

What to think about when moving your exams online

Thank you for considering Verita for your online examinations!

This document contains "big picture" questions in regard to either moving an exam online or creating one from scratch, and has been put together to aid in future discussion and the brainstorming of options during development.

We have also added the layout and assumptions for a hypothetical exam to show how the process might flow and to review the details that need to be considered all within a realistic framework.

Finally we have included a Glossary of Terms that will help in our communication as we move forward.

We hope this document is of help, and of course please feel free to contact us at info@veritagroup.com with any questions whatsoever!

The "Big Picture" Questions

The following are a list of questions that cover the majority of the "big picture" issues to be addressed.

The Online and Coding Environment:

1. What **platforms** should the exam application be able to run on reliably? (PCs, Macs, tablets, smart phones, ...?)
2. What **browser versions** should the exam application be able to run on reliably? It is a given that the application would run on Firefox, Internet Explorer, Safari, and Chrome - however is the industry norm of the **current version of each browser plus the two previous** sufficient, or would it be necessary that the application run on older browsers? (The latter can be quite difficult and costly.)
3. Will the exam application be **interacting directly with a CRM** or other database application on the Examiner (your) side? An example would be an exam interacting with your **Membership Database**.
4. **If items (questions) need to be created and maintained as an ongoing process**, would these changes be done "by hand" directly into the database, or does a process within the exam application need to be developed to manage the addition, deletion, and adjustment of items? The former is less expensive up front, while the later allows for "**item developers**" to continually create, analyse, and manage items on their own.
5. What sort of server "**down time**" is acceptable? .01%, .001%, .0001% (per year)? This is balanced against cost, and is a function of the servers (stand alone, cloud, ...) and other details in regard to the hosting environment for the exam. A rough idea of cost would range from \$8 to \$300 per month. (This is separate from any issues of down time that might occur at the exam site itself or with the actual computer used to run the exam.)

The Exam Process:

6. Is it intended that the exams take place in a **controlled environment** - such as a computer lab or office - or are they to be taken "from home" without supervision?
7. Is this a **timed** exam?
8. Where would **payment and scheduling** taking place (if any)? As part of the exam application or on a separate CRM/database?
9. Would there be a **Proctor** involved?
10. If there is a Proctor:
 - a. would a "**Proctor validation process**" be part of the exam application? (as opposed to the Proctor only validating the identity of the examinee on site and not interacting in any way with the exam application itself)
 - b. if there is a validation process, would a certain Proctor be associated directly with each examinee/exam instance, or would they act as "Gatekeepers" where any Proctor can invigilate any exam instance at any time?
11. If there is a Proctor validation process:
 - a. where are the **Proctor accounts/credentials/information** created and stored? (The exam application or the CRM side?)
 - b. if the exam application is interacting with a **CRM**, at what point is the validation of the exam by the Proctor done ...
 - i. on the CRM and **before** the application. (i.e. the Proctor does not interact with the application at all)
 - ii. within the application and **after** being passed from the CRM.
12. What are the protocols for a "**crashed test**"? This is the set of rules and procedures that govern what occurs when an examinee becomes disconnected from the exam for any length of time, and then needs to be restarted either part way through or from the beginning. (Reverting to paper is also an option.)

The Questions (aka The Items):

13. Have the items been (or can they be) constructed in such a way that they can **stand alone** without referring to any of the other items? This is particularly important to consider when converting items previously on paper to online use, where items are generally in random order and can only be seen one at a time.
14. Can all items be presented in such a way as to conform to an **A to E response style**, or are other response styles required such as text? (The actual number of responses can be made flexible regardless and could be A to D, or A to F.)
15. Do the items require **diagrams or pictures**?

The Exam Structure:

16. How many **exams types** would there be in the application? (ex. Physics and Chemistry = 2 types of exam)
17. Are items pulled from a larger **pool of items**? (ex. the exam might be created by picking 60 items from a pool of 200.)
18. Would there be **subtests** (ex. kinesiology, ethics, ...), all within the same exam that need to be treated and selected from individually? (i.e. pick 10 of these, 20 of those ...)
19. Would **exam items be randomized**? (This is a given if the items are picked from a larger item pool.)

20. Would **exam responses be randomized**? (We generally suggest not for reasons of exam validity.)
21. Should the "**difficulty**" of the items be considered or controlled when creating an exam instance? (i.e. should all instances of the exam fall within a given range of "difficulty".)
22. If controlling for "difficulty", and if there are subtests, should the "**difficulty**" **within subtests** be considered or controlled?
23. Would "**candidate items**" be part of the structure? These are items that are added to the exams but are not marked, and are used for the purpose of determining a question's performance before release into the "real" item pool.
24. Should all items be **displayed** on one large page, or should each item be shown alone with navigation buttons to move between them?

Exam Performance and Measurement:

25. Is **ongoing question performance and item analysis** required - either by us or as part of the exam application - to measure the behaviour of the items and the exam over time? This would be for the purpose of separating the "good" items from the "bad" and assessing overall exam performance.

Other Items

26. What would be the **timeline** for the project in regard to launch - keeping in mind the time needed for testing, corrections and edits.
27. Would there be the need for **multiple language** versions of the exams? If so would these be run together (two or more languages shown at the same time on the same page) or as separate exams?

A Hypothetical Online Exam

To help provide a more holistic view of the process, the following is the set of criteria and the layout of a hypothetical exam to show how the process might flow, and to provide a realistic framework within which the above choices are made.

The Details

Servers/Hosting/Compatibility:

1. As this is a proctored exam, where a paid proctor must be present during the entire exam (with associated costs), server down-time needs to be minimal. However the Examiner understands that this may still occur from time to time due to issues outside of anyone's control, and we will therefore work together as time goes on to develop and adjust additional "crashed test" processes and procedures to deal with these occurrences.
2. While the exam application will initially be created and hosted on servers owned by Verita, the exam may at some point be moved to an internal server if desired (and compatible). Work on this is not included in this proposal.
3. As per industry norms, we will create the application in such a way as to be compatible at launch with the current plus one-previous versions of the most common browsers - these being Firefox, Internet Explorer, Safari, and Chrome - and are not responsible for any issues caused by incompatibility with older browsers. We will however warn the examinee in regard to their use of older browsers within the application and in the instructions.
4. We are not considering mobile or tablet platform compatibility as this would conflict to some extent with the concept of a proctored exam. (Though due to the above the site will by coincidence run on most tablets.)

Exam Creation Process:

5. There will initially be four exam types, built from eight subtests. Further, the application will be designed in such a way so as to allow for any number of exam types to be created from items and subtests that may be added in the future.
6. Each instance of an exam will be created "randomly" out of a larger list of items within each subtest (the Item Bank).
7. The "difficulty" of each randomized exam will be determined by calculating an average difficulty across all selected questions, ensuring that this average falls within a range of 80 +/- 5%. Difficulty within each subtest will not be calculated.
8. Though exam items will be randomized, item responses will not.
9. While multiple languages can easily be included within future exam items (one following the other), here are currently no plans to create separate and distinct alternate-language-related versions of the exam.
10. The Examiner is responsible for creating and vetting the exam items, however Verita will export the item datasets as needed so that item analysis can be performed. (Online tools could be developed in the future to assist in determining how these items are performing if required.)

Examination Process/Protocols:

1. Payment is made on the Examiner's CRM, and it is assumed that once an Administrator creates an exam in the application it has been paid for.
2. Once created, an open exam record is only valid for 60 days before it "expires" and the exam for this record cannot be taken.
3. Exam "instances" are overseen by an Invigilator /Proctor who validates/enables each exam instance by entering a code provided to them by the Examiner. These codes are created and entered into the exam application through the Administrator Page by the Examiner.
4. Entry of the Proctor code allows the Examinee access to the next page and prompts them for their sign in information, which in turn begins the examination process.
5. Exam results are reported to both the Examinee and the Examiner through emails sent at the completion of an exam. (There is no interaction with a CRM.)
6. All exams are "timed" exams, and the Examinee will receive a warning (at 5 minutes to go), and then on timeout the exam will end with results emailed as above.
7. Once an Examinee has viewed an exam by clicking "Start the Exam", it will be considered to have been an attempt at the examination, and the examination will be considered written and assigned a grade (if any).
8. If an exam "crashes", there is a 4-hour time limit after which the application will not allow a restart.
9. Invigilator/Proctor sign-in accounts are valid for any exam at any time - there is no direct link between a proctor and an exam instance. (i.e. Proctor accounts are "Gatekeeper" accounts.)
10. Verita will maintain a historical database of past exams and results, along with some personal information supplied by the Examiner (currently Name and Email).

Exam Administration Pages:

11. Administrator Pages (with sign in) will be created to allow the Examiner staff to:
 - a. Create Proctor accounts (ID and password).
 - b. Create/enable Examinee accounts (one per exam instance with ID/password).
 - c. Review historical exam results.

Other:

12. Administration tools for the creation and maintenance of exam items are not included here, but may be added in the future.

Overview of the Process

Setting up an Exam:

1. An examinee indicates to the Examiner that they wish to take an exam, and provide details on their choice of exam and proctor and make payment. (This all occurs outside of the Exam Application environment.)
2. Once payment is confirmed, a record for that examinee is created by the Examiner within the Exam Application through the Exam Administrator Pages.
3. If the proctor chosen by the Examinee is accepted but not on record, the Examiner sets up a Proctor account (name, ID and password) for them through the Exam Administrator Pages.

Taking an exam:

4. The Examinee and Proctor sit down at a computer in a secure environment , open up the Exam Site and:
 - a. are greeted with a page containing information on how to proceed and everything they will need to know before they begin.
 - b. at the bottom of the page is a "Sign in" button which they press to begin.
 - c. they are shown a "Proctor Sign In" screen where the Proctor enters in their ID and password.
 - d. if the account information is valid, they are passed on to the "Examinee Sign In" screen, where the Examinee enters their own ID and password. (Note that the Examinee's account is linked directly to the details of the exam in regard to who they are and the type of exam they are taking.)
 - e. they are shown a "Before you Start the Exam" screen where they are presented with a number of items with checkboxes that acknowledge who they are, that the proctor is there, that cheating is punishable by (etc.), along with an "I accept these terms" button.
 - f. on checking off all boxes and clicking "I accept these terms", they are shown a "Start the exam" button along with text indicating that on clicking this button the timed exam will begin.
 - g. The examinee clicks the button, an exam instance is created of the appropriate type, and they begin the exam.
5. During the exam they are shown:
 - a. each item on a separate page with navigation tools "Next", "Back" or "Jump to ..." .
 - b. a countdown with the minutes remaining.
 - c. a popup warning at 5 minutes remaining.
6. There are three ways for the exam to end:
 - a. they click "I'm finished", are shown a list of unanswered questions (if any), and either go back to finish the questions (if any) or click "Yes I'm Finished" which takes them to a "Thank you" page with confirmation that the exam has concluded successfully.
 - b. they "time out", and are sent to the same "Thank you" page as above with an additional note that the exam timed out.
 - c. the exam crashes due to:
 - i. the browser closing or crashing
 - ii. the computer crashing
 - iii. the connection to the internet going down
 - iv. other reasons (Acts of God)
7. If the exam does not crash, the process is over and the personal information and results are emailed to the Examinee and the Examiner staff. Results are not displayed to the examinee on the site beyond the "Thank you" page as above.
8. If the exam crashes, the "crashed test" protocol kicks in as follows:
 - a. the Examinee and Proctor can try for up to 4 hours (based on exam "start time") to re-enter the exam by following most or all of the steps in #4 above. If successful the exam is restored to the condition just before the crash with the same time remaining and items answered.
 - b. if unsuccessfully restarted during this 4-hour period, the exam is considered aborted, an email is sent to the Examiner with all details, and the Examinee is required to reregister with the Examiner.
9. (End of Process.)

Glossary of Terms:

Administrator Site (Administrator Pages): The pages accessed only by the Examiner that administer exam instances and Examinee accounts, set up Proctors (if any), view results and possibly edit and manage items - all within the exam application.

CRM: "Contact Relationship Manager", also referred to as a "Contact Database" or just "the Database", and where membership information is kept and retrieved. This is usually not part of the exam application, but may interact with it.

Exam Application (The Application, The App): Everything of a technical nature, developed by Verita and hosted on a server, that allows the administration and delivery of an online exam.

Exam Site (Pages): The pages that allow the examinee to run an exam. (The exam itself sits here.)

Exam Type: A stand-alone exam with unique questions - ex. Physics vs. Chemistry.

Examinee (Candidate): A person taking an exam.

Examinee Code/Account: The details that the examinee provides within the Exam Application in order to take an exam.

Instance (an Instance, an Exam Instance): One exam taken at one time by one examinee.

Invigilator/Proctor: A person vetted by the Examiner who will administer and proctor an exam instance.

Item (Question): All the parts of one "question"; including the question itself (the "stem"), the set of answers (the "options"), the correct answer, the sub-test (if any), and any other information that is required to display, grade, and monitor the question.

Item Bank: The full list of questions (items) that are used to create an exam instance.

Item Developer: A content expert in the subject of the exam who will create and possibly vet items for the Item Bank.

Proctor Code/Account: The details that a Proctor is provided with by the Examiner or the exam application that are required in order to allow an exam to be administered.

Sign Up Pages: The pages that the examinees use to sign up and pay for an exam - may be either within the exam application or on the client's site.

Subtest: A subtopic within an exam with its own unique set of items. (Can be thought of as a smaller exam within the exam.) If subtests are used, every item must be associated with a given Subtest.

Thank you for your Interest!

Thank you again for your interest in having Verita assist in moving your exams online, and of course we are available at any time for questions or further details at info@veritagroup.com.

Wishing you well in the process!

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