at the meetings. Representatives from SEAB would attend the N-Level GCM in Cambridge.

Preparation and grading process

Before the grading meeting, preparations carried out by SEAB representatives include conducting research and collating background statistical information that can inform the GCM and facilitates its grading decisions.

CIE Product Managers prepare their individual reports on their syllabuses that include comments by the Principal Examiners on the candidates' performance and paper difficulties, statistics on the current and past years' performance, as well as Principal Examiners' recommended grade thresholds. These reports form the basis of discussion for the grading committee for each syllabus.

SEAB representatives usually arrive in Cambridge a day before the GCM commences. At the GCM, the Product Managers lead the discussion and the meeting decides on the grade thresholds based on the various sources of information presented.

NEW APPROACH IN GRADING

Rationales

In 2003, an idea was mooted to embark on a new grading approach through the use of VC technology. This idea came after the major outbreak of Severe Acute Respiratory Syndrome (SARS) disease that hit Asia badly in 2003. The occurrence of SARS raised great concern over officials travelling overseas. The use of this new technological approach in grading will totally eliminate the health and anxiety concern in overseas travelling. Other reasons for the use of VC technology are time-saving and cost-saving. Time and cost can be saved because those who are involved in the meeting no longer need to spend time travelling from one location to another.

The use of VC/information technology in education relating to teaching and learning has been published [2][3][4]. However, the use of this technology in association with grading meetings has not been reported previously. This new approach to grading meetings, which made use of VC technology as a communication medium (or link) between Singapore and the UK to conduct face-to-face discussions, was fully implemented in November 2005 for the GCE N-Level examination between SEAB and CIE.

PREPARATION

Equipment required

Prior to SEAB's purchase of VC equipment, SEAB checked with CIE on the type of VC equipment used by their end and obtained feedback of its quality. After discussion, SEAB purchased a similar type of equipment to ensure compatibility as well as optimal comparability in image and voice reception and performance.

Figure 1 shows the equipment set-up in the Cambridge Assessment video-conferencing meeting room. Figure 2 shows a VC grading meeting in progress for the 2005 GCE N-Level examinations at CIE and SEAB respectively.

Figure 1: A view of VC set-up in the Cambridge Assessment VC meeting room.



Figure 2: VC grading meeting in progress for the 2005 GCE N-Level examinations at CIE and SEAB respectively.



Pilot grading sessions

In preparation of the full scale VC grading for the GCE N-Level examination in November 2005, three pilots involving a small number of subjects were conducted on different occasions between October 2004 and January 2005 to test the feasibility of VC grading meetings. The outcome of these pilots was very positive and logistical improvements were made progressively to refine preparations before the grading meetings and to ensure that such implementations run effectively and efficiently.

Full scale VC grading

Arrangements were made several months in advance between SEAB and CIE to have the N-Level GCM conducted completely via video conferencing for twenty-six syllabuses over three days in November 2005, with a duration of approximately four hours per day.

As part of the contingency plan, an additional half day was reserved for grading to deal with any disruption or delays which might arise during the first three days of the GCM. SEAB's representatives were also physically present at Cambridge during that period so that grading could still proceed should there be unexpected serious disruption in the use of video conference equipment.

Owing to time zone difference⁴, the office hours shared between SEAB and CIE were very limited and the GCM had to be conducted after or before office working hours for one of the parties. At the grading meeting, each syllabus was given a 30-minute session slot with a 15-minute break after each session, plus a lunch break in between the morning and afternoon sessions. After the first few grading sessions, it became apparent that less time was needed for each session as a result of effective grading templates containing succinct grading information and time scheduling. All session breaks and the lunch break were removed. After the re-scheduling, the grading meetings for each day were shortened to only a half-day session. This was welcomed by both parties.

For the grading procedures, a new standardised template was introduced. This template was sent to CIE well in advance of the grading meetings. The administrative staff and Product Managers provided SEAB with the relevant data and information,

⁴ Singapore is 8 hours ahead of the UK in winter.

including comments on candidates' performance or paper difficulty by the Principal Examiner. The completed templates and other relevant data were then securely transmitted to SEAB before the grading session. Information and data on the template therefore formed the basis of discussion for the grading panel. With close co-ordination with CIE, SEAB's grading team was able to prepare all the necessary information in time for the GCM.

In view of the tight time schedule before VC grading meetings for CIE's Operations Division, a few new measures were implemented at CIE on top of the usual procedures to ensure that the process ran smoothly:

- *Examiners returning Grade Threshold Recommendation forms electronically* – Previously, Grade Threshold Recommendation forms (with suggested grade thresholds and comments on candidates' performance) could be returned either by conventional mail or online. To avoid any conceivable postal delay, all such forms were arranged to be returned online by examiners.
- *Mark-chasing and other logistical arrangements* – A single point of contact regarding mark-chasing was appointed to keep track of all late marks; the Operations Division put together a rigorous logistical plan which required Product Managers to strictly adhere to all deadlines for all syllabuses to be graded. That plan was distributed to all involved personnel.

Technical setup

At SEAB, the VC equipment and all peripherals were set up and tested for connection a day before the GCM. Four ISDN lines were used to ensure proper image and voice transmission. If any of the telephone lines was not working, servicing of the line had to be called upon immediately. In fact, it was fortunate that this check was carried out as it turned out that one line was not working on that day and the local telephone company was contacted to service it. After servicing, the connection was rechecked.

On each grading day at SEAB, the technical support team set up the equipment and was deployed on standby throughout the grading sessions. In the event of an unresolved abrupt voice transmission failure, grading sessions could still proceed through phone calls. As a fallback plan, felt-tip markers and paper were prepared to serve as a form of visual communication.

At CIE, on the day of the grading meetings, the Cambridge technical support team set up and tested the VC equipment in the meeting room well in advance of the actual meetings. A laptop computer installed with the Cambridge Assessment Examination Processing System (EPS) used for grading was also connected to the VC system and tested to ensure that the plasma TV screen could be toggled between the view from Singapore and that of the laptop computer when EPS data was required during the meetings.

Prior arrangement was made for SEAB to initiate the first call thirty minutes before the actual meetings to test the functionality of all hardware of the VC system on each grading day. This was then followed by the actual dial-up, also from SEAB, to start the grading meeting.

KEY SUCCESS FACTORS

The key factors contributing to the success of the GCM using the VC technology are as follows.

- *Advanced preparation of grading templates and background materials* – The standardised template for the relevant data and information were made available to the SEAB team via secure means before the date of the GCM. This enabled the Committee members from both panels to familiarise themselves with the data before the GCM.
- *Grading process* – The VC grading meetings generally followed the grading procedures compiled jointly by SEAB and CIE. Committee members' familiarity with grading procedures enabled the meetings to proceed smoothly.
- *Administrative and logistical preparations* – Staff from SEAB and CIE put much effort into making sure that the mark-chasing, time-scheduling and VC equipment and grading documents were ready for the GCM.

ISSUES / CHALLENGES ENCOUNTERED

Although the first GCE N-Level VC full trial completed successfully, there were a few issues/challenges which surfaced during the VC meetings and needed to be addressed to refine future operations.

- *Technical problems* – Technical problems regarding Cambridge Assessment EPS arose during grading meetings and were subsequently resolved by its IT Department. In future, the IT Department will give first priority to any EPS problems that surfaced during live VC grading meetings to ensure their smooth running. Minor hardware problems related to printing, audio and resolution of the plasma TV had been reported and were subsequently resolved during grading meetings.
- *Sudden change of time schedules* – Time schedules were changed on the first day as a result of the smooth running of grading meetings. Some Product Managers felt slightly uneasy because they were psychologically prepared for meetings according to the initial time schedule which was subsequently changed. In future, time schedules can be better planned as we now have a better idea of duration of meetings after the first full trial.

PROS AND CONS – FEEDBACK FROM RELATED PERSONNEL

Valuable feedback, which could help improve future VC grading meetings, was sought from SEAB and CIE grading participants after the full VC trial.

All participants interviewed felt very positive about their VC grading experience and they welcomed some practices of the new approach which could be extended to other examinations, e.g. the grading template. They felt that the VC approach was more efficient than the conventional one because Product Managers were required to prepare the necessary information/data by using a standardised template well before grading meetings. This helped them establish a mental framework and allowed them

to focus on the essential issues during grading discussions. Some of them even felt more confident during discussions as a result of being consistently well prepared.

With VC grading, more SEAB Assessment Officers were given invaluable opportunities to attend the GCM to provide inputs whenever applicable without the need to travel. This provided them with the opportunity to understand the grading processes and obtain early feedback from the Principal Examiners on the performance of candidates and the paper difficulty in the various subjects.

The majority also felt that the VC approach was more relaxed than the conventional approach as each GCM panel had its own 'space' and yet was able to communicate with each other face-to-face. Several participants also felt that the reduced formality and protocol of the VC approach and, possibly, the novelty of the equipment contributed to the relaxed atmosphere.

All participants being interviewed thought that the shortened grading schedule did not have an effect on the grading outcome. In fact, almost all the VC grading meetings completed well before the allocated time slot and ran very smoothly.

Table 1 summarises the feedback from participants relating to the pros and cons of this technology when used in grading meetings.

Table 1: Feedback from participants on the pros and cons specifically to the VC grading meetings.

Pros	Cons
<ul style="list-style-type: none"> ❖ Minimised potential risk of travelling (esp. terrorism and outbreak of diseases); ❖ Cost and time-saving through minimised travelling; ❖ Efficient - condensed the meeting duration substantially compared to conventional meetings; ❖ Being able to meet personnel who would not normally meet in conventional meetings, e.g., SEAB's Assessment Officers; ❖ Invaluable opportunities for SEAB Assessment Officers to attend the grading meeting which they were unable to do in the past; ❖ Use of a standardised template, instead of individual templates in the past, acts as a good basis for discussion and helps better understanding of the syllabus; ❖ More confident as a result of being consistently well prepared; ❖ Transmission delay of the audio signal in ISDN lines gives Product Managers more time to make succinct comments. 	<ul style="list-style-type: none"> ❖ Technology dependent - some technical problems that may arise, e.g. delay in ISDN lines and blurry EPS images at first when toggled between TV screen and laptop screen; ❖ If one session overruns, there is a knock-on effect on the following sessions because of the streamlined procedures; ❖ CIE felt constrained in terms of time and communication medium to conduct informal conversations/issues with Singapore officials via VC equipment; ❖ Works well for straightforward syllabuses, but might not work as well for complex syllabuses; ❖ One-shot event – if grading issues arise after the video link has broken, another meeting has to be scheduled much later than usual because of the time zone difference and tightly streamlined schedules; ❖ Lost the feeling of a genuine discussion; ❖ Reduced opportunities for social interaction and rapport building among officers from CIE and SEAB.

FUTURE PLANS AND POSSIBILITIES

The successful outcome of the GCE N-Level VC grading meetings further reinforces the feasibility of using technology in the assessment sector. The future plan is to extend this practice to grade O-Level and, possibly, A-Level examinations via video-conferencing. The option of having grading sessions via video conference offers a viable approach to effective and efficient grading practices while maintaining the rigour of the process.

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