C.L.U.E

WHAT IS IT?
A collaborative quiz game

WHO IS IT FOR?
Small groups of STEM undergraduate students from within the same courses

WHERE IS IT USED?
Tutorial classes (remote, in-person or a combination of both)

WHEN IS IT USED?
During tutorial classes as learning or revision activity

WHY IS IT USED?
To promote the development of communication and collaboration skills in STEM undergraduates

HOW IS IT USED?
Collaborating with team members to construct and answer quiz questions

PROBLEM

It has been found that STEM graduates entering the workforce lack the proficiency in soft skills expected by employers.

Various courses within STEM undergraduate degrees require students to work in collaboration with others for the purpose of developing such skills; however, this is often in the form of group assessments. Research has revealed that the academic overtones present in such assessments encourage students to perform in a manner that results in higher grades rather than in a way that facilitates the development of soft skills. Since there are few opportunities for these students to practice these skills without academic pressure, their transition into the industry is made more difficult.

SOLUTION

C.L.U.E aims to facilitate the more effective development of soft skills in a way that seamlessly integrates into the learning activities undertaken by STEM undergraduates.

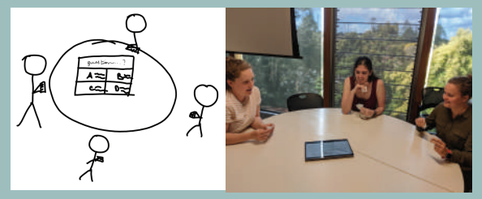
While using a collaborative approach to learning has been found to be effective at developing critical thinking, collaboration and communication skills, a largely individual approach is used for the learning of theoretical content in STEM courses. C.L.U.E aims to incorporate collaborative activities into this learning process, thus furthering the development of students' soft skills while providing a more effective method of learning content.

REQUIREMENTS

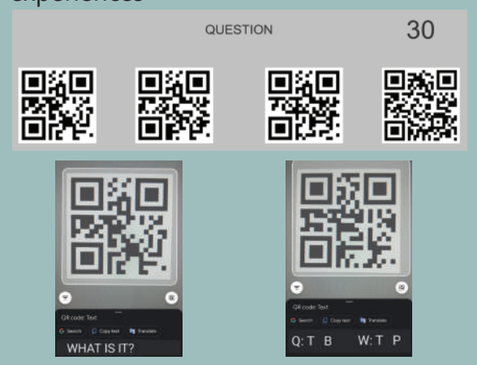
User evaluations and research into the domain has been conducted to ensure that each aspect of the design aligns with the needs, wants and goals of the stakeholders.
Relevance: C.L.U.E is designed to be incorporated into the learning activities completed during content-heavy classes, either as a content-learning exercise or to aid in the revision of previously learnt content
Workload: since the questions used in the exercise are intended to be taken from the course content, the exercise can seamlessly be integrated into students' existing study activities without increasing their workload
Equal participation: Users cannot record the potential answers of other team members; thus, all users must communicate with their peers

ITERATIONS

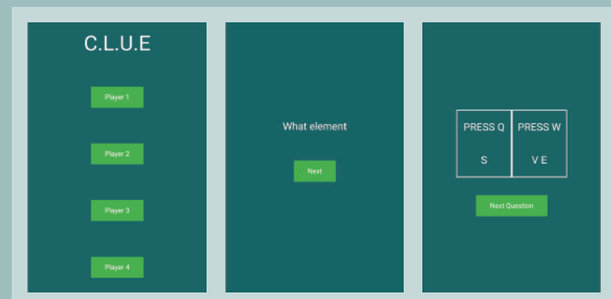
Low-Fidelity 'Wizard of Oz' Prototype
Did not fully incorporate the collaborative learning approach - students worked individually before being required to collaborate



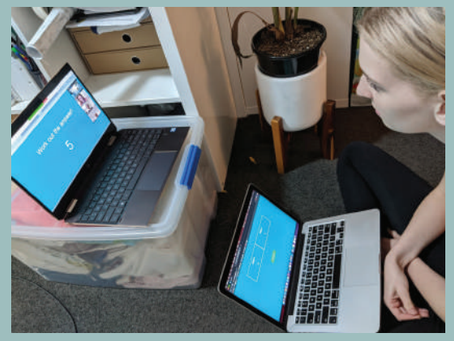
Medium-Fidelity Prototype
Each player is only given part of the question and must collaborate with their team to construct the full questions and answers.
30-second countdown for each stage of the game was ineffective.
The use of QR codes affected users' experiences

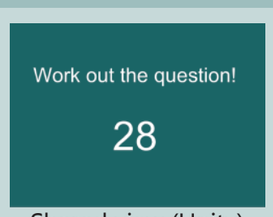


Proof-of-Concept Prototype
A stopwatch was implemented that keeps track of the total time taken to finish the quiz.
Form changed to web-based application (supplemented with Unity to simulate interaction between webpages)



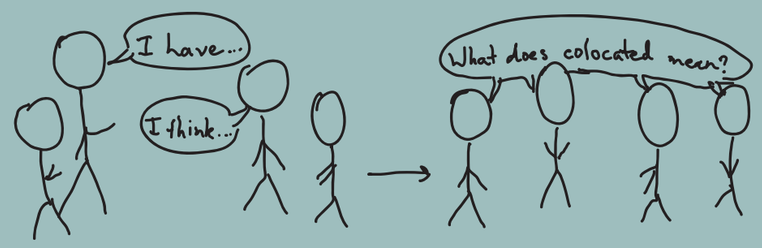
Player 1 View (mobile site)





Shared view (Unity)

1. Decide which player each user will be
2. Discuss and collaborate to construct question
3. Once question has been constructed, press next
4. Construct answer
5. Submit answers
6. Repeat for remaining questions



SOCIAL

Collaboration: C.L.U.E requires all users to work together in order to complete the activity
Communication: As users can only see part of the questions and solutions (and cannot show other users what they see), they must effectively communicate with others
Co-ordination: the actions of each user are dependent on those of their peers - this co-ordination is a foundational aspect of C.L.U.E
Synchronous/Asynchronous: Interactions with C.L.U.E occur synchronously

MOBILE

Context of use: C.L.U.E is most effective when used by small groups (3 or 4 students) during classes in which one of the main goals is to learn and/revise content (due to its basis on the collaborative leaning approach). In the final product, the experience and outcomes of using C.L.U.E would not be affected by whether or not users are present in the classroom. However, users must all be using the application at the same time in order to have the full experience.
Form: In order to facilitate the flexibility in contexts of use mentioned above, C.L.U.E is a web-based application that all students using a device (such as a laptop, phone or tablet) that is connected to the internet can access easily.
Location: C.L.U.E can be used anywhere in which the user has reliable network access
Public/Private: C.L.U.E is most suited to be used by a small, private group; members of this group should be taking the same course at university due to the way in which the questions are specific to the course's content.

C.L.U.E

PROBLEM SPACE

Lack of opportunities for STEM students to develop soft skills outside of assessment

AIM

Provide a way for STEM students to learn and study course content collaboratively, thus allowing them to practice and develop their communication and collaboration skills

CONTEXT OF USE

Used during classes in which theoretical content is the focus; can be used as a content-learning or revision activity

TARGET AUDIENCE

Undergraduate STEM students

SOCIAL

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MOBILE

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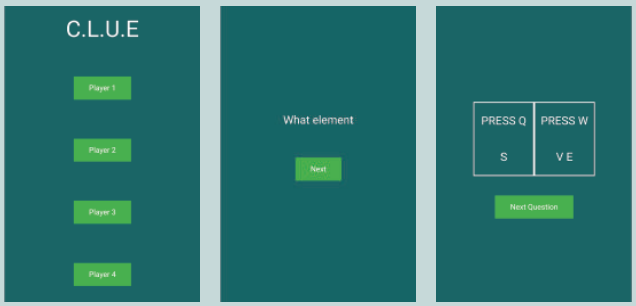
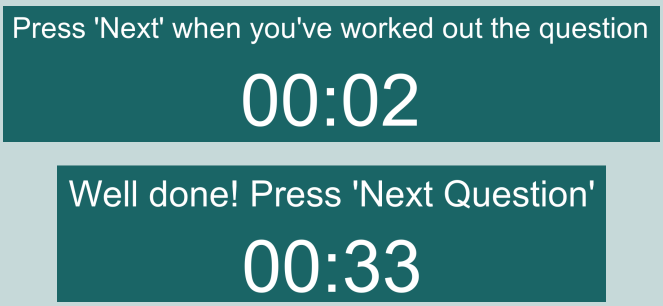
DESIGN

A web-based collaborative quiz game. Each player sees only part of the question and must work together with the rest of their group to construct it.



In the Proof of Concept, this website is to be used in conjunction with an application on a computer to allow players to submit their answers; this interaction will be incorporated into the website in the final product.



C.L.U.E

CREATE QUESTIONS

The facilitator/s of the activity (lecturer, tutor/s) creates questions from their course content — the splitting of the questions and corresponding answers is done automatically when the full statements are entered.

FORM TEAMS

Teams must be of three to four players, who may be in-person or remote.

JOIN

On their own devices, all team members must navigate to:

https://lor-rani.github.io/

Players should not be able to see another player's screen.

CHOOSE PLAYERS

All team members choose a player number and select the corresponding button on their screen.

REFLECT

Once the team has answered all of the questions, they will see a screen on their devices that congratulates them.
Then, students are encouraged to discuss how effectively they communicated and how this could be improved, as well as any challenges they had with the course content.

REPEAT

The process outlined in Step 5 & 6 are repeated for each question in the game.

CONSTRUCT ANSWER

Each player is provided with two possible answers; the full answer to the question is comprised of one option from each player. Teams follow the process outlined in Step 5 to construct the answer.

Once completed, players select their chosen answer.

CONSTRUCT QUESTION

Each player has a different part of the question on their screen. Players must communicate what is visible to them and collaborate with their team to construct the question.

Once the team is confident that they have the full question, each team member selects 'Next'.