

# Nursing Skills Tracker System Test Plan

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# 1 Introduction

## 1.1 Purpose

The purpose of this document is to describe the system test plan for the Nursing Skills Tracker (NST) [System](#) and will specifically cover the testing of functional and non-functional requirements.

## 1.2 Scope

The scope of this document is intended to cover the system tests with regards to functionality, usability, compatibility, business cycles, scalability, performance, and security. These tests are meant to cover the system extensively so that all bugs can be discovered. All tests are conducted in the black box setting. For a black box view please refer to the Architecture Design and Processes Report.

## 1.3 Target Audience

This document is intended for use as a reference by the development team, maintenance team to define which tests are to be run and execute from this.

The End User and Operational owner may optionally use this as a reference to understand what black-box testing has been performed as part of entrance criteria to downstream User Acceptance Testing (UAT) in environments where UAT is performed.

## 1.4 Related documents

These documents contain information related to the information in this document.

Document Short Name Reference	Document Title	Version (Optional)
ArchDoc1	<a href="#">ArchitectureDesignAndProcessReport</a>	20200121
[OperationalDoc2]	To be written	
[Test Results]	MCleroux_E63_A03_Test_Results	

Table 1-1 Related Documents

## 1.5 Glossary

Term/Acronym	Description
CSRF	Cross-Site Request Forgery attack occurs when a form can be submitted from a site that is not the original domain

Table 1-2 Glossary

## **2 Setup and Test environment**

The project will be deployed to CSTest where all tests will be carried out.

### 3 Tests

#### 3.1.1 Functional Tests

Test ID	Purpose	Expected Result
FN01	Ensure student can successfully create an evaluation for a lab skill associated to courses they can evaluate for. All student can evaluate skills for courses in their current semesters or for courses that are in lesser semesters.	<ul style="list-style-type: none"><li>- "Evaluation Saved" message is displayed to student</li><li>- Yellow check mark is displayed next to skill evaluated, unless the teacher has already evaluated as satisfactory, then the skill will have a green check mark</li><li>- Student can now view historical data</li><li>- Student can see satisfactory evaluation and comment left (if any)</li><li>- Teacher who has the specific student in their cohort is notified that on dashboard that students require evaluation</li><li>- When teacher "views all students" the student shows up in the list of students requiring evaluation</li><li>- When teacher "views student details" the lab section is highlighted</li><li>- When teacher expands labs skills, the skill is included in the list of skills requiring evaluations</li><li>- Teacher can view student's evaluation</li></ul>
FN02	Ensure teacher can successfully create an evaluation for a student in their cohort for any lab skill associated to course the student is enrolled in wherein the student has already evaluated the lab skill.	<ul style="list-style-type: none"><li>- "Evaluation Saved" message is displayed to student</li><li>- Green check mark is displayed next to skill evaluated</li><li>- Green thumbs up is displayed next to skill evaluated</li><li>- Green thumbs up is displayed next to associated clinical skill</li><li>- Teacher can see satisfactory evaluation and comment left</li><li>- Student is removed from list of students requiring evaluation</li></ul>

		<ul style="list-style-type: none"><li>- Number of students requiring evaluation is decreased</li><li>- Student is notified they have a new evaluation on their dashboard</li><li>- When student clicks "lab skills" or "new labs skills card" student is taken to lab page and new evaluations are shown prominently</li><li>- When student clicks lab skill</li><li>- Student sees green check mark and thumbs up</li><li>- Student can view teacher's evaluation and comment</li><li>- Student can evaluate associated clinical skill</li><li>- Student sees green thumbs up next to associated clinical skills</li><li>- When student filters skills that skill will no longer show up under "no evaluations" filter</li><li>- When student filters skills that skill will show up under "satisfactory" evaluations</li><li>- Historical data is now visible</li></ul>
FN03	Teacher can evaluate any skill for a student, regardless of enrollment status.	<ul style="list-style-type: none"><li>- If teacher is evaluating a skill a student is not enrolled in, teacher should see student's enrollment status</li><li>- Same results as FN02</li></ul>
FN04	Student can evaluate skill as needs improvement or unsatisfactory.	<ul style="list-style-type: none"><li>- "Evaluation Saved" message is displayed to student</li><li>- Red check mark is displayed next to skill evaluated</li><li>- Student can now view historical data</li><li>- Student can see rating and comment left</li><li>- Teacher who has the specific student in their cohort is notified that on dashboard that students require evaluation</li><li>- When teacher "views all students" the student shows up in the list of students requiring evaluation</li><li>- When teacher "views student details" the lab section is highlighted</li><li>- When teacher expands labs skills,</li></ul>

		<p>the skill is included in the list of skills requiring evaluations</p> <ul style="list-style-type: none"> <li>- Teacher can view student's evaluation</li> <li>- Teacher can view historical data</li> </ul>
FN05	Teacher can evaluate lab skill as needs improvement or unsatisfactory.	<ul style="list-style-type: none"> <li>- "Evaluation Saved" message is displayed to student</li> <li>- Red "X" is displayed next to skill evaluated</li> <li>- Teacher can see satisfactory evaluation and comment left</li> <li>- Student is notified they have a new evaluation on dashboard</li> <li>- When student clicks "lab skills" or "new labs skills card" student is taken to lab page and new evaluations are shown prominently</li> <li>- Student sees red "X"</li> <li>- Student can view teacher's evaluation and comment</li> <li>- Student cannot evaluate associated clinical skill</li> <li>- Historical data is now visible</li> </ul>
FN06	Verify student cannot evaluate lab skill if the skill is associated to a course in a higher semester than their currently enrolled semester unless a teacher has already evaluated the skill.	<ul style="list-style-type: none"> <li>- When there is no teacher evaluation, the student cannot evaluate for a future course</li> <li>- When there is a teacher evaluation (regardless of the evaluation) a student can evaluate the skill as well</li> <li>- If the teacher has evaluated as "unsatisfactory" or "needs improvement" and then the student evaluates the teacher will see that the student requires an evaluation after the student evaluates</li> <li>- If the teacher has evaluated as "satisfactory" and then the student evaluates the teacher will not see that the student requires an evaluation after the student evaluates</li> <li>- Historical data is now visible</li> </ul>
FN07	Ensure student can successfully evaluate clinical skill when corresponding lab skill has been evaluated as satisfactory by teacher.	<ul style="list-style-type: none"> <li>- "Evaluation Saved" message is displayed to student</li> <li>- The clinical skill will have the green "thumbs up" symbol</li> </ul>



		<ul style="list-style-type: none"><li>- The student can successfully save an evaluation</li><li>- Yellow check mark is displayed next to skill evaluated</li><li>- Student can now view historical data</li><li>- Student can see satisfactory evaluation and comment left (if any)</li><li>- Teacher who has the specific student in their cohort is notified that on dashboard that students require evaluation</li><li>- When teacher "views all students" the student shows up in the list of students requiring evaluation</li><li>- When teacher "views student details" the clinical section is highlighted</li><li>- When teacher expands clinical skills, the skill is included in the list of skills requiring evaluations</li><li>- Teacher can view student's evaluation</li><li>- Teacher can view historical data</li></ul>
FN08	Teacher can successfully evaluate clinical skill when corresponding lab skill has been evaluated as satisfactory by a teacher.	<ul style="list-style-type: none"><li>- "Evaluation Saved" message is displayed to student</li><li>- The clinical skill will have the green "thumbs up" symbol</li><li>- Green check mark is displayed next to skill evaluated</li><li>- Teacher can see satisfactory evaluation and comment left</li><li>- If the student has previously evaluated the student removed from list of students requiring evaluation and the number of students requiring evaluation is decreased</li><li>- Student is notified they have a new evaluation on their dashboard</li><li>- When student clicks "clinical skills" or "new clinical skills card" student is taken to clinical page and new evaluations are shown prominently</li><li>- Student sees green check mark and thumbs up</li><li>- Student can view teacher's evaluation and comment</li></ul>

		<ul style="list-style-type: none"> <li>- When student filters skills that skill will no longer show up under "no evaluations" filter</li> <li>- When student filters skills that skill will show up under "satisfactory" evaluations</li> </ul>
FN09	Student can evaluate a clinical skill as "needs improvement" or "unsatisfactory" if the associated lab skill has been evaluated as satisfactory by a teacher.	<ul style="list-style-type: none"> <li>- "Evaluation Saved" message is displayed to student</li> <li>- Red check mark is displayed next to skill evaluated</li> <li>- Student can now view historical data</li> <li>- Student can see rating and comment left</li> <li>- Teacher who has the specific student in their cohort is notified that on dashboard that students require evaluation</li> <li>- When teacher "views all students" the student shows up in the list of students requiring evaluation</li> <li>- When teacher "views student details" the clinical section is highlighted</li> <li>- When teacher expands clinical skills, the skill is included in the list of skills requiring evaluations</li> <li>- Teacher can view student's evaluation</li> <li>- Teacher can view historical data</li> </ul>
FN10	Teacher can evaluate a clinical skill as "needs improvement" or "unsatisfactory" if the associated lab skill has been evaluated as satisfactory by a teacher.	<ul style="list-style-type: none"> <li>- "Evaluation Saved" message is displayed to student</li> <li>- Red "X" is displayed next to skill evaluated</li> <li>- Teacher can see satisfactory evaluation and comment left</li> <li>- Student is notified they have a new evaluation on dashboard</li> <li>- When student clicks "clinical skills" or "new clinical skills card" student is taken to lab page and new evaluations are shown prominently</li> <li>- Student sees red "X"</li> <li>- Student can view teacher's evaluation and comment</li> </ul>
FN11	Student cannot evaluate a clinical skill if the associated lab skill has not been evaluated as satisfactory by a teacher.	<ul style="list-style-type: none"> <li>- There will be no green thumbs up next to the skill</li> <li>- If the student tries to submit an</li> </ul>

		evaluation for a clinical skill which does not have the green thumbs up they will be notified that the associated lab skill has not been evaluated satisfactorily by a teacher
FN12	Teacher cannot evaluate a clinical skill if the associated lab skill has not been evaluated as satisfactory by a teacher.	<ul style="list-style-type: none"><li>- If a teacher tries to submit an evaluation for a clinical skill which does not have the green thumbs up they will be notified that the associated lab skill has not been evaluated satisfactorily by a teacher</li></ul>
FN13	An evaluation cannot be submitted without a rating. Comments are optional.	<ul style="list-style-type: none"><li>- A user cannot submit an evaluation without a skill rating</li><li>- A user will be notified that the evaluation was not saved as they require a rating to submit the evaluation</li><li>- A user can submit an evaluation without a comment</li></ul>
FN14	Student can successfully evaluate clinical skill when corresponding lab skill has been evaluated as satisfactory by a teacher for a future course.	<ul style="list-style-type: none"><li>- There is a thumb up next to the skill</li><li>- The student can evaluate the clinical skill regardless of enrollment status</li><li>- An "Evaluation Saved" message is shown</li><li>- Student can view historical data</li><li>- When student filters the skill is shown under the appropriate filter</li><li>- The associated symbol for the evaluation status is shown</li></ul>
FN15	Verify that coordinator can add a new unit and associate skills to that unit.	<ul style="list-style-type: none"><li>- A coordinator cannot add a unit without a name or number</li><li>- A coordinator cannot add a unit with the same unit number as another currently active unit</li><li>- When the coordinator saves the unit, a "Success" message is shown</li><li>- The unit is shown in the list of available units to edit or delete</li><li>- The unit is shown in the available units to associate to a skill when adding a new skill</li><li>- The unit is shown in the available units to associate to a skill when</li></ul>

		editing a skill
FN16	Verify coordinator can remove a unit and skills can no longer be associated to that unit.	<ul style="list-style-type: none"> <li>- When a coordinator removes a unit that is associated to a skill, that skills unit will be defaulted to the "No Unit" unit</li> <li>- When the unit is deleted the coordinator is shown a "Delete successful" message</li> <li>- The unit is not available under the list of units to delete or edit</li> <li>- The unit is not available to associate to a skill when editing or adding a skill</li> </ul>
FN17	Verify coordinator can add a new skill and that students can now add evaluations for that skill.	<ul style="list-style-type: none"> <li>- Coordinator cannot add a skill without the required fields: skill name, course, unit</li> <li>- Coordinator is shown "success" message when skill is saved</li> <li>- Coordinator can see skill under specified course</li> <li>- Skill count has increased on coordinator dashboard</li> <li>- Student can see skill under the associated course in lab and clinical skills</li> <li>- FN01 – FN14 applies to newly added skills</li> </ul>
FN18	Verify that coordinator can archive a skill and that student can no longer add evaluation for that skill.	<ul style="list-style-type: none"> <li>- Coordinator can remove skill</li> <li>- Coordinator is notified that this will affect the student's ability to evaluate the skill, but it will still show up on portfolios for which students have satisfactory clinical ratings</li> <li>- Skill is added to archived list of skills</li> <li>- Coordinator number of skills is decreased</li> <li>- Student can no longer see skill in list of skills to add evaluations for</li> <li>- If the student has a satisfactory clinical evaluation for said skill, the skill is included in the generated portfolios</li> </ul>
FN19	Verify that coordinator can edit a skill and that students will be able to see the skill changes.	<ul style="list-style-type: none"> <li>- The coordinator is notified that this will affect how the student sees the skill</li> </ul>

		<ul style="list-style-type: none"> <li>- The coordinator will not be able to edit the skill with the required field: name, course, and unit</li> <li>- The coordinator will be shown a "success" message</li> <li>- The student will be able to see the edits</li> </ul>
FN20	Verify that students can generate a portfolio of all their skills that have been evaluated as satisfactory in the clinical setting.	<ul style="list-style-type: none"> <li>- Student can generate portfolio at any time</li> <li>- Only skills that have been evaluated as satisfactory in the clinical setting is included</li> <li>- Skills that have been expired still but the student has a clinical satisfactory evaluation still shows up in the portfolio</li> </ul>
FN21	Verify that coordinator can generate a portfolio of all current and past students that have been evaluated as satisfactory in the clinical setting.	<ul style="list-style-type: none"> <li>- Coordinator can search a list of all current and past students wherein the student has satisfactory clinical evaluations</li> <li>- Coordinator can generate a portfolio for any current or past student wherein they have a satisfactory clinical evaluation</li> <li>- Only skills that have been evaluated as satisfactory in the clinical setting is included</li> <li>- It should be obvious to the teacher which students are current and which students are past students</li> <li>- Skills that have been expired still but the student has a clinical satisfactory evaluation still shows up in the portfolio</li> </ul>
FN22	Verify that a coordinator can assign students to a clinical teacher.	<ul style="list-style-type: none"> <li>- Coordinator can successfully assign student to any teacher</li> <li>- Student is added to list of students assigned to this teacher</li> <li>- Student can be added to multiple clinical teachers</li> <li>- Student cannot be added to a single clinical teacher more than once</li> <li>- When teacher signs in they see the student in their list of clinical students</li> <li>- FN02, FN03, FN05, FN08, FN010, FN012, FN013 are applicable to</li> </ul>

		this test case
FN23	Verify that a coordinator can unassign students to a clinical teacher.	<ul style="list-style-type: none"> <li>- Coordinator can successfully remove student for clinical teacher's assigned students</li> <li>- Student is no longer visible in list of students assigned to teacher</li> <li>- Teacher can no longer see student in "clinical students assigned to you"</li> </ul>
FN24	Verify that a coordinator can reactive a skill and that students and teachers can add evaluations for that skill.	<ul style="list-style-type: none"> <li>- A coordinator can reactive a skill that has be archived</li> <li>- Students and teachers will be able to see the reactivated skill in their list of skills to evaluate</li> </ul>

**Table 3-1 Functional Tests****3.1.2 Usability Tests**

<b>Test ID</b>	<b>Purpose</b>	<b>Expected Result</b>
US01	Symbols are intuitive and explanations are easy to find	<ul style="list-style-type: none"> <li>- When symbols are used for actions or to represent something, they can be hovered on to find explanation</li> <li>- All symbols are included in legends that describe what the symbol mean</li> </ul>
US02	Required fields for forms are obvious	<ul style="list-style-type: none"> <li>- When fields are required it is obvious to the user</li> <li>- User should no before submitting the field what the requirements are for being able to submit the form</li> </ul>
US03	It is clear when and when not a student/teacher cannot evaluate a skill and user is shown why they can or cannot evaluate a skill	<ul style="list-style-type: none"> <li>- User should know before submitting the evaluation what is required to submit the evaluation</li> <li>- Enrollment status should be clear to student/teacher</li> <li>- Message should be shown to user when they try to submit an invalid evaluation</li> </ul>

US04	Navigation is intuitive and has a logical flow	<ul style="list-style-type: none"><li>- Navigation should be intuitive flow based on how often the option will be used</li><li>- Navigation should be in logical order depending on the order that the pages will be visited</li></ul>
US05	When user can interact with feature is it is obvious to the user	<ul style="list-style-type: none"><li>- Whenever a user hovers on desktop the pointer will change so that is obvious it is clickable</li></ul>

**Table 3-2 Usability Tests**

### 3.1.3 Business Cycle Tests

Test ID	Purpose	Expected Result
BC01	Student can still access application in the summer	<ul style="list-style-type: none"><li>- Students can log into the application in the summer</li><li>- Student can evaluate skills when they are not enrolled in any courses</li><li>- Student's semester will be calculated on the highest completed semester</li><li>- If student has not completed any courses but is an active student, they will be assigned semester 1</li></ul>
BC02	Students are shown when they have not evaluated a skill in 6 months	<ul style="list-style-type: none"><li>- When student has not evaluated a skill in 6 months a symbol appears showing the student that is hasn't been evaluated by the student for 6 months</li></ul>
BC03	Teachers courses and cohort changes every semester	<ul style="list-style-type: none"><li>- When the semester changes the teacher's courses and students change according to the data available in Clara</li><li>- Clinical students will persist even after the semester changes</li><li>- Teacher's graphs will change to reflect their current cohort</li></ul>

BC04	Students semester is changed to reflect the highest semester course they are currently enrolled in or course they have completed	<ul style="list-style-type: none"><li>- When a student visits a skills page, they are shown the tab of their current semester</li><li>- Student semester is calculated based of their currently highest enrolled or completed course</li></ul>
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**Table 3-3 Business Cycle Tests**



## 4 Non-Functional Tests

### 4.1.1 Scale Tests

All functional and usability tests are performed under the following scale constraints:

Constraint	Constraint Description	Size/Amount
1	The maximum number of students that are generally enrolled in the nursing program at once	120
2	The maximum number of teachers that are generally teaching in the nursing program at one	15
3	The maximum number of skills the portfolio can be generated with due to license constraints – therefore the maximum number of skills a student should be able to finish is 150.	150

**Table 4-1 Scale Constraints**

Cross reference to other tests. Which tests are done under the full scale conditions.

### 4.1.2 Performance Tests

Performance tests are all run at maximum scale identified in Section 4.1.1

For any metric-based results, the observed metric is captured so that it is understood how close we are to the failure threshold.

Test ID	Purpose	Expected Result	Observed Result
1	Ensure that each page is rendered in the course standard time	Each page is rendered in no more than 2 seconds	Failed, some page take up to 20 seconds to load. Main culprits: <ul style="list-style-type: none"> <li>- View students page as teacher/coordinator</li> <li>- View student details page as teacher/coordinator</li> <li>- Saving evaluation</li> </ul>
2	Login time meets department standards	Login should take no more than 2 seconds	Passed

3	Graphs are rendered in acceptable time	Graph loading does not affect other components of the pages they are present on. Graphs load in no more than 5 seconds.	- Graphs can take up to 30 seconds to load
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**Table 4-2 Performance Criteria**

### 4.1.3 Security Tests

Test ID	Purpose	Expected Result
SE01	No page that requires authentication can be accessed	- No actor can access any page that requires authentication without first being authenticated
SE02	Each page that is role specific can only be accessed by those roles	- Students can only access pages where in they have permissions - Teachers can only access pages where in they have permissions - Coordinators can only access pages where in they have permissions
SE03	Verify inputs are not susceptible to SQL injection	- No input allows for inject SQL to successfully execute
SE04	Verify stored values that are input by users which are viewed by other users are not susceptible to cross-site scripting	- No rendered input allows for scripts to be executed
SE05	Ensure that users cannot be logged in without their consent.	- When users log out ensure they can not be logged back in when the back button is pressed
SE06	Verify session times out after 15 minutes.	- User is no longer logged in - User's account cannot be accessed without authenticating - User is notified when session has timed out
SE07	Verify that students cannot save evaluations for other students.	- Ensure a student can not post an evaluation for another student

SE08	Verify that teachers cannot view students that are not in their cohort	- Verify teacher cannot access a student's details that are not in their cohort (clinical or courses)
SE09	Ensure that forms cannot be posted from other sites.	- Verify that all forms are not susceptible to CSRF
SE10	Ensure that forms are not susceptible to buffer overflow.	- Verify that all forms have maximum lengths when inputting to fields

**Table 4-3 Security Tests**

#### **4.1.4 Compatibility Tests**

<b>Test ID</b>	<b>Purpose</b>	<b>Expected Result</b>
CO01	Application is mobile friendly	<ul style="list-style-type: none"><li>- All pages are mobile friendly down to 320px</li><li>- All functionality tests can be completed on mobile with ease</li></ul>
CO02	Application works on Firefox, Edge, and Chrome	<ul style="list-style-type: none"><li>- All pages and functionality behave as expected on Firefox, Edge, and Chrome</li></ul>
CO03	Application is usable on any version of Safari greater than version 10	<ul style="list-style-type: none"><li>- CSS differences from Firefox, Edge, and Chrome allowed</li><li>- All pages are still usable and functional as expected</li></ul>

**Table 3-4 Compatibility Tests**

## **5 Conclusion**

### **5.1.1 Test Results and Analysis**

#### **5.1.1.1 Functional Tests**

Four defects were found in 24 tests. Most of the defects were minor and easy fixes.

#### **5.1.1.2 Usability Tests**

11 defects were found in five tests. The application is missing some usability features, especially for the coordinator. As well, many symbols were lacking the ability to find out what the symbols stood for.

#### **5.1.1.3 Security Tests**

Five defects were found in ten tests. These were major defects, such as being able to “hack” evaluations and submit evaluations that should not be able to be submitted.

#### **5.1.1.4 Business Cycle Tests**

Many of the business cycle tests could not be run due to the limitations of the test data. One test is unable to be run due to the time frame and not being able to test the semester switching.

#### **5.1.1.5 Scalability Tests**

One defect was found in the three scalability tests. This is a serious defect because it affects a major feature of the application. Discussion with the client is necessary to remediate and to ensure the limitation of 140 skills is acceptable.

#### **5.1.1.6 Performance Tests**

The application has serious performance issues that are of the utmost priority to resolve.

#### **5.1.1.7 Conclusion**

Many of the defects are minor in nature. However, there a few major defects that must be resolved to move into production and to be considered a serious candidate such as the performance and security defects.

## Approvals

This document has been read and approved by the following people, responsible for its implementation. Approval is indicated by an email showing approval. Those approving below indicate that the contents of this document are correct and complete and agree to their implementation:

Title	Name	Approval

**History**

Version	Status	Date	Author	Reason for changes