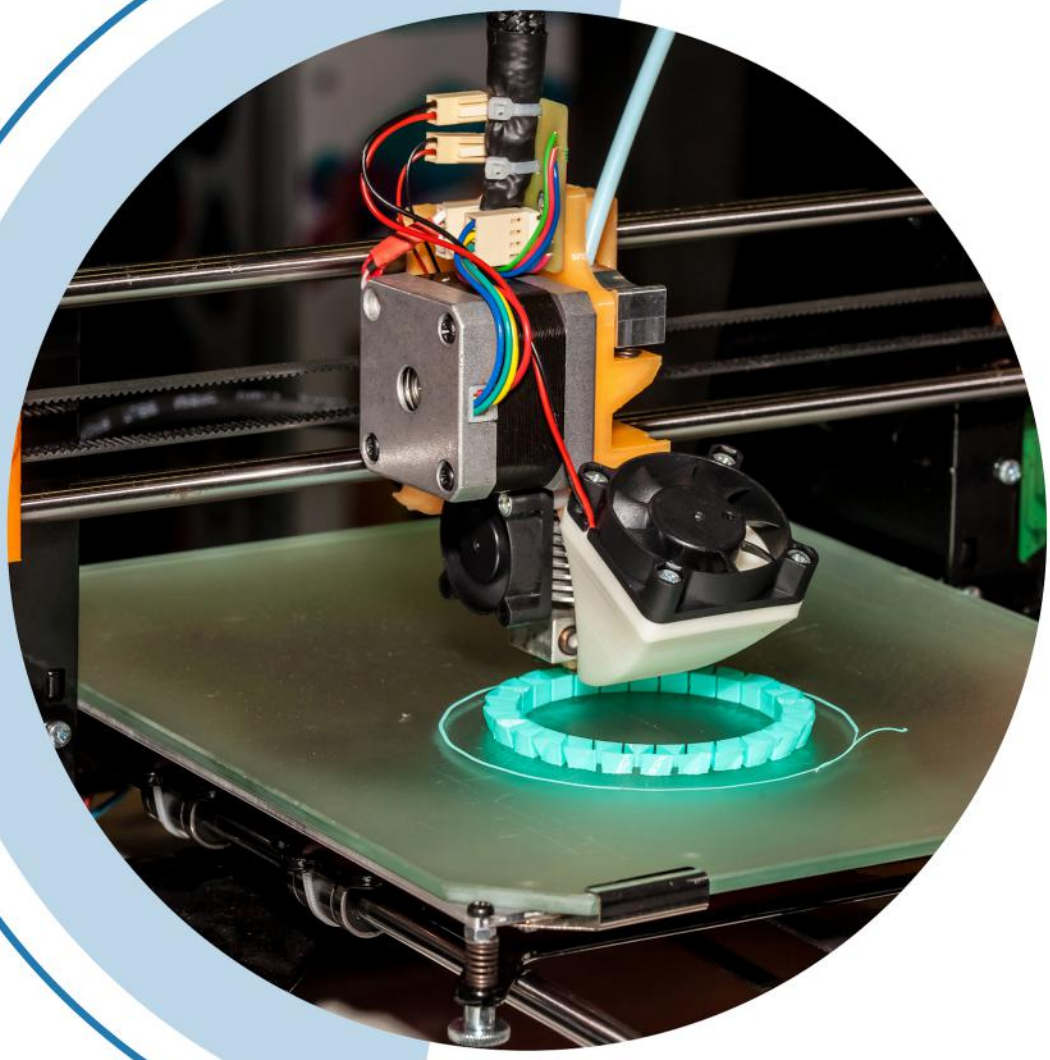
DP Design Technology

Preparing students for their IA



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Your Role as the Teacher

The Design Technology IA is a comprehensive portfolio that should include many revisions and evolutions of the prototype, therefore I like to plan out this project over the course of two years, giving students ample time to explore and test their solutions.

You play an important role during both the planning and execution stages of the exploration. You should see your role as a guide or facilitator and familiarize your students with the requirements of the IA, the IB academic honesty policy, and the specific assessment criterion for which they will be graded.

A benchmark approach or a timeline of expected progress of some sort will enable students to take a large scale project and break it down into smaller, manageable parts. Also, teachers should have grade rubrics available for a streamlined grading process.

Encourage your students to do the following when planning their investigations:

- Pick a topic you actually find interesting!
  - The examiners want to see inquisitiveness, interest, and engagement with the subject.

- Use, but don't copy, existing design portfolios.
  - The best IAs are those which have an appropriate design problem and has a clear target audience.

I find that the most difficult part of beginning the IA is finding an appropriate design opportunity to begin with. I usually begin the topic choice by having students view the examples provided by IB and complete a mock grading activity. This allows the students to get a holistic view of what the project entails before beginning and choosing a topic.

Next I have students keep a design journal where they take note of any design opportunities they observe or think of over a several week period. I then individually conference with students to assess where they are at and what they may choose, helping to guide them in the right direction. It is imperative that as the advisor of the IA you guide students from the very beginning of the project as the project be feasible skill, time, and material wise.

I also try to gauge the students interest in their chosen topic as students who find something that they are truly interested in will put forth a much greater effort than students who just choose what they think they are supposed to do. I've observed that students get burned out and disinterested in design projects that have no meaning for them. If students are having difficulty thinking of a project, I remind them that as designers it is important to think about opportunities that would make areas more efficient, make designs more sustainable or environmentally friendly, or to focus on creating a design for people with different ability levels to improve their daily life. One should also note that projects must be tangible items, not software or apps.

I also advise that you remind students not to try and immediately think of a solution and stick to it, but to follow the design cycle and gather as much primary and secondary research as possible, then explore multiple options before narrowing down to a final design.

My notes

How the IA Criteria relate to the Topics

Criterion A : Analyzing a Design opportunity

Topic 5 -Invention and innovation:
This topic addresses the ways designers have made discoveries and solved problems, whether it be product discontent, or a design analogy. I like to relate this topic based on discovery and creative solutions to students choosing a design opportunity.

Topic 1 - Human Factors and Ergonomics:
It is important that students have an understanding of where to find and how to apply anthropometric data and other human factors to their designs. While a large portion of design specifications will be based on environmental factors such as materials, and space it inhabits, ultimately it is people who interact with the products, and time should be spent researching what is needed to best fit the user needs.

Topic 7 - User centered design (HL):
This relates to justifying design specifications based on user feedback. This topic covers ways of gathering primary data from users, such as user trials, surveys, field tests.

Criterion B: Conceptual design

Topic 3 - Modeling:
I usually teach this unit in conjunction with this IA criteria because so many of the skills relate. I begin with teaching design sketching methods such as perspective, shading and proper annotations. Then I provide time for students to take the skills learned and apply it to their IA. I also teach CAD in conjunction with this topic and their detailed development plan.

Criterion C: Development of a detailed design

Topic 4 - Final product:
For material selection and manufacturing of the prototype it is important that students have a good overview of material properties and can make the most informed choice based on mechanical properties, availability of materials, and available equipment.

Topic 3 - Modeling:
After having students practice various forms of CAD (Computer Animated Design) I have students create their final detailed design. There are many free programs available to educators such as Autodesk Inventor and Google Sketchup. There are also apps that allow you to create more professional looking drawings but are not as involved as the prior CAD options including Conceptdraw and Paper53.

Criterion D: Testing and evaluation

Topic 1 - Human Factors and Ergonomics:
Along with the functionality of the product, students should refer back to this topic to evaluate how their final prototype meets physical, physiological, and physiological needs of users.

Topic 7 - User Centered Design (for HL students):
Students will want to consider how they will gather information on how their product meets design specifications. Data on some of the specifications will be easily measured such as weight and height, but others will need a system of gathering user feedback form interviews to field tests which this topic covers in detail.

Criterion E: Detailed development of a commercial product and Criterion F: Making choices for commercial production (HL Only)

Along with modeling from topic 3 and knowledge about the mechanical properties of materials in topic 4 final production the HL topics that students will be addressing in this criterion are based on topic 10 Commercial Production. Students will address best practice including whether their product made JIC or JIT, the best workflow procedures including types of production equipment.

Lesson Plans & Activities

Here are some learning activities and lesson plans to help you plan and support your students as they prepare and create their IA.

Read through each type of activity. Then find the printable in the Resources section.

Analyzing a Design Opportunity

Criterion A is the research portion. Here students are deciding on what issue they'd like to address, outlining product goals and constraints, then completing in depth research both primary and secondary to create a comprehensive design specification. This section usually takes my students the longest as it is crucial to have well-developed research and design specifications as a foundation for the rest of their IA.

In the resources section, find:

- A template for your students to use for criterion A.

Lessons on Sketching

I like to share examples of design sketching to students to inspire them. Then I give them a template to help them as they develop their own design.

In the resources section, find:

- A PowerPoint presentation with sketching examples to show to your students.

Scaled Prototypes

We also have a project where we create scaled prototypes, here I discuss using recycled or abundant resources such as cardboard for simple prototypes.

I find these videos particularly useful in relaying the fact that through resourcefulness and creativity they can make surprisingly well constructed prototypes of their designs.

https://youtu.be/k_9Q-KDSb9o

https://youtu.be/gWk6br5Ngkc

Development of a Detailed Design

For the detailed plan of manufacture of the prototype students can use the Gantt chart as well as use a template to help guide them through this process.

In the resources section, find:

- A Gantt template for your students to use.
- A template for the development of a detailed design.

Testing and Evaluation

Students should be sure to evaluate how their product performs on all of its design specifications and record their findings in a concise manner. When presenting design changes I always tell my students if they have done their design in CAD well, the easiest way to present changes is to edit their original Designs. If not they may add annotations to photographs of their prototype.

In the resources section, find:

- A template students can use to keep themselves organized throughout this process.

Conclusion

Think about when you think you will introduce the individual investigation of the IA to your students.

1. If you will teach Design Technology over one year, will it be at the beginning, middle, or end of the year?
2. If you teach the class over two years, will it be introduced in year one, year two, over the Summer?

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After you decide this, also consider how much class time the individual investigation will take, how much personal time your students will need to plan for to complete the IA, and how you may help students best pace their progress in this experience.

Final Best Practices

- Pace, pace, pace! Keeping your students accountable for parts of their IA over time help them produce a more quality product than what would be produced in one, hurried deadline.
- Use a rubric of your choice that aligns with external moderator expectations and assessment language. There are many published and available, just find one that suits you!
- Assign small, 'practice pieces' to the IA. This not only helps students get a better hang of how to create their own final product, but gives you crucial practice in grading IA's.

Notes

Teacher Reflection

Think about your own students and classroom environment. What are some ways you can prepare your students for their IA?

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My notes

Resources

Find all the printables that were discussed in this Print and Go Pack by downloading the individual files in this Pack.

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