Speech Recognition Project Plan

Post-Implementation Evaluation

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POST IMPLEMENTATION EVALUATION

1 INTRODUCTION

1.1 Project Identification

Provide the identifying information associated with the project, including the applicable project control code, system acronym, and system title.

The Speech Recognition (NLP/ML) system allows physicians to use their voice to document into the EHR at the bedside to alleviate the manual, time consuming, and error-prone documentation process in place currently. The solution will automate and transform the current documentation process to the NLP/ML-enabled process following the best practices to facilitate user adoption.

1.2 System Proponent

Provide the name of the System Proponent.

Physician documentation (Nuance Communications)

1.3 History of the System

Briefly describe the system's history and predecessor, if any. State the mission needs and information requirements, including how the system is expected to help users.

System of physician documentation has moved from paper based, Dictation driven services to Electronic based.

The system is now ready to enhance the physician and patient experience by adding voice recognition to the physician documentation workflow.

Functional System Description and Data Usage

Briefly describe what the system does functionally and how the data are used by the system.

The system uses NLP/ML processes to enable voice recognition during the physician documentation workflow. The system captures keywords and turns them into key diagnosis and billing codes.

Goals

- **Utilize NLP/ML solution to improve accuracy, speed of clinical documentation**

- **Increase reimbursement by more accurate coding and billing practices**
- **Improve patient satisfaction by increasing the amount of time providers can spend with the patient**
- **Improve clinician workflow by reducing time spent documenting**

2 EVALUATION SUMMARY

The purpose of this section is to provide a summary of the overall adequacy and acceptance of the system.

Nuance Communications is a trusted system in the automatic speech and voice recognition industry based on NLP/ML algorithms. It is widely accepted by clinicians, and improves accuracy and speed of clinical documentation. This leads to increased patient satisfaction by increasing the amount of time that a provider can spend time with a patient.

2.1 General Satisfaction with the System

Describe the users' experience with the implemented system. Comments should address the following:

- The level of user satisfaction
- The strengths of the system, including specific areas of success
- Any problems
- Frequently used features
- Infrequently used features
- Features not used at all
- Suggested improvements

The physician user is very satisfied with the mobile device and ease of use of the system. The user interface is easy to use and the voice recognition picks up words correctly the majority of the time for all users. Strengths include increased time in documentation, most physicians are able to leave on time since implementation of the technology. Some problems include some users' words are not translated correctly. The most frequently used feature is to automatically fill a review of systems with two word phrase. Not all suggested features have been utilized yet but will plan to be in future phases of deployment. Suggested improvements to increase clinic overall WiFi bandwidth and coverage to ensure good mobile technology experience.

2.2 Current Cost-Benefit Justification

Assess if the system is paying for itself Base the assessment on the anticipated benefits and costs projected during the System Concept Development phase and revised during the subsequent phases of the systems development life cycle. This section is intended merely to review the costs and benefits and to provide details of costs and benefits in other sections. Comments should address the following:

· The extent of the benefits and if they are reported to be less or greater than those projected in the development analysis and functional requirements report
· If any difference is permanent or will change over time
· If the system is or will be cost-justifiable.

The system is necessary as the healthcare organization scales and increases patient population. It reduces the time it takes for clinical documentation. By increasing patient satisfaction there are better survey results which will ensure proper medicare/medicaid reimbursement rates. This system also increases reimbursement through more accurate coding and billing practices.

2.3 Needed Changes or Enhancements

Gauge the magnitude of effort needed to change or improve the system. Describe the nature and priority of the suggested changes~ more detail will be provided in other sections. Comments should address the following:

· **The suggested changes include increasing the clinics WiFi network strength and coverage. This will ensure a good mobile technology experience in the future.**
· **The scope of the changes will include adding 6 access points to the clinics existing WiFi infrastructure.**
· **The resource requirements to effect the changes will require temporary resources to install access points and test the network strength. Cost will be ~$1000.00 over 1 week.**

3 ANALYSIS AND IMPLEMENTATION

The purpose of this section is to gauge the completeness of the functional requirements and implementation according to the study.

The project implementation was carefully planned out and included four phases spanned over 6 months.

Phase 1 - Project Initiation (Month 1)

- **An outline of the project's purpose, expected goals and key deliverables, benefits, risks, and costs estimation, key personnel was identified, justification for the speech recognition system was given and key constraints were identified.**

Phase 2 - Project Planning (Months 2-4)

- **Project activities, budget, success metrics, progress indicators were defined, project timeline was developed, project team responsibilities were identified, and regulatory requirements were defined.**

Phase 3 - Project Execution (Month 5)

- **The work on the system's design, building, and testing was completed and the speech recognition system was implemented.**

Phase 4 - Project Closure (Month 6)

- **The project Create closure report with outcomes and deliverables were listed, lessons learned were documented and future recommendations given.**

Each phase of the project was successfully completed and implemented on time.

3.1 Purpose and Objectives

Evaluate the adequacy of the original definition of purpose and objectives presented in the functional requirements document and if the objectives were achieved during implementation. Evaluate if any objectives have changed or should have changed.

Success Metrics

The project will be considered successful if all the following factors are met:

1. > 95% utilization of documentation tool
2. > 75% reduction in transcription costs within 6 months
3. > 40% improved accuracy of clinical documentation
4. > 75% end-users satisfaction improved

Comments should address the following:

- Extent to which goals were met

  Successful completion of utilization and reduction in transcription. Areas where goals have not yet been achieved include increasing 40% improved accuracy of clinical documentation, this goal is only at 30%. Also, only 60% of end users are satisfied with the new workflow which does not meet 75% goal.
- The level of the objective definition

  There are three levels of objectives: tactical (milestones), operational, and strategic.
- Extent to which objectives were met

  We achieved all our tactical and operational objectives. We will continue to track our outcomes as they relate to strategic goals.
- Possible changes to the objectives

3.2 Scope

Analyze if proper limits were established in the design of the implementation within your project plan and if they were maintained during implementation. Comments should address the following:

- Variations from the scope definition as agreed to in the concept development
- The extent to which the scope was followed
- Any possible future changes to the scope

Scope was followed per our project plan. Some delay was experienced due to a software defect that needed to be fixed and WiFi issues that required troubleshooting. This did not impact the overall project timeline but did place it off track for the majority of the project. Future changes to scope would include more time for technical troubleshooting and end user training.

3.3 Benefits

Analyze if the benefits anticipated by implementing the new HER system are met and if they are not met how did they miss the metric for measuring success. Detail all benefits, quantifiable or non-quantifiable, and any quantifiable resources associated with each. Comments should address the following:

- The adequacy of the benefit definition
- The level and types of benefits of the EHR system realized
- The anticipated benefits that can be realized
- The reason for the variance between planned and realized benefits

The goals and benefits of the project include:

- Utilize NLP/ML solution to improve accuracy, speed of clinical documentation
    - Benefit: While overall speed improved, accuracy was not achieved for all users.
- Increase reimbursement by more accurate coding and billing practices
    - Benefit: Increased reimbursement was achieved by more accurate coding within the documentation.
- Improve patient satisfaction by increasing the amount of time providers can spend with the patient
    - Benefit: Too soon to tell by survey's if patients are more satisfied with their experience. Surveys to patients are sent by the clinic 4 times per year.
- Improve clinician workflow by reducing time spent documenting
    - Clinicians found benefits in voice recognition workflow. Some have more adoption than others due to technology comfort.

3.4 Project Cost

Total Cost:
$50,000

Phase	Description	Timeline	Budget
Phase 1 – Project Initiation	● Create an outline of the project's purpose, expected goals and key deliverables, benefits, risks, and costs estimation ● Provide justification for the Speech Recognition system ● List key personnel ● Identify key constraints, risks, and assumptions with level of impact on the project	**Month 1**	**$10,000**
Phase 2 – Project Planning	● Define detailed project activities, budget, success metrics, progress indicators ● Develop a project timeline (create WEB (Work Breakdown Structure) and Gantt Chart) ● List project's team responsibilities ● Define regulatory requirements ● Project's requirements approval	**Month 2-4**	**$25,000**
Phase 3 – Project Execution	● Speech Recognition system implementation (system's designing, building, and testing) ● Continuously measure the project's progress ● Monitor changes and conformance to the project's plan and requirements	**Month 5**	**$10,000**
Phase 4 – Project Closure	● Create project's closure report with outcomes and deliverables ● Document lessons learned ● Provide future recommendations	**Month 6**	**$5,000**

TOTAL			**$50,000**

Overall accuracy of budget was within $3,500.00.

The project went over budget due to damaged iPad device that needed replacement and software ticket fee from Nuance for enhanced support.

- The adequacy of the original and subsequent cost estimates
- The actual costs, by type
- The reasons for any difference between estimated and actual costs

4 OUTPUTS

The purpose of this section is to evaluate the adequacy and usefulness of the outputs from the system. Outputs are defined as the clinical records (data) generated by patient visits and any associated data such as billing , coding, quality reports/data.

The outputs from the Nuance System include clinical documentation in the patient's EHR during a patient visit, billing associated with ICD-10 diagnosis codes and procedure codes are pulled from the output of the voice recognition software. The system is useful in generating the billing and coding based on the provider's voice documentation into the system.

4.1 Usefulness

Measure the extent to which the users feel the EHR systems meet the intended needs. Comments may address identification of the level of need, such as the following:

- Usability
- Absolutely essential (does it effectively replace the paper based system)
- Important and highly desirable
- Interesting - proves what is already known
- Incomplete - does not provide all the necessary information
- Unnecessary- "We need to go back to the paper based system"
- Identification of information/reports needed but not currently generated by the system or unable to be obtained
- Demonstration of the ability to do without the reports
- Alternatives for obtaining the information where improvements can be achieved

The documentation system has an easy to use native iOS interface that allows for voice recognition to be utilized. It is a necessary system for physicians as they are

legally and financially required to document patient encounters. While the documentation system is easy for the physician end users to use, the back end data is fragmented and requires two different reporting systems to have a clear data history report.

4.2 Timeliness

Determine if output production performance meets user needs. Comments should address the availability of clinical records, clinical data, lab reports, imaging data, previous clinical visits, and billing data.

The system produces a document very accessible to the physician and clinic office administrative team. The system does not create a view for the patient and their personal health record. The patient records are only available onsite at the clinic or over VPN.

4.3 Data Quality

Assess the need to provide for effective use of shared data to enhance performance and system interoperability. Comments should address data accuracy and data reliability.

The data is accurate but is disparate in two separate systems. This causes issues with reliability if the interfaces between systems are not in sync.

5 SECURITY

The purpose of this section is to determine if the system provides adequate security of data and programs. A reassessment of HIPPA compliance should be part of the review process In addition to access security, procedures for backup, recovery, and restart should be reviewed.

5.1 Data Protection

Determine if the security, backup, recovery, and restart capabilities adequately safeguard data. Comments should address the following:

- The adequacy of the security, backup, recovery, and restart procedures
- Data and activity meet HIPPA compliance
- If data and clinical activity with the EHR does not meet HIPPA/security compliance indicate what additional steps will be necessary to ensure compliance

Nuance Communications software is HIPAA compliant and HITRUST CSF-certified. It supports the required patients' security and confidentiality guidelines for PHI and PII.

Nuance Communications provides both user and data security by utilizing the following methods:

1. **Automatically log idle users off after 10 minutes of inactivity**
2. **Data collected by the software is automatically encrypted in transit and at rest**
3. **Data integrity controls are used**
4. **Security reminders**

5.2 Disaster Recovery

Determine if appropriate clinical files, programs, and procedures are established to enable recovery from a disaster (unintended down time of EHR) resulting in the potential loss of data or lack of access to stored data. The following are suggested areas of comments:

- Backup and recovery procedures are established
- Staff demonstrate ability to perform down time procedures for all clinical activities
- Ability to access backup data for downtime procedures

Business Associate Agreement (BAA) and Service Level Agreement (SLA) between clinic and Nuance guarantees 99.5% uptime for software availability; active-active backup configurations for Business continuity and disaster recovery (BCDR) plan is established.
Detailed policies and procedures around Business continuity and disaster recovery (BCDR) plan is provided to the users.

5.3 Audit Trails

Review the ability to trace clinical documentation and other online processes transactions through the system. Comments might address the following:

- Who manages the audit trails?
- What data is contained in the audit trails
- When: frequency of audit trails

Internal System administrator manages audit trails and analyzes activity logs by utilizing cloud native reporting and monitoring tools (Azure Monitor, Azure Logs Analytics). The audit trails contain the following information - event logs; user/ device; and date and time of event. The audit trails have to be up-to-date and must be reviewed annually or on as-needed basis. Activity logs must be kept in an encrypted database and/or storage for a minimum of six years as per HIPAA logs retention regulation.

5.4 System Access

Evaluate systems that manage access to HIPPA data. Comments should address the following:

- Policy governing access for the EHR systems
- Assignment of security officer
- Criteria for level of access to EHR systems
- Documenting any access breaches
- Frequency of access review for new, established and terminated employees
- Breach notification plan is created

A combination of access control and technical control methods are used for system access:

- **Proper authentication and authorization controls are in place**
- **Role-based access control (RBAC) with least privilege and need-to-know principles to prevent unauthorised access**

Up-to-date security administrative, physical, and technical standards:

- **Risk management plan**
- **Workforce security measures**
- **Security incident procedures**
- **Security awareness and training**
- **Contingency plan**
- **Data breach response plan**

6 COMPUTER OPERATIONS

The purpose of this section is to ascertain the current level of operational activities. Although the user point of view is primary to the Post-Implementation Review Report, the computer operations view is also important to investigate.

6.1 Control of Workflow

Evaluate the EHR user interface for collecting clinical data for given workflows. Investigate issues related to data gathering at given points in workflow. Comments should address the following:

- Any problems in accomplishing clinical workflow processes

Some problems included the voice recognition not understanding some of the users and certain words. This causes the user to have to manually edit documentation taking time away from the patient.

- The frequency and extent of problems related to clinical data gathering within a workflow

Problems were infrequent and often a result of end user needing to get used to the technology. Some phrases and medical terms were reported to Nuance as issues for certain users and devices.

- Suggested changes from end users

End users would like the system to be more automated. For example, they want voice recognition in the room to record and document everything automatically. They do not want to have to interact with a tablet.

- The effort or barriers required to make changes to the EHR to remediate issues

More technology needs to be applied into easy to use interfaces that are created for clinicians.

6.2 EHR User Interface

Analyze the usability of the system. The transaction throughput and error rate are included in this analysis. Comments should address the following:

- Number of patient visits processed (number of transactions)

100 patient visits

- Number of errors made when carrying out clinical documentation

10 errors

- Frequency of problems with the interface

10%

- Suggested changes from users

Users would like a keyboard for the tablet.

- Effort required to make the changes

Budget for 6 keyboards for tablets.

6.3 Computer systems

Analyze computer issues and problems. Some areas to review are as follows:

- The correct or incorrect use of forms and offline files
- The adequacy of instructions for end-users on use of EHR
- Downtimes via web access through practice
- Downtimes via the EHR company of your systems is web based
- software bugs or glitches as described by end users
- Hardware issues

6.4 Peak Loads

Assess the ability of the system to handle patient volume at peak loads and to resolve backlogs when they occur. Any offloading that could be helpful should be investigated. Comments should address the following:

- The level of user satisfaction
- The adequacy of the response time (for online systems)
- The effect of delays on online and/or batch systems
- Suggested changes
- The effort required to make the changes

Not Applicable, low latency due to use of local area networks.

7 MAINTENANCE ACTIVITIES

The purpose of this section is to evaluate maintenance activity involving the EHR system software and all hardware components.

7.1 Activity Summary

Provide a summary of maintenance activity to date. Provide type, number of actions, and scope of changes required. Estimate a projected maintenance workload based on the findings of the review. Discuss the adequacy of maintenance efforts or if major enhancement/revision is required.

To date, the system has been through one application software upgrade and one server update. Annual maintenance for software and security are required.

7.2 System Maintenance

Discuss the system maintenance based on the design, types of changes required, documentation, and knowledge about the system (both user and technical personnel).

Our documentation system is cloud based software where maintenance agreement is 10 days per year and as needed per BAA. Annual maintenance for low peak time periods, software upgrade is scheduled. OS updates are required annually to devices. End user training guides need to be updated with each update to the software where workflow is impacted. Technical documentation is maintained by both clinic administration staff and Nuance software vendors.