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**TCU Computer Science**

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**Instructional Equity Observing Tool  
Software Requirements Specification**

**Version <1.1>**

Instructional Equity Observing Tool	Version: <1.1>
Software Requirements Specification	Date: <4/25/2023>

## Revision History

Date	Version	Description	Author
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# Software Requirements Specification

## 1. Introduction

### 1.1 The Purpose of the Instructional Equity Observing Tool

The Instructional Equity Observing Tool is for teachers who wish to have a digital analysis of their instructional time, in order to better improve their instructional equity and student engagement. This system will replace a costly and time-consuming method of manual analysis of teaching videos with a simple and straightforward system for automated digital analysis. This system was originally designed for the TCU Education Department.

### 1.2 The Purpose of this Document

The purpose of this document is to describe the functional and nonfunctional requirements for software release 1.0 of the **Instructional Equity Observing Tool (IEOT)**. Its role is to describe the problem to be solved, not the solution: what the system must do, not how. This document is intended to be used by the members of the project team who will implement and verify the correct functioning of the system. Unless otherwise noted, all requirements specified here are committed for release 1.0.

### 1.3 Document Conventions

**There are currently no customized notation utilized for any sort of document convention. (Note: Add future conventions if any are utilized).**

### 1.4 Product Scope

The IEOT will allow for users to upload video/audio files of their own or other teacher's instructional time and request analysis of the uploaded file, as well as saving the resulting analysis. A detailed description is available in the IEOT Vision and Scope Document [[Section 4](#)].

### 1.5 Definitions, Acronyms, and Abbreviations

A glossary of terms for the IEOT system is found in the [IEOT Glossary Document](#).

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## 1.6 References

1. Instructional Equity Observing Tool Glossary [[Google Drive](#)]
2. Instructional Equity Observing Tool Vision and Scope Document [[Google Drive](#)]
3. Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]
4. Instructional Equity Observing Tool User Interface Wireframe [Figma]

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## 2. Overall Description

### 2.1 Product Perspective

Reference the [IEOT Vision Document](#) for the Product Perspective/Context Diagram [Section 4].

### 2.2 User Classes and Characteristics

User class	Description
Teacher/Instructional Equity Analyst	Main user class for uploading files of instructional teaching. Will request analysis of files and utilize general account creation of user profile. Will save outputted analysis files. Will only be able to see analysis tied to their own account.
Administrator	Manages database of user profiles and analysis files. Will be able to see analysis files of all users.

### 2.3 Operating Environment

OE-1: The IEOT shall operate correctly with the following web browsers: Google Chrome (all versions), Firefox, all versions of Apple Safari, and Internet Explorer versions 7, 8, and 9.

OE-2: The IEOT shall permit user access from the corporate intranet; from a VPN Internet connection; and by Android and iOS smartphones and tablets.

OE-3: The IEOT shall operate on a server hosted utilizing Amazon Web Services.

### 2.4 Design and Implementation Constraints

Note: There are no client-specified design and implementation constraints for the IEOT, all design decisions are unconstrained.

### 2.5 Assumptions and Dependencies

AS-1: AssemblyAI will be available for use at all hours of each day that the IEOT requires.

AS-1: The third-party Brain.js model will be available for use at all hours of each day that the IEOT requires.

DE-1: The operation of the IEOT depends on the third-party AssemblyAI model being available for the future to fulfill API requests.

DE-2: The operation of the IEOT depends on the third-party Natural Language Processing Brain.js model being available for the future to fulfill API requests.

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### 3. Specific Requirements

**3.1 UC-1 - Customer uploads a video file** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.2 UC-2 - Customer requests an analysis**

- 3.2.1 The System shall receive the file from the User.
- 3.2.2 The System shall transcribe the file from speech to text.
- 3.2.3 The System shall use the transcription to do speaker diarization.
- 3.2.4 The System shall use the transcription to find the questions asked by the teacher.
- 3.2.5 The System shall take the questions and put the questions through a Natural Language Processing System.
- 3.2.6 The System shall use the result of NLP analysis to determine the different elements of Bloom's Taxonomy that were used.
- 3.2.7 The System shall generate a report using the metrics/insights that were found.
- 3.2.8 The System shall display the report to the User.
- 3.2.9 The System presents the option to save the report.

**3.3 UC-3 - Customer cancels a requested file analysis** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.4 UC-4 - Customer saves analysis to a file** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.5 UC-5 - Customer deletes analysis report from Account** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.6 UC-6 - Customer saves analysis report to Account** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.7 UC-7 - Customer loads analysis report from Account** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.8 UC-8 - Customer creates an Account** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.9 UC-9 - Customer categorizes a Question** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.10 UC-10 - Customer removes sentence from Question list** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.11 UC-11 - Customer adds a Question from Transcript** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.12 UC-12 - Customer logs into Account** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.13 UC-13 - Customer re-labels speaker of a sentence in transcript** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.14 UC-14 - Customer edits the text of a sentence in the transcript** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.15 UC-15 - Customer names an analysis file** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

**3.16 UC-16 - Customer uploads new recording** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

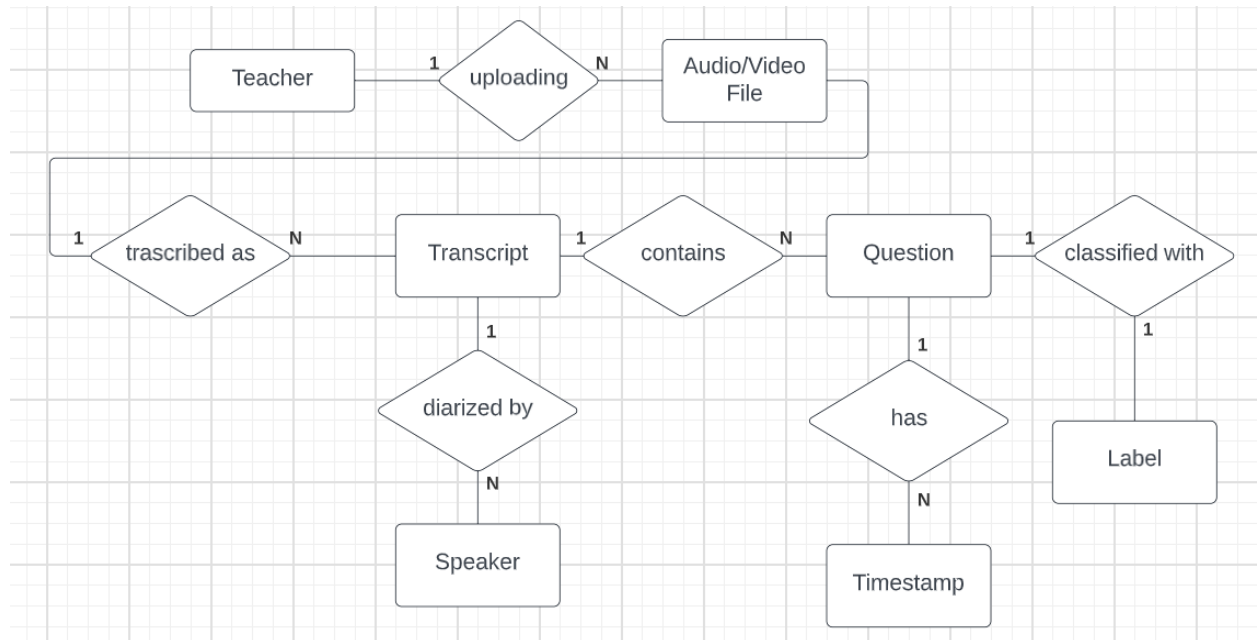


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**3.17 UC-17 - Customer adds a sentence to the transcript** -> Reference Instructional Equity Observing Tool Use Cases and Business Rules [[Google Drive](#)]

## 4. Data Requirements

### 4.1 Logical Data Model



### 4.2 Data Dictionary

Data Element	Description	Composition/Data Type	Length	Values
Report File Name	The name of the report that the user wishes to save to their account	String	n/a	Must be named. Can be named whatever the user wishes.

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### 4.3 Reports

The analysis report shall include the following metrics and insights:

ME - 1: Number of speakers.

ME - 2: Types of questions being asked (Bloom's Taxonomy).

ME - 3: How many questions asked by the teacher.

ME - 4: Distinguish which speaker is the teacher.

ME - 5: % of the video file time that the teacher is speaking.

ME - 6: % of the video file time that the students are speaking.

ME - 7: % of the video file time that is left over.

### 4.4 Data Acquisition, Integrity, Retention, and Disposal

DI-1: The IEOT shall collect analyses from each user who requests an analysis.

DI-2: The IEOT shall retain analyses indefinitely following their creation.

DI-3: Administrators shall have access to stored analyses from all users

DI-4: Users may only view saved analyses created by themselves

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## **5. External Interface Requirements**

### **5.1 User Interfaces**

UI-1: The webpages shall permit complete navigation and file upload by using the mouse alone.

### **5.2 Software Interfaces**

SI-1: AssemblyAI

SI-1.1: The IEOT shall transmit the audio file from classroom sessions to the AssemblyAI API endpoint through an API call.

SI-1.2: AssemblyAI will convert audio to text.

SI-1.3: The IEOT shall receive a text transcription of submitted audio in return from the AssemblyAI API endpoint.

### **5.3 Hardware Interfaces**

HI-1: Mouse

HI-2: Keyboard

### **5.4 Communications Interfaces**

CI - 1: The System shall send a secure email to the User based on the email inputted on the site. This email shall be used in order to verify/authenticate the User and will give a link to access the page to upload their video files.

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## 6. Quality Attributes

### 6.1 Usability

USE-1: The IEOT shall allow a user to retrieve an analysis of their video/audio file with a single interaction.

USE-2: 99% of new users shall be able to successfully request an analysis without errors on their first try.

USE-3: The IEOT shall allow a user to retrieve previous analyses by a secure link sent to their email with a single interaction

USE-4: 99% of new users shall be able to successfully access previous analyses without errors on their first try.

### 6.2 Performance

PER-1: The system shall accommodate a total of 700 users and a maximum of 250 concurrent users during the peak usage time window of 4:00 A.M. to 5:00 P.M. local time, with an estimated average session duration of 10 minutes.

PER-2: 95% of webpages generated by the IEOT shall download completely within 4 seconds from the time the user requests the page over a 20 Mbps or faster Internet connection.

PER-3: The system shall return an analysis on an average of  $\frac{1}{3}$  the duration of the submitted file. If a file is 10min, then it will take about 3min, and so on and so forth.

### 6.3 Security

SEC-1: Users' access to analyses shall be limited to only those requested previously by themselves.

SEC-2: Only authorized administrators will be able to access analyses made by all users of the IEOT.

SEC-3: Users will only be able to access previously requested analyses by a secure link sent to their email address, allowing them to login and access their account page.

SEC-4: All requested analyses will be stored in a secure database only accessible to IEOT administrators

### 6.4 Safety

SAF-1: The requested analysis reports will display simply objective metrics and not directly suggest changes to instruction methods

### 6.5 Availability

AVL-1: The IEOT shall be available at least 99% of the time between 5:00 A.M. and midnight local time and at least 95% of the time between midnight and 5:00 A.M. local time, excluding scheduled maintenance windows.

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## 6.6 Robustness

ROB-1: If the connection between the user and the IEOT is broken, and the analysis was saved to the user account, the user will be able to view their analysis on their account page.

## 6.7 [Others as relevant]

There are currently no other relevant sections to be added in this stage of the document.

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## **7. Internationalization and Localization Requirements**

The IEOT will be accessible and inclusive no matter the origin or current location of the user and their machine, barring countries with government censorship of internet access, in which case it would be out of the scope of the IEOT Team's control.

## **8. Other Requirements**

There are no other requirements to be added to this section.

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## 9. Appendix A:

There are no figures or entries applicable to be included in this appendix.