

TCSL-70130 Lecture 06: Multimedia in Education 多媒體科技之教育應用

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Lecture Topics

- An overview of **Multimedia** technologies
- Multimedia technologies in **education**
- Multimedia in education **tools/apps** case studies

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What is Multimedia(MM)?

- **Multimedia** is **content** that uses a combination of **different** content **forms** such as text, audio, images, animations, video and **interactive** content. (Wikipedia)
- **Multimedia** is the **field** concerned with the **computer-controlled integration** of text, graphics, drawings, still and moving images (Video), animation, audio, and any other media where every type of information can be **represented, stored, transmitted** and **processed digitally**. (Dave Marshall)

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Multimedia Content & Devices

- Multimedia can be recorded and played, displayed, interacted with or accessed by **information content processing devices**, such as computerized and electronic devices, but can also be part of a **live performance**.
- **Multimedia devices** are electronic media devices used to **store** and **experience** multimedia content.

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5 Multimedia / Hypermedia

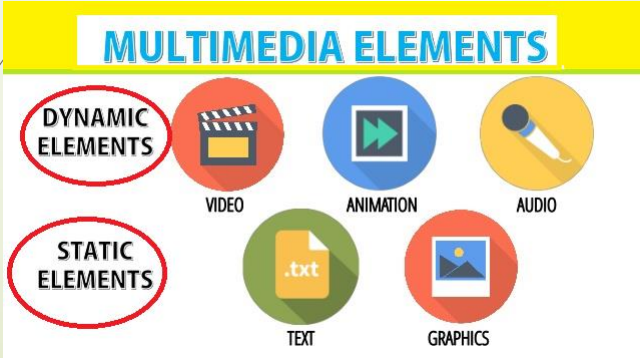
In the 1993 first ed of *Multimedia: Making It Work*, **Tay Vaughan**:

- **Multimedia** is any combination of text, graphic art, sound, animation, and video that is delivered by computer.
- When you allow the **user** to **control what** and **when** these elements are delivered, it is **interactive multimedia**.
- When you provide a **structure of linked elements** through which the user can **navigate**, interactive multimedia becomes **hypermedia**.

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6 Elements of Multimedia

- **Elements of multimedia:** text, graphics/images, audio, video, animation, ...
- Multimedia can be **static** or **dynamic**.



The diagram, titled "MULTIMEDIA ELEMENTS", is organized into two categories:

- DYNAMIC ELEMENTS:** Represented by a red oval, this category includes three icons: a clapperboard for "VIDEO", a play button for "ANIMATION", and a microphone for "AUDIO".
- STATIC ELEMENTS:** Represented by a red oval, this category includes two icons: a document with ".txt" for "TEXT" and a picture icon for "GRAPHICS".

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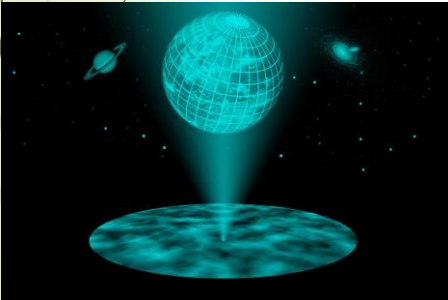

7 General Definition

- Multimedia is the combination of two words: "multi" and "media".
- Therefore multimedia is any possible combination of multiple media types as channels of communication.
- As technology advances, new media types may become elements of multimedia. (next)
- As long as they carry messages and are used as channels of communication.

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8 New Media Types

- Virtual/Augmented/Mixed Reality (VR/AR/MR)
- Hologram (全息投影)
- Projection mapping (光雕投影)



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Advantages of MM in Education

- Increase **learning effectiveness** (convey information, explain difficult concepts, ...)
- Increase student **interest**, enrich **experience**
- Address multiple learning **styles**
- Easy **access** and fast **delivery** of content
- **Flexible** learning at **anytime & anywhere**
- Inspire **creativity**
- Reduce training **costs**
- Have **fun**

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Disadvantages of MM in Education

- **Development** costs
- Learners **hardware & software** costs
- Information/cognitive **overload**
- **Reduce** learning **demands** on students
- Use multimedia for the **wrong purposes** (piracy, pornography, etc.)
- **Negative social aspects** (estrangement, socializations, inhumanity, ...)
- **Healthy** issues

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MM Elements in Edu — Text

- **Text** are still the **most basic** and **important** element in MM
- Can give the **most impact** on the **quality** of interaction
- Text are more **direct** and **easy** to use/understand
- Used to provide **important** information
- **Multimedia text** with rich **styles, fonts, and colors** can increase learning effectiveness



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MM Elements in Edu — Graphic

- **Graphic** are **2D figure** or **illustration** (picture, drawing, photograph, images, ...)
- **Backbone** of other MM types
- **Visualize** important part of learning content
- **Illustrate** concepts, add **emphasis**, direct **attention**, enhance **memory**
- Offer **informational** and **background** for content
- Help **navigation** control




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MM Elements in Edu — Audio

- **Fundamental** to multimedia
- Provide **narrative** and/or **explanation**
- Act as a **notice** or **warning**
- Enhance **attraction** & increase **concentration**
- **Interaction, chatting,** and online **discussion**
- **Long distance** learning
- Help **disable** (such as **blind**) students
- Add **music** in learning process
- The only media that can **perceive** and **drive** at the same time




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MM Elements in Edu — Video

- Present info beyond ordinary scope
- Combine **graphics** and **audio**
- **Powerful** and **immediate** info delivery
- Provide **visual** stimulation
- **Highlight** key points
- Understand **real life** situation (seeing is believing)
- Enhance **practical skill**
- **Record** learning progress

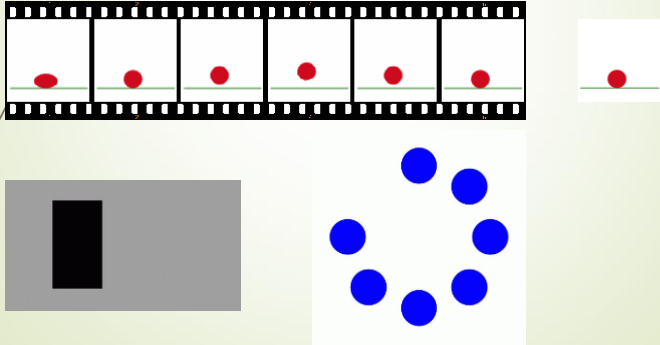


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MM Elements in Edu — Animation

- **Animation** are created using continuous motion and shape change combined.
- **Persistent of vision** and **phi phenomenon**

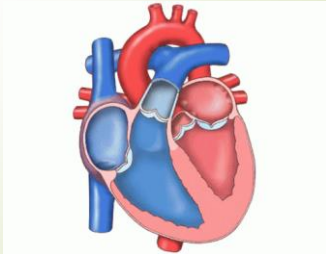


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MM Elements in Edu — Animation

- **Animation** are **different than video**.
- Video is taken from real life event while animation are usually taken from **drawing**.
- Help teachers to **explain difficult concepts**.
- Help students to learn **faster** and **easier**.
- Animation software help improve students **creativity**.
- **Fun** in learning



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17 Characteristics of Educational MM

Screen design:

- To **coordinate** text, graphics, ... to present **sequenced content**
- **Facilitate learning** and **enhance** student's **understanding**
- Each screen must provide **effective instruction** and **navigation tools**
- **Boost** the student's **interest** and **convey info**
- Should require **focusing** student's **attention**, **maintaining** their **interest**
- Promoting **processing** and **engagement**
- Help student **find** and **organize** info with **navigation guide**

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18 Characteristics of Educational MM

Interaction and feedback:

- Allow student to **interact** and **control** the **flow** of info and **stage** of learning.
- Enable student to be an **active participant**
- Provide **feedback immediately** following a student response.
- Feedback is info about the **correctness** or **appropriateness** of student's response
- Provide **further instruction**

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Characteristics of Educational MM

Navigation:

- Enhance learning outcome
- Make and interactive MM **easy to use**
- Provide students some **control** over the events
- Can **jump** into new sections or **revisit** earlier content
- Allow students to **control the pace** such as slow down, start and stop at certain point

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Characteristics of Educational MM

- Use **video** and **audio** elements properly.
- **Help** students with **poor reading** and **learning skills**.
- Dynamic video and audio contents are **easier to learn** than static materials.
- Can **support text**
- Should allow students to **pause** and **repeat**.
- Should not allow the **entertaining elements** to overshadow the **learning content**.

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MM in Education Case Studies

- The **CAEME**(Computer Application of Electromagnetic Education) project is a successful early demonstration by IEEE.
- **Greenfoot** is another well studied MM tool for teaching object-oriented programming.
- **VAE** is developed based on the ADDIE (Analysis, Design, Develop, Implement, and Evaluate) model of instructional design.
- **Mondly VR, ImmerseMe, VirtualSpeech** are Apps for language learning with VR.

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Concluding Remarks

- Multimedia are **excellent tools** for educational purposes.
- Teachers must understand the **power**, the **advantages**, and **disadvantages** of MM.
- Learning can become much **easier** and **fun** with the help of multimedia.
- Many **multimedia tools** are available for teachers (and students) to create learning content.

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