



STUDENTS AS
CO-CREATORS

A Learning & Teaching Research Collaboration

Gamifying Critical Thinking

Millie Thomson (BA Digital Media Production)

Lara Kleingarn (BA Digital Media Production)

Maritina Keleri (CETI)

Dr Maria Marda (School of Media & Communication)

CASE 2606

Academic Year 2025-26

1. Executive Summary

[CASE 2606](#) is a browser-based narrative investigation game developed to support critical thinking among Foundation Year (FY) students across all UoW schools and based on the *Critical Thinking in a Changing World* module. The player takes the role of a detective investigating the death of a fictional student across five in-game days, gathering clues, interviewing characters, linking evidence on a case board and reaching a verdict. The design deliberately offers a plausible but unsupported revenge explanation alongside the evidence that leads to the correct conclusion, so that arriving at the right answer depends on weighing evidence rather than following the most satisfying story.

A pilot study was run in July 2026 with six (n=6) FY students. Each participant completed a critical-thinking disposition questionnaire before play, played the game in a single session, and then completed the same questionnaire, a short-written transfer scenario and an optional experience questionnaire. The game also generated a structured session log recording clues, links drawn on the case board, characters interviewed and the final verdict.

All six participants (n=6) completed the case and reached the correct conclusion (while two reached in in their second time) (Appendix E; Fig.7). Self-reported critical-thinking disposition rose for every participant, from a group mean of 49.0 to 58.3 out of a possible 72, with individual gains of between 7 and 14 points. The largest gains were made by the participants who began with the lowest scores. Written responses to the transfer scenario showed that half of the participants could identify confounding variables and propose a comparison that would test the causal claim, although the quality of these answers varied widely.

The pilot also identified where the design needs work. The session logs show that several markers intended to capture deliberate checking behaviour were triggered identically by all six participants, which indicates that they record progress through the case rather than reasoning about it. The nightly journal prompt (Appendix E; Fig. 5, Fig.6) collected very little usable text. Without a comparison group it is not possible to separate any teaching effect from selection effects or from the tendency of self-report measures to rise after an enjoyable session.

The pilot confirms that the game is playable, well received and completable within a single session, and that the study instruments and data pipeline work as designed. The recommendations that follow concern strengthening the in-game measures of reasoning, rebuilding the end-of-game case review, and running a larger study with a comparison group.

2. Background and Aims

Background

Critical thinking in a Changing World is a core module for FY level across all schools, but it is often taught through worked examples in which the reasoning has already been done. Students can learn to recognise the shape of good

reasoning without practising the judgement it requires. Game-based learning offers one route around this, because a well-designed investigation asks the player to commit to a conclusion and then live with it. Evidence on transfer suggests that critical-thinking instruction works best when the skill is practised in a concrete context and then named explicitly (Halpern, 1998), and reviews of digital game-based learning report modest but consistent gains over conventional instruction (Clark, Tanner-Smith and Killingsworth, 2016).

The project began from two assumptions: that a murder mystery would provide a natural setting for evidence evaluation, and that students would examine their own reasoning more willingly inside a fiction than in a seminar exercise. The case was built on a documented instance of accidental self-poisoning from a dietary supplement (MacFarquhar et al., 2010) so that the correct conclusion would be reachable only through evidence rather than narrative appeal. Every character in the game is eventually innocent.

Aims

To design, build and evaluate a browser-based game that gives FY students practice in the five critical thinking tools taught in *Critical Thinking in a Changing World* module: Asking Meaningful Questions; Analysing Reasoning; Analysing Assumptions & Bias; Considering Multiple Viewpoints; Evaluating Evidence.

Objectives

1. Co-design the narrative, visual identity and interaction model with student partners and for students.
2. Build a single-file browser game that runs on university or personal machines without installation.
3. Instrument the game to record play behaviour without surfacing a score to the player.
4. Pilot the game with FY students.
5. Identify design and measurement changes needed before a larger study and further development.

Stakeholders

FY students are the intended beneficiaries. The student partners on the project are direct beneficiaries of the co-creation experience. The findings are addressed to FY module leaders and subject leads, CETI and other academic staff who are considering game-based approaches to graduate attributes.

3. Methods

The pilot used a single-session, within-participants design with measures taken immediately before and immediately after play. There was no comparison group.

Six FY students (n=6) entering Level 4 in September 2026 took part: five women and one man, all aged 19, all with English as a first language, drawn from Architecture, Life Sciences, Computer Science & Engineering and Law. Five reported playing narrative or detective games rarely or never. A seventh participant completed the pre-game questionnaire only and is excluded from the matched analysis.

Three instruments were used (Appendices B & C).

- The first was a twelve-item self-report inventory of critical-thinking disposition (Payan-Carreira et al, 2022), answered on a seven-point frequency scale from 0 (never) to 6 (always), giving a total between 0 and 72, administered identically before and after play.
- The second was a short-written transfer scenario in which participants were asked to evaluate a claim that new street lighting had reduced road accidents.
- The third was an optional four-item experience questionnaire. In addition, the game generated a session log on the participant device recording every clue collected and examined, every link drawn on the case board, every character interviewed, the nightly journal entries and the final verdict.

Participation was voluntary and could be stopped at any point (Appendix A). Participants were told in advance that the storyline involves a fictional death from an accidental cause. Questionnaire responses were matched across the two time points using a self-generated personal code rather than a name. Contact details for the thank-you voucher were collected separately.

4. Results

4.1 Critical-thinking disposition

Every participant scored higher after play than before. The group mean rose from 49.0 to 58.3 out of 72, a mean gain of 9.3 points ($p = 0.031$).

Participant	Pre (0-72)	Post (0-72)	Change
NA2477	42	54	+12
RA2973	56	63	+7
AM1332	37	51	+14
ZE0860	55	63	+8
YA0830	50	58	+8
SH1030	54	61	+7
Group mean	49.0	58.3	+9.3

Table 1. Total critical-thinking disposition scores before and after play ($n = 6$).

The size of the gain was closely related to the starting point: participants who scored lowest before play gained most, and those who scored highest gained least. At the item level, ten of the twelve items rose and two fell.

Item	Pre	Post	Change
1. Assess the contextual relevance of a claim	4.50	4.67	+0.17
2. Seek the accuracy of supporting evidence	4.33	4.50	+0.17
3. Assess the chances of a premise supporting a conclusion	3.67	4.33	+0.67
4. Examine the logical strength of underlying reasons	3.67	5.00	+1.33
5. Search for new data to confirm or refute a claim	3.67	5.17	+1.50
6. Search for information that supports or weakens an argument	4.50	5.33	+0.83
7. Examine the logical reasoning of an objection	4.67	4.50	-0.17
8. Collect evidence to back up opinions	3.50	5.00	+1.50
9. Figure out alternate hypotheses or questions	5.00	4.67	-0.33
10. Systematically analyse using multiple sources	4.00	5.67	+1.67
11. Weigh the merits and demerits of a solution	3.67	4.17	+0.50
12. Reach conclusions supported by strong evidence	3.83	5.33	+1.50

Table 2. Item means before and after play, on a 0 to 6 scale ($n = 6$).

The two items that fell are worth noting. Item 9, on generating alternative hypotheses, is the item that corresponds most directly to what the game is designed to teach, and it started from the highest pre-game mean of any item.

4.2 Play behaviour

All six participants reached Day 5, accused no one, and reached the correct ending in which the death is shown to be accidental self-poisoning. Two participants first closed the case another way and then reopened it. Engagement varied considerably: the number of conversations held ranged from 18 to 49 and the number of links drawn on the case board from 5 to 16, while the number of clues found was almost identical across participants.

Participant	Clues (of 28)	Board links	Conversations	Journal entries	Transfer (of 6)
NA2477	26	9	18	2	6
RA2973	28	5	29	1	5
AM1332	28	11	47	1	2
ZE0860	28	12	35	3	3
YA0830	25	9	22	0	5
SH1030	28	16	49	0	6

Table 3. Session log summary and transfer scenario score ($n = 6$).

All five of the source-checking markers recorded by the game returned identical values for all six participants: every participant examined the attendance record, saw it shown to be false, questioned the attendance system, read the toxicology timeline on Day 1, and did not accept the Head of School's claim without re-checking it. The revenge-frame counter, which is designed to fall as the player moves away from the tempting but wrong explanation, was negative for every participant, ranging from -8 to -17.

4.3 Transfer scenario

Scores ranged from 2 to 6 out of 6, with a median of 5. Four of the six participants asked whether anything else had changed over the same period, and two of those also questioned whether the fall was unusual against the preceding trend. Five offered three or more plausible alternative explanations, most often reduced traffic volume, road resurfacing, changes to speed limits or enforcement, and improved vehicle safety. Three named the strongest available test directly, comparing accident rates on comparable roads that had not received new lighting, or comparing night-time with daytime accidents. The weakest response did not question the causal claim at all and instead asked about the cost and sustainability of the lighting.

4.4 Experience

Four of the six participants agreed or strongly agreed that they enjoyed the game and that it made them think carefully before deciding. Responses to whether the game changed how they would approach a claim were more mixed, spanning the middle of the scale. One participant selected the lowest point on three of the four items, against a background of an eight-point rise in disposition score and a correct ending, so this response should be treated with caution.

5. Discussion

The pilot met its main purpose. The game runs reliably in a browser on any conventional PC, is completable within a single session alongside two questionnaires, and was enjoyed by almost all participants. The three-stream design worked well: the questionnaires, the written scenario and the session logs each answered a question the others could not, and using them together produced a considerably more honest picture.

The self-report result is encouraging but should be read carefully. Every participant improved, and the improvement is statistically detectable even at this sample size. However, the participants who started lowest gained most, which is the pattern expected from regression to the mean and from a ceiling on a seven-point scale, and self-report measures taken immediately after an enjoyable session are known to move in a favourable direction regardless of learning. The result is consistent with the game working; it does not on its own demonstrate that it does.

The single most useful finding came from the session logs. All six participants reached the correct ending, and all six triggered every source-checking marker identically. That uniformity is implausible as a description of six different people's reasoning, and points instead to the markers recording progress through the case rather than deliberate checking. The same applies to the revenge-frame counter, which was negative for everyone. A correct-ending rate of 100 per cent is therefore not evidence that the game teaches: at present the correct ending appears to be reachable by completing the investigation, whatever the player believes along the way. This is a design problem rather than a disappointing result, and it is a specific and fixable one.

The transfer scenario, by contrast, discriminated well. Scores spread across the full range, and the differences between responses were qualitative and visible: the strongest answers reached for a comparison group unprompted, while the weakest did not treat the claim as a claim at all. This suggests that a written scenario is a better measure of what the game is trying to teach than either the self-report inventory or the in-game markers, and it is the measure most

worth developing. It is also worth noting, cautiously, that the two participants who closed the case incorrectly and then reopened it produced the two strongest transfer answers. With six participants this is an observation rather than a finding.

No in-game behaviour predicted transfer quality in this sample. The participant with the most conversations and the second-highest number of board links produced the weakest written reasoning, while the participant with the fewest conversations produced one of the strongest. Engagement and reasoning quality are evidently not the same thing, and the game currently rewards the former more clearly than the latter.

The nightly journal collected almost nothing usable. Two participants wrote nothing at all and the remainder wrote fragments. The prompt currently interrupts play rather than arriving at a natural pause, which is a straightforward placement problem.

The main limitations are the sample size, the absence of a comparison group, and the reliance on self-report. Six participants, all Foundation Year entrants and all aged 19, cannot support any claim about effect size, and correlations at this sample size are unstable and are not reported as findings. Without a comparison group it remains ambiguous whether the game teaches critical thinking or simply attracts and identifies students who already reason this way. The transfer responses were scored by a single rater, so the rubric has not yet been tested for reliability.

6. Conclusion and Recommendations

CASE 2606 works as a piece of teaching material. It is playable, well received, completable in one session, and it produces rich behavioural data at no cost to the participant experience. Participants left the session reasoning visibly well about an unrelated causal claim, and every one of them reported a higher critical-thinking disposition than before. The pilot has also shown which parts of the design are not yet doing the work intended of them, which is the most valuable thing a pilot of this size can deliver.

The following recommendations are addressed to the project team:

1. Rebuild the end-of-game case review first. It is the point at which the player's reasoning is named and explained, and it carries most of the teaching load.
2. Separate the source-checking markers from path completion, so that the logs record what the player chose to verify rather than what the case required them to open.
3. Move the reflective journal prompt to the end-of-day break, where players are already pausing.
4. Treat the written transfer scenario as the primary outcome measure, add a second scenario before play, and have responses scored independently by two raters.
5. Run a larger study with a comparison group, so that teaching effects can be distinguished from selection effects.

The pilot has established that the game and the study design both function and has produced a clear and specific list of changes. The next round of work should focus on making the correct ending something the player earns rather than something the structure supplies.

7. Dissemination

The project has secured a Quintin Hogg Trust (QHT) Innovation Fund to continue development beyond the pilot. This supports a further round of design work on the case review and the in-game measures, and a larger study with a comparison group. Dissemination is therefore planned in two stages: sharing the pilot findings and the co-creation process now, and reporting outcome findings once the larger study is complete.

This report will be circulated to:

- The *Students as Co-Creators* team and CETI.
- Critical Thinking in a Changing World module leader and subject leads.

Planned dissemination activity includes a presentation to the University learning and teaching community when opportunities arise, a contribution to sector conference on game-based or immersive learning and on teaching critical thinking, and a publication reporting the design rationale alongside the outcome study. The game itself is browser-based and can be shared as a link, which makes it straightforward to demonstrate live and to offer to other course teams for trial use.

8. Reflection

As written by one of the student partners, Millie Thomson:

"In this Co-Creators project, my role was creating the narrative and admin. From being part of this project, I learnt new skills and put some skills in practice such as organisation as I kept track of the vouchers, who they were sent to and the narrative document. This project has given me insight into how a team works effectively and what goes into creating a game that others can learn from and working around different outcomes such as the number of participants we planned for and members leaving at the start of the project. This improved my problem-solving skills as we were able to create a game with the planned graphics and creating a unique narrative with a smaller project group. Overall, this project has taught me a number of skills and has given me amazing insight that I can use for future projects within the media industry. I'd recommend students to get involved in Students as Co-Creators projects as it broadens your knowledge and, in this case, I found out more about critical thinking and game development and these projects are something to add to your skills and experience. This project was amazing to be part of and would love to see it go further in the future with more participants and possibly extend the game."

Regarding the project it was organised into three tracks, narrative, visual design and technical build, each with a named student lead. The team met mainly on Teams for a weekly catch-up from March to July 2026. Fourteen meetings were held, usually an hour, and each closed with a short list of actions set for each of the team members (both students and academic). Minutes were circulated after every meeting, and work was kept on a shared drive with a fixed folder structure so that drafts were visible without having to be asked for. When two partners withdrew in May, roles were reallocated, and the build was re-scoped to something the remaining team could maintain.

Two things were harder. Decisions sometimes had to be revisited when a track lead had not been present, and narrative changes continued to arrive after the build had started, which was however expected on a project like this.

Recruiting Foundation Year students as study participants over the summer was also difficult, as they were not available and sessions had to be arranged individually across three weeks in July. As the project continues, we will aim to recruit students during teaching weeks, which will be both more efficient and more relevant to the module.

References

- Clark, D.B., Tanner-Smith, E.E. and Killingsworth, S.S. (2016) "Digital Games, Design, and Learning: A Systematic Review and Meta-Analysis," *Review of educational research*, 86(1), pp. 79–122. Available at: <https://doi.org/10.3102/0034654315582065>.
- Halpern, D.F. (1998) "Teaching Critical Thinking for Transfer Across Domains: Dispositions, Skills, Structure Training, and Metacognitive Monitoring," *The American psychologist*, 53(4), pp. 449–455. Available at: <https://doi.org/10.1037/0003-066X.53.4.449>.
- MacFarquhar, J.K. *et al.* (2010) "Acute selenium toxicity associated with a dietary supplement.," *Archives of internal medicine*, 170(3), pp. 256–261. Available at: <https://doi.org/10.1001/archinternmed.2009.495>.
- Payan-Carreira, R., Sacau-Fontenla, A., Rebelo, H., Sebastião, L. and Pnevmatikos, D. (2022) "Development and Validation of a Critical Thinking Assessment-Scale Short Form," *Education sciences*, 12(12), p. 938. Available at: <https://doi.org/10.3390/educsci12120938>.

Appendix A: Participant Information Sheet and Consent Form

You are being invited to take part in a **research study evaluating an educational video game called CASE 2606**, designed to support critical-thinking skills. The study looks at whether playing the game is associated with any change in how players approach evidence and reasoning. Before you decide, please read this information. Ask the researcher if anything is unclear.

In a single session (up to approximately 60 minutes) you will: • Complete a short questionnaire about how you approach problems (about 6-8 minutes). • Play the game CASE 2606 (about 30 minutes). • Complete a second short questionnaire, similar to the first, plus one short written scenario (about 10 minutes). At the very end, **you will be asked for your name and email address so we can send you a voucher as a thank-you for your time (£20 Amazon Gift Card)**. These contact details are collected only for that purpose.

Do I have to take part? No. Participation is entirely voluntary. You may withdraw at any time, without giving a reason and without any penalty or effect on your studies. If you withdraw during the session, any data collected from you can be removed on request up until the point the dataset is anonymised.

Are there any risks or benefits? The game is a fictional investigation. The storyline involves the death of a fictional student from an accidental cause. If any theme feels uncomfortable, you may pause or stop at any time. There is no direct benefit to you beyond the voucher, but your participation will help improve teaching resources for future students.

How will my information be used and protected? Your questionnaire answers are analysed anonymously. To match your first and second questionnaire without using your name, you will create a short personal code (instructions on each questionnaire). Your name and email are collected separately, only to send the voucher and to let you exercise your right to withdraw. • Your CT questionnaire responses are stored against your personal code, not your name. • Your name and email are held in a separate, access-restricted list, and are deleted once vouchers have been sent and the withdrawal window has passed. • Data are handled in line with UK GDPR and the University's data-protection policy. • Anonymised, aggregated results may appear in reports, funding documents, or publications. You will never be identifiable in any output.

Who has reviewed this study? This study has been reviewed and approved through the UoW's Ethics Board. If you have any questions about this study, or wish to withdraw your data, please contact: Maritina Keleri, Centre for Education and Teaching Innovation (CETI), University of Westminster Email: m.keleri1@westminster.ac.uk

Consent Form

Please read each statement and tick the box to indicate your agreement. If you do not agree with a statement, please speak to the researcher before continuing.

I have read and understood the participant information above, and I have had the chance to ask questions.

- ☐ Yes

I understand that my participation is voluntary and that I can withdraw at any time, without giving a reason, and can ask for my data to be removed up until it is anonymised.

- ☐ Yes

I understand that the game's storyline involves a fictional death from an accidental cause, and that I can pause or stop at any time.

- ☐ Yes

I understand that my questionnaire answers are stored against a personal code, not my name, and are analysed anonymously.

- ☐ Yes

I understand that my name and email are collected only to send my voucher and to let me withdraw, are kept separately, and are deleted after vouchers are sent.

- ☐ Yes

I understand that anonymised, aggregated findings may be used in reports, funding documents, or publications, and that I will never be identifiable.

- ☐ Yes

I agree to take part in this study.

- ☐ Yes

Appendix B: Pre-Game Questionnaire

Administered online through Microsoft Forms before play. Question numbering follows the live form, in which questions 1 to 7 were the consent items as per Appendix A. Required questions are marked with an asterisk.

1. Your personal code *

So we can match your two questionnaires without using your name, please create your code below. Use the same code on both questionnaires. Make it something you will reproduce the same way both times: first two letters of your mother's or carer's first name, plus the day of the month you were born (two digits), plus the last two digits of your phone number.

Example: mother 'Anna', born on the 7th, phone ending 43, gives the code AN0743.

2. How old are you? *

- ☐ Please enter a number only.

3. What is your gender? *

- ☐ Woman
- ☐ Man
- ☐ Non-binary
- ☐ Prefer not to say

4. What is your course and level starting in September 2026? *

Please enter your School, course and level, for example: School of Computer Science and Engineering, BSc Cybersecurity, Level 4.

5. Is English your first language? *

- ☐ Yes
- ☐ No

6. Have you played narrative or 'detective' style video games before? *

- ☐ Often
- ☐ Sometimes
- ☐ Rarely
- ☐ Never

7. How you approach problems *

Below is the question: «*What do you do when presented with a problem?*» For each statement, tick the box that best reflects how often you do it, using the scale 0 = Never to 6 = Always.

	(0) Never	(1) Rarely	(2) Occas.	(3) Usually	(4) Often	(5) Freq.	(6) Always
1. I assess the contextual relevance of an opinion or claim posed.							
2. I seek the accuracy of the evidence supporting a given judgment.							
3. I assess the chances of success or failure in using a premise to conclude an argument.							
4. I examine the logical strength of the underlying reason in an argument.							
5. I search for new data to confirm or refute a given claim.							
6. I search for additional information that might support or weaken an argument.							
7. I examine the logical reasoning of an objection to a claim.							
8. I collect evidence supporting the availability of information to back up opinions.							
9. I figure out alternate hypotheses or questions, when I need to solve a problem.							
10. I systematically analyse the problem using multiple sources of information to draw inferences.							
11. I figure out the merits and demerits of a solution while prioritising from alternatives for making decisions.							
12. I arrive at conclusions that are supported with strong evidence.							

Appendix C: Post-Game Questionnaire

Administered online through Microsoft Forms after play. Introductory text on the form read: *as before, this is not a test; please answer for how you usually approach problems, not how you think you should answer after the game.*

Required questions are marked with an asterisk.

1. Your personal code *

So we can match your two questionnaires without using your name, please create your code below. Use the same code on both questionnaires. Make it something you will reproduce the same way both times: first two letters of your mother's or carer's first name, plus the day of the month you were born (two digits), plus the last two digits of your phone number.

Example: mother 'Anna', born on the 7th, phone ending 43, gives the code AN0743.

2. Session file upload *

Please upload here your session file. You should be able to download it from the game: read the Case Review, scroll down to the bottom and follow the instructions for the One Required Step.

File number limit: 1. Single file size limit: 10MB. Allowed file types: Word, Excel, PowerPoint, PDF, image, video, audio.

3. How you approach problems *

The same question as before: «*What do you do when presented with a problem?*» Tick the box that best reflects how often you do it, using the scale 0 = Never to 6 = Always.

	(0) Never	(1) Rarely	(2) Occas.	(3) Usually	(4) Often	(5) Freq.	(6) Always
1. I assess the contextual relevance of an opinion or claim posed.							
2. I seek the accuracy of the evidence supporting a given judgment.							
3. I assess the chances of success or failure in using a premise to conclude an argument.							
4. I examine the logical strength of the underlying reason in an argument.							
5. I search for new data to confirm or refute a given claim.							
6. I search for additional information that might support or weaken an argument.							
7. I examine the logical reasoning of an objection to a claim.							
8. I collect evidence supporting the availability of information to back up opinions.							

	(0) Never	(1) Rarely	(2) Occas.	(3) Usually	(4) Often	(5) Freq.	(6) Always
9. I figure out alternate hypotheses or questions, when I need to solve a problem.							
10. I systematically analyse the problem using multiple sources of information to draw inferences.							
11. I figure out the merits and demerits of a solution while prioritising from alternatives for making decisions.							
12. I arrive at conclusions that are supported with strong evidence.							

Short scenario

Please read the situation below and answer in your own words. There is no single correct answer; we are interested in your reasoning.

A local news report says: "A town installed new street lighting last year. Over the same year, road accidents in the town fell by 30%. Residents are crediting the new lighting for making the roads safer."

4. What questions would you want to ask before accepting that the new lighting made the roads safer? *

5. What other explanations could there be for the fall in accidents? *

6. What single piece of evidence would most help you decide whether the lighting was really the cause? *

7. Your experience (optional)

These help us understand how the session felt. Tick one per row, where 1 = strongly disagree and 5 = strongly agree.

	(1) Strongly disagree	(2)	(3)	(4)	(5) Strongly agree
I enjoyed playing the game.					
The game made me think carefully before deciding.					
The game changed how I would approach a claim or piece of evidence.					
I would recommend this game to other students.					

Contact details

Collected only so that the thank-you voucher could be sent.

- Your personal code, the same as above *
- Full name *
- Student email address *

Appendix D: Sample session log

CASE 2606 - SESSION LOG

Participant code: xx1234

Generated : 2026-07-11 12:55 Days played : reached Day 5

OUTCOME

Accusation: No one

Ending: No one charged - self-poisoning (correct) Reopened : no

CLUES - what was found, and when it was read

Day 1 [evidence] Toxicology report - read same day Day 1 [TIMELINE] The timeline - read same day

Day 1 [motive] The flask - read same day

Day 1 [evidence] Flask contents - read same day

Day 1 [motive] The affair - read same day

Day 1 [character] Sally's record - read same day

Day 1 [source] Attendance record - read same day

Day 1 [TIMELINE] Her regimen - read same day

Day 1 [motive] Cecilia's threat - read same day

Day 1 [evidence] Cecilia at the IT desk - read same day

Day 1 [TIMELINE] Who gave her the name - read same day

Day 1 [TIMELINE] She was fading - read same day

Day 2 [evidence] Sally's interview - read same day

Day 2 [evidence] The tap-in - read same day

Day 2 [motive] David's grievance - read same day

Day 2 [character] David's knowledge - read same day

Day 2 [character] The row, in context - read same day

Day 2 [motive] The blackmail - read same day

Day 2 [TIMELINE] The TikTok doctor - read same day

Day 2 [evidence] Brennan's doctorate - read same day

Day 2 [TIMELINE] The bins - read same day

Day 2 [motive] "I wished she'd disappear" - read same day

Day 3 [evidence] Torn printout - read same day

Day 3 [evidence] Bruising - read same day

Day 3 [TIMELINE] David moved out - read same day

Day 3 [TIMELINE] Her calendar - read same day

Day 5 [evidence] Lab analysis - read same day

Day 5 [TIMELINE] The mechanism - read same day

BOARD LINKS - drawn between clues, in order

Day 1 The flask (motive) + Flask contents (evidence)

Day 1 She was fading (TIMELINE) + Her regimen (TIMELINE)

Day 1 The timeline (TIMELINE) + The flask (motive)

Day 2 The tap-in (evidence) + Sally's interview (evidence)

Day 2 Cecilia's threat (motive) + "I wished she'd disappear" (motive)

Day 3 Her regimen (TIMELINE) + Her calendar (TIMELINE)

Day 3 David's grievance (motive) + David moved out (TIMELINE)

Day 3 The TikTok doctor (TIMELINE) + Torn printout (evidence)

Day 3 The row, in context (character) + The blackmail (motive)

Day 5 Toxicology report (evidence) + Lab analysis (evidence)

Day 5 Brennan's doctorate (evidence) + The mechanism (TIMELINE)

Totals: 11 links - 1 motive-to-motive, 2 timeline-to-timeline, 8 other

SALLY ROSE - Days 1, 2, 3, 4, 5

ADA ELLIS - Days 1, 2, 3, 4 AMAYA RITTER - Day 4

JEREMIAH PRINCE - Days 1, 2, 3, 4 (optional supply-chain source)

DAVID JONES - Days 2, 3, 4, 5

ISAAC LOPEZ - Days 3, 4 (optional supply-chain source) CECILIA THOMAS - Days 2, 3, 4, 5

JESSIE SMITH - Days 1, 2, 3, 4

LUCY WOOD - Days 1, 5

LOGAN HAYS - Days 2, 3, 4 (optional supply-chain source)

SOURCE-CHECK EVENTS

Attendance record examined : yes Attendance shown false : yes

Head of School's claim accepted without re-check : no Attendance system questioned : yes

Toxicology timeline read : yes, Day 1 Revenge-frame counter (raw) : -10

NIGHTLY JOURNAL - the participant's own words Day 1:

.hannah-cheated-on-her-bf-with-her-sally's-bf.why??

.did-she-do-this-for-revenge?what-has-caused-her-to-do-this

.why-was-cecilia-making-suspicious-comments-in-the-semianr-session?

.sally's-speech-sounded-as-if-she-was-nervous-or-allegedly-guilty?

End of readable log.

STRUCTURED DATA (for analysis; ignore if reading by eye)

---BEGIN CASE2606 JSON---

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-

10,"clues":{"crime_scene_note":{"cat":"evidence","collected_day":3,"examined_day":3},"tox_report":{"cat":"evidence","collected_day":1,"examined_day":1},"tox_timeline":{"cat":"timeline","collected_day":1,"examined_day":1},"bruises":{"cat":"evidence","collected_day":3,"examined_day":3},"flask_gift":{"cat":"motive","collected_day":1,"examined_day":1},"flask_origin":{"cat":"evidence","collected_day":1,"examined_day":1},"affair":{"cat":"motive","collected_day":1,"examined_day":1},"bestie_record":{"cat":"character","collected_day":1,"examined_day":1},"bestie_attendance_false":{"cat":"source","collected_day":1,"examined_day":1},"bestie_interview":{"cat":"evidence","collected_day":2,"examined_day":2},"frank_tapin":{"cat":"evidence","collected_day":2,"examined_day":2},"david_motive":{"cat":"motive","collected_day":2,"examined_day":2},"david_knowledge":{"cat":"character","collected_day":2,"examined_day":2},"david_estrangement":{"cat":"timeline","collected_day":3,"examined_day":3},"victim_regime":{"cat":"timeline","collected_day":1,"examined_day":1},"cecilia_threat":{"cat":"motive","collected_day":1,"examined_day":1},"cecilia_context":{"cat":"character","collected_day":2,"examined_day":2},"cecilia_alibi":{"cat":"evidence","collected_day":1,"examined_day":1},"frank_blackmail":{"cat":"motive","collected_day":2,"examined_day":2},"supplement_intro":{"cat":"timeline","collected_day":1,"examined_day":1},"influencer_obsession":{"cat":"timeline","collected_day":2,"examined_day":2},"influencer_credentials":{"cat":"evidence","collected_day":2,"examined_day":2},"supplement_analysis":{"cat":"evidence","collected_day":5,"examined_day":5},"dosing_mechanism":{"cat":"timeline","collected_day":5,"examined_day":5},"victim_symptoms":{"cat":"timeline","collected_day":1,"examined_day":1},"supplement_daily_evidence":{"cat":"timeline","collected_day":2,"examined_day":2},"david_wished_harm":{"cat":"motive","collected_day":2,"examined_day":2},"supplement_calendar":{"cat":"timeline","collected_day":3,"examined_day":3},"links":{"a":{"a":"flask_gift","b":"flask_origin","day":1,"shape":"XX","note":""},"a":{"a":"victim_symptoms","b":"victim_regime","day":1,"shape":"TT","note":""},"a":{"a":"tox_timeline","b":"flask_gift","day":1,"shape":"XX","note":""},"a":{"a":"frank_tapin","b":"bestie_interview","day":2,"shape":"XX","note":""},"a":{"a":"cecilia_threat","b":"david_wished_harm","day":2,"shape":"MM","note":""},"a":{"a":"victim_regime","b":"supplement_calendar","day":3,"shape":"TT","note":""},"a":{"a":"david_motive","b":"david_estrangement","day":3,"shape":"XX","note":""},"a":{"a":"influencer_obsession","b":"crime_scene_note","day":3,"shape":"XX","note":""},"a":{"a":"cecilia_context","b":"frank_blackmail","day":3,"shape":"XX","note":""},"a":{"a":"tox_report","b":"supplement_analysis","day":5,"shape":"XX","note":""},"a":{"a":"influencer_credentials","b":"dosing_mechanism","day":5,"shape":"XX","note":""}},"link_totals":{"total":11,"MM":1,"TT":2,"other":8},"visits":{"scott":[1,2,3,5],"tyler":[1,2,3],"frank":[2,3,5],"franca":[2,3,4,5],"sally":

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"cecilia":[2,3,4,5],"jessie":[1,2,3,4],"lucy":[1,5],"logan":[2,3,4]},"skippable":["jeremiah","logan","franca","isaac"],"source_checks":{"attendance_examined":true,"attendance_shown_false":true,"hos_claim_accepted":false,"attendance_system_questioned":true,"tox_timeline_examined_day":1},"journal":{"1":"hannah-cheated-on-her-bf-with-her-sally's-bf.why??\n.did-she-do-this-for-revenge?what-has-caused-her-to-do-this?\n.why-was-cecilia-making-suspicious-comments-in-the-semianr-session?\n.sally's-speech-sounded-as-if-she-was-nervous-or-allegedly-guilty?"}}

---END CASE2606 JSON---

End of session file.

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Appendix E: CASE 2606 Gameplay Images



Figure 1. CASE 2606, opening screen and disclaimer.

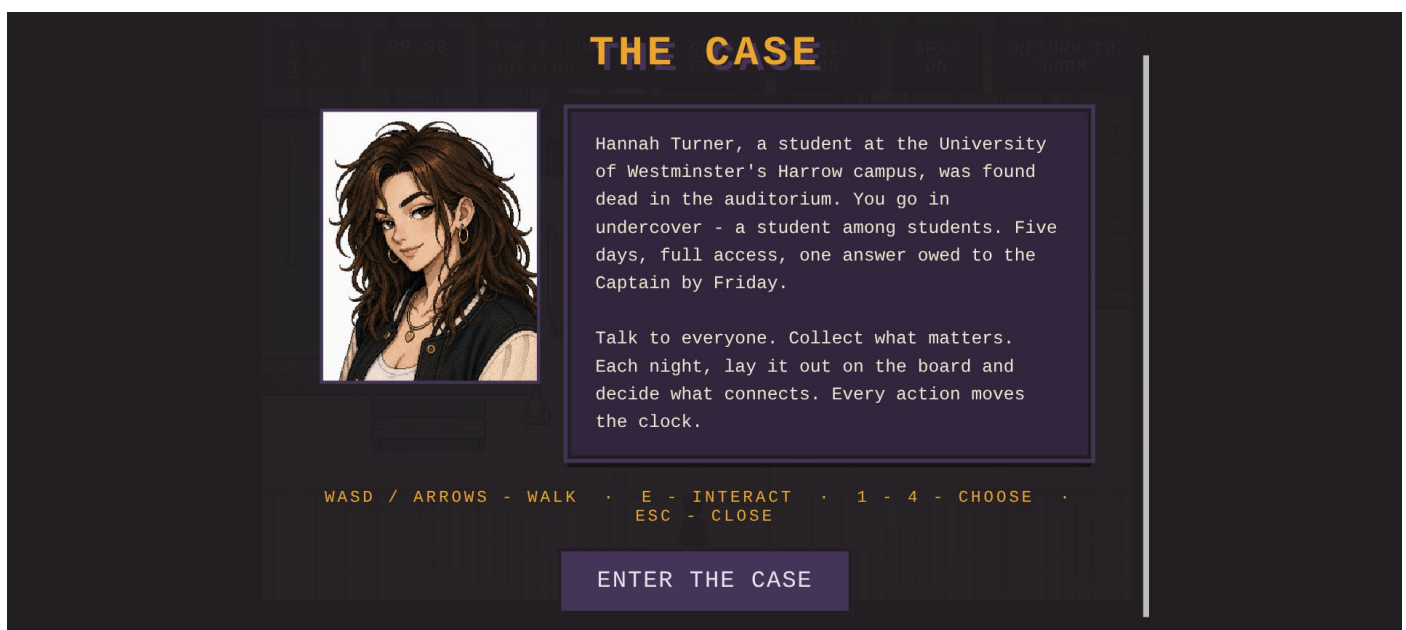


Figure 2. CASE 2606, presentation of the case and aim of the game. The player would play as a detective impersonating a UoW student, trying to solve the case of Hannah Turner's death. They would have 5 "game" days to reach a conclusion. On each day they would use one of the five Critical Thinking Tools taught at the Critical Thinking in a Changing World module: Asking Meaningful Questions; Analysing Reasoning; Analysing Assumptions & Biases; Considering Multiple Viewpoints; Analysing Evidence.



Figure 3. CASE 2606, screenshot of the gameplay. In this instance in a 2D pixelised representation of Harrow Forum.



Figure 4. CASE 2026, screenshot of the gameplay showing a typical interaction with NPCs (non-playing characters). The player would have the option to ask any of the 3-4 questions, leading to a different answer and outcome of the story and eventually the game.

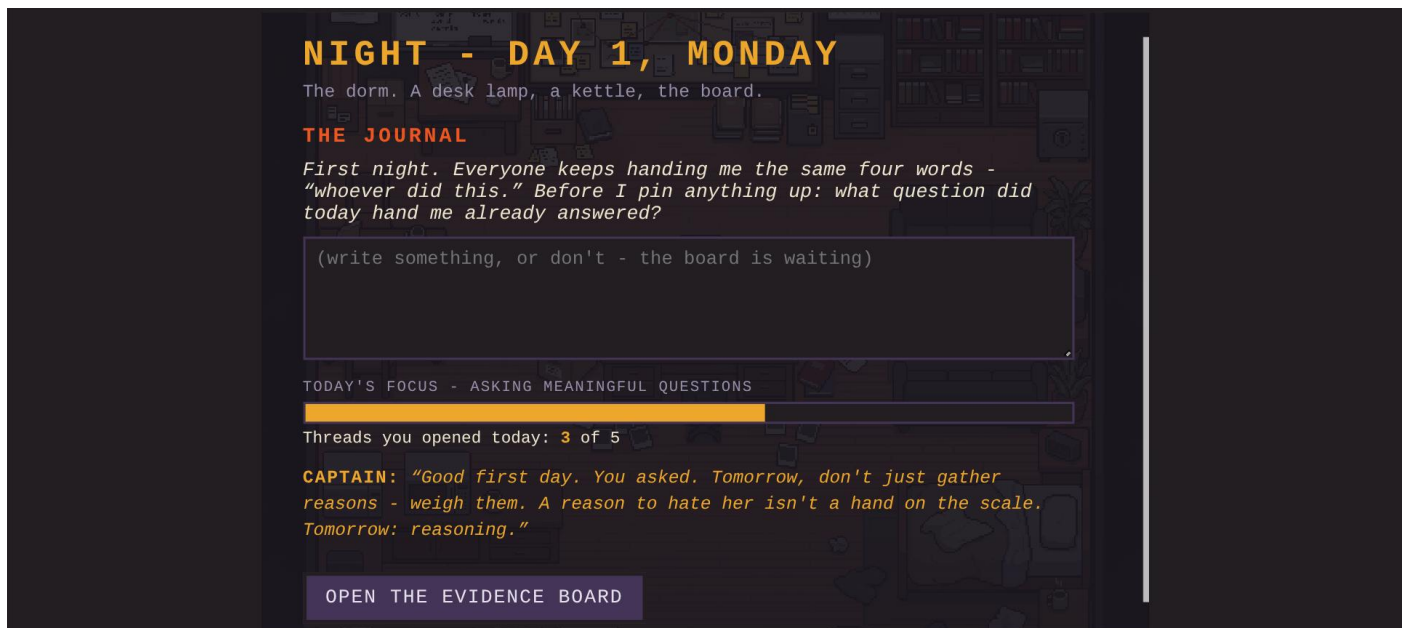


Figure 5. CASE 2606, the journal. At the end of each day (5 "game" days in total) the player would be able to review the gathered clues and add notes on their journal, as well as, get instructions of the next day's aims (which Critical Thinking tool they would be using) by their captain.

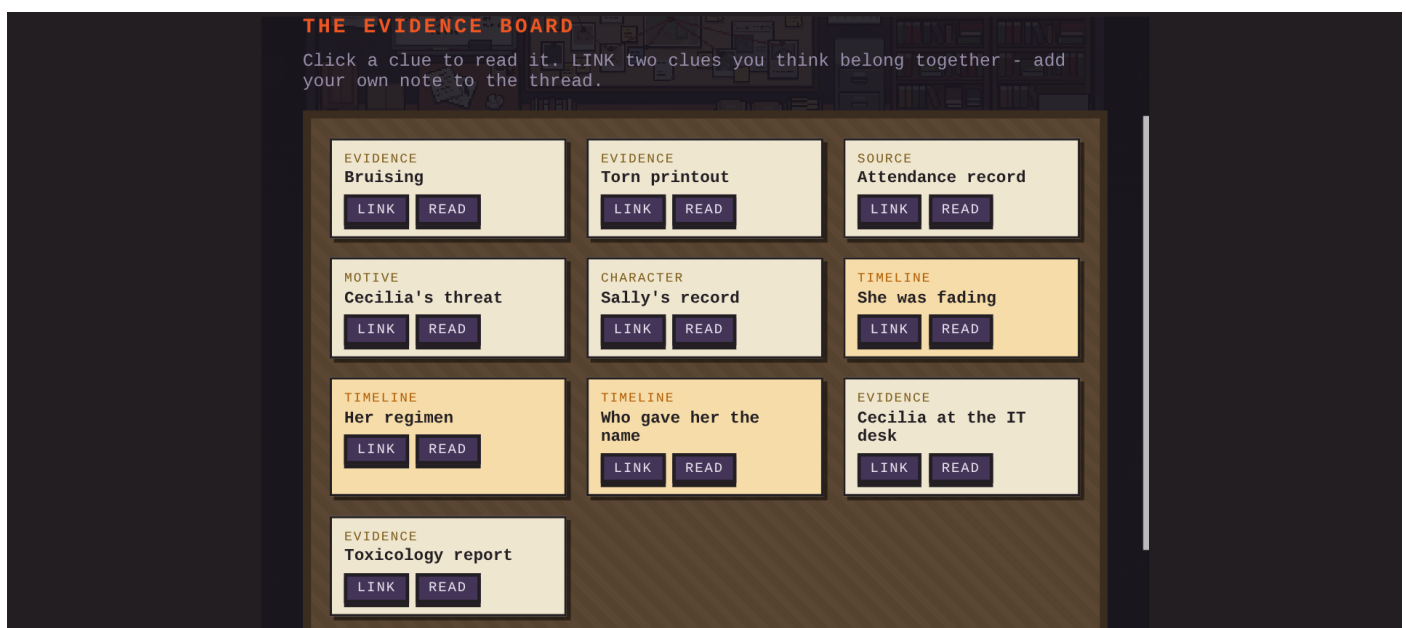


Figure 6. CASE 2606, the evidence board. All collected clues would appear on the evidence board. The player would be able to link clues or read further details. They would be able as well to add notes to expand their reasoning on how the clues linked to each other.

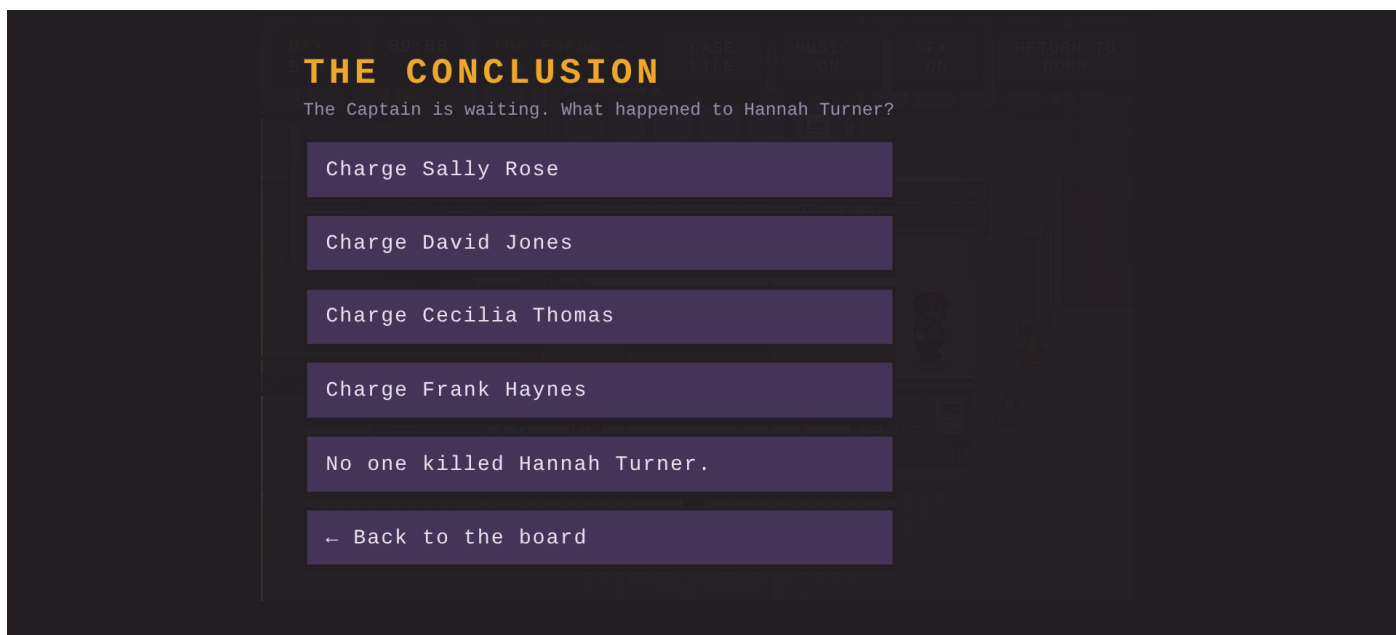


Figure 7. CASE 2606, the conclusion screen. After the end of day 5, the player would need to decide which suspect to arrest and solve the case of Hannah Turner.



Figure 8. CASE 2606, the case review page. After selecting which suspect was guilty of Hannah's death, the player would have the option to reopen the case should it not be the right answer. In any case, they would be presented with the real scenario of Hannah's death.



Figure 9. CASE 2606, credit screen.