1) a)
- Daily-use scenarios are main actions/goals that user needs to perform and scenarios that need the most robust interaction support.
- Edge-case scenarios are rarely used, but must be included (like configuration).
- Example: calculator – daily-use is addition, edge-case is resetting the calculator

b)
- **Time to learn**: User might need a longer time to learn the movements of the car without the visual aid of the steering wheel and gear box. Without learning the movements, it would be hard for the user to know where the car is heading to and might experience motion sickness.
- **Speed of performance**: Speed of performance not affected as the movement of the car would not be affected.
- **Rate of errors by users**: Rate of error by user would not be affected as the car is still controlled by the algorithm instead of the user.
- **Retention over time:** The new way of driving can be retained over long period of time if it is used constantly.
- **Subjective satisfaction**: Users might not be satisfied with the interface as it is different from the usual interface. The visual aid of the steering wheel and the gear box is crucial in providing a peace of mind for the user in knowing which direction the car Is steering.

Subjective satisfaction is the most crucial factor in the usability design as the other factors do not have a huge impact in the results, Hence, this is **NOT** a good usability design.

Editor's comment: Usability measures are **always with respect to the user**. As such, for like speed of performance, it is not about how long the *car* needs to move. It is about how long the user takes to use the car!

c) A feature that can be incorporated is a text-to-speech tool that reads out the direction and speed of the car to the user. For the visual impaired who are unable to see, without visual aid, they would not know where they are heading towards, which could be dangerous. With the text-to-speech tool, they would have a greater peace of mind.

d) The usability study could be a usability lab where participants assess the application. An invigilator for the study would time the users on how long they take to learn a specific set of tasks to evaluate the first human factor - time to learn. The specific task could include adding text to slides, adding pictures to slides, adding animation, etc. The invigilator would also take note of the loading time between each action and watch out for any action that requires high loading time. This is to evaluate the second human factor - speed of performance. He would also have to take note how many and what kind of errors are made during the study to evaluate the third human factor - rate of errors by users. After exploring the functions of the prototype, the users would take a survey to indicate their satisfaction to the overall usage of the prototype and also their feedback. This is to evaluate the fourth

human factor - subjective satisfaction. After a day, the users should proceed with the same tasks and the invigilator should assess if their knowledge of the system is retained over a day. Alter a week, the same thing would be done to assess if their knowledge is retained over a week. This is to evaluate the last human factor - retention over time.

2) a) Gulf of execution: Mismatch between the user's intention and the allowable actions
Gulf of evaluation: Mismatch between the system's representation and the users' expectations

b) Gulf of execution happened as Joyce wanting to proceed to make payment but there is not button for it, which means there is a mismatch between Joyce's intention and the allowable actions. The golden rule that was violated is the rule of **offering informative feedback**. The error message the popped up was not useful to the user in solving the problem or achieve what she wants.

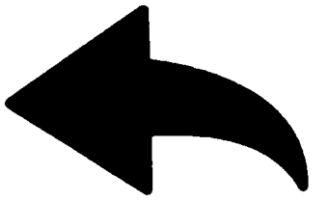
c) Joyce was stuck at the stage "Specifying the action". This is because Joyce has already formed her intention of making the payment but does not know how to specify what action should be taking to the action as there is no button to click.

d) The golden rule that was violated is the rule of supporting internal locus of control. The user should be in charge of the interface and the system should avoid acausality. The 30 avatar was uncalled for user and it makes the user a responder instead of an initiator.

e) Gulf of evaluation happened as when Joyce pressed on the "OK" button and the "Cancel" button, she expected the system to respond instantly but it didn't, and when the website took Joyce to another page, she would expect receipt of an indication whether the payment was successful, but she did not get what she expected. Hence, there was a mismatch between the system's representation and the user's expectations.

The two golden rules that were violated are the rule of **supporting internal locus of control** and **designing dialogs to yield closure**. There was a lack of internal locus of control due to long lag when pressing the button, which would build anxiety and dissatisfaction in the user. Also, there was no dialog to yield closure The payment sequence should provide a sequence to indicate beginning, middle and end, followed by a feedback to provide a sense of accomplishment. But in this case, the end was not clear whether the payment sequence was completed.

3) a) Context is very important: used as a prior conditioning to overcome noise and ambiguity in low-level features. Part of the top-down visual perception process. The back arrow could be seen as a back button, an undo button or a left button depending on the context.



b) i) A mental model is a user's idea of how a particular device or software works or behaves. Mental models are an important consideration in user interface design as if the user interface respond in a manner that fits a user's mental model, it results in small or no gulfs of execution and evaluation. Hence, there would be greater satisfaction levels among the users.

ii) Example that fits: Airbrush function of a paint software, it colours pixels in a manner identical to user's idea of of paint drops landing on the canvas.
Example that does not fit: Thermostat of room heater, users like to set thermostats high at the start, then turn down later Their idea of the thermostat is of a stove. But heaters are auto full power until pre-set temperature is reached.

c) 1) Display screen → vision
2) Speech recognition → voice
3) Keyboard → hand manipulation
4) Haptics → touch
5) Motion simulator → sense of balance
6) Loudspeakers → hearing
7) Computer mouse → hand manipulation
8) Text-to-speech → hearing
9) Affective computing → facial movement
10) Scent synthesis → smell

4) a) Teletypes (teleprinters) are electromechanical typewriters that can be used to send and receive typed messages through various communications channels, in both point-to-point and point-to-multipoint configurations. They print to paper as displays.

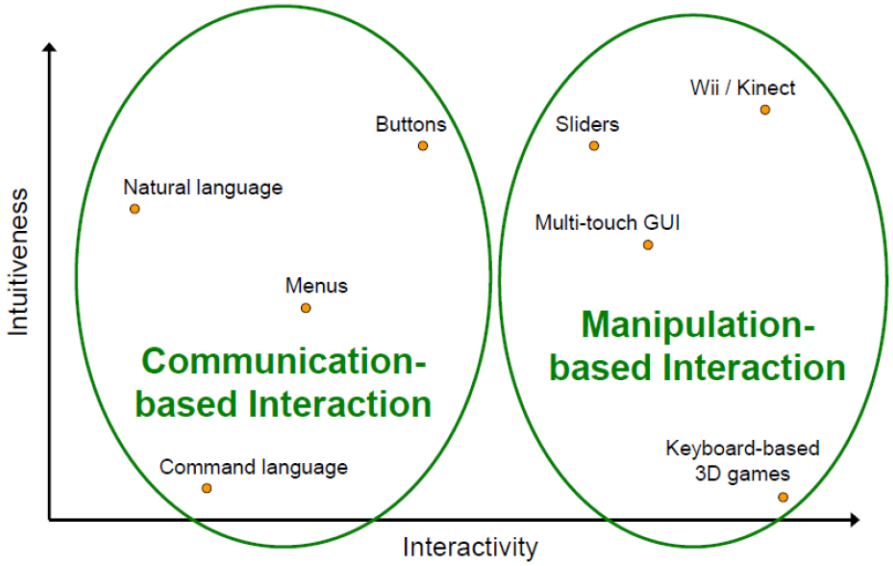
b)
- **Stereoscopic:** different image to each eye, viewer must wear special glasses, can use circularly polarised glasses or active shutter glasses
- **Autostereoscopic:** different image to each eye, does not require special glasses, can use lenticular lens or parallax barriers
- **Multi-view:** different images depending on viewer's position

c) i)

- **Interactivity:** how actively the interface engages the user or rate of human-computer interaction
- **Intuitiveness:** how quickly and easily user learn to use the interface or ease of using an interface

ii)

iii)



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