

Developing evaluation skills in design

Evaluation is an integral and essential part of effective design and problem solving. To produce good ideas, products, systems or environments, that meet design needs and criteria, students need to develop skills in critical analysis and the making of judgements. All technology subjects involve students in analysis and evaluation.

Like all important skills, once you are capable it is difficult to remember how you learnt to evaluate. You may not even be conscious of using the skill. Evaluation becomes automatic.

Often as teachers we expect students to know how to evaluate, without checking to see if they have the skill first. We would never expect a student to use a tool or a piece of equipment properly without first showing them. Likewise we need to build students' confidence and skills in evaluation through explicit, planned and sequenced strategies.

Evaluation is ongoing; it occurs constantly throughout a design project. Formal written analysis at every step in a project can be very daunting for a Year 7 student, as well as tedious and time-consuming.

One of the most efficient and effective evaluation approaches for students to use is talking and listening. Talking through thinking processes with their peers or their teacher helps students to enlist the help of other people and to make more considered decisions. Cooperative peer evaluation is also a foundation of collaborative work practices.



A Gorokan High School student shows his swing tag

During 1998, Fiona Walsh, a technology teacher at Gorokan High School, participated in the Curriculum Support Directorate's Literacy Action Research Project. She undertook to focus on how literacy strategies could be used to improve the evaluation skills of her students.

When Fiona designed a unit of work on clothing and accessories for her Year 7 design and technology class, evaluation was the special literacy focus. Her students had to devise a company name, design a logo and swing tag, then design and make a bandanna or sarong.

Two aspects of language essential to critical analysis and evaluation are questioning and expressing judgements. Fiona created special opportunities for students to practise formulating questions and expressing judgements with reasons.

Evaluating using questions

At the beginning of the unit, while developing students' understanding of the design situation and design brief, Fiona used small-group discussion and whole-class brainstorming. Besides a list of key words, students noted down questions which they could use to clarify their task and some statements expressing things they already knew about their projects.

A class set of key questions was established from those written by groups. The sheet was laminated for display during the unit of work.

These questions and statements served two purposes. Firstly they helped students to elicit information related to the design project. The questions formed the basis of the design criteria for the project and were used as a checklist for students to refer to as they worked. Secondly they served to demonstrate language structures and examples of the correct use of appropriate vocabulary.

Questions are more common in speech than in writing, so students have relatively fewer chances to see them and reflect on their structure. Writing them down, reusing them and modifying them, as they did in these lessons, are very valuable experiences. Some examples of the questions are shown below.

What is a sarong?

What type of material will I use for the sarong or bandanna?

How large should the swing tag be?

How can I market the sarong or bandanna?

Will I place the logo on the product?

Note that all these questions use the formal form with inverted verbs. That is, some part of the verb comes before the subject:

verb	subject	verb
is	a sarong	
will	I	use
should	the swing tag	be
can	I	market
will	I	place

Control of these formal language structures is an important communication tool. By using a whole-class activity to gather suggestions from groups, make a selection, write them down collectively and then display them, Fiona provided her students with questions to guide students' decision-making as well as opportunities to become familiar with the language of questioning.

The writing of questions and statements also helped to stress the need for formal language. When one of the students referred to a local beach having "sick" waves, it was possible to substitute more formal language.

Using evaluation to clarify requirements and improve products

Students need a great deal of help with expressing judgements using reasons linked to project criteria. (See Dian Madden's work on response texts at Albury in **CURRICULUM SUPPORT** Vol. 3, No. 1 1998, p. 1.)

Before the Gorokan students started designing and making their own products, they were asked to evaluate two bandannas or sarongs not made by the class. This evaluation provided valuable clarification of the tasks before they started on their own work. The discussions resembled coaching sessions, with each group working through the design criteria and making judgements, then making suggestions for improvement.

Audio recording

For the purposes of the action research project, and to assist Fiona to analyse the oral language and evaluation skills of the students, the discussion sessions were taped.

Students quickly lose self-consciousness about a small recorder, and recording dialogue and interactions for later reflection can be most informative for the teacher.

The tape revealed that, when the teacher was participating, the students waited for the teacher to

ask questions and set the topic for each interaction. Here are some extracts:

T: *What was the design brief asking from you?*

S: *To be colourful.*

T: *What's wrong with this?*

S: *It's black.*

T: *How could you make this product fit the design requirements?*

S: *Make it colourful. Bright red.*

Use something thicker. Cotton.

Have some iron-on transfers - beach, waves and stuff...

T: *When the design brief says the sarong must be a quality product what do you think that means?*

S: *A good hem so that the material won't fray. Material that's not too thick so it's not too hot in summer...*

Peer evaluation

Student discussion and peer evaluation are effective strategies and can achieve valuable outcomes where students have practised group work and collaboration skills and can demonstrate respect, tact and objectivity in their interactions.

Students need to have a clear understanding of what they are being asked to do, and checklists, such as the agreed set of questions used by Fiona's class, can help to keep students focused. Brainstorming, PMI charts and mind-mapping can be used by students as an evaluation strategy.

A group secretary can be appointed to help record students' comments for later reflection and action.

In some situations it may be more effective for students to evaluate another student's work using drawings or written responses, rather than oral responses.

For more information about peer evaluation or assessment refer to:

- *Assessment and Reporting Issues 7-12. Bulletin 3: Student self and peer assessment*, NSW Department of Education and Training, April 1998
- Harriman, S: *Design it, Make it, Appraise it: Lower Secondary Technology*, Curriculum Corporation, Carlton, 1996

Evaluation involves complex analysis and judgement and the language to support it is also sophisticated. Realistically, students need many opportunities to encounter and gain control of the concepts and language of evaluation.

Teachers need to be aware of the evaluation demands made of students in technology subjects and to plan and implement explicit teaching and learning strategies to assist students to develop evaluation skills.

For more information about literacy and using oral language refer to:

- *Teaching literacy in design and technology in Year 7*, NSW Department of Education and Training, November 1997
- *Literacy for Learning, Years 5-8 CD-ROM*, National Professional Development Program, 1998.

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