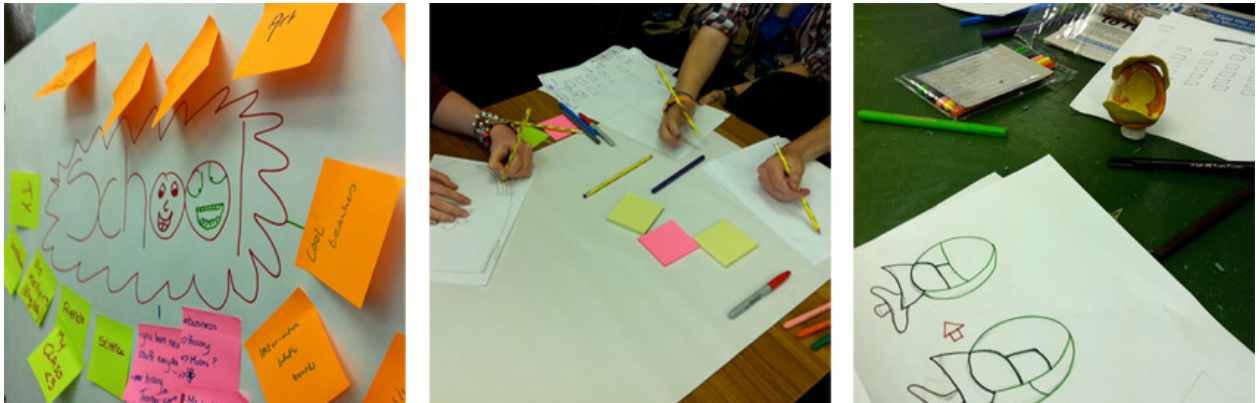# Learning through design thinking

Overall aim

To engage students in real-world projects, which gives them the opportunity to develop key skills such as critical thinking, self-directed learning, creativity, problem solving, communication and collaboration.

Approach

Structure lesson plans into design thinking projects.

Design thinking

Design thinking in education involves engaging students in a form of project-based learning where they are using the mindset and methodology of design to find and solve problems. Working in this way encourages students to become more engaged in their learning when they have ownership over projects that bring relevance to the subject matter being studied.

Before you start

Group-work

Collaboration is central to design thinking and an essential skill for students to develop. Having a group of students working together with a variety of strengths and perspectives will enable them to solve complex challenges. Groups of two to five work best.

Working spaces

Giving each group a dedicated, immersive working space for the duration of the project gives them a physical place to share research and ideas and display work and sketches

created throughout the project. This space could be a wall in the classroom, flip chart boards, or large sheets of card.

Materials

Some suggested materials are listed below. Students should be encouraged to use their own notebooks for taking notes throughout the project.

- Post-it notes
- Flipchart paper (or other large sheets of basic paper)
- Markers
- Dot stickers
- Digital/video cameras (students often have a camera on their own phones/mp3 player)
- Cardboard
- Lollipop sticks
- Pipe cleaners
- Glue
- Scissors

Lesson timeframe

Small: Can be run over the course of 1 to 2 hours. Focus on one subject area.
Medium: Can be run over 1 to 10 day periods. Can focus on one or more subjects and can allow for the students to delve deeper into the topic.
Large: Can be run over several weeks. The level of learning involved here means that these size projects will typically span across multiple subject areas.

Lesson Plan for English

Learning Objectives

English: Developing a deeper meaning of the characters and context of a piece of English literature.
Art & Design: Learning about the design process and using design for problem solving.
ICT: Developing ICT skills through research and presentation techniques.

The challenge

A challenge can be developed by looking at a setting in English literature, identifying characters and any potential problems. Structuring an English lesson around a design challenge can give the learning more meaning as the students immerse themselves in

the lives of the characters. The challenge should be framed by identifying one of these characters and a problem they face.

Example 1: If a character has done something that has caused a series of disasters to happen.
 "How might [character] _____ have done [something] _____
differently to prevent [disaster] _____ from happening?"

Example 2: If a character is in a negative setting, for example prison, a possible design challenge could be;
"How might we make [character] _____'s life in [setting]
_____ more bearable?"

Stage 1: Empathy
The empathy stage of the project focuses on observing and engaging with various people associated with the project, in this case literary characters, to discover and understand their needs and any potential problems they face. Identifying these opens up opportunities for problem solving and design.

Activity: Role play
1. Divide students into groups.
2. Assign a character/historical figure to students in each group and ask them to imagine that they are in the shoes of this person.
3. The students should do research in order to fully immerse themselves in their roles.
4. Students will role play to empathise with the character.

Activity: Observation
1. Ask each group to plan a performance of a scene.
2. Each group will perform for the class. The other students will use this for observation.

Other activities:
Interviews: Ask the students to interview the various characters in the other groups.
Video observation: Show a film version of the piece of literature, if available.

Stage 2: Define
During stage 2 students will analyse and reflect on the information gathered as a way of identify the needs and potential problems that could be solved.

Activity: Sharing stories

Students share the information they've gathered with the rest of their group. While one student is sharing, the others capture key quotes, surprising insights and other bits of information on post-it notes, keeping one point per post-it.

Activity: Share and analyse research

Following on from the sharing stories activity, groups should display all post-it notes of interesting findings on their team wall. Photos and any other imagery or notes that are important should also be shared. In order to analyse this the students should then group the pieces of information to identify common themes and patterns that have been uncovered through research.

Image courtesy of Stanford d. school

Activity: Empathy map

The empathy map is a way of analysing observations in order to identify needs. To do this, ask students to draw their own representation of the diagram. Ask the students to look at their research and to populate the empathy map.
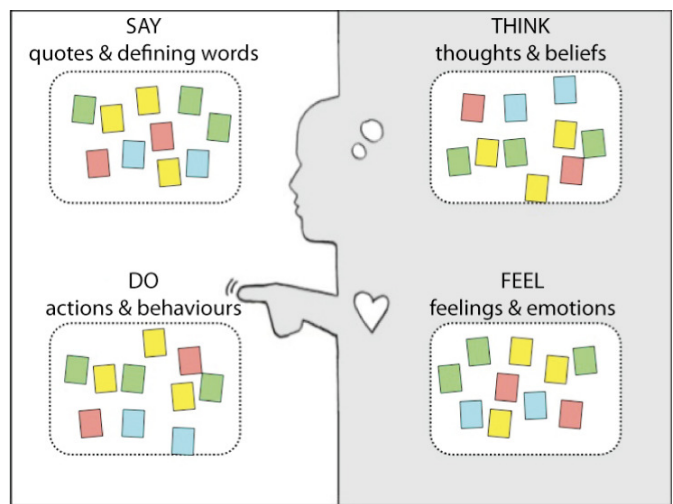
Activity: Identify needs

The next phase is to extract the needs of the person. Ask students to note these needs on the side of their empathy maps.

Activity: Identify insights

An insight is something surprising or remarkable that has been discovered through analysing research, this is often the deeper meaning attached to the needs identified. Ask the students to discuss any comments or findings that are surprising or interesting to them. Ask them to record these as their insights on the right side of their empathy maps.

Activity: Define Point of View

The next phase of the process involves students defining a point of view based on their findings about the character, their needs and the key insight uncovered. This point of

view captures the teams actionable problem statement that will lead them into the ideate stage of the project.

A point of view can be framed using a sentence like this:
"[User] _____ is a [who is this user] _____ who needs [need] _____ because [insight] _____."

Stage 3: Ideate solutions

Activity: Brainstorming

Brainstorming is a method of rapid idea generation. The guidelines below will encourage creative output.

-Set aside a short period of time, approximately 15 to 30 minutes to rapidly generate as many ideas as possible.

-Encourage rapid idea generation by asking students to stand up while brainstorming.

-Use a vertical wall space or board to post up ideas and encourage students to work closely together around this communal wall space.

-Use post-it notes, one idea per post-it.

-Encourage students to be visual.

-Ask students to defer judgement and instead build on the ideas of others.

-Encourage wild ideas.

Activity: Idea selection

1. Give each student three votes with post-its or dot stickers.
2. Ask the students to silently place a sticker on each of the three ideas that they would like to develop further.
3. The three ideas with the highest number of votes are then taken forward. One of these can be selected to develop further or the three ideas can be merged to form one idea.

Activity: Idea development

Set some time to allow students to develop their idea further. Encourage sketching and mind-mapping.

Stage 4: Build solutions

The next stage is to build a physical representation of the idea so students can show their ideas and get feedback.

Activity: Paper

Paper is used to mock-up ideas for software or websites. To do this students can create and sketch elements of the interface on pieces of paper, post-it notes or card.

Activity: Physical

Physical modeling is done with card, lollipop sticks, pipe cleaners or any basic materials that will allow the students to physically create a 3D representation of their idea.

Activity: Video

Video can be used to demonstrate a form of technology that is not possible to physically build.

Activity: Intangibles

Some ideas students will create may be intangible, for example an experiences or system. A series of sketches that tell a story, story-boarding, can be used to tell the story of how something would work. Role playing can also be used to communicate an idea.

Stage 5: Test solutions & re-develop

Students will use their sketches and physical models to present and test their ideas.

Activity: Feedback

1. Ask students to present and get feedback on their ideas from each-other.
2. Groups should re-form and discuss how their ideas might be refined.
3. Students should make any changes necessary and prepare for final presentation.

A final presentation session should be held where all teams present models and any sketches, videos, or supporting presentation material. If possible showcase the outputs from the project.

Design Thinking Lesson plans could also apply to History

Learning Objectives

Art & Design: Learning about the design process and using design for problem solving.
ICT: Developing ICT skills through research and presentation techniques.
History: Developing a deeper understanding of the key figures and events in History.

The challenge

Similarly to the English lesson play, a challenge can be developed by looking at an event in history, identifying key figures and any problems encountered. The challenge should then be framed by identifying one of these key figures and a problem they face.

Once the challenge is framed follow the activities proposed in the English lesson plan.

Design Thinking Lesson plans could also apply to Geography

Learning Objectives

Art & Design: Learning about the design process and using design for problem solving.
ICT: Developing ICT skills through research and presentation techniques.
Geography: Learning about sustainability through a real-world project.
CSPE: Developing a sense of social responsibility.

The challenge

Example 1: Home + Brown bin usage
"How might we encourage people to use the brown bins in their homes?"

Example 1: School + Paper wastage
"How might we reduce our school's paper footprint?"

Example 3: Community + Water wastage
"How might we make people in our community aware of the wastage of water in our area?"

Follow the activities proposed in the English lesson plan and ask students to develop ideas to address any of these geography-related challenges. For more in-depth work, students could be asked to build prototypes of any proposed solution which could be used to elicit feedback from potential users.