

Investigation into the marking of CCEA A level Chemistry Summer 2010

Stage 2 Report



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Executive Summary

The Office of Qualifications and Examinations Regulation (Ofqual) was asked by the Department of Education (DE) in Northern Ireland to conduct a two stage external investigation into the marking of A level Chemistry by the Council for the Curriculum, Examinations and Assessment (CCEA) in summer 2010 following the discovery that incorrect marks had been awarded to 935 candidates in the multiple choice section of the A2 unit 1 paper.

The terms of reference for the investigation (Annex A) set out two stages for the investigation. The first stage required Ofqual to: identify what went wrong, how the failure occurred, how it was discovered, how many candidates were affected and how it was communicated to relevant bodies. Ofqual submitted its report on the stage one investigation to DE on 4 October 2010. The second stage required Ofqual to undertake a more detailed review, informed by the findings of stage one, of the processes and practices within CCEA Awarding Body focussing on systems and processes as well as management, control, quality assurance and compliance. This report details Ofqual's findings in relation to stage two of the investigation.

Ofqual's stage one investigation identified the following issues that warranted further scrutiny as part of the second stage of the investigation:

- The fitness for purpose of key operational systems and procedures and the extent to which they reflect current roles and responsibilities
- The level of checks required at key stages of the examination process
- Audit trail requirements
- Business continuity
- Planning
- Risk assessment and risk management.

Informed by the findings of the stage one investigation, the stage two investigation focussed on the CCEA systems and processes which are critical to ensuring that fair and accurate examination grades are delivered to students on time. To this end, Ofqual reviewed CCEA's: corporate governance and management arrangements; resources and expertise in relation to the delivery of GCSE and GCE examinations; quality assurance and control arrangements in relation to question paper and mark scheme production, script handling, standardisation and marking, producing checking and reporting results. The investigation team also reviewed the progress CCEA has made in response to the review of its GCE and GCSE examinations systems and processes conducted by CCEA in its regulatory capacity, and the support work carried out by Ofqual, in May 2010.

CCEA has well documented systems and procedures for all aspects of the delivery of its examinations. CCEA is accredited against ISO 9001 which is an internationally

recognised quality management system which it uses to manage its processes and help ensure that processes are fit for purpose. However, the marking failure in GCE Chemistry in 2010 and other operational failures that have occurred in recent years indicate that systems and procedures need to continually be reviewed, updated and tested to ensure they remain fit for purpose and are being properly implemented.

Ofqual found evidence that a number of procedures have not been reviewed for some time. The level of detail regarding particular processes varies between procedures, in particular in terms of defining the roles and responsibilities of particular post holders within a process. CCEA's ISO procedures are also the main vehicle for capturing and transferring knowledge within the organisation. In view of the uncertainty regarding the future of the organisation consideration should be given to ensuring that procedures contain sufficient detail to enable new staff to quickly understand a process, as well as facilitating the flexible deployment of staff across functions when the need arises.

CCEA has appropriate risk management systems in place but needs to remain ever vigilant regarding future risks and be proactive in identifying appropriate mitigation actions. The new unitised GCSE specifications which will be certificated for the first time in summer 2011 pose particular challenges which will need to be addressed well in advance of the commencement of the summer examination series.

CCEA is different to many of the other regulated awarding organisations that operate in England, Wales and Northern Ireland as it is a Non-Departmental Public Body which reports directly to the Department of Education, and as such advises government on curriculum matters, monitors standards and awards qualifications. CCEA is currently going through a transitional period due to the proposed changes to the education system in Northern Ireland. A consequence of the uncertainty surrounding the transition is that the organisation currently has an interim Chief Executive, there is no corporate or strategic plan in place and the Council has been reduced in size.

Although there is no evidence to suggest a direct link between these factors and the marking failure that occurred in A level Chemistry in summer 2010, the uncertainty surrounding the transition means it is difficult for CCEA to plan and implement the continual improvements that are essential to ensuring it continues to deliver fair and accurate examination results to students on time.

Ofqual has identified a number of areas for improvement which are intended to help minimise the possibility of future failures. These include:

- Reviewing all ISO procedures to ensure they remain fit for purpose and contain the detail necessary to facilitate knowledge transfer.

- Ensuring all procedures clearly define the roles and responsibilities of different staff within a process.
- Ensuring the role and responsibilities of the ICT section is reflected in all procedures where appropriate.
- Reviewing the control process for checking that procedures are adhered to.
- Reviewing the resources that are dedicated to checking that procedures and regulatory requirements are adhered to.
- Ensuring there is end to end of testing of any new system developments, including IT, before they go live.
- Undertaking a comprehensive risk assessment in relation to the delivery on time of accurate and fair examination results for the new GCSEs in summer 2011.
- Reviewing the governance arrangements relating to the awarding organisation arm of CCEA.
- Ensuring that the role of Director of Qualifications as the single named point of accountability responsible for maintaining the quality and standards of qualifications offered by CCEA is reflected in the post holder's job description.

Background

On 20 August 2010 the Council for the Curriculum, Examinations and Assessment (CCEA) became aware following the receipt of enquiry about results (EAR) requests that incorrect marks had been awarded in the multiple choice section of an A2 Chemistry paper. There were 1024 entries for the examination and of this, a total of 935 candidates received incorrect marks. 151 candidates from 42 centres received lower grades than they should have.

On 23 August 2010 the Education Minister, Caitríona Ruane, announced that a full external investigation would be carried out to determine how the failure occurred. On 31 August 2010, the Department of Education (DE), CCEA's sponsor department, announced that it had asked the Office of Qualifications and Examinations Regulation (Ofqual) to conduct an external investigation into the failure of the CCEA marking process in relation to the 2010 summer A level Chemistry paper. Ofqual is the independent regulator of qualifications, assessments and examinations in England and vocational qualifications in Northern Ireland.

Terms of Reference

The terms of reference set by the Department of Education require the investigation to be conducted in two stages:

- **Stage 1** – an immediate investigation to identify and record what went wrong, how the failure occurred, how it was discovered, how it was communicated to all relevant bodies and how many candidates were affected.
- **Stage 2** – informed by the findings of Stage 1, the completion of a more detailed review of processes and practices within CCEA Awarding Body focussing on systems and processes as well as management, control, quality assurance and compliance.

The full terms of reference can be found at Annex A.

Findings of the stage 1 investigation

Ofqual submitted its stage 1 investigation report to DE on 4 October 2010. The investigation found that a processing error in the marking of the multiple choice component of an A2 unit resulted in 151 students receiving lower grades than they should have in their A level Chemistry examinations. The Optical Mark Reader (OMR) system used to mark the multiple choice component incorrectly held the mark scheme for the January 2010 examination series, rather than the mark scheme for the summer 2010 examination series. This meant that correct answers on candidates' OMR answer sheets were not awarded marks. Secondly, a manual check of processed OMR sheets was not carried out in accordance with CCEA's

standard procedures. Ofqual identified a number of deficiencies in CCEA's existing systems and procedures and highlighted particular concerns in relation to the:

- fitness for purpose of the current OMR software and the high potential for operator error
- security of the OMR database and the lack of any audit trail function
- adequacy of the existing control and assurance arrangements. In particular, the arrangements and level of sign-off required for business critical processes
- structure and allocation of responsibilities within the part of the organisation that is responsible for processing OMR sheets
- how multiple choice components are considered during the awarding process.

The stage 1 report contained recommendations that were intended to address these concerns and prevent a similar error occurring again. The report also identified the following issues which required further scrutiny as part of the second stage of the investigation:

- the fitness for purpose of key operational systems and procedures and the extent which they reflect current roles and responsibilities
- the level of checks required at key stages of the examination process
- audit trail requirements – both electronic and hard copy
- business continuity, in particular the arrangements for knowledge capture and transfer
- planning
- risk assessment and risk management.

This report details Ofqual's findings in relation to stage two of the investigation.

Focus and format of the stage 2 investigation

In establishing the focus of the stage 2 investigation Ofqual took into account: the terms of reference set by DE, the findings from the stage one investigation, outcomes of previous review activities undertaken by CCEA and Ofqual in May 2010 and other operational incidents which occurred prior to the A level Chemistry marking failure. Having considered these sources, Ofqual focussed its investigation on the systems, processes and control arrangements that are critical to ensuring that fair and

accurate results are delivered to students on time. The investigation therefore focussed on the following three core areas:

1. Management and governance arrangements including:
 - a. Risk management and reporting
 - b. Strategic and operational planning
 - c. Compliance.
2. Resources and expertise including:
 - a. Recruitment and retention of staff and examining personnel
 - b. Contingency arrangements for the loss of staff and examiners
 - c. Knowledge capture and transfer
 - d. Training and support.
3. Systems, processes and control arrangements for:
 - a. Question paper and mark scheme production
 - b. Script handling, standardisation and marking
 - c. Determining, checking and reporting of results.

Format of the investigation

The Ofqual investigation team visited CCEA's offices between 12 and 15 October 2010. The purpose of the visit was to:

- understand CCEA's processes and quality assurance systems relating to the delivery of GCSE and A level examinations
- review CCEA's ISO procedures for the key examination processes and other relevant documentation including risk registers, operational plans, internal audit reports and job descriptions
- identify progress made against previous review reports
- interview key members of CCEA staff.

A summary of the documentation reviewed by the investigation team and details of the CCEA staff that were interviewed can be found at Annex B and C.

Management and governance

Ofqual reviewed CCEA's organisational structure, corporate governance and management arrangements including risk management and reporting, and strategic and operational planning.

The Northern Ireland Council for the Curriculum, Examinations and Assessment (CCEA), was established on 1 April 1994. It is a Non-Departmental Public Body (NDPB) responsible for curriculum, assessment and examinations in Northern Ireland and reports directly to the Department of Education (DE). In this respect the organisation is very different when compared to other regulated awarding organisations that operate in England, Wales and Northern Ireland.

CCEA is managed by a council and its governance arrangements apply to the whole organisation. Currently CCEA has three directorates: corporate services, qualifications and education strategy. CCEA's regulatory function sits outside of the directorates within accreditation and reports directly to the Chief Executive.

Two further committees support the governance of CCEA: the Finance Committee and Audit and Risk Committee. The terms of reference for these committees are under review and awaiting ratification by the CCEA Council.

CCEA's interim Chief Executive explained that in December 2009 the existing CCEA Council, which comprised 14 members, came to the end of its remit due to the expected transition of CCEA into the Education and Skills Authority (ESA). In preparation for transition the membership of the CCEA Council was reduced to 10 members who were appointed for the transitional period until ESA is established. This change reduced the skills base of the Council and has meant there have been fewer people covering the same responsibilities. CCEA acknowledges that, as a consequence, the governance regime has not been as robust as it could have been. The minutes of the Council meeting held on 22 June 2010 indicate that only four Council members, including the Chairman, were in attendance.

CCEA's awarding body function sits within the Qualifications directorate. The Qualifications directorate is responsible for the delivery and marking of assessments and public examinations and is headed up by the Director of Qualifications who reports to the Chief Executive and CCEA Council. In addition, since September 2010 the Interim Chief Executive provides a report to the Permanent Secretary at the Department of Education on a quarterly basis. Directors are also involved in this meeting.

The Director of Qualifications is also the single named point of accountability responsible for maintaining the quality and standards of the qualifications offered. However, the job description of the Director of Qualifications does not reflect these

responsibilities nor is the Director of Qualifications name on the qualification certificates which is a regulatory requirement.

The Qualifications directorate comprises four business units each of which is headed by a business manager: Examinations and Assessment Administration; Examinations; Operations Support and Awards and Certificates in Education, Training and Skills (ACETS). The investigation focussed on the activities carried out by the first three business units as they have responsibility for the delivery and marking of GCSE and GCE examinations. The ACETS business unit is concerned with all aspects of vocational qualifications and has no relevance to this investigation.

The management structures which are used to ensure the delivery and quality of CCEA's qualifications comprise: the Operations and Modernisation Board and Business Development Board. The Operations and Modernisation Board considers all operational issues relating to examinations and is chaired by the Operations Support Business Manager. The Director of Qualifications attends these meetings.

The Business Assurance Unit (BAU) within the Corporate Services Directorate is central to the functioning of CCEA. It is responsible for ensuring that quality standards such as ISO 9001 and quality procedures are met. Within the last 18 months there has been slippage with reviewing some of CCEA's internal procedures. The review of procedures has been highlighted as a significant risk and is part of the corporate risk register. Governance is also highlighted as a significant risk.

The database and i-Series AS 400 operating platform for all qualifications offered by CCEA is programmed and maintained by the ICT Business Unit within the Corporate Services Directorate. The ICT team also provides the general business platform across all areas of CCEA operations.

Risk identification and management

CCEA has in place a comprehensive risk management system. The system is formalised in an ISO procedure, which was last updated in March 2010, and a risk process manual. CCEA's Business Assurance Unit is responsible for driving, providing support for and administering all aspects of CCEA's risk management system. CCEA's Audit and Risk Committee provides an external monitoring mechanism and the system is also subject to annual review by CCEA's outsourced internal audit function.

As part of their risk management system, CCEA maintains a Corporate Risk register which is reviewed by the directors on a monthly basis. CCEA's Corporate Risk Register is aligned with that of the Department of Education. The Director of Qualifications owns three specific corporate risks concerning the delivery and quality of CCEA's qualifications. They are:

- failure to ensure that appropriate resources, systems and procedures are in place to ensure the accurate delivery of examinations
- failure to maintain and develop relevant portfolio of General and Vocational Qualifications
- failure to ensure appropriate resources, systems and procedures are in place to implement an effective modernisation programme.

In addition, the Qualifications Directorate maintains its own risk highlight report. This report details the risks and mitigation measures for each of the four business units within the directorate. Each Business Unit Manager owns the risks identified within their business area, with another member of staff being assigned operational responsibility for managing the risk. Below this, owners of specific operational risks within each of the business units complete a *Stewardship and Risk Review Report*. These reports detail: the risk rating (likelihood and impact) for the standing risks for each area of activity, any new risks that have been identified for reporting period including a risk rating and details of the mitigation measures that have been in place. Risk registers are also maintained for specific projects, for example, the introduction of online marking.

Ofqual reviewed CCEA's Corporate Risk Registers for May and September 2010. It is evident from the September 2010 risk register that CCEA is taking proactive steps, in light of the systems failures that have occurred in the last year, to identify and manage those risks relating to the delivery of accurate examinations. CCEA has identified the following possible factors which could result in a failure to ensure that appropriate resources, systems and procedures are in place to ensure the accurate delivery of examinations:

- Vacancy control and staff turnover in context of RPA has resulted in a lot of new/inexperienced staff in these areas.
- Ineffective management of change in terms of new processes and systems.
- Reduced focus on ISO systems and controls.
- Human error which cannot be entirely eliminated.

The current actions which are in place to manage the risk include:

- Vacancy control risk assessments.
- Staff training and mentoring/shadowing.

- Renewed focus on ISO procedures.
- Project management implementation.
- Close monitoring of activities.
- Use of statistics and enhanced modelling in awarding.
- Operations and Modernisation Board monitoring of activities.
- Controls and checks in ISO procedures.

An action plan for improvement is also outlined in the risk register. Measures include:

- Increased training and mentoring/shadowing for staff
- Increased focus on compliance with procedures
- Team procedure audits
- Implementation of improvement activities in response to the review of CCEA's examinations systems and procedures carried out by CCEA the regulator on behalf of DE, and the support activities carried out by Ofqual, in May 2010 as well as the findings of this external investigation.

Ofqual notes that the risk of CCEA failing to ensure proper governance and accountability arrangements also materialised last year and is currently rated as a high risk on the Corporate Risk Register for September 2010.

The risk documentation reviewed by the investigation team indicates that risk awareness and management training for staff took place between October and November 2003. In view of the importance of ensuring risks are properly identified and managed, and the fact that CCEA has significant numbers of staff who are either acting up or on fixed term contracts, CCEA should review the training that is provided to staff on effective risk management.

Strategic and operational planning

CCEA's Corporate Plan ended in March 2010. CCEA is unable to develop a new Corporate Plan due to the uncertainties regarding CCEA's transition into ESA. In the absence of a corporate or strategic plan the organisation is currently following operational plans which have been developed by the individual departments. While the Department of Education has advised CCEA of priorities for 2010-11 in relation to examinations/qualifications, assessment and a range of curricular issues, and has approved a CCEA costed work programme reflecting these priorities, in the absence

of a corporate or strategic plan there is risk that CCEA is disadvantaged in terms of its ability to identify and manage the priorities and resources which are necessary to ensure the delivery of fair and accurate examination results.

Team leaders within each business unit are responsible for maintaining detailed operational plans and timetables to ensure key processes are completed on time. The operational timetables viewed by Ofqual were comprehensive as they detailed the actions to be completed, when they needed to be completed, the section responsible and the individual who had lead responsibility.

The Stage 1 investigation found that the changes necessary to add new component codes onto the OMR database had not been planned for and implemented before the summer examination series started. Ofqual as the part of the stage 2 investigation therefore looked at the extent to which the system and procedural changes which are necessary in order to ensure the successful delivery of new qualifications or changes to existing qualifications are planned for and tested.

The main mechanism through which large scale process and system changes which are required for new or revised qualifications are managed is the New Specification Board. The Board is chaired by the Examinations and Assessment Administration Manager. However, the New Specification Board does not oversee the planning and implementation of all the changes that need to be made to CCEA's operational processes and procedures. Individual teams are responsible for identifying and implementing adjustments to existing processes and procedures in order to reflect new operational requirements. There is a risk that things can be missed, in particular in those cases where responsibility for implementation rests with two teams, and their respective roles and responsibilities have not been clarified in advance.

CCEA also has in place robust project management arrangements for particular projects connected with the delivery of examinations, for example the introduction of online marking. In the case of online marking, there is a dedicated project board which in turn reports to CCEA's Operations and Modernisation Board. In addition, a comprehensive risk register is maintained for the project.

Successful implementation of changes to systems, processes and procedures relies on rigorous testing before new systems go live. The review of CCEA's GCE/GCSE Examinations Systems and Processes carried out in June 2010 identified a number of issues concerning the planning, development and testing of CCEA's exams processing IT systems. The issues identified included:

- User-testing of software releases are timed to take place in April. This causes problems as it is in the busy examinations period
- ICT currently have only one test engineer to carry out QA role on software designed for examination processes

- Two different methodologies are currently being used within ICT for the development of web-based and AS400 software programmes
- ICT are not part of CCEA's Technical Issues Group (TIG) and do not currently attend post-examinations review sessions.
- Changes affecting examinations and which impact on ICT software programmes are not always discussed and agreed with ICT in a timely manner.
- CCEA does not currently have a joined up approach to user testing requirements for new software releases.
- No one currently has a holistic perspective on user testing of software before sign off. Each section is responsible for signing off the area that relates to them.
- Currently there is a member of staff with responsibility for user testing of software within the Examinations and Assessment Administration business unit but not other units.

CCEA is currently in the process of implementing a range of recommendations in response to these issues. Ofqual reviewed CCEA's *Monitoring grid for longer term recommendations being implemented following Review 2010* to establish the progress being made. There is evidence of some progress being made, for example in relation to creating a new section within the ICT team focussed on quality assurance, and ensuring an ICT representative is part of the CCEA Technical Issues Group. Many of the actions being implemented are due to be completed between November 2010 and January 2011, although the target status of many of these activities is rated as either amber or red. Ofqual also notes that CCEA's ability to enhance its user testing capacity is dependent on being able to secure additional resources through the examinations modernisation budget.

When implementing new systems either to facilitate new qualifications or to modernise examinations delivery processes, CCEA appears to focus on testing new IT systems rather than testing a whole process, including any IT element, from end to end before it is implemented.

Resources and expertise

The delivery of fair and accurate results to students on time is dependent on awarding organisations having sufficient resources and expertise to support the current and future demand for its examinations. Ofqual therefore reviewed CCEA's:

- arrangements for ensuring it has sufficient staff and examiners with the expertise necessary to deliver high quality examinations
- contingency arrangements for covering the unplanned unavailability of staff and examiners
- training and support for staff, including arrangements for knowledge capture and transfer.

Staff

There is no evidence to suggest that CCEA does not have sufficient staff to deliver its examinations. Historically staff turnover within the organisation has been quite low and CCEA has managed to retain a number of long serving staff who have considerable expertise and knowledge in the field of examinations delivery and CCEA systems. However, since November 2006 CCEA has been subject to vacancy control which was introduced as part of a wider review of public administration in Northern Ireland. Vacancy control means that CCEA is currently unable to appoint staff on a permanent basis. Vacancies are therefore filled through: existing staff acting up at a higher level, promotion of existing permanent staff on a fixed term basis, secondments or external appointments made on a fixed term contract basis. The Chief Executive and Director of Corporate Services indicated that 54% of CCEA staff are either acting up or on fixed term contracts – this includes all second tier staff. Since 2007 there has been an acting Chief Executive. When this post became vacant in June 2010 Gavin Boyd was appointed as interim Chief Executive on a part time basis.

CCEA has recently developed a new recruitment code to “take account of a changing work and social environment, the different business demands placed upon the organisation and the continued requirement for consistency in recruitment practice”.

CCEA is able to recruit new staff, and there is a process set out in the recruitment policy through which a Business Unit Manager can make a business case to establish new or additional posts. However, the vacancy control arrangements restrict CCEA's ability to advertise posts externally and this can result in long recruitment lead times. These restrictions potentially affect CCEA's ability to appoint new people who have the necessary skills and expertise to deliver examinations and bring 'new blood' into the organisation. As a result CCEA relies on promoting existing staff. CCEA's reliance on acting up and temporary promotion arrangements, and the

difficulty it faces in appointing new people to the organisation, increases the risk in terms of the organisation's continued capability to deliver fair and accurate examinations on time.

Ofqual notes that the review of CCEA's GCE/GCSE Examinations Systems and Processes carried out in May 2010 observed that the arrangements for carrying out Enquiries about Results were not judged to be fit for purpose. In response, CCEA has reviewed the structure within the Centre Examinations Support team and a new section leader has been appointed and the new team structure is reported as being stable.

Contingency arrangements

CCEA's contingency arrangements for handling vacancies and staff absences appear to work well. In preparing for each examination series, Business Unit Managers review the risks relating to resources and staffing within their area of responsibility and identify the measures necessary to mitigate the risk. For example, for the summer 2010 series a key member of staff involved in the preparation of statistics for awarding was on sick leave during the awarding process. In response, two members of the Research and Statistics team, one of whom had worked with exam statistics for a number of years and one of whom had been with CCEA for less than a year, were detailed to carry out the operational work. Increased monitoring arrangements were also put in place. In another example, a comprehensive mentoring and shadowing programme was put in place for the new Team Leader for the Entries, Results and Certification (ERC) team who joined the organisation on 1 June 2010. This was undertaken by an experienced Team Leader from another section who had previously covered the role and had carried out a similar mentoring role for the previous ERC team leader appointed in early 2009.

CCEA's contingency arrangements rely on being able to re-deploy experienced members of staff, who may have moved to other teams within the organisation, to cover business critical vacancies. CCEA is also able to call upon former employees or experienced senior examiners to provide cover for awarding meetings if the need arises. The ISO procedures are seen as the main vehicle for ensuring that someone coming new to a post understands what needs to be done. It is therefore important that all documented procedures are up to date and include as much detail as possible.

There is also evidence of CCEA developing multi-skilled teams in order to develop the expertise within a team and in turn ensure critical processes can be covered in the event of unexpected absences. For example, Executive Officers within the Operations Support business unit move between teams to see how other teams work and to learn the role to ensure there is joint expertise within each team.

The review of CCEA's examinations systems and processes carried out in May 2010 highlighted the need to ensure contingencies were put in place for circumstances where the Director of Qualifications is unavailable to fulfil the duties of Accountable Officer. The Director of Qualifications confirmed that the contingency arrangement is for the Director of Education Strategy to assume accountable officer responsibilities, with support from the Examinations Manager. The Director of Qualifications meets with the Director of Education Strategy to ensure he is updated on issues concerning the awarding process and the sign off of grades.

Training and support for staff

As part of its ISO 9001 documentation CCEA has standard procedures covering the induction of new staff, as well as a learning and development procedure. On the job training, shadowing and mentoring arrangements coupled with the ISO procedures are the main vehicles for ensuring staff understand what their role is and what they are expected to do. Team leaders within each business unit also have regular one-to-one meetings with their staff to identify any specific training and support requirements that need to be addressed.

In the Examinations team, new staff who are running awarding meetings for the first time have dedicated briefing meetings with the Examinations Technical Manager before the start of the examination series. They are also normally given the opportunity to sit in on an awarding meeting with an experienced member of staff before running their own awarding meeting. Experienced members of staff are on hand to provide advice to new staff during the awarding period and the Exams Technical Manager holds regular one to one meetings with subject officers during each examination series to provide an opportunity to address any issues that may affect the smooth running of the Review of Marking and Awards process. Feedback on the documentation which needs to be completed by the subject officer and is presented to the Accountable Officer before grading decisions are signed off is also provided.

The review of CCEA's GCSE/GCE examinations processes conducted in May 2010 identified that the ICT skills of some staff within the examination administration teams may not be adequate to meet the needs of their role. This puts undue pressure on ICT and other members of teams. The review recommended that an audit of ICT skills across Examinations administration staff be undertaken. The outcome of the audit and recommendations are scheduled to be presented to the Operations and Modernisation Board by the end of December 2010.

Although the training and support arrangements for staff appear to be effective, CCEA does rely on experienced staff continuing to be available to provide mentoring and support and ensure effective knowledge transfer. Consideration should be given to developing a knowledge transfer programme to ensure that the invaluable

knowledge which is held by experienced staff, and which may extend beyond what is recorded in procedural documents, is properly captured and documented.

Examiners

The Director of Qualifications stated that CCEA does not face the same pressures of ensuring it has sufficient examiners to mark examination scripts as other awarding organisations. This is in part due to the close relationship CCEA maintains with its centres and existing examining personnel which it enables it to respond quickly to any potential shortfall in examiners. Risk registers are maintained for each specification to ensure any potential shortfall in examiners is identified and appropriate mitigation actions are put in place.

CCEA has experienced problems in recruiting examiners who have the necessary expertise and capability to mark A level English Literature. In order to help meet future demand, CCEA has initiated a training programme for individuals who have expressed an interest in marking English Literature but currently do not have the necessary expertise in order to help meet future demand.

CCEA is also dealing with an ongoing issue concerning the availability of Irish medium examiners. Where insufficient Irish medium examiners are available CCEA has to rely on translating the scripts into English which is time consuming, costly and does not represent assessment best practice.

Training and support for examiners

All new examiners are required to attend a training session run by the Examinations Technical Manager before the start of the examination series. The Investigation Team reviewed the training pack which was provided to new examiners at a training session held on 29 April 2010. The pack is comprehensive and covers the key issues that new examiners need to know to ensure examination scripts are marked accurately and on time. New examiners are also assigned a mentor when they attend the standardisation meeting. This is normally the supervising examiner.

Ofqual also found evidence of training for senior examiners taking place. For example, during 2009/10 the senior examiners for GCSE Economics had training on: the role of the Chair in awarding and the implications for question paper setting and examining of the revised specification to be first examined in 2011.

CCEA has also introduced a new grading system for examiners which assesses their performance in relation to: the application of the mark scheme, annotation of scripts and completion of administrative requirements. Examiners are given a grade A to D. Examiners graded as C must undergo re-training before they are allowed to mark again. Examiners graded as D are not normally re-employed. This system helps ensure only competent examiners are used and helps minimise the potential for

marking errors.

Quality Assurance and Control Arrangements

CCEA uses ISO9001 to manage its processes. ISO9001 is an internationally recognised Quality Management System. All of CCEA's key processes for the management and delivery of its GCE and GCSE examinations are set out in standard procedure documents which follow the same format. The Business Assurance Unit (BAU), which sits within the Corporate Services Directorate but has a remit across the organisation, is the custodian of CCEA's quality standards and quality procedures. Procedures should be reviewed annually. All changes, and when they were made, are recorded within the procedural documentation. The Business Assurance Unit is also responsible for overseeing CCEA's internal audit function and conducting process review audits and compliance monitoring activities in accordance with the organisation's quality management system.

The stage 1 investigation found shortcomings in CCEA's standard procedure for the processing of optical mark reader sheets. Ofqual is also aware of a number of other operational failures that have occurred in recent years which may indicate that some procedures are not fit for purpose, or are not fully understood and being properly followed by CCEA staff and examiners. Details of these operational failures are outlined below.

A level English Summer 2010

CCEA became aware of an issue in relation to the marking of one examiner in one paper of its GCE A level English examination on Friday 3 September. In total 41 candidates were affected by a negative adjustment and should have had higher marks than they had been awarded. This affected the grades of 15 candidates, from 11 centres, who should have had higher grades as follows – 6 A to A*, 4 B to A, 5 C to B.

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CCEA identified that 17 candidates did not follow the examinations instructions correctly i.e. they answered more than the number of questions permitted within the different sections of the question paper. Examiners did not consistently apply the procedures for marking the scripts of these candidates which resulted in incorrect marks being issued. CCEA's quality assurance procedures failed to ensure that correct marks were recorded for the candidates.

AS Further Mathematics

On carrying out a review of awarding processes and systems, CCEA identified an issue in relation to AS Further Mathematics awards in 2008 and 2009. Students must sit 9 separate units in order to certify A level mathematics and AS Further Mathematics. In a small number of cases only seven or eight units were used to certify both qualifications in 2008 and 2009. The result was that some students received a more favourable grade in their AS Further Mathematics. Their A level Mathematics grade was not affected.

In light of the findings of the stage 1 investigation into the marking of A level Chemistry in summer 2010 and the other operational failings outlined above, Ofqual reviewed the procedures and control arrangements which are essential to ensuring that accurate and fair results are delivered to students on time.

Question paper and mark scheme production

The setting of question papers is overseen by the Examinations business unit whilst the Operations Support business unit is responsible for the production and distribution of question papers and examinations related materials to centres.

The standard procedure for question paper design provides guidance for the design of examination questions in order to ensure question papers are designed to the appropriate standard and meet the specification requirements. The procedure for the design and approval of question papers is clearly outlined in a flowchart and an explanation of the roles and responsibilities of CCEA staff and examiners in the process is provided. The procedure was last updated in May 2010.

The Question Paper Production (QPP) Unit Quality Manual (EDS/TP/0200/05) details the extent to which the QPP unit is involved in the production of CCEA question papers and associated materials including mark schemes. The manual outlines: the QPP team structure, the roles and responsibilities of the QPP Unit Manager and Team leader and the role and management arrangements for each of the sub teams; the Desk Top Instructions (DTIs) that are relevant to each team, induction arrangements for new starters, security guidance on handling examination materials; procedures for the confidential communication of material and the external contractors that CCEA uses to produce confidential examination materials. The QPP Unit Quality Manual is a comprehensive document and is particularly useful for induction purposes. Although amendments were made in 2010 to reflect changes to KS3 tests the document history record indicates the procedure was last subject to an annual review in April 2008.

The procedure for question paper printing and dispatch (EDS/OP/0008/06) is intended to provide guidance on the printing and dispatch of all question papers and

confidential materials to ensure that all materials are delivered to centres on time. However, the process for the printing and dispatch of question papers, details of roles and responsibilities and sign off arrangements for the process are not detailed in the document. Instead the user is referred to a number of other related documents. This increases the potential risk of particular elements of the procedure not being followed as all the key information is not in one place. Furthermore, the document history record indicates that the procedure was last reviewed in November 2008.

The standard procedures covering the development, production and dispatch of question papers are supplemented by a comprehensive set of Desk Top Instructions (DTIs). The DTIs set out in detail the steps that need to be undertaken to complete a particular process, the staff involved in the process and associated management arrangements as well as the documentary evidence which needs to be completed to show that the process has been completed properly. It is the Section Leader's role to ensure there is full compliance with procedures and DTIs.

It is evident from the procedures governing the QPP process that there are suitable arrangements in place to check that particular tasks within a process have been completed correctly, and this is supported by an appropriate audit trail. For example, CCEA is set up as a dummy centre so it receives a copy of exactly the same examination materials that schools receive and therefore is able to identify if there are errors and rectify any problems before students sit their examinations.

Script handling, standardisation and marking

The handling and processing of scripts is overseen by the Examinations and Assessment Administration business unit. The script processing standard procedure (EDS/TP/0047/12) sets out in detail the steps to be followed to ensure the effective processing of scripts. The procedure was last amended on 17 December 2009. The procedure contains detailed flowcharts for the various processes that relate to script processing including: receiving scripts from centres, checking the receipt of scripts from centres, pirate and late entries, advanced allocations, allocation of scripts for individual examiners, examiner re-allocations and scripts returned from examiners. The procedure indicates where responsibility for completion of a particular process rests. However, for some processes responsibilities are only assigned to a team or section whereas in other areas eg checking the receipt of scripts from centres, responsibilities are assigned to individual posts. Similar inconsistencies were found in other procedures reviewed by Ofqual for example within the procedure covering the process for re-moderating coursework during post-results services (EDS/TP/0054/14).

The investigation team found that procedures relating to the processing of scripts, coursework and other examination artefacts had been reviewed and amended at the end of 2009.

The standardisation and marking of scripts is the responsibility of the Examinations business unit within the Qualifications directorate. CCEA's standard procedure for marking (EDS/OP/0016/18) provides guidance for the marking of GCSE and GCE examination scripts and sets out the process for briefing examiners at standardisation meetings and monitoring the marking of examiners. The procedure sets out clearly the roles and responsibilities of examiners and CCEA staff within the marking process and covers the key processes that CCEA needs to follow to ensure it complies with the requirements of the GCE/GCSE code of practice. The document history record indicates that the procedure is regularly reviewed before the start of each examination series. This ensures that any changes to the regulatory requirements are reflected in the procedures. The marking procedure was last reviewed in May 2010.

Ofqual also reviewed CCEA's Instructions to Chairs of Examiners, Chief Examiners and Principal Examiners and Instructions to Examiners regarding the standardisation of marking. These are comprehensive documents which set out clearly: the processes that need to be completed to ensure scripts are marked properly and accurately, the roles and responsibilities of examiners and CCEA staff within the process and the audit trail documentation that should be completed.

As outlined earlier, in the January 2010 examination series CCEA discovered after the issue of results that in an A2 Geography unit examiners had not consistently applied the procedures for marking the scripts of candidates who had not correctly followed the question paper rubrics i.e. they answered more questions than required. Ofqual found that the instructions to examiners booklet, which was revised in February 2010, unambiguously explains the procedure for marking the scripts of candidates who have failed to follow the rubric instructions. However, the instructions to Chairs of Examiners, Chief Examiners and Principal Examiners do not make any reference to senior examiners checking whether examiners have applied the rubric procedure correctly when checking examiners first and second samples. The Examinations and Assessment Administration Business Manager indicated that extra clerical checks have been put in place to identify possible errors with the handling of rubric infringements. However, an extra level of assurance would be provided by making supervising examiners aware of the need to check that the rubric infringement procedure is being properly applied by examiners.

The standardising of marking process and subsequent checking of examiners' marking is designed to ensure that all candidates work is marked to the correct standard. However, a further check of examiners' marking is undertaken following the completion of marking. A Review of Marking meeting is held for each specification where the marking of all examiners is reviewed. Reports from the supervising examiner and a range of statistical information are considered to identify any examiners whose marking may be lenient or severe (or inconsistent). Adjustments may be made to examiners' marks in order to bring them in line with the required

standards where the evidence indicates it is prudent to so. Examiners whose marking is deemed unacceptable is re-allocated to a different examiner for re-marking.

The process for reviewing marking of examiners is set out in the standard procedure for Review of Marking and Awarding (EDS/OP/0017/08) and the Instructions to Chairs of Examiners, Chief Examiners, Principal Moderators and Awarding Officers for the conduct of Review of Marking/Awarding Meetings. Both these documents were revised in spring 2010. CCEA's standard procedure *Review of Marking/Awarding* (EDS/TP/0024/15) outlines the process by which adjustments (factors) that need to be applied to particular examiners marks are entered onto CCEA's AS400 exams processing system.

In the summer 2010 examination series CCEA discovered after the issue of results that incorrect adjustments had been applied to the marking of one examiner in GCE English which resulted in 41 candidates receiving lower grades than they should have. The Director of Qualifications indicated that the matter was the subject of an ongoing internal investigation. It appears that the error was highlighted by the Enquiries about Results process and that marks of some candidates were adjusted twice as CCEA staff had not taken into account the fact that these candidates' scripts had already been re-marked before the adjustment was applied. Ofqual could not find in the documentation it reviewed any procedures for dealing with examiner's scripts whereby some scripts are extracted for re-marking and others have an adjustment applied to them.

Determining, checking and distributing results

The process through which examination grades are awarded is managed by the Examinations business unit. Statistical information for awarding is provided by the Research and Statistics team which sits within the Operations Support business unit. However, the examinations technical team and the R&S teams are co-located which facilitates the exchange of information and resolution of issues.

The awarding process is fully documented in CCEA's standard procedure *Review of Marking and Awarding* (EDS/OP0017/08) and related instructions for senior examiners and awarding officers, and comply with the relevant regulatory requirements. The processes for preparing, conducting and checking the outcomes of awarding meetings appears to be rigorous. There are extensive post-award quality assurance checks. The examinations manager, examinations technical manager and the Director of Qualifications ensure the outcomes of awarding meetings are given close scrutiny before they are signed off, and the Accountable Officers booklet provides a suitable audit trail for the awarding process.

CCEA has its own Technical Issues Group (TIG) which considers technical issues raised by the Joint Council for Qualifications and the examination regulators. It identifies any changes to systems or data requirements that are necessary to

address these issues. Ofqual also found that a comprehensive risk assessment had been carried out of issues relating to the first award of new A level specifications and the new A* grade. This provides assurance that CCEA has the mechanisms in place to ensure students continue to receive fair and accurate results when there are major changes in the design and assessment requirements of qualifications. CCEA will need to pay particular attention to its planning for the first certification of the revised GCSE specifications in 2011.

The operational failure outlined earlier regarding the combination of mathematics units for the award of AS Further Mathematics illustrates the importance of continually reviewing and improving systems and procedures, as well as conducting complete end to end testing of new systems in order to highlight potential issues. The Examinations Manager explained that in response to the AS Further Mathematics CCEA was in the process of developing a new IT system to generate the A level mathematics results. In the meantime, CCEA will continue to carry out 100% clerical checks of the unit combinations; with the Examinations Manager and Examinations and Assessment Administration Manager conducting a 20% sample check.

Conclusions and recommendations

CCEA has well documented systems and procedures which are generally fit for purpose. Ofqual acknowledges that work is in hand following the review of CCEA's Examinations systems and processes carried out in May 2010, to review all of CCEA's ISO procedures. However, Ofqual did find evidence that some procedures have not been reviewed for over 18 months.

The level of detail regarding roles, responsibilities and accountability arrangements varied between the procedures reviewed. In addition, the role and responsibilities of the ICT section within particular procedures is not clearly outlined. This increases the risk of business critical knowledge and technical (ICT) expertise not being properly captured. It also increases the risk of things not being completed when they should, due to teams thinking it is another team's responsibility. These issues were also identified in the stage 1 investigation

The marking failure in A level Chemistry in summer 2010 and the other operational failures outlined in this report highlight the importance of checking that procedures are being correctly followed. Team leaders within the individual business units and the corporate Business Assurance Unit have a critical role to play in ensuring that procedures are regularly reviewed and properly implemented. However, the size and remit of the BAU across the whole of CCEA's functions may affect the extent to which it can provide assurance that procedures across the awarding body function are being properly implemented. The capacity and influence of the BAU was identified as an issue by Ofqual in the work it undertook in support of the regulator's review of CCEA's processes conducted in May 2010.

CCEA has contingency arrangements in place to manage absences or vacancies in business critical roles, and to provide support for staff that are new to a role. However, these arrangements tend to rely on being able to re-deploy experienced members of staff from other teams and sections. The ISO procedures are also seen as the main vehicle for capturing and transferring knowledge. The vacancy control constraints and the proportion of staff that are acting up or are on fixed term increases the risk in terms of CCEA's ability to maintain business continuity should critical roles become vacant unexpectedly. Consideration should be given to: developing a programme for capturing and transferring knowledge; the detail contained in ISO procedures and the introduction of DTIs where appropriate; facilitating the flexible deployment of staff across roles within teams and sections; and developing and testing contingency plans for handling unexpected vacancies in business critical roles.

CCEA has in place mechanisms for managing changes that need to be made to systems and processes as result of the introduction of new or revised qualifications. Ofqual also notes the actions that CCEA is undertaking in relation to the

development and testing of new IT systems that support the processing of examinations. However, consideration should be given to how changes to all processes and systems, not just IT systems, and the dependencies between different teams and functions are identified, planned for and tested.

CCEA's governance arrangements are not as good as they could be. The structure and remit of CCEA means that the organisation does not have a governance committee which solely looks at the awarding body function of the organisation. In view of the high stakes nature of the qualifications and examinations function, consideration should be given to the suitability of the governance arrangements for CCEA's awarding body function. Ofqual had to seek clarification regarding who is the single named point of accountability for maintaining the quality and standards of the qualifications offered by CCEA. Both the Chief Executive and the Director of Qualifications considered it to be the Director of Qualifications role. However, the job description of the Director of Qualifications does not reflect these responsibilities nor is the Director of Qualifications name on the qualification certificate.

Ofqual makes the following recommendations which are intended to help minimise the possibility of future failures.

CCEA should:

1. review all ISO procedures to ensure they remain fit for purpose and contain sufficient detail necessary to facilitate knowledge transfer
2. ensure all procedures clearly define the roles and responsibilities of different posts within a process
3. ensure the role and responsibilities of the ICT section is reflected in all procedures where appropriate
4. review the processes for checking that procedures are being properly followed
5. review the resources that are dedicated to checking that procedures and regulatory requirements are adhered to.
6. ensure there is end to end of testing of any new system developments, including IT, before they go live
7. undertake a comprehensive risk assessment in relation to the delivery, on time, of fair and accurate examination results for the new GCSEs in summer 2011
8. review the governance arrangements relating to the awarding body function of CCEA

9. ensure that the role of Director of Qualifications as the single named point of accountability responsible for maintaining the quality and standards of qualifications offered by CCEA is reflected in the post holder's job description.

Annex A - Terms of reference for the external investigation set by the Department of Education

On 20 August 2010 the Council for the Curriculum, Examinations and Assessment (CCEA) became aware that incorrect marks had been awarded in the multiple choice section of an A2 Chemistry paper. This resulted in 151 students from the north of Ireland receiving lower grades than they should have.

The Department of Education, CCEA's sponsor department, has therefore asked the Office of Qualifications and Examinations Regulation (Ofqual) to conduct an external investigation into the failure of the CCEA marking process in relation to the 2010 summer A level Chemistry papers.

The investigation should comprise two stages:

a. Stage 1

An immediate investigation to identify and record what went wrong, how the failure occurred, how it was discovered, how it was communicated to all relevant bodies, how many candidates were affected, with a report and recommendations for immediate action to the Department by the end of September at the latest.

b. Stage 2

Informed by the findings of Stage 1, a more detailed review of processes and practices within CCEA Awarding Body focusing on systems and processes as well as management, control, quality assurance and compliance will be conducted. The review will identify any weaknesses and make recommendations on measures to be taken to ensure that similar failures do not recur. The review will report to the Department by the end of October 2010, in order to allow any necessary actions to be taken in time for the forthcoming winter examinations series.

Ofqual will be provided with access to evidence from CCEA and may seek evidence from third parties as appropriate.

The stage 1 and 2 reports should be provided to the Department of Education and should not be shared outside Ofqual or the Department without the Department's explicit agreement. The reports will be made available to the Minister of Education and subsequently published, along with details of actions to be taken in response to the reports.

Annex B - Summary of documentation reviewed

1. ISO Quality Manual.
2. Quality Policy.
3. Internal audit plans and reports.
4. Corporate and Operational Plans.
5. Qualifications risk highlight reports – June 2010 and January 2011.
6. Qualifications risk action plan – summer 2010.
7. Risk management policy, manual and procedure.
8. Risk reviews report 2010.
9. Risk register – online marking.
10. Business Continuity Management Policy.
11. Assurance Framework.
12. Contingency arrangements for the loss of staff and examiners eg Pandemic Flu plans.
13. Recruitment policy and procedures manual.
14. Employee development scheme policy.
15. Procedures for the induction of temporary staff and staff on fixed term contracts and secondment.
16. Learning and development policy.
17. List of vacancies, fixed term contracts and acting ups.
18. Procedures for the appointment of examiners and moderators.
19. Standardisation of Marking – Instructions to Examiners (February 2010).
20. Standardisation of Marking – Instructions to Chairs of Examiners, Chief Examiners, and Principal Examiners (February 2010).
21. Conduct of Review of Marking/Awarding (RMA) Meetings – Instructions to Chairs of Examiners, Chief Examiners, Principal Examiners, Principal Moderators and Awarding Officers (Summer 2010).

22. Examiner Training Pack – 29 April 2010.
23. ISO procedures and desktop instructions relating to:
 - a. Question paper and mark scheme production,
 - b. script handling and processing,
 - c. standardisation, marking and awarding.
24. Minutes of CCEA Council and Audit and Risk Committee meetings.
25. Job descriptions for Director of Qualifications and Team Leader posts within the qualifications directorate and ICT teams.
26. CCEA (regulator) report on the review of CCEA's GCE/GCSE examinations systems and processes – June 2010.
27. Monitoring grid for longer term recommendations being implemented following 2010 review.

Annex C – CCEA Staff interviewed

Gavin Boyd	Interim Chief Executive
JJ Cavanagh	Business Unit Manager – Examinations
Lorna Doherty	Business Unit Manager – Operations Support
Anne Marie Duffy	Director of Qualifications
Gerry Garvey	Business Unit Manager – Examinations and Assessment Administration
Roger McCune	Accreditation Manager
Martin Quinn	Director of Corporate Services

The Investigation Team

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Ofqual wishes to make its publications widely accessible. Please contact us if you have any specific accessibility requirements.

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