

Technology Education Key Learning Area
Teacher's Experience Sharing
Design and Applied Technology

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Background

Objectives and Highlights of DAT

- **Students learn to suggest alternatives, tackle unexpected results and manage failures in various technological areas.**
- **Students are expected to reflect on their learning, solicit feedback from their teachers and peers, illustrate and present their learning outcomes, and document the learning process.**
- **Enable students to develop positive values and attitudes such as perseverance, resilience and risk-taking.**
- **Innovation and entrepreneurship are the two core concepts to be developed through the study of DAT.**

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Information about the School

- TWGSS is one of the elite schools in the TW district.
- Students are very busy.
- Students who study DAT were mainly from the group at the bottom end in the classes.
- M3 and M5 as elective part of DAT.
- In general, the curriculum time for D&T was about 47 hrs. at JS level.
- At S4 and S5 levels, 5 students were taking DAT at each level. The total curriculum time was about 263 hrs. at SS level

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Reflection:

The school preferred to provide a more diversified curriculum for students,. In the school year 2009-10, the school offered DAT Course for students even the number of the students is 8 only. In 2010-11, the school authority planned to act as a cluster school to serve potential students from neighbourhood EMI schools.

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Considerations and Implementation

Curriculum Planning for DAT

Level	Topics	Coursework
S4	Compulsory Part Strand 1: Design and Innovation Strand 2: Technology Principles Strand 3: Value and Impact	Design Project ♦ Chair design with model making and presentation ♦ Hair dryer design <u>Case Study</u> ♦ Mobile phone Theme-based Learning ♦ Octopus card ♦ Track guided vehicle
S5	Elective Part Module 5: Visualisation and Computer-aided Design (CAD) Modelling	<u>Case Study</u> ♦ Michigan's Gateway bridge <u>Theme-based Learning</u> ♦ Action Torch <u>Practise</u> ♦ 3D modelling, sketches, drawings <u>SBA</u> ♦ Identification & analysis of problem ♦ Research, investigation and data collection ♦ Idea sketches & development sketches
S6	Elective Part Module 3: Design Implementation and Material Processing Module	Design Project ♦ Display system <u>Case Study</u> ♦ Earphone <u>SBA</u> ♦ Design Portfolio ♦ Final Product/solution

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Reflection:

Through the Chair Design Project, students engaged in technological activities which enhance their creative and critical thinking. In order to reveals what students know and don't know, and their strengths and weaknesses, students' performance in the coursework is used as a tool for formative assessment.

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Interface arrangement

- Students' prior knowledge and interests.
- Generic skills, such as, critical thinking skills, communication skills and problem-solving skills
- Design implementation skills, such as application of tools and materials

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Reflection:

- *The JSS students are not ready for DAT. Enhancement workshops are arranged for train up them. Creative mind, communication and problem solving skills are essential for students to take DAT.*

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Interface arrangement

- Design project : Swinging Figure/ Memo Clip, Mini Electric Fan/Photo Stand and Musical Decoration with Motion/ Mechanical toy/Motion Figure/Bubbles Generator in S1 to S3.
- Various concepts and applications in the DAT curriculum, laser cutter, *SolidWorks* and *Robolab*.

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Reflection:

- *Through joining open competitions and DT ECA activities may help students to prepare for DAT providing both the teachers and students have capacity.*

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Curriculum Adaption

- Tailor the Resources Material provided by EDB as the blueprint of the course materials. Adaptations were made according to previous knowledge and experience of his students. Minor adjustments on language were made.

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Reflection:

- *When planning the curriculum and selecting the modules, students' strengths identified are considered. Relevant ECA activities, visits and open competition are arranged in accordance with students' abilities, interests and aptitudes*

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Support Measures and Planning Strategies

- Plan to use SimMan as a self-learning platform at S5-6. Students will explore the concepts, operations and learn to solve production problems at their own pace.
- 1 double-period per cycle arranged at the end of school day

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Reflection:

- *A variety of teaching resources can be employed as tools of learning. For example, computers and CAD/CAM tools can help students to produce high-quality products, accurately and repeatedly, with a range of materials.*
- *There are some resourceful competition held by many organization and post-secondary institutes. Joining this type of competition is a ways to expand the availability of learning and teaching resources.*

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Support Measures and Planning Strategies

- Case Study, Design Project (see **Appendix 2**) and Theme-based learning are the major learning activities.
- Use case studies to conduct investigation tasks, product analysis, observation, and discussion. Design projects were also used to engage students in various problem-solving activities. In all the activities, 'hands-on' practical activities were the essential elements.

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Reflection:

- *Learning and teaching in DAT is structured around enquiry into a range of technological and design contexts. Students are provided with opportunity (Lamp Shield Design) to appreciate the changing, complex and controversial nature of design contexts. Through product analysis, understanding the materials and discussion, students gain new perspective to problem solving as well as develop new design ideas.*

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Assessment Planning for DAT

● ***Assessment Policy and Guiding Principles***

- Alignment with learning objectives, clear assessment criteria and arrangement were well defined.
- Cater for full range of students abilities
- Tracking progress over time
- Varieties of means to assess students performance over time

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Assessment Planning for DAT

- Assessment tasks such as, tests, practical tasks, design projects, case studies and presentations. Students were able to reflect in the assessment process, while teacher could keep track of individual student's learning progress effectively.
- Homework is also another integral part of learning and assessment. Quizzes in the Learning Resources Material as exercise for student on a regular basis.

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Reflection:

- *Different types of assessment including peer assessment, teacher assessment and continuous assessment are provided for students. Feedback on performance provided to students help them to improve in different aspects.*

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Integrating Learning with Assessment

- Theme-based approach “Golden Jubilee Cerebration” was used to integrate learning elements with formative assessment.
- Quizzes and exercises suggested in the Resources Material as a mean to evaluate students’ progress and understanding of concepts and knowledge conducted.

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Reflection:

- *During the course of study, the students find enjoyment and able to develop a sense of ownership and commitment in their learning.*

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Integrating Learning with Assessment

- All the test papers, examination papers, and design projects have the same assessment criteria and were conducted similar to the arrangement in the HKDSE examination. Continuous assessment through coursework and SBA were in place in S5 and S6 respectively.

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Reflection:

- *The format of the assessment is in line with the public examination. In S4-S6, Paper I is arranged in each examination. Paper II is arranged in S5 (yearly examination) and S6. The scores in SBA will form part of the assessment in S5 (yearly examination) and S6, too.*
- *The project, TBL and hands-on exercises are kept to minimal so the students will not be overloaded.*

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Catering for Learner Diversity

- Learner diversity in the DAT class was not obvious. However many gaps in students' performance on writing, sketching, and analytic thinking skills were still identified in S5.
- Flexibility is adopted to structure appropriate, achievable, but challenging activities to cater for students' different abilities. (Game booth and USB Case)

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Catering for Learner Diversity

- Authentic 'hands-on' learning experiences to reinforce the importance of both manipulative and problem-solving skills so that students with a practical orientation to learning could find their own way to perform well.
- Group work different personal characteristics, such as 'thinkers' and 'doers', could learn to support each other in completing the tasks through collaboration.

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Epilog

- A well-structured curriculum in S1-3 that focused on the development of generic skills for design and making can provided a solid foundation for students to explore the technological concepts and knowledge at the senior secondary level

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- The learning activities arranged should closely integrate with formative and summative assessment. Through daily exercises and practises, students were able to reinforce the new concepts and knowledge acquired; while the design projects, tests and examinations provided students with constructive feedback for them to improve accordingly.

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- With appropriate support measures, students could learn successfully according to their interest and ability. Theme-based learning could cater the needs of students and encourage them to expand their potential as well.

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