Human-Computer Interaction
Exercise sheet 1

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Exercise 1: Usability

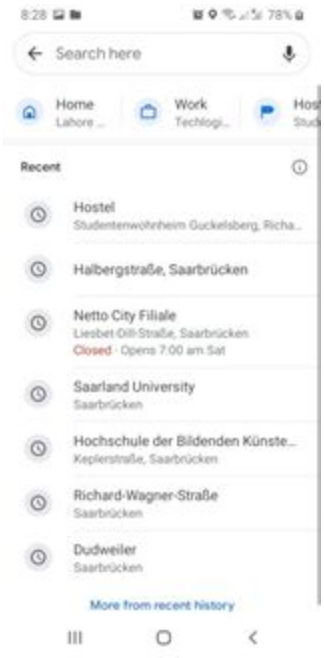
1.1: Six goals of usability:

1) **Effectiveness:** Is the user able to achieve his specific goal by using a product defined as the effectiveness of that product. Does the product perform the required task accurately and completely?

Example: Google maps - It shows the right path and directions to go to the desired destination.

2) **Efficiency:** Can a product perform the required task efficiently? Is it economical in terms of cost, time, and resources it uses in order to achieve a goal?

Example: Google maps - It quickly finds the shortest and fastest route and also shows other alternative routes. The map's feature to save the recent or frequently used destinations in the search options can be considered as an efficient feature as it saves a number of clicks and time.

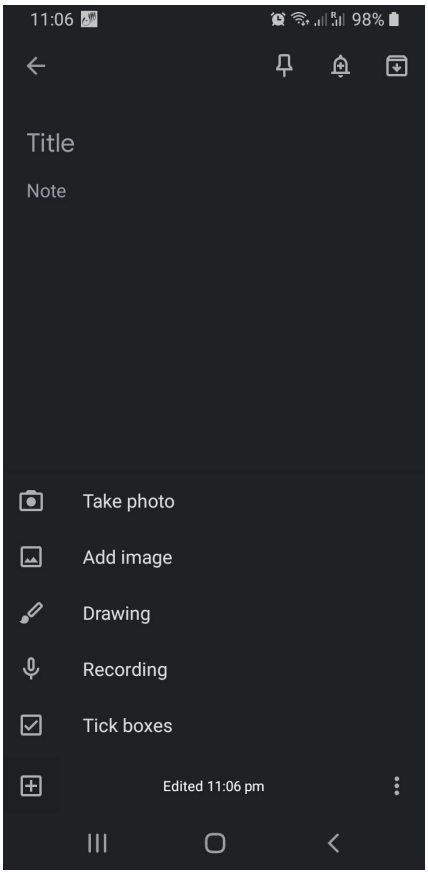


3) **Easy to learn:** How easy is it for the user to use the product? Is the product interface designed in such a way that the user does not get confused or stuck and can easily work his way out by exploring what (action) happens (by doing what) where and how.

Example: Google Map - The homepage is a traditional map that can make the user feel like he/she is looking at a real map. And the search bar and the microphone clearly tells the user to type or give voice input to find their desired location.

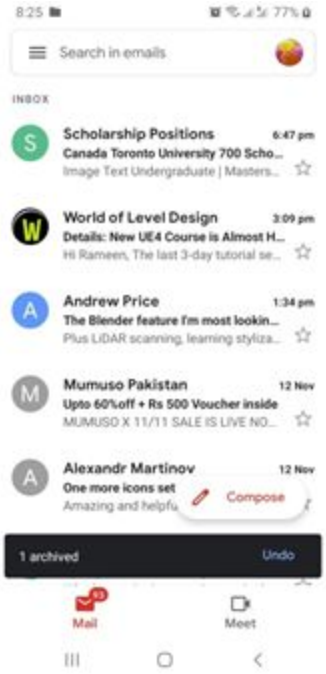
4) **Easy to remember:** Does the product have interfaces that are easy to remember after the user has experienced it? This property is related to the learnability of the product. If an application has used appropriate icons for the respective actions they perform, then it is easier for the user to remember which icon does what.

Example: Google Keep - When one opens Google keep, it is quite easy to remember the use of each icon by using the application just once.



5) **Safe to use**: Does this product allow the user to perform his task safely in terms of the user's confidential information protection and the possible errors that could arise while it is performing a task? Does it prevent user’s data from getting lost?

Example: Gmail - If the user deleted an email by mistake, a popup appears immediately with an undo button on it. And if the user clicks on it within their average attention span, they can have their email back in the inbox.



6) **Utility:** Is the product useful to the user? Does a product meet the user's needs and perform tasks the way the user wants? A product can solve a problem but is not always what the user wanted in terms of cost or size.

Example: Taxi app - A user downloaded a taxi app but it was in French. The user only knows English. Even though that application is the best taxi finder app in France but is of no value to this particular user.

1.2: Usability of Xbox wireless controller:

1) Effectiveness: The product is very effective: features like a hybrid D-pad, Bluetooth technology for wireless gaming on various devices, easy to pair, and switch between devices are quite beneficial to achieve quality results.

2) Efficiency: Once a user is able to understand different functionalities, the product becomes very efficient and easy to use. The features like the share button, hybrid D-pad, textured grip on the triggers and bumpers, etc helps improve the productivity and experience for the user.

3) Easy to learn: It is not straight-forward to learn the functionalities without going through the instruction manual. The buttons (X, Y, A, B) are not very intuitive about their functionalities. The color code indications used for Bluetooth pairing can be tricky to understand.

4) Easy to remember: The buttons, navigator, triggers, and bumpers are placed very strategically so that once a user learns about its functionalities, it's very easy to get along. The ON/OFF button right in the middle and very prominent. It blinks when it's turned on.

5) **Safe to use**: The feedback to the user is not very prominent, if there is an error while using the share button or while using the Bluetooth feature to pair between devices, the user will not be able to debug it easily.

6) **Utility:** The product fulfills all the basic functions a user can expect from a controller. Also having additional features like Bluetooth, easy share button, wireless, hybrid D-pad, etc.

Exercise 2 - Interaction modes

1. You would like to pay for your parking ticket before leaving the parking garage in your car. (Do also consider the fact that some people might suffer from disabilities.)

Main interaction mode(s): Instructing and Conversing

- Instructing: In Germany, a user needs to drop the parking coin in the machine and press the buttons to pay
- Conversing: There is a button which when pressed will instruct what to do for disabled people

2. You are walking in a foreign town using a pedestrian navigation system.

Main interaction mode(s): Conversing, Manipulating

- Conversing: One can provide verbal input. The navigation system provides visual and audio feedback
- Manipulating: One can zoom in and out and pan the map to identify the location
- Instructing: We issue commands by typing in the destination and pressing enter

3. You would like to follow a recipe for baking a cake for your friend's birthday.

Main interaction mode(s): Exploring, Manipulating

- Exploring: Searching for recipes in a book or online search engine
- Manipulating: One has to open and scroll down to view and follow the recipe respectively
- Conversing: If one uses a voice input available in many search engines
- Instructing: We issue commands by typing and pressing enter to look for a recipe

4. You need to find a store in a mall using a public display

Main interaction mode(s): Exploring, Manipulating

- Exploring: Need to search for the store - in both static or interactive map or even without a map(by looking at the nameboards of each store)
- Manipulating: In an interactive map, one can zoom in and out of the map to locate the store
- Instructing: One can also type in the name of the store to search for it in an interactive map

Exercise 3 - Analyze Interfaces

3.1: Six elements composing the foundations of interaction design:

- **Affordance:** The buttons on the control panel afford to be pressed.
  Flaw: It is hard to tell which one is the button in the first glimpse. The user could mistakenly press the black area and feel stupid.

- **Visibility:** A star has been used (possibly) to represent the building entrance/exit. Braille alphabets have been used for the usage of visually impaired people. The white text color on a black background is good.
  Flaw: The representation of the star icon or the alphabets 'R', 'DH', or decimals are unclear(What does 4.6 even mean?). Also, it does not show which floor the elevator is currently on or if the elevator is going up or down?

  It is difficult to comprehend the labels for the button in the middle if it belongs to the left label or the right one.

- **Feedback:** Pressing the button illuminates it as a response to the command.
  Flaw: The white light camouflages with the silver background - a brighter color could be used. There is no display to show the direction of the movement of the elevator after when a button is pressed.

- **Mapping:** It is good that the buttons are ordered from lower level to higher level.
  Flaw: The buttons don't represent the physical mapping(Eg: 7R should be on top of 6R, not beside it). (See proposed solution design Fig 3.2)

- **Constraints:** There are no constraints used here.
  Flaw: People might mistake the black region for a button and might tap on it by mistake.
  It is unclear if the right or left button needs to be pressed for the labels in the middle region.

- **Consistency:** All the floor buttons are meant for the same purpose i.e. to go to that floor, also the open and close buttons are consistent.
  Flaw: There is no consistency in the placement of the buttons - Eg: 3.1 comes after 3R whereas 6 comes before 6R

Proposed Solution design:

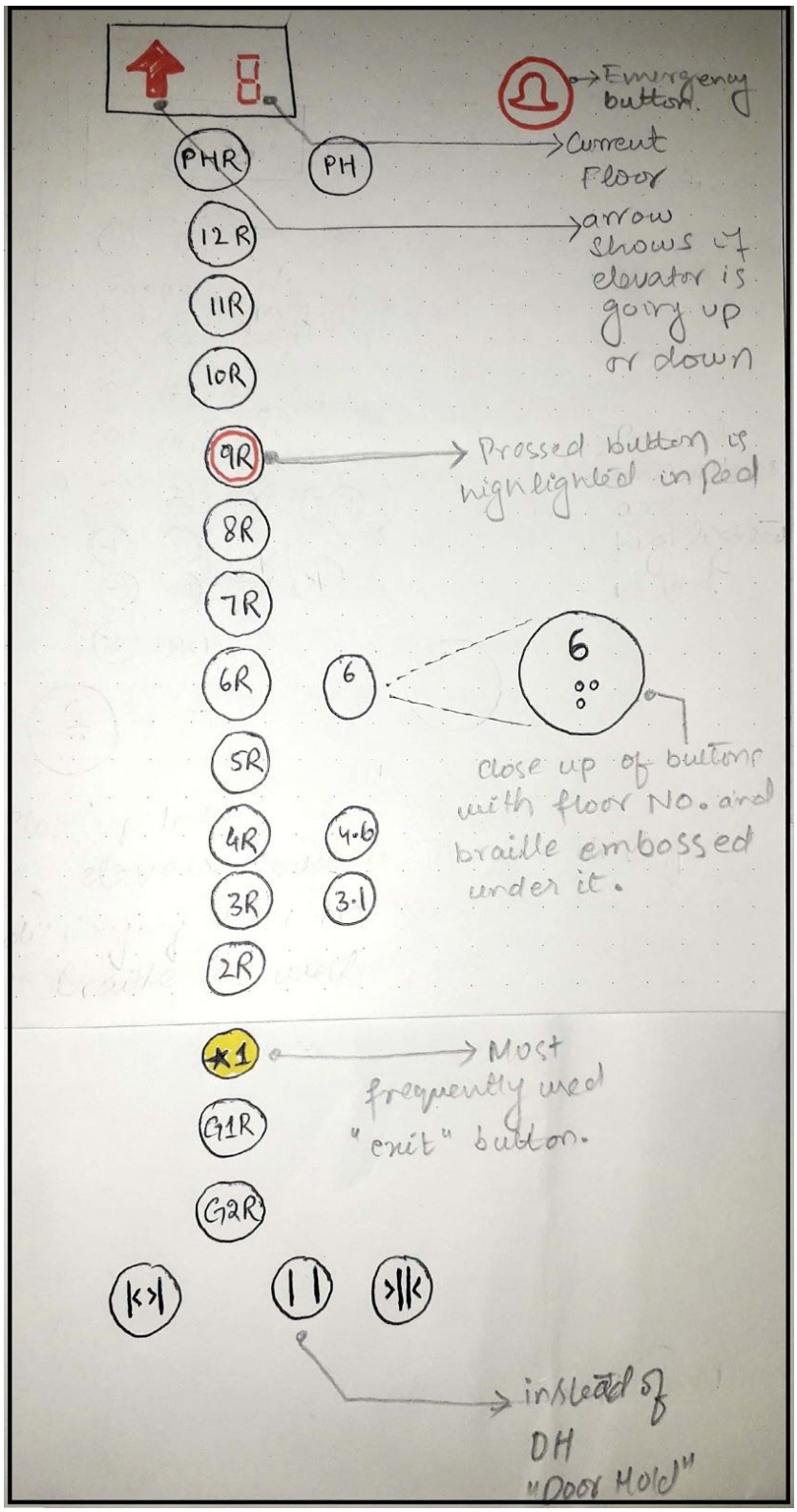


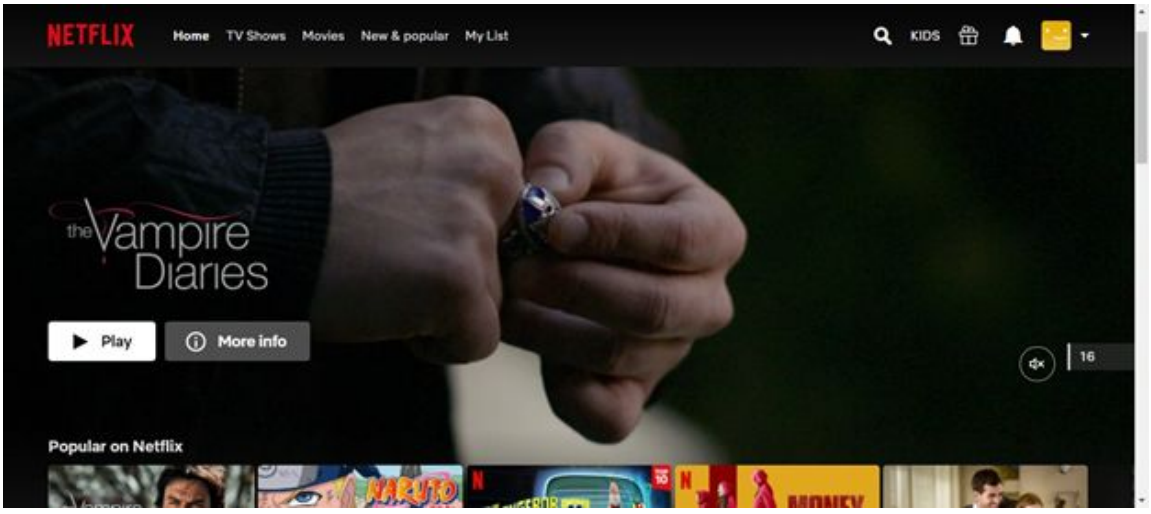
Fig 3.2: Proposed Solution design.

- Numbers and braille lettering can be placed on the button itself instead of separate confusing labels.
- It has to be arranged vertically rather than horizontally to achieve better mapping and consistency.
- There should be a prominent emergency button highlighted in red. (cultural constraint).
- A display to show the current floor and the direction of movement of the elevator.
- Could use a more prominent color light in the button as feedback when it is pressed.
- The button ***1** is highlighted to indicate the ground floor which is an exit of the building.
- Audio feedback will be helpful for blind people.
- The use of unfamiliar labels should be avoided as in the above example the person who has come to this building first time may not know what does R represents or where does 4.6 take?

3.2 Examples of two different user interfaces:

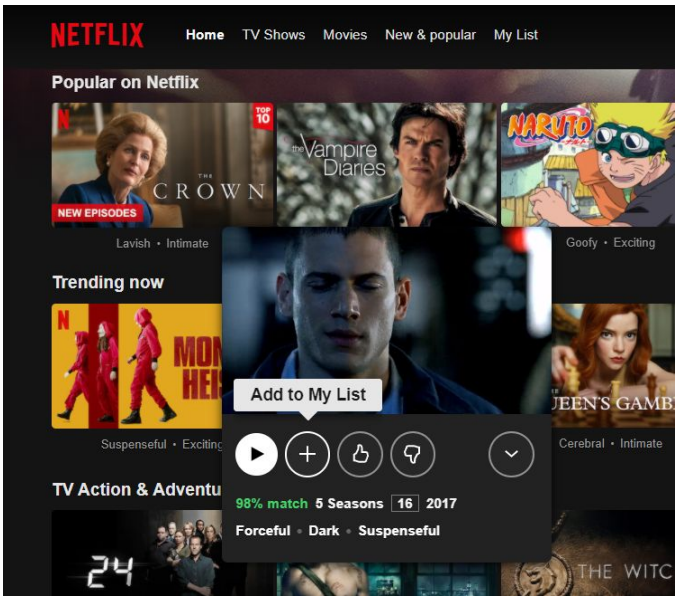
Example 1: Netflix

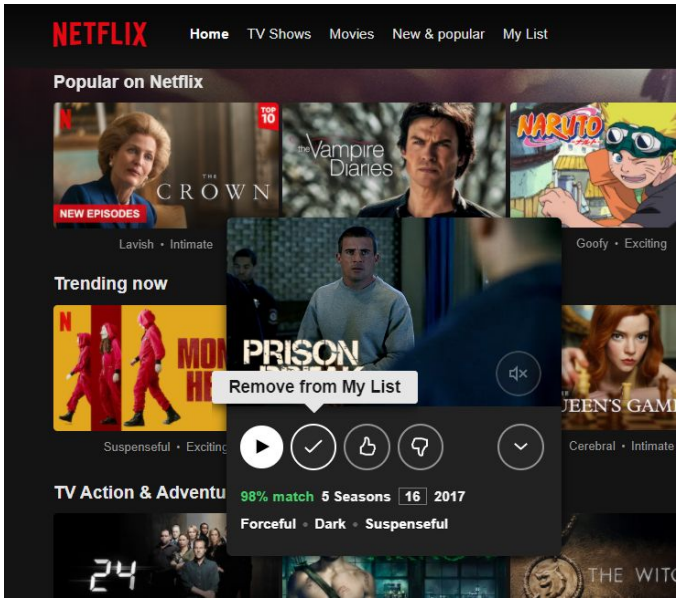
Affordance: Since this is a digital application so we will talk about its perceived affordances: such as the play button affords to be clicked. The search icon affords to be clicked and the textbox that appears in the response of that click affords to take text input from me.



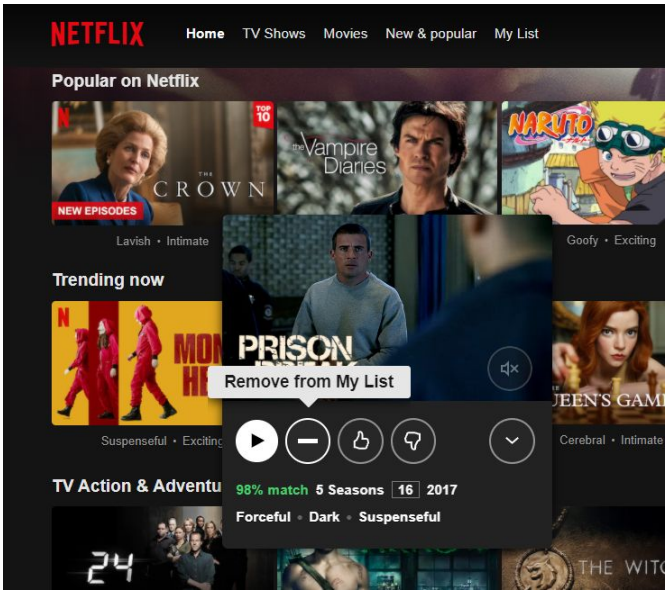
Improvement: However, the label of “Play” with the play icon was unnecessary. The Play icon is already a learned convention.

Visibility: The “plus” button was obvious to add the movies to my list but when it is clicked on, it turns into a “tick mark” showing that the movies has been added to my list. So far so good. But, what if I want to remove from my list after I have matched this movie. This “tick mark” does not make sense anymore.

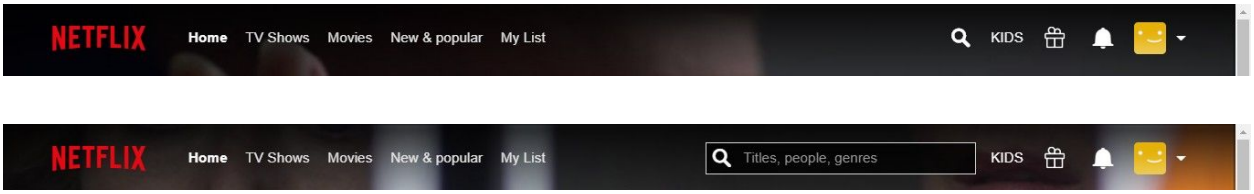




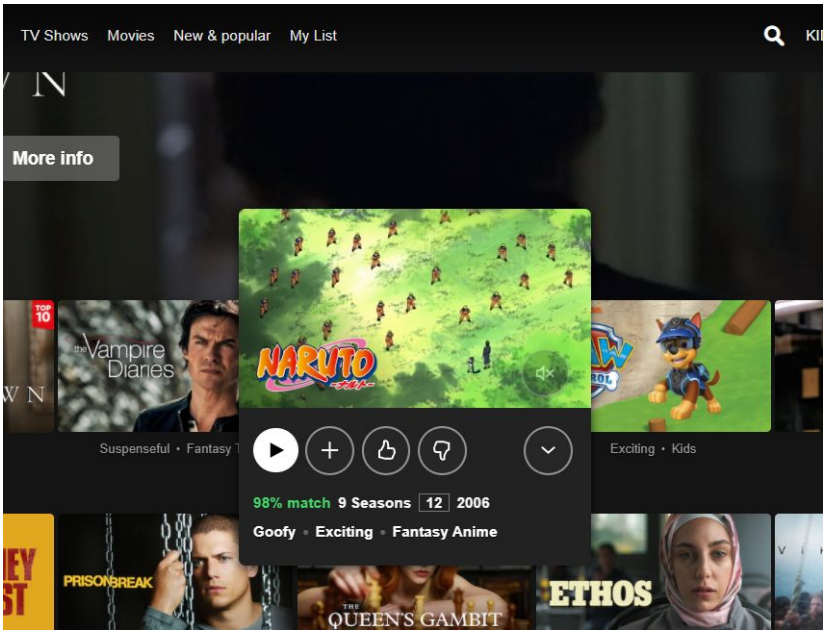
Improvement: It could be turned into a “minus” sign rather than a “tick mark” then in case of remove from list use case “minus” would be more obvious and visible.



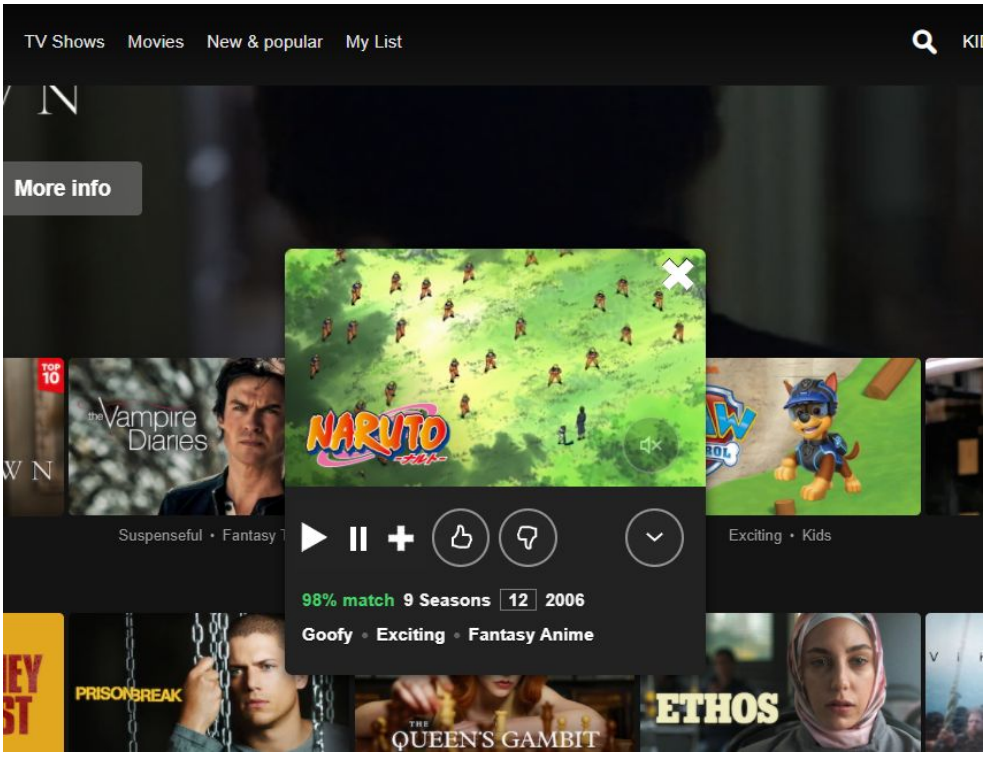
Feedback: When I click on the search icon, a textbox appears which is a response to my click that the application has understood that I am about to type in some information.



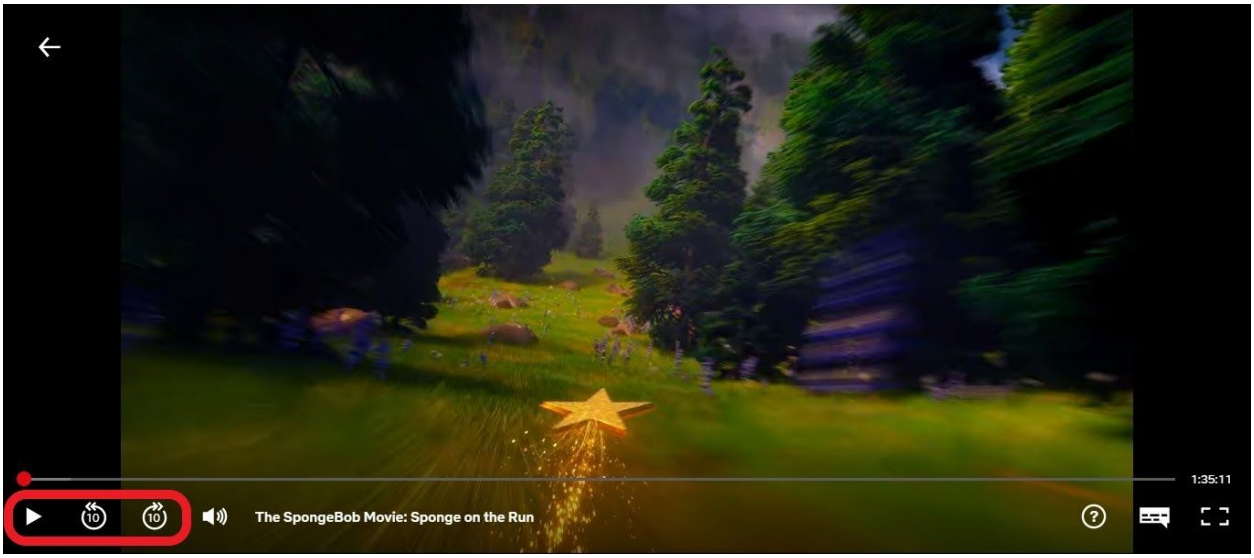
Bad Responsiveness: When I hover over a movie, in response, its thumbnail gets enlarged and its trailer is played even when I do not wish to see it. And I don't like this lack of control over what I see or not. This also interrupts my browsing process.



Improvement: There should be a “cross” button on this small window of the trailer and a “pause” button to pause. Additional option could be to turn this feature turn ON/OFF in user settings.

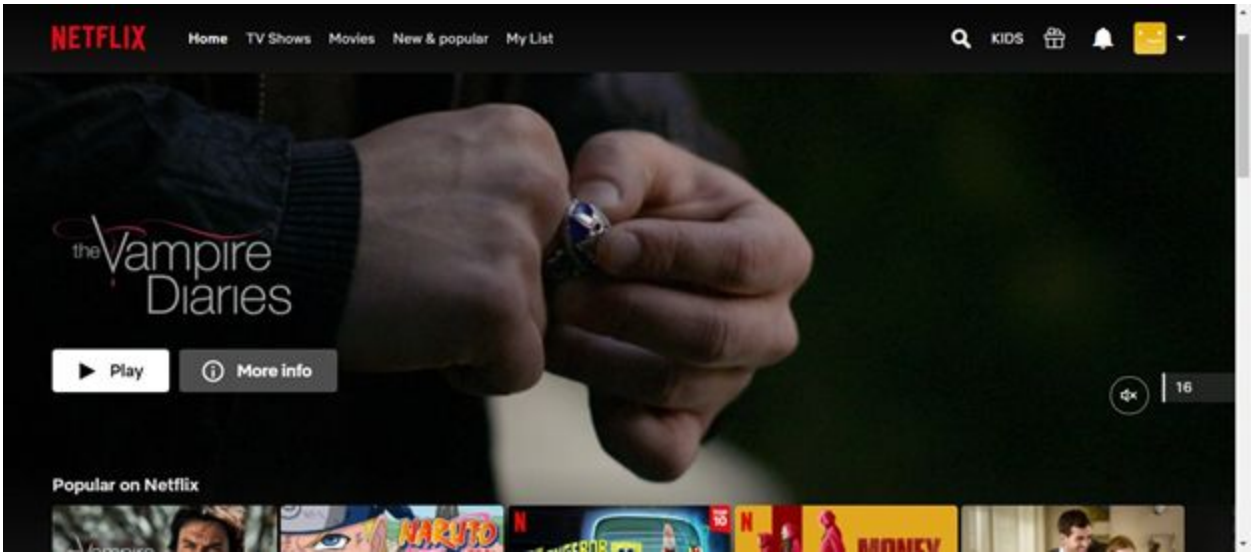


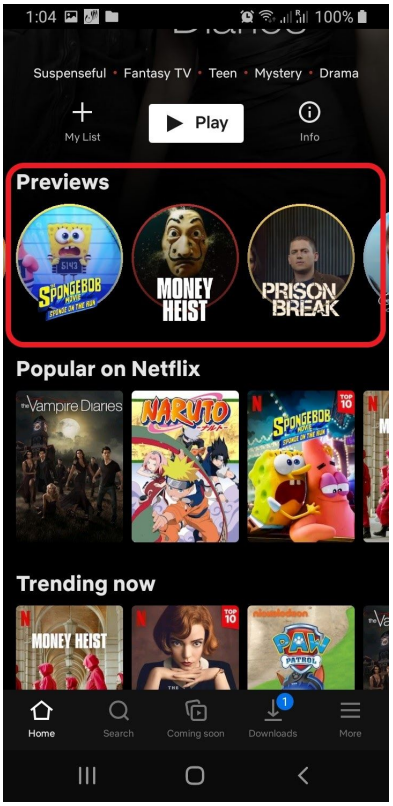
Mapping: The placement of forward and backward buttons is exactly how it should be. If this placement was against the natural mapping for example -> and <- this would have created confusion.



Constraints: The unnecessary behavior of auto play of trailers does not offer constraint in the interface of Netflix. One has to carefully avoid the mouse pointer on the thumbnails while searching for movies.This could interrupt the browsing processing and put strain on eyes which leads to the bad user experience.

Consistency: Overall internal consistency of Netflix UI is good. There are a few external consistencies between Netflix mobile app and web app. The mobile app gives a separate category of previews and you have the choice to select the preview as well as the close icon to close the preview window.. In the web app there is no option to select the preview of your choice rather it starts to play on its own. With no option to pause.





Improvement: In web app homepage give pause option to pause preview trailer on main window on the top.

Metaphor: Netflix was created as a replacement of TV channels and video players and cassettes. To smoothly search and play the movie/series. Browse Netflix catalogue rather than looking for movie cassettes in different stores. And making the whole experience highly responsive and making all the functions obvious to the user.

Example 2: Button to open the tram door

Considered example:

Affordance: The buttons afford to be pressed

Visibility: The color coding of green to open and red to close is clear

Feedback: There is no feedback once a button is pressed

Mapping: The buttons are placed on the side of the door confusing people if it is meant to open the door or for emergency brake or to open/close the surface on which it is placed on

Constraints: The entire button has been colored which makes it easy for the users to not press anywhere else but only on the button

Consistency: External consistency with respect to color coding is provided. However, internal consistency with the placement of the labels are not given - label for open is placed below the button and the label for close is placed above the button

Proposed design:

Affordance: The button affords to be pressed

Visibility: The button is highlighted to indicate that it is active. The button is active only when the train is at a station - making it clear for the user to press it or not

Feedback: Once the button is pressed, it changes its color and provides a feedback

Mapping: Placement of the button on the door makes it much more clear about its functionality - similar to a door knob to open a door

Constraints: The placement of the lights around the circumference of the buttons constrain the user to press within the highlighted area. Having only one button also constrains the user from pressing a wrong button

Consistency: The symbol on the button and the color of the lights provides external consistency - indicating the user to open the door. The color coding of the buttons - green colored button with a red circumference does not have an external consistency though