

# GDD

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### Conestoga CSI 2.0

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### May 25, 2022

## Project Overview & Flow

Almost 2 years ago XpertVR collaborated with Conestoga College to create the Crime Scene simulation. This simulation was an amazing leap forward in police foundations training content: the scenario allowed students to use all of the tools and techniques they would use in the real world to investigate a collision or accident scene.

That being said, one major investigative tool was missing: communication. More specifically the ability to communicate with the victims of the crime, witnesses and other emergency responders, to better understand the scenario and investigate the scene.

XpertVR recently created a Conversation Matrix Tool (CMT). The CMT allows VR users to have decision tree based conversations with avatars in any virtual environment, while still having all of the other required functionality for the simulation.

In this expansion of the existing project, XpertVR will be implementing the use of avatars who can be interviewed.

### Hardware & Platform Considerations

PC and Quest Builds are required.

### Learning Goals & Outcomes

Create a roster of varied avatars to gather information from so students can practice their

communication skills

• Integrate an [unlockable information system](#_efb511cbkk4) so that students can unlock more questions

through investigating the crime or vice versa unlock new clues through the conversations

• Prepare students to follow industry standards in investigating crime scenes, while also having

the communication skills necessary to succeed

## User Flow

Users start in a menu scene. Using the menu in the scene, users can access the options menu or start the simulation. In the options menu, they can change settings like volume and/or pick their dominant hands. To activate the start button, users need to provide a name and an email address in the menu. Pressing the start button on the main menu will start the simulation with a randomly selected scenario from the pool of scenarios.

Users will start the simulation at the entrance of the crime scene. Depending on the scenario being simulated, users will meet a first responder, a witness and/or a victim in the crime scene, and will be able to investigate them by asking them questions about people, objects and other points of interest regarding the incident being investigated. Users will have more points of interest in their inventory as they discover more evidence by not only talking to people but also collecting evidence pieces properly from the crime scene. Users can also take photos of the crime scene.

After dusting, tagging and/or bagging evidence properly, and talking to witnesses, users can end the simulation once they are convinced that they have enough information for their report on the incident.

Ending the simulation will take the user back to the main menu scene. Users will receive a list of collected evidence, fingerprints and photos in the email address they had entered before starting the simulation.

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## Systems

*This version of the simulation is based on a previous version, which comes with 5 systems already built;*

### Dusting

Users will have the tools to properly dust evidence pieces for fingerprints. If a fingerprint is collected correctly, it will show up on the evidence list as an identification report that shows the information about the owner of the fingerprint. If a fingerprint is not collected properly, it will show up on the list as “spoiled”.

### Tagging

Users need to tag each evidence piece in order to be able reference them in their final report on the incident.

### Bagging

Users need to put each evidence piece in the proper bag to preserve it. Preserved evidence will be listed with detail in the email, whereas improperly bagged evidence will appear as “spoiled”.

### Photographing

Users need to take photos of evidence pieces after numbering each, to be able reference them in their final report on the incident.

### Distractions

Users will be subjected to different types of distractors like noise, loud music or flickering room lights during the simulation.

*There are 2 new systems that will be implemented;*

### Interviewing

Users will interview witnesses, victims and/or first responders in order to collect information for their final report. A transcription of each interview will be included in the final email.

For each scenario, witnesses will be available for interviewing. While interviewing witnesses, users will not only be able to ask generic questions for general information, but also ask specific questions on specific evidence pieces or people if they unlock the questions during evidence collection process or during a conversation with other characters in the scenario.

Unlocked questions will appear on a list on the tablet, where users can select their preferred question to ask to the character they are interviewing.

### Unlockable Information System - Question Pool

As users progress in their investigation, new evidence pieces will enable new questions for them. Talking to witnesses, victims and/or first responders will also unlock new questions.

This system uses tags to determine which questions are available. Tags are string-based , single word expressions that represent a specific idea or incident, or a connection between any two entities. Each evidence piece, along with certain dialogue options will add or remove relevant tags. Depending on the tags that are active in the pool, questions will be enabled or disabled in the Conversation Matrix Tool’s Question Pool.

Questions can have more than one tag. Tags of a question are compared to the active tags in the CMT pool by their specific comparison type, that can be one of the three options given below:

1. **All:** Question is enabled if all of its tags are active in the pool.
2. **Any:** Question is enabled if any number of its tags are active in the pool.
3. **None:** Question is enabled if none of its tags are active in the pool.

## Art

Cliffy’s Diner assets from the previous Conestoga Crime Scene will be used for this project. Characters are designed in Ready Player Me.

### Environments

#### Diner

*This is where the investigation takes place. Users will be able to collect unique evidence pieces and interview different people based on which scenario is being simulated.*

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### Scenarios

1. **Breaking and entering with No Victim Present**
   1. Story: The perpetrator broke into the diner after hours through the front door. They broke the glass using their crowbar. Using the same crowbar, the perpetrator broke into the register and safe, and left with all its contents.
   2. Characters:

* Char01 Prep Cook (Witness1)
* Char02 Neighbour (Witness2)
  1. Witness1 Statement: "When I got to the diner this morning, the front door was busted. I didn't notice until around 5:30 because I came in through the back door. When I went to count the money to start the day, that's when I noticed the safe was opened and the register was broken into."
  2. Dispatch Call: “Attention all units, we have reports of a breaking and entering at Cliffy’s diner, witness reported broken windows and missing valuables. Please enter the diner to investigate.”
  3. Evidence:
     1. Spray Painted Cameras
     2. Spray Can (Fingerprints)
     3. Soda can (Fingerprints)
     4. Open Cash Register (Fingerprints)
     5. Open Safe (Fingerprints)
     6. Broken Door (Fingerprints)
     7. Back Door (Fingerprints)
     8. Hair Fibre
     9. Security Camera Spray Painted
     10. Security Footage

**2. Burglary with Assault (Robbery)**

* 1. Story: The perpetrator broke into the diner through the back door shortly after closing time. Robert, The closer forgot to lock the back door when putting out garbage. Robert was closing for the day by cleaning and listening to the jukebox. While cleaning he hears something in the kitchen and goes to investigate. Robert is snuck up on and knocked out by a swift blow to the back of the head with a frying pan. After knocking Robert out, the perpetrator takes the money from the register but is unable to find the safe. Once the perpetrator takes the money, they leave through the back door.
  2. Characters:
* Char03 Diner Closer Robert (Witness1)
  1. Witness1 Statement: "I was closing the store for the night, when I heard a noise in the back room. I went to check it out and BOOM, I fell on the floor and was out cold. When I woke up I noticed that the money in the register was gone, but thankfully they couldn't get in the safe, so I called you guys."
  2. Dispatch Call: “Attention all units, we have reports of an assault at Cliffy’s diner, witness had been knocked unconscious and the perpetrator fled the scene. Please enter the diner to investigate.”
  3. Evidence:
     1. Front Door, Pristine (Fingerprints)
     2. Frying Pan (Blood)
     3. Back Door (Fingerprints)
     4. Blood Drops (Victim)
     5. Spray painted camera
     6. Spray Paint Can (Fingerprints)
     7. Security Footage
     8. Register, Open (Fingerprints)
     9. Safe, Closed (Fingerprints)
     10. Jukebox (Fingerprints)
     11. Hair Fibre (Womans Hair)
     12. Money (Fingerprints)

**3. Accidental Assault (Switchblade Knife)**

* 1. Story: perpetrator showed up late right before close, tried to hold up the worker at cash. Pulled a switchblade knife on the worker, started a tussle, the knife ended up being redirected back to perpetrator, perpetrator does not die.
  2. Characters:
* Char04 The worker who did the accidental stabbing, Kyle (Witness 1)
* Char05 Nancy Rodriguez - Diner Worker(Witness 2)
  1. Witness1 Statement: "He showed up to the store right as we were closing, demanding we open the cash registers. I stood my ground and protected the register. When he pulled the knife on me and attempted to stab me, I grabbed his hand and began to wrestle with the knife, unfortunately, it ended up being redirected back to his chest and he fell down to the floor. I called the police immediately after"
  2. Dispatch Call : “Attention all units, we have a disturbance at Cliffy’s Diner. There have been reports of a stabbing. Please enter the diner to investigate.”
  3. Evidence:
     1. Door Pristine (Fingerprints)
     2. Back Door, not tampered (Fingerprints)
     3. Cash Register, Closed (Fingerprints)
     4. Safe, Closed (F)
     5. Security Camera, clean
     6. Jukebox (F)
     7. Switchblade Knife (both fingerprints on handle, blood)
     8. perpetrator Blood
     9. Worker Blood, Sample 1
     10. Worker Blood, Sample 2
     11. BloodyTissue
     12. Security Footage
     13. Hair Fibre, worker shirt

**4. Accidental Murder (Baseball Bat in the Restaurant, also a gun )**

* 1. Story: perpetrator comes into the store after close, breaking the glass door to get in. The perpetrator uses a gun to intimidate a worker who is closing up. Worker pulls out a baseball bat and hits the perpetrator. Does not kill the perpetrator, the perpetrator then shoots the worker in defence and kills the worker. Body is behind the counter.
  2. Characters:
* Char06 Another worker at the scene at same time (dishpit worker), reported shots fired at their co-worker (Witness 1).
* Char07 Cook (Witness 2)
  1. Witness1 Statement: "I was in the back, cleaning up the last of the dishes for the day, we were almost closed when I heard some arguing and commotion at the front counter, followed up by a scream, and then gunshots."
  2. Dispatch Call: “Attention all units, we have reports of a disturbance at Cliffy’s diner, witness reported a commotion with shots fired. Please enter the diner to investigate.”
  3. Evidence:
     1. Front Door Broken (F)
     2. Back Door, not tampered
     3. Cash Register, Closed (F)
     4. Safe, Closed (F)
     5. Jukebox (F)
     6. Corpse behind counter
     7. Blood Puddle
     8. perpetrator Blood, Sample 1
     9. Victim Blood, Sample 1
     10. Baseball Bat (F,B)
     11. Bullet Casing
     12. Security Footage

**5. Burglary Homicide (Kitchen Knife)**

* 1. Story: Someone broke into the shop in broad daylight during a constitutional holiday. The owner of the shop was in the diner when someone apparently went in through the back door. Owner went into the kitchen to investigate, and got into an altercation with the perpetrator. The perpetrator took a nearby kitchen knife and stabbed the owner.
  2. Characters:
* Char08 Cook (Tuesday morning shift) (Witness1)
* Char09 Worker - new guy (Witness 2)
  1. Witness1 Statement: "Monday was a holiday so I did not come to work that day. On Tuesday morning, I was ready for my shift at the diner. I came through the back door and saw our owner on the floor in the kitchen, covered in blood... There was blood everywhere...[staring on the floor] Then the new worker came in and helped me calm down before we called you.”
  2. Dispatch Call: “Attention all units, we have reports of a deceased victim at Cliffy’s diner, witness reported finding the body upon arrival at work this morning. Please enter the diner to investigate the crime scene.”
  3. Evidence:
     + 1. Back Door, tampered (F)
       2. Front Door, pristine (F)
       3. Cash Register, Open(F)
       4. Money, on floor (F)
       5. Security Cams, clean
       6. Security Footage
       7. Jukebox (F)
       8. Safe, Open (F)
       9. Corpse, stab wounds
       10. Blood Puddle (B)
       11. Kitchen Knife (F,B)
       12. Bloody Tissue (B)
       13. perpetrator Blood, Sample 1
       14. perpetrator Blood, Sample 2
       15. Hair Fibre, Managers Hair, Male Brown Short

**6. Intentional Murder (With a Baseball Bat and Gun)**

* 1. Story: A perpetrator knocks on the front door after the restaurant is closed, the manager opens the door with bat in hand, unaware of who is there. The perpetrator has a pre-existing relationship with the manager and is demanding money. After the argument, the perpetrator pulls a gun out. Manager complies and opens safe in manager room, but then attempts to shove the perpetrator away and causes him to lose his gun. Gunshot is fired but the gun is lost and slides under the desk. The perpetrator takes a bat from the manager and bludgeons him. He takes the money from the safe, then escapes.
  2. Characters:
* Char10 Worker (Witness 1)
* Char11 A bystander who heard shots and saw a person running in the alley (Witness 2).
  1. Witness1 Statement: "I went to work early on Wednesday morning and saw the cash register had been looted. Then I proceeded to the back to see if anything else had been taken, and saw our manager dead on the floor.”
  2. Dispatch Call: “Attention all units, we have reports of a deceased victim at Cliffy’s diner. Witnesses reported coming to work the next morning and finding the body near the manager’s office. Please enter the diner to investigate the crime scene.”
  3. Evidence:
     1. Front Door, pristine (F)
     2. Back Door, not tampered (F)
     3. Cash Register, closed (F)
     4. Security Camera, clean
     5. Jukebox (F)
     6. Security Footage
     7. Safe, open (F)
     8. Money Pile (F)
     9. Baseball Bat (F, B)
     10. Corpse, Bludgeon
     11. Blood Puddle
     12. Gun (F)
     13. Bullet Casings
     14. Bullet Holes
     15. Victime Blood, Sampe 1
     16. perpetrator Blood, Sample 1

**7. Intentional Murder (With a Hunting Knife)**

* 1. Story: The manager is having a late night meeting with someone in one of the customer booths. An altercation breaks out and the manager is stabbed with a hunting knife. The perpetrator leaves out the front door. Manager is dead on the floor in the middle of the dining area. Employee comes in the next day and sees this, then calls the police. After closer inspection, it seems there were two kinds of blood on the knife, but coming from the same DNA, proving it was a family altercation.
  2. Characters
* Char12 Worker 1 (Witness1)
* Char 13 Worker 2 (Witness2)
  1. Witness1 Statement: "I showed up this morning for work and my manager was lying on the floor in a pool of blood. It looks like he was stabbed. The door leading into the dining room was left open, we always locked that door at the end of the night."
  2. Dispatch Call: “Attention all units, we have reports of a deceased victim at Cliffy’s diner, witness reported finding the body upon arrival at work this morning. Please enter the diner to investigate the crime scene.”
  3. Evidence:
     1. Front Door, Pristine (F)
     2. Back Door, not tampered (F)
     3. Jukebox (F)
     4. Security Camera, clean
     5. Security Footage
     6. Cash Register, closed (F)
     7. Safe, closed (F)
     8. Corpse, stabbed
     9. Blood Puddle (B)
     10. Hunting Knife (F,B)
     11. Soda Can (F)
     12. Tissue Ball (B)
     13. Business Card (F)
     14. Cigarette Butts
     15. Hair Fibre, female black hair
     16. Victime Blood, Sample 1
     17. perpetrator Blood, Sample 1

Potential Distractors:

* + 1. Jukebox (Fingerprints)
    2. Lights flickering (Fingerprints)
    3. Tablet Distraction email
    4. By-passer tries to open restaurant door

Dispatch calls: OPP

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### 3D Assets

**Diner (Sourced)**

*Cliffy’s Diner assets from the earlier version of the project will be reused.*

**Characters(Sourced)**

*Ready Player Me API will be used to create NPCs in the project.*

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### Sound Assets

*Existing audio assets will be reused in the new Version of the project. The only new assets are the voice-over recordings of the voice lines of the NPCs in the dialogues.*

#### **Voice Lines**

***[Work in Progress - once interview scripts are written this doc will be updated]***

[Voice Line Document Template](https://docs.google.com/document/d/1eT43jKZv8htuVz0XOvS5iE_5wSv4HDe0DZIFeKb_LiI/edit#)

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### UX/UI Design

The UX/UI design for both *Conestoga Traffic Uplift* and *Conestoga Crime Uplift* will be as similar as possible to ensure a sense of uniformity between all Conestoga policing training simulations. Colour scheme, fonts, button sizes and placement, along with visual, audio, and haptic feedback will all be considered and utilised to create a seamless and fluid feeling UI and menu UX. There will exist a persistent exit simulation button as well as an option to adjust various user settings. Menu systems will ultimately be used to collect player data and for scenario selection as well as persistent simulation termination capabilities.  
Main Menu  
***[Work in Progress - once menus are designed, this section will be updated with images]***

*This section will include a description of what the menu is, as well as a wireframe. The one included is an example of what a wireframe could look like.* [Wireframe Template](https://docs.google.com/presentation/d/1Z46TZMRig354zIdQR_g3p0VGH53dazgCkuKTt4bdosM/edit#slide=id.g10fda171cdd_0_9)

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## Technical Design

The simulation is being developed for both the Android platform, specifically for Meta Quest 2 device; and Windows platform, for PCs.

### Unlockable Information System

*Scripts & Public Variables / Methods*

This system contains a pool of questions that can be enabled or disabled by certain events like collecting a piece of evidence or talking to an NPC. A special node for our in-house Conversation Matrix Tool will be created to enable the display and handling of these questions in the UI.

* *QuestionPool.cs*
  + *Contains and manages questions.*
  + *CSIQuestion[ ] questions*
    - *The array of questions.*
  + *Public void ToggleQuestion(int index, bool state)*
    - *Enables/disables a question at the given index.*
  + *Public string GetQuestion(int index)*
    - *Returns the question text at the given index. Returns empty (““) if the question is disabled.*
  + *Public string[] GetQuestions()*
    - *Returns the questions as a string array. Disabled questions are listed empty (““).*
  + *Struct CSIQuestion*
    - *string questionText*
      * *The text of the question.*
    - *bool isEnabled*
      * *The status of the question.*
* *QuestionPoolNode.cs*
  + *A special node for the in-house Conversation Matrix Graph Tool. This node will display the enabled questions in the question pool via Conversation Matrix Graph Player UI.*
  + *int input*
    - *Previous node.*
  + *int output*
    - *NextNode*

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### Conversation System

*Scripts & Public Variables / Methods*

An in-house tool called Conversation Matrix Graph Tool is used for the conversations. This system handles the dialogues between the user and the NPCs in the simulation. It consists of 2 components; a Conversation Matrix Graph, and a Conversation Matrix Graph Player.

* *Scriptable Object ConversationMatrixGraph.so*
  + *Contains all the text and audio information of a dialogue, along with NPC animations and camera movements. All the information to make a dialogue work is contained in this scriptable object.*
* *ConversationMatrixGraphPlayer.cs*
  + *This component contains a list of dialogues and can start / manipulate / end the dialogues via public methods.*
  + *conversationMatrixGraph[ ] conversations*
    - *An array of dialogues.*
  + *Public void StartConversation(int index)*
    - *Starts the conversation at the index.*
  + *Public void EndConversation()*
    - *Ends current conversation.*
  + *Public void Answer(int index)*
    - *Picks the answer at the index in the list of answers.*
  + *Public void NextNode()*
    - *Moves to the next node in the graph.*

### Email System

*Scripts & Public Variables / Methods*

Existing email system will be modified to include the transcription of the dialogues by the unlockable information system..

* *EmailManager.cs*
  + *Contains all the text information about the simulation. At the end of the simulation, all information is gathered and formatted into a human-readable format, to be sent to the user and the professor.*
  + *string professorEmailAddress*
    - *Email address of the professor.*
  + *string studentEmailAddress*
    - *Email address of the student.*
  + *Public string CreateEmailBody()*
    - *Generates the text of the email body and returns it.*
  + *Public void SendEmail(string emailBody)*
    - *Send the content of the email body as an html email to the professor and the student.*

## Schedule & Deliverables: Conestoga CSI V2

### Asset Creation

*Whitebox creation*

* + *Creating 3D layout*

*Environment assets*

* + *Static objects to fill the scene*

*Interactable objects*

* + *Create assets and displayed information*

### Programming & Technical Art

*Technical Artwork*

* + *Scaling/sizing, Material Optimization, Lighting*

*System creation*

* + *Game Flow, Scene Transitions, Dusting, Blacklight, Locomotion, Navigation, Scenario Randomization, Data Export, Question Pool System*

*UX*

* + *Sound Design, UI, Interactable Objects Information Display*

*Gameplay Optimization*

* + *Build for both PC (Mouse & Keyboard) and Oculus Quest*
  + *Optimization AND cleanup of existing systems*

### Milestones

***We anticipate a project timeline of: 5 months, with a routine check-in every: 2-4 weeks***

Project Start: Confirm all required materials to begin development - 05/25/ 2022

Milestone 1: 3D Environment Delivered - 08/12/2022

Milestone 3: V1 of Simulation delivered - 10/28/29

Milestone 4: Final build delivered - 01/13/2023

## Project Uncertainties and Risks

* Unlockable information system:
  + Consider user flow: collecting evidence can unlock more questions, not vice versa