



Risr Assess Written Exam Delivery

Overview



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risr/platform

The risr/platform is a cloud hosted service, made up of 3 key components all of which can be utilised as a full-suite of integrated service modules or as standalone service modules.

- risr/apply (Exam and Event booking & registrations)
- risr/assess (End-to-end exam management & delivery)
- risr/advance (Workplace based assessments, ePortfolio & CPD/PCS)

risr/apply is our Memberships, Exams and Events Booking module that compliments the life-long learning journey of a trainee/student through Examination, Workplace Based Assessment, CPD and Revalidation. risr/apply has been designed and delivered, as many of our services are, in collaboration with our customers. risr/apply enables the publishing, online booking and payment of subscriptions, memberships, exams, courses and events and is integrated directly with risr/advance and risr/assess to automate the whole process. The system enables automation of eligibility rules and a single view for both Administrators and Trainees/Students in their progression.

risr/assess is our end-to-end exam management solution. risr/assess delivers a number of question types including MCQ, SAQ, SBA, MEQ & EMQ Papers (Online Electronic and/or Paper delivery). risr/assess is currently being used by the most advanced medical assessment and training organisations around the world. The “out of the box” functionality covers question/item bank, exam preparation, design and delivery, exam processing, analysing and reporting. risr/assess is highly flexible, allowing both online or paper based assessments to be delivered. Finally, risr/assess unrivalled OSCE, SOE, Oral, MMI and project online remote video delivery capability means that customers are able to deliver all exam types from a single exam management solution and are future-proofed with our integrated platform.

risr/advance is our cloud hosted ePortfolio management solution for preparing, delivering and processing online Workplace Based Assessments and CPD/PCS. risr/advance is a key component of our integrated cloud hosted eAssessment services Platform.

risr/advance is integrated into the eAssessment platform to deliver a seamless and high quality user experience. risr/advance is currently being used by some of the most advanced Medical Assessment and Training organisations in the world and is continuously developed (as

with all 3 components of our platform) alongside our customers to ensure our services stay relevant and constantly innovate. risr/advance will enable customers complete flexibility in configuring Workplace Based Assessments, fully automated workflow, mobile/offline working, standard blueprinting, in-built notifications and event creation.

Question Bank

The Risr Assess solution includes a comprehensive Written question bank that has been used by education and training organisations for many years. The system allows for multiple assessment types to be created, managed, delivered and analysed – with independent sub banks for each. This can be done in both a collaborative or segregated fashion, with custom permissions and restrictions able to be configured by organisation administrative staff.

Question authors can access the system remotely, and depending on the role and permissions they are assigned, they can edit question content, including all sections, as well as add new questions. Items can be templated on the system, and an unlimited number of these can be created. Items can also be copied as templates to be used as new questions/stations.

Many question types are supported on the system. These include:

Single Best Answer questions, OSCE, Oral and MMI Stations, Essay Questions, Short Answer Questions, Very Short Answer questions, Extended Matching questions (EMQ), Ranking questions, Hotspot questions, Prescribing VSA questions, and Multi-part Written Questions among others. We also have a track record of working with organisations to implement new question types as needed.

All exam content is version controlled, with only one Live/Approved version of the item able to be active at any one time. Custom statuses can be defined for the approval of an item– by default these are Draft, Pending, Approved or Archived, however these can be changed as needed. Each item has an audit trail, and the transition between statuses is recorded, with the user and date/time.

Multimedia can be easily included as part of Written questions and observed stations. This includes images (jpeg, png, tiff and others), video (mp4, mov), audio (mp3, aac, wav) and documents (pdf). In addition, specialised formats such as radiographic DICOM Images can be included in exams. All images are presented in original quality, ensuring that high quality images can be used in exams.

Questions and stations are strictly version controlled on the system. Only approved/live items can be used in an exam, and only one approved/live version of an item can have that status at any one time. Once an item is set to being approved/live, it is not editable, and is locked from changes being made to it. If changes do need to be made, this can be done by creating a new draft version, and going through the approval process. This is in addition to previous versions, which are retained with archived status. Items can also be manually archived, individually or in bulk. Question performance statistics are tied to the version of the item delivered in a given exam.

The Risr Assess platform has comprehensive blueprinting and metadata tagging functionality. This includes Multi-level hierarchical tagging, where several levels of information can be documented; Multi-dimensional tagging enabling the representation of complex frameworks, and preventing implicit tags; Dependent tagging, supporting sub-dimensions to be shown only in relevant cases; and Automated tagging, where users belong to a particular role. This allows the question bank to be searched, reviewed and filtered extremely efficiently. Complex filters can be created by users, ensuring that existing content can be leveraged to develop exams, in addition to new content.

The system also tracks and stores historical exam performance data, so that performance statistics such as facility, discrimination and point biserial are calculated. Additionally information such as cut scores, standard setting judgements and alpha if excluded is also calculated. This information can be exported if desired.

Exam Preparation

The Assess platform can automatically select questions/stations for an item set based on the Exam Blueprint and other filters. Users can create an Exam Blueprint, which sets out the proportion of content they would like to include for each tag/category (based on the sampling grid). They can define this based on either the number of marks, or the number of stations in the assessment. Minimum and maximum proportions can be set, ensuring that content correctly reflects the exam requirements. Question papers can be regenerated multiple times if required, and rules can be configured to exclude recently used items (e.g. no questions that have been used in the last year). It is possible to filter and exclude questions based on their performance data. This includes facility and discrimination. It is also possible to reflect 'enemy' item status, such that certain items cannot appear on the same Item Set together. It is possible to report against the Exam Blueprint, to validate how the automatically generated question paper conforms to the exam requirements. These item sets can be reviewed and manually edited by users before they are finalised.

Item Sets can also be constructed manually, by selecting the items from the bank that you would like to include. The item bank can be searched and filtered based on tagging and free-text, and multiple items can be selected. It is possible to report against the Exam Blueprint, to track how the manual construction conforms to the Exam Blueprint.

Candidates can be assigned to written exams, and for OSCEs Examiners and Role Players/SPs can also be allocated. Various settings and configurations can be adjusted by admins, to control the functionality available to exam participants. The system will automatically generate an exam schedule, and relevant accompanying documentation.

Exam Delivery

The Risr Assess Exam platform features a modern and intuitive design, allowing candidates to quickly familiarise themselves and respond to questions. A full range of knowledge based questions can be delivered in written exams, including SBAs, SAQs and VSAs. Candidates can select the questions they would like to answer in any order, or can be required to navigate through the exam paper with a predefined order. Candidates can see which questions they have responded to, and flag questions that they would like to return to.

During the exam, a timer is displayed, which can be configured to count up or count down. This is synchronised and monitored on the server, ensuring that candidates cannot overrun their exam time. Exams can be configured to show questions in a random order for each candidate. In addition, answer options can be randomised for each candidate as well. Questions can be organised into sections with each section independently randomised.

The exam client is extremely robust, with both online and offline use supported. If the candidate is interrupted when taking the exam, they are able to rejoin where they left off. Additional time can be granted to them, in case of significant disruption. It is also possible to track how many times a candidate has accessed an exam. The exam delivery can be locked-down to ensure that candidates may not capture or record their screen, view external resources (including other software and websites), or record audio transcriptions. Full proctoring and remote invigilation can be provided, with the candidate monitored either by live exam proctors, or on a record and review basis.

The system allows candidates to submit and finish their exam at any time. All mark submissions are automatically submitted when they are created, ensuring that if any interruption occurs to the exam, the results are safe and can be re-synchronised preventing responses from being lost.

Proctoring

In addition to delivering exams on site, Risr also offers online remote proctoring services, where candidates can take the exam in their own homes, whilst ensuring exam security and robustness.

Risr is able to ensure the security, validity and robustness of online exams in partnership with our proctoring providers. We have partnerships with several proctoring services, and have integrated these with our platform to ensure a smooth and consistent experience for candidates. Both low-ratio Live Proctoring, and Automated Record and Review Proctoring are supported, with proctors assigned to monitor and flag candidate issues. Exams can be delivered robustly in circumstances where internet connections are intermittent, and can allow the candidate to continue their exam with minimal disruption.

Our proctoring partners have extensive capacity, with proctors based in the UK, Europe and internationally. Risr can liaise and manage the proctoring capacity based on forecast exam volumes, with last minute changes accommodated if necessary. We have delivered proctored exams with many thousands of concurrent candidates. Our partnerships with the proctoring providers are extensive, allowing us to book and reserve capacity well in advance of exam dates.

The proctoring system protects examination content, detects any candidate violations, and ensures that candidates have a high-quality examination experience. Candidates are continually monitored throughout the exam by either live human proctors, or reviewed post exam where automated proctoring is used. All live proctored exams can also be recorded for review and investigation post-exam. The customer has the ability to view these flagged violations on a proctoring dashboard, which sets out any notable incidents that happened during the exam. These can optionally be released to select candidates if desired.

Clear information and signposting for candidates means that they are guided throughout the pre-exam check, system familiarisation, ID and environment check, and exam delivery process. This includes a setup and connection test. Through integration between the systems, candidates will seamlessly be passed into the exam interface once they have been onboarded on to the exam, completing their ID and environment scans, and secure authentication.

Candidates undergo rigorous identity checks and verification processes. Before the start of an exam, each candidate is required to go through a thorough identity verification process. This typically includes presenting valid photo identification and may involve additional steps like facial recognition checks, depending on the level of security required. These measures are essential to prevent impersonation and ensure that the individual taking the exam is indeed the registered candidate. An environmental room scan is also performed.

Candidates are able to access support via a chat interface during the exam. Depending on the support arrangements desired by the customer, this can be routed to Risr or the customer. Additionally, if they have proctoring-specific queries, they are able to ask the proctor who can see and hear them. The proctor can respond via chat to answer any of these questions as they arise. Additionally, telephone support can be provided if specified as part of the support services scoping.

Whilst the exam is ongoing, customer admins are able to raise issues urgently with Risr, if Enhanced Support has been procured. Exams can be live monitored by Risr support teams, with chat and telephone support for customer administrators.

Exam Security

Risr has a robust, multi-faceted approach to maintaining the security and validity of exams delivered by our customers. Broadly speaking, our approach fits into two categories – protecting examination content, and eliminating academic dishonesty.

Content is protected in a number of ways by the system. Exams can be delivered in a locked down browser. This restricts the candidate's ability to capture exam content via screenshot or recording, and prevents them from copying or saving a copy of the exam. Candidates can be prevented from accessing the exam on non-approved and secured devices, by locking the exam to only be accessible via Safe Exam Browser, which has been configured with a unique key. This prevents access to users not using SEB (or those using SEB without the approved profile), for example if candidates are not present in the exam hall.

Examination content is encrypted when both at rest on the server, in transit when being downloaded, and when stored on the candidate's device prior to the start of the exam. Exam files are precompiled, and are encrypted with AES-256 with Galois Counter Mode enabled. Exam content can be decrypted by remote launch by invigilators, or can be decrypted by release of an exam PIN to candidates in the exam hall. This prevents candidates from decrypting content ahead of time, if they had access to the encrypted exam files.

Access to the exam is verified when launched, and candidates must have available exam time. At the end of the allocated exam time, or if the candidate leaves earlier, the exam ends and all responses are submitted. The exam content is then securely deleted from the device, with no information retained.

With regards to eliminating academic dishonesty, Risr's approach is made up of three key elements – prevention, detection and mitigation.

The use of SEB ensures that candidates are prevented from accessing any external materials, such as documents, notes and websites. Candidates are only able to access the exam interface, without the ability to open other applications and resources. Shortcuts and system interrupts can be disabled also, and any system interruptions can be detected (e.g. shutdown). Installed applications can also be detected, to prevent screen sharing or other functions being used.

There are a variety of detection methods used to identify any academic dishonesty. The most visible of these is the invigilation team provided by test centres and remote proctors, who are able to monitor and track candidate behaviour, and perform ID and other environmental

checks. However, to fortify this there are a number of techniques employed by the system. The time on question is tracked for each candidate, measuring in seconds how long they complete each question. This can be cross referenced against overall exam performance, such that candidates answering difficult questions quickly can be identified, particularly where they are taking longer for easier questions. Additionally, the overall performance of candidates compared to their cohorts can be used to identify areas for investigation.

Candidate's device identifiers and IP addresses can also be logged, with their access time and exit times recorded. Candidate idle time can also be shown, to monitor those who may not have submitted responses for an extended period.

No exam is 100% secure, and despite the range of methods employed to prevent and detect any academic dishonesty, candidates can be extremely creative in the ways in which they try to evade these. Therefore, additional mitigating measures can be used to minimise the impact of academic misconduct if undetected. These include the randomisation of exam questions, as well as content within these. This can prevent candidates from attempting to sample and memorise the exam content. This randomisation can also be defined on a per-section basis. Additionally, candidates can be restricted to forward-flow only, if desired. This means that they must answer the questions in sequence, and cannot go back and forth between other questions.

Reasonable Adjustments

Risr takes a case-by-case approach to supporting accessibility requirements and reasonable adjustments for exams, reflecting the varied needs of candidates. However, we do have a set of standardised tools which aid this approach. Additional time can be assigned to candidates, both in advance of their exam, and whilst the exam is ongoing. This will allow differentiated timing for individual candidates, and may be based on standard levels (e.g. 25% or 50% extra) or at a custom level. Additionally, it is possible to add reading time to the beginning of exams, to allow candidates to read question content ahead of their main exam time starting. Candidates can also have breaks during the exam, where their countdown timer is paused, and they are unable to answer questions for the duration of their break.

The responsive design of the exam interface allows zoom levels and font sizes to be used. These can be adjusted by candidates based on their own preferences. Background colour tints can be applied, with pre-selected options as well as granular controls available to candidates.

A range of accessibility software can be used with the platform, such as speech-to-text and text-to-speech tools. Risr uses standardised accessibility frameworks which enables a high degree of compatibility, however due to the large range of software packages available, we

always recommend testing before the exam for new tools. This can use OS level functionality, so as to ensure compatibility with the locked down device.

Candidates are also able to highlight sections of the question text, so as to aid in their comprehension of the exam, as well as (optionally) striking through incorrect answers.

Exam Marking

For written exams, questions such as SBAs, MTFs, MCQs and EMQs can be automatically scored by the system, such that after the exam is complete and verified, marks can be viewed and exported as needed. The timeline varies depending on the number of participants – typically automatic marking is applied within 1hr of completion. Responses for question types where automatic marking is not suitable, such as SAQ questions and essay questions, can be marked on screen by examiners.

Depending on the configuration of the question, negative marking can be used if desired. By default, the system will award one mark for the correct answer for an SBA or MTF question, and zero marks if any other option, or no option is selected. However, it is possible to award a negative partial mark (-0.5, -0.25, -0.2 or other) if an incorrect answer is selected. If 'don't know' is selected, or no option is selected, 0 marks can be awarded.

For responses written by candidates, administrators can assign markers within the system, to reflect the structure and marking processes of the exam. This can include single and double marking, with options to escalate to a senior marker or reviewer. A tolerance of marking differences can also be set, to allow automatic reconciliation. Markers can be assigned to mark all questions within a paper, or alternatively, to mark a subset of specific questions. Multiple markers can be assigned to responses, so that group marking can occur. These can be done in a way to split the cohort or share it. The system will automatically separate candidate answers and show them to the correctly assigned marker. This allows the individual question to be assigned its own pair of markers, each of whom will mark blind to the other.

Examiners can then log in to the system, and be presented with a list of assigned questions to mark. Candidates are marked anonymously, such that the examiner cannot see the name or ID whilst marking. When marking responses, markers can see the full question and all resources, marking rubrics, candidate response, model answers, mark submission fields and mark approval button. The system is designed to make marking as efficient as possible, with markers able to mark candidates sequentially without leaving the page. They can record their marks on a holistic or analytical basis, with the option for comments back to admins or candidates. Marks can be averaged or summed, to give the final score.

Should there be disagreement in the case of double marking, this can be escalated to a senior marker to resolve the issue. Markers can see a dashboard with their recently completed marks, and their pending questions to mark. This allows them to see how many have been recently completed. Additional reporting can be generated to give more detailed breakdowns of marking performance.

Escalations are currently made by the detection of discordance in marker's marks, and this is referred to a senior marker. Senior markers can be assigned to resolve disputed marks, and tolerances can be set under which discordant marks are averaged. Senior markers can currently review prior marks, and make final arbitration and marking decisions.

Exam administrators can track and monitor the progress of marking, and see how many outstanding responses there are. It is also possible to reallocate the marker if they have not made sufficient progress. Exam admins can see the transcript of marks, and can make amendments if necessary.

Automated Scoring

Automated scoring of written responses is supported on the system, using a matching algorithm to identify the probability of matching the correct answer. This can apply a score, and flag responses that need a human review. Responses are grouped by frequency, meaning that marking can be much more efficient, with thousands of common responses marked at the same time. Newly identified answers can be stored, such that over time Risr Assess learns which other answers should be given marks. This is most suited to responses of up to 10 words, where the candidate is asked a short or medium form question. The system does also support long form responses, where the candidate is required to respond in longer sentences or paragraphs – however require a human marker to mark the responses post exam on screen.

The automated marking for VSA questions checks candidates' responses against a predefined answer key, and matches corresponding answers. There are allowances for spelling or punctuation errors, and multiple correct answers can be defined to allow various permutations. After a machine marking pass, a review process occurs where an assigned marker can view candidate responses grouped together by frequency, and see how the automated marking has scored them. Where the automated marking is unsure of the candidate's response, colour coded flagging is used to highlight these to reviewers. These can then be amended, with updated marks applied across the cohort. In addition, alternate correct answers can be added to the question, so that when responded to in future, the automated marking can detect more correct responses.

The VSA question type has been extended to deliver 'Prescribing VSAs'. These questions use a similar marking process to VSA questions, but with allowances for variations in medical

prescribing formats. As well as the drug name, candidates can define dose, dose unit, route, frequency, and details of fluid delivery if relevant. These are open ended, allowing the candidate to choose from standardised units, routes and frequencies. This allows for multiple correct drug prescriptions to be marked – for example where a stronger drug is prescribed at a lower unit. These questions take a more probing (and ultimately more valid) approach to testing a candidate's prescribing abilities.

Standard Setting and Statistical Analysis

The system includes sophisticated reporting and standard setting functionality. Question performance data, including question breakdown, difficulty, discrimination, point biserial and other psychometric data can be generated on the system, which can additionally give an indication of which candidates passed/failed each item.

Risr Assess will automatically calculate a pass/fail outcome based on the candidates mark in the exam, and the exam cut score. This cut score can be calculated by a variety of methods, including Angoff, Ebel and Borderline Regression standard setting processes. Risr Assess allows a standard error of measurement to be calculated automatically. This can have a confidence weighting applied (e.g. 95% giving a 1.96 multiplier), and then added to (or subtracted from) the cut score. Conjunctive passing criteria such as a minimum number of stations can be set for each exam, and can be adjusted by users. A breakdown of the reasons why a candidate has failed an exam can be created (minimum stations, cut score, domain criteria etc).

It is possible to exclude candidates from the exam, either before, during or after marking has been completed. These candidates are marked as Excluded, with their results greyed out in the user interface. These exclusions are reflected in the reporting and statistical calculations, which can be remodelled with candidate(s) included or excluded. For each item, it is possible to see the overall proportion of candidates passing (p value) and each individual candidate's response and mark (barring those excluded). Candidate results for stations, including pass mark, station marks, exam outcome and domain scores can be reported on, among other fields. These can be exported, or can be included in the Candidate Feedback Report.

Difficulty and discrimination can be calculated using Classical Test Theory, Rasch Modelling and Item Response Theory. Cronbach's Alpha (KR-20) can be calculated for exams, and for each item if excluded. Exams can be linked and combined post-delivery, so that they are represented as one statistical event.

Results Export

Candidate results can be exported in varying levels of granularity, including raw responses, scored responses, outcomes and overall exam analysis. This can be provided in CSV/XLSX format, allowing compatibility with common external analysis tools. This data can include the exam ID, Date, Exam name (centre), Candidate IDs, Station Scores, Total Candidate Scores, Results and domain scores, among other data fields. Mean Scores and Reasonable adjustments can also be exported from the system, and if needed as an integrated report, Risr can provide all of these data fields together.

Overall exam success can be shown in a number of ways, including the Candidate Feedback Report, and Exam Results export. All reporting can be exported from the system, and can be done in PDF/XLSX/CSV as appropriate.

Individual Candidate Feedback Reports can be generated from the system, which can be customised by the customer. They can show candidate overall scores, scores per station, comparison to the cohort, station metadata and individual station feedback, among others. This report can be generated in PDF, and created in bulk for the whole cohort. This data can also be generated in excel format.