Digital Game Development

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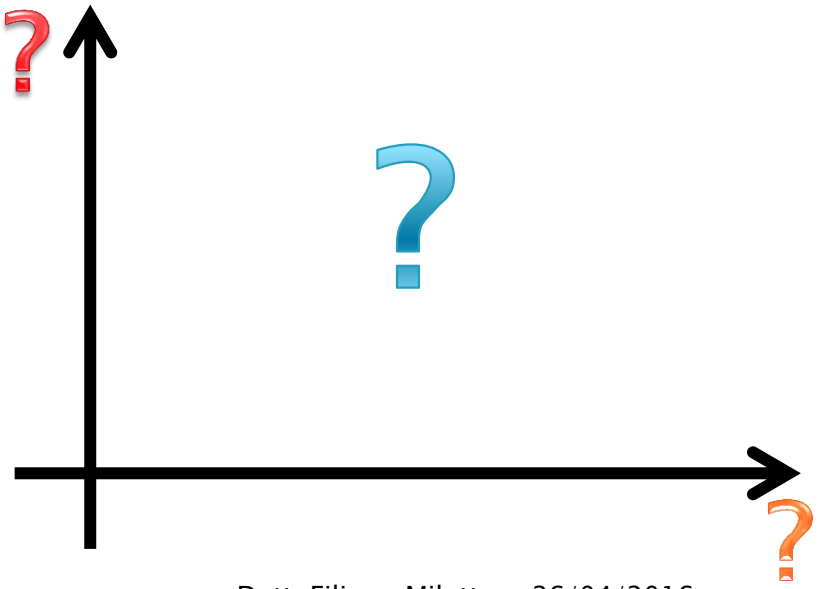
Lecture Overview

- Learning and Experience Curves
- Interaction Design (IxD)
- GUI Design
- User Experience (UE)
- Mockup: definition and tutorial

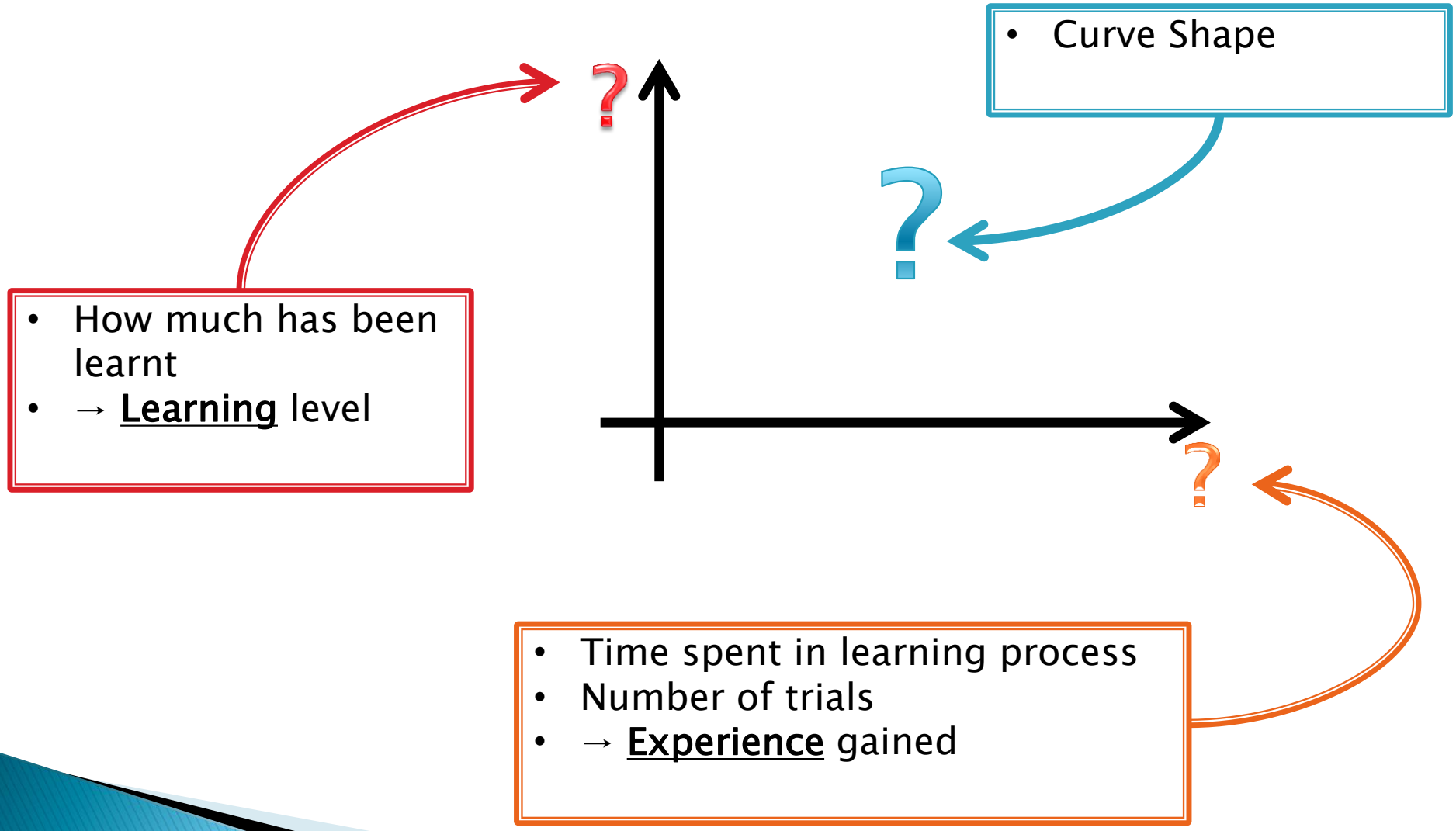
Learning Curve (1/8)

- Thought by Hermann Ebbinghaus in 1885
- It could represent the learning process when:
  - the same task is repeated in a series of trials

  OR
  - where a body of knowledge is learned over time
- How to draw a learning curve?

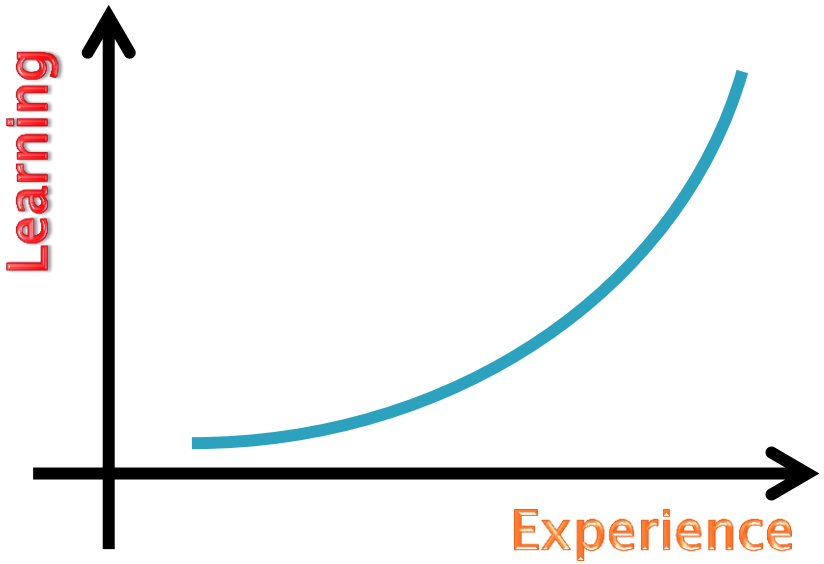


Learning Curve (2)



Learning Curve (3) – Shapes

- Exponential Growth

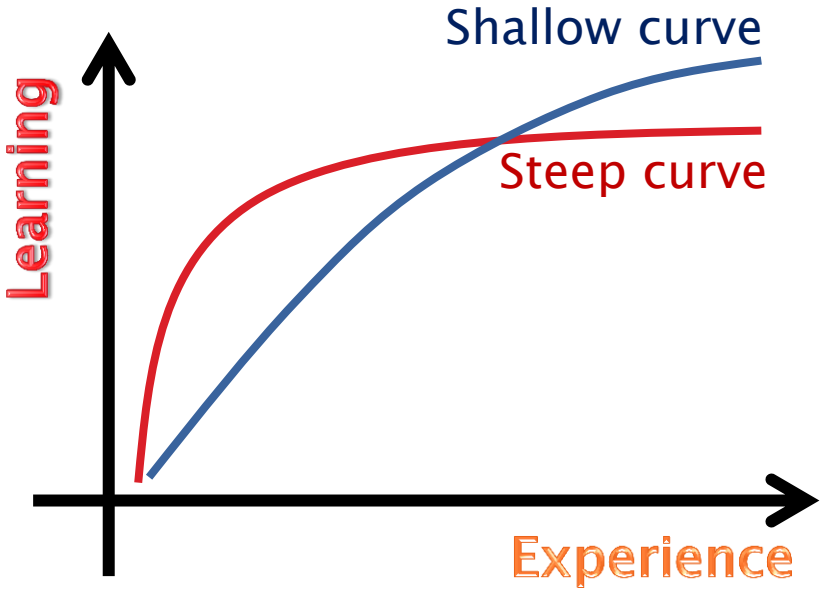


Characteristics:

- Curve can increase without limits

Learning Curve (4) – Shapes

- Exponential Rise

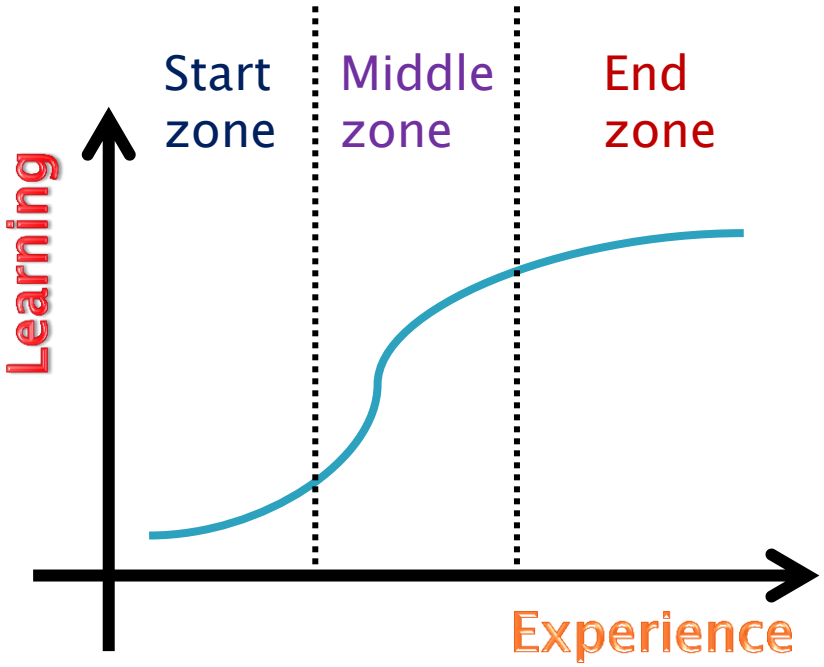


Characteristics:

- A steeper curve means that learning process is more difficult, but also shorter
- A shallower curve could be more tedious for learner
- A curve with an Exponential Rise shape has a maximum limit to learning level

Learning Curve (5) – Shapes

- S-Curve (Sigmoid)



Characteristics:

- There are three zones with different learning rates: **start zone** has slow rate, then there is a boost in **middle zone** and finally learning level tends to maximum in the **end zone**
- A curve with a Sigmoid shape has a maximum limit to learning level

Learning Curve (6) – Considerations

- Any learner has his own learning curve
  - There is not a single, absolute, learning curve for a system
  - An overall curve could be estimated as the average of the learning curves of the learners
- Usually, learning curves are monotonically increasing
  - Sometimes learning level might decrease
    - e.g., the learner stop the learning process for a while, then when he comes back again to the process he forgot something and has to revise what it has already done before

Learning Curve (7) – Game Context

- How to help an user in the learning process?
  - **Start the game with a tutorial (Learning-by-doing)**
  - Show tips on loading screen
  - Show suggestions before important events in-game
  - Provide a good Guide Section available from menù
  - Provide meta-game activities to speed-up the learning process (forum, how-to videos, …)
  - …

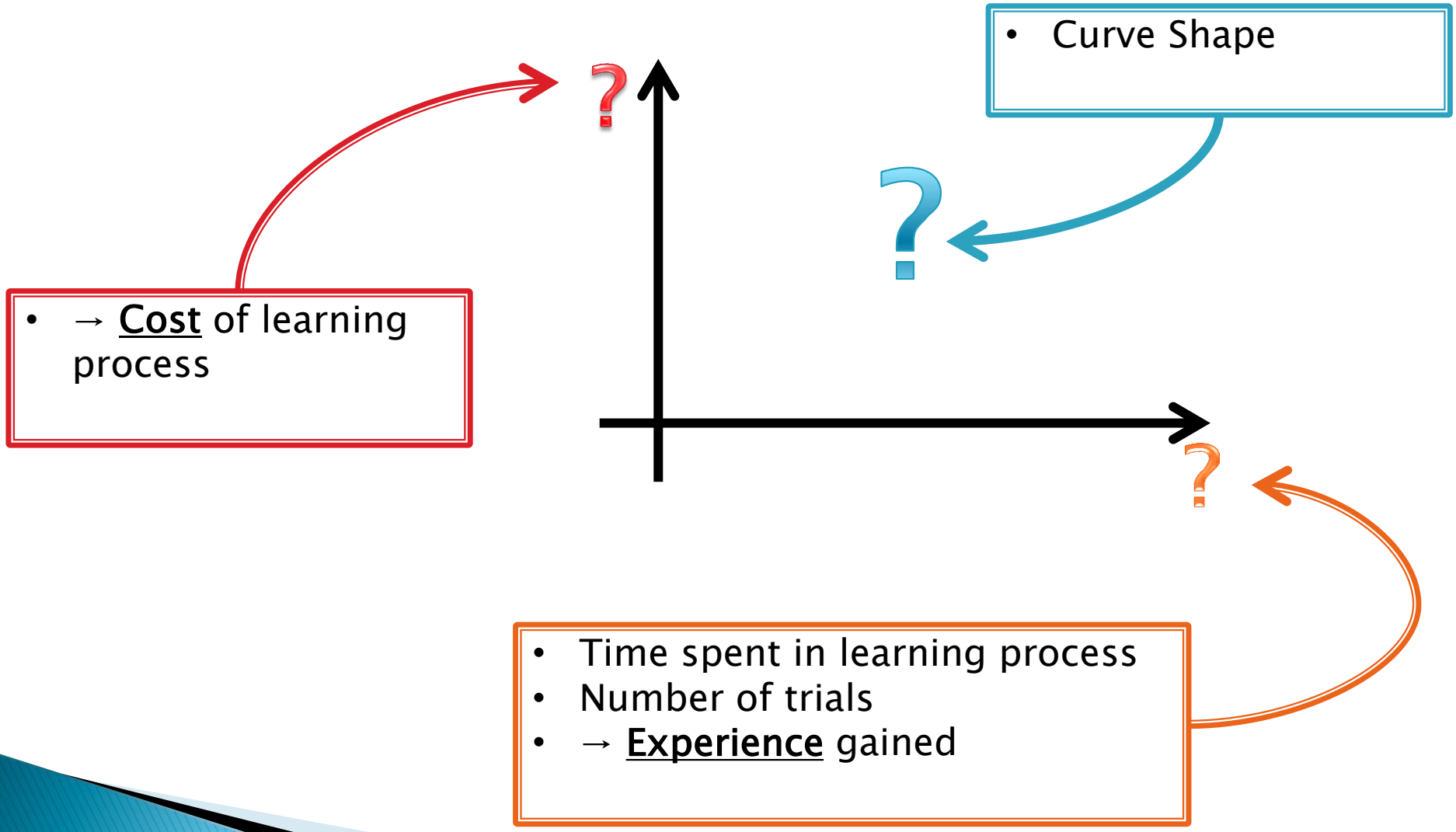
Learning Curve (8)

- Why is so important the learning curve?
  - You should avoid discouraging a player with a steeper learning curve
  - On the other hand, if you choose a shallower learning curve your game might become too easy and so no one will play it
  - Adopting a S-Curve shape with short start zone and a long term end zone might grant you an higher longevity to your game

Experience Curve (1/5)

- Sometimes, you can find a particular type of learning curve, called *Experience Curve*
- Thought by Wright in 1938
- It has a slighty different meaning:
  - More times a task has been performed, the less time is required on each subsequent iteration
  - It measures the **efficiency** of the learning process

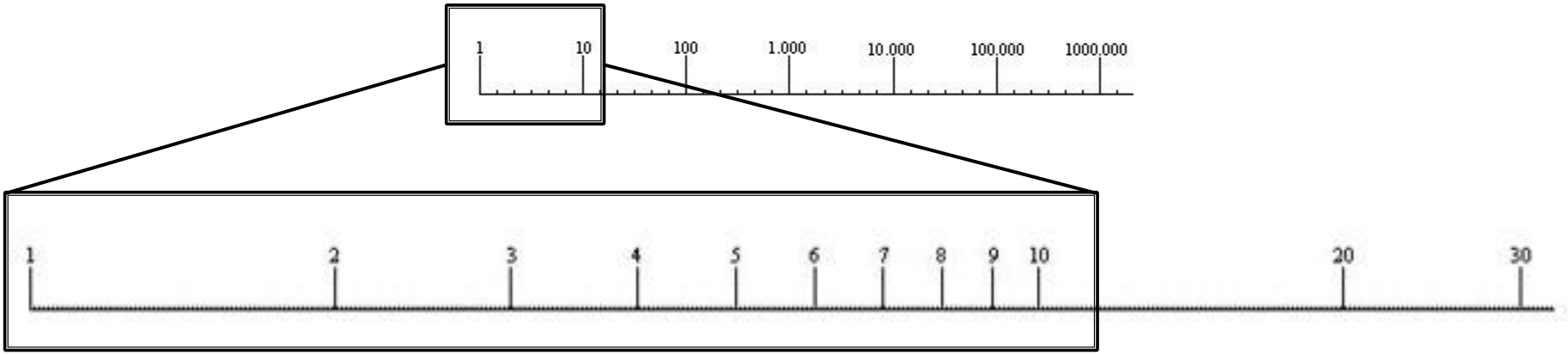
Experience Curve (2)



Logarithmic Scale

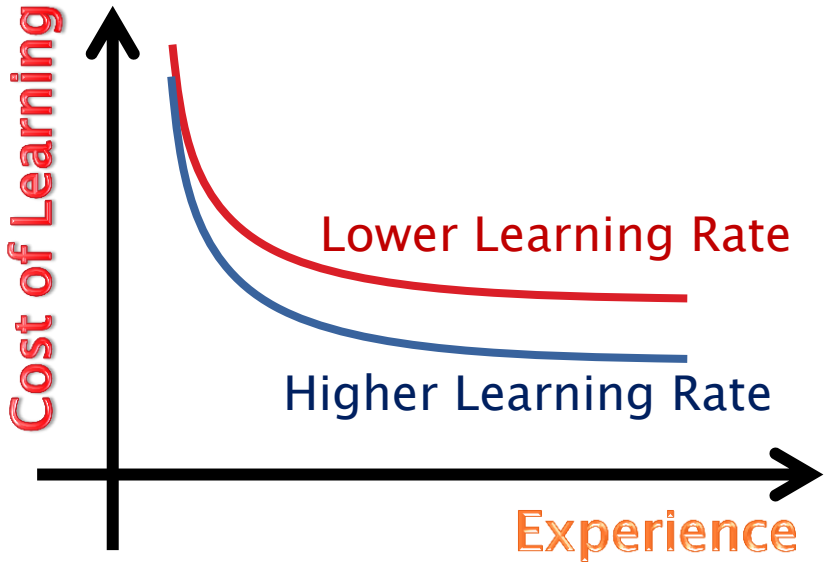
- Experience Curves are represented using the logarithmic scale

- A logarithmic scale is a nonlinear scale used when there is a large range of quantities



Experience Curve (3) – Shape

- Experience represented in Linear Scale VS Cost of learning rep. in Logarithmic Scale



Characteristics:

- Experience Curves has a minimum limit to cost of learning
- This minimum limit depends on learner learning rate

Experience Curve (4) – Game Context

- How to decrease the cost of learning process?
  - **You cannot decrease the learning rate of users!**
    - As for Learning Curves, each user has his own Experience Curve
  - You should encourage users to **spent more time** in the learning process:
    - Recognize their progesses with rewards
    - Use a positive approach when users fail some task
    - …

Experience Curve (5)

- Why is so important the experience curve?
  - Users can really feel the so called **EROEI**:
    - **Energy Returned On Energy Invested**
  - What does it mean?
    - If you spend a lot of time in a game, then you expect to gain more experience. You expect to become more able to play it, stronger and more expert.
    - If you do not perceive this kind of progress is very likely that you will abandon that game: it is simply not worthy!

Interaction Design (IxD) (1/4)

- To facilitate the learning progress the Interaction Design (IxD) cover a critical role

- IxD is often associated with the design of system ***interfaces***
  - but concentrates on the aspects of the interface that define and present its **behavior over time**, with a focus on developing the system **to respond to the user's experience** and not to the technical issues.

Interaction Design (IxD) (2)

- The 5 dimensions of IxD:
  1. **Words** (voice, text, messages, …)
  2. **Visual Representations** (figures, icons, banners, …)
  3. **Physical Objects or Space** (windows, rooms, …)
  4. **Time** (contents that changes over time, …)
  5. **Behaviour** (contents that changes accordingly to user actions or behaviours, …)

Interaction Design (IxD) (3)

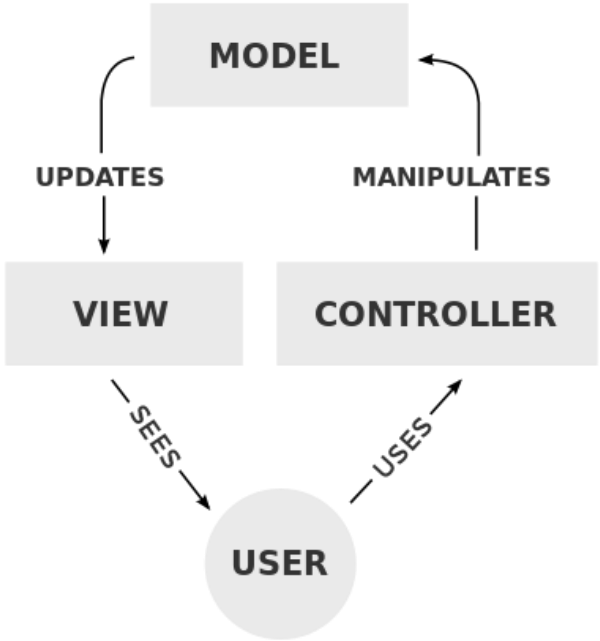
- The 4 activities of IxD:
  1. **Goal and Requirements definition**
  2. **Design**
     - Conceptual Design
     - Physical Design
  3. **Implementation**
     - Release of a prototype
  4. **Evaluation**

Interaction Design (IxD) (4)

- Each user interacts with the system in his own way
  - However, the interaction is strictly related to the goal of the system
- IxD exploits archetypes of users and customers called ***Personas***
- IxD is related to Model-View-Controller (MVC) architectural pattern and Human-Computer Interaction (HCI)

MVC Pattern

- The Model–View–Controller (MVC) architectural design pattern divides a software application into three interconnected parts:
  1. **Model**
     - Handles the logic of the sw
  2. **View**
     - Handles the display of the data
  3. **Controller**
     - Handles user interaction



Human-Computer Interaction (HCI)

- HCI includes methods for describing and testing the *usability* of interacting with an **interface**

- HCI define the "**loop of interaction**", that includes:
  - **Audio** and **Video** based **interactions**
  - **Task Environment** (user side)
  - **Machine Environment** (computer side)
  - **Input Flow** (from user to computer, within task environment)
  - **Output Flow** (from computer to user, within machine environment)
  - **Feedback** (about input and output flows)

- We are interested in **Graphical User Interfaces (GUI)**

GUI Design (1/3)

- L. Constantine and L. Lockwood states several principles to user interface (UI) design:
  1. **Structure**
     - concerned with overall UI architecture, the elements of the UI should be positioned in a structured way
  2. **Simplicity**
     - Common tasks should be performed in the easiest way
  3. **Visibility**
     - Needed elements should be always visible, while UI should limit at most distracting elements

GUI Design (2)

4. **Feedback**
   - UI should keep user informed about its current state (e.g., using loading bars during loading operations)

5. **Tolerance (UI forgive the user)**
   - UI should allow undoing and redoing, and generally be tolerant with user errors

6. **Reuse**
   - Use the same elements in different views of the UI

GUI Design (3)

- J. Raskin add 2 more principles, based on the Asimov's laws of robotics:

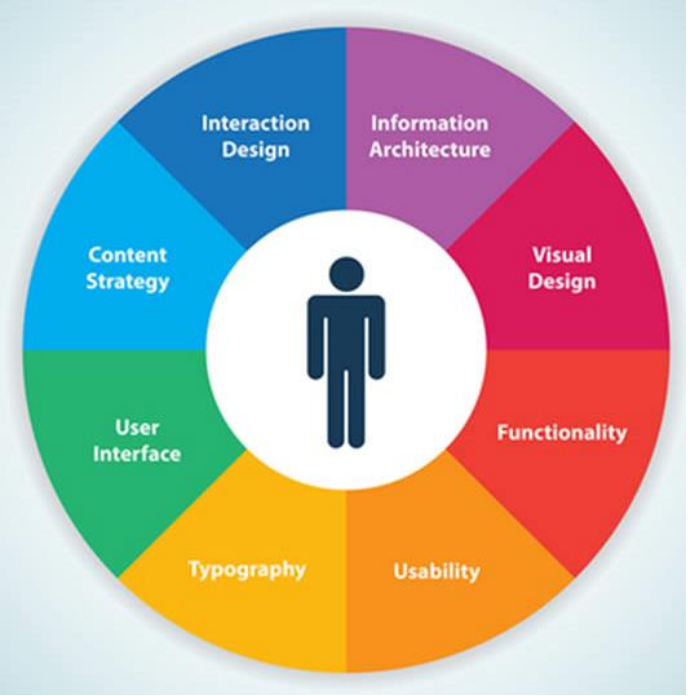
7. **A computer shall not harm your work or, through inactivity, allow your work to come to harm**

8. **A computer shall not waste your time or require you to do more work than is strictly necessary**

User Experience (UX) (1 /3)

- UI is one of the many elements that influence the so called User Experience (UX). Some of them are included in the figure below.

- UX has been defined in the ISO 9241-210 as
  "a person's perceptions and responses that result from the use or anticipated use of a product, system or service"



User Experience (UX) (2)

- The ISO also list three factors that influence user experience:
  - System
  - User (yes, the user himself!)
  - The context of use

- Then, ISO hints “Usability criteria can be used to assess aspects of user experience”

User Experience (UX) (3)

- Users' feelings, motivations, and values are given as much, if not more, attention than
  - **efficiency**,
  - **effectiveness** and
  - **basic subjective satisfaction**
  - (i.e. the three traditional usability metrics)

- For instance, UX provided a platform to cover the interests of all the stakeholders involved in a website design:
  - Usability is valuable for marketing, branding, and popularity issues

UX Design (UXD)

- UXD is the process of enhancing user satisfaction by improving
  - usability,
  - accessibility, and
  - pleasure provided in the interaction between the user and the product

- Starting from HCI, UXD extends it by addressing all aspects of a product or service as perceived by users

UX Evaluation (UXE)

- Implicit UXE Methods:
  - **User Tracking and Profiling**
  - **Eye Tracking**
  - **HeatMap of salient zones**

- Explicit UXE Methods:
  - Usability testing
  - Emotion evaluation
  - Survey

Mockup of a GUI UX-oriented

- UI that show the end-user what the software will look like without having to build the software or the underlying functionality
- Can range from very simple hand drawn screen layouts, through realistic bitmaps, to semi functional user interfaces developed in a software development tool
- TUTORIAL → Try to make your own mockup!

Tutorial – Make a Mockup

- Take a random ticket, then…
  - If you take a «website»
    - Home page
    - Create account page
    - Main task related to the website
      - i.e., e-commerce website → new order page
  - Otherwise, if you take a «videogame» or «app»
    - Main menù
    - Create your account/character sheet/page
    - Achievement sheet/page