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# Values in Technology Education: A Two-Country Study

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Like science, technology, and by implication, technology education, was once thought to be value-neutral. Such propositions are now discredited, however, the question concerning the values that technology educators hold is still an open one. This paper reports on the findings of a pilot study into the values held by technology educators in a selection of high schools in Australia and the Russian Federation.

## Introduction

Since the 1990's Technology education programs, curricula, standards or syllabi have been introduced in many countries including Australia, (Curriculum Corporation 1994a, 1994b; QSCC 2002) America (ITEA 2000) Russia (Lednev et al 1998) and Hong Kong (Curriculum Development Corporation 2000). The programs from which these technology education programs have grown have a history that is variously, craft, industrial arts or work skills oriented. The values within these courses reflected their history and nature.

Contemporary technology education programs represent a significant change from these earlier programs that had quite specific orientations, as they generally propose a wider concept of what technology education should be concerned about. One of the concerns that had been articulated in most technology curriculum documents is an explicit emphasis on values. That is, the values that students should explore, be exposed to and understand, as a result of involvement in a technology education course. However, implementation of any policy heavily depends on teachers understanding the policy and having strategies suitable for implementing it. Two assumptions underpin and provide part of the rationale for the study. The first is that teachers need to have an explicit understanding that values are involved in technology education. The second is that teachers need to understand and be able to use strategies aimed at the development of particular values among students.

## Background

There is a substantial number of publications that argue for the inclusion of values in technology education (Barlex 1993; Breckon 1998; DES/WO 1988; Holdsworth & Conway 1999; Layton 1991; McLaren 1997; Prime 1993). A widely accepted approach to

describing them is in terms of eight categories developed on the basis of theoretical analysis of human needs (technical, economic, aesthetic, social, moral, environmental, cultural and political) (Layton 1991; Prime 1993; McLaren 1997). However, very few studies focused on teachers' interpretation of values. As teachers' values influence the values of their students, an exploration of teachers' values was the central objective for this study. The study was considered important both in order to understand classroom practice, and to inform the process of developing the most effective ways of preparing teachers to deal with values in technology education.

One factor which seems to be missing from the views of all individuals and organisations ...[DATA, OFSTED, DfEE] are the views and opinions of those who deliver a values input to the students, the design and technology teachers themselves" (Holdsworth & Conway 1999, p.209)

Another objective of this study was to trial an instrument for data collection for the comparative study. No comparative studies examining the values held by technology teachers were located in a literature search. However, a number of comparative studies examining teacher values in general were reviewed (see for example, Stephenson, Ling, Burman & Cooper 1998; Steiner-Khamsi & Dawson 2000). Thus, comparative perspective for investigating the approaches to values taken by teachers was another type of literature that informed this study. Comparison between two countries made it possible to examine the issues related to the dimension of specific versus universal characteristics of values in technology education. These studies examined teachers' views on the kinds of values that should be taught in schools and the most effective ways to teach values in schools. The general conclusion was that:

educators lack a discourse to express their ideas about values and to conceptualise the area of values in education. This stems, largely, from the lack of theoretical knowledge and experience educators possess in this area (Ling 1998, p.210).

All studies indicate the importance of establishing an appropriate analytical and interpretive framework for this type of study. Among the issues related to comparative research underlying the study were the following: The meanings ascribed to the issues within the two languages and the assumptions underlying the views of participants in the study.

### **Research Question**

What values do technology teachers express as values for technology education and how do they interpret their roles in dealing with values?

### **Methodology**

The research described in this paper was a trial, with the intention that it would inform the development of a proposal for a larger, funded research project. Only limited University funding was available and the methodology was shaped, to some extent, by this factor. The methodology was qualitative and based on structured interviews with teachers, and a survey they filled out after the interview. The interviewees selected for the study were practicing technology teachers or heads of technology departments. In addition, teachers were selected on the basis that they could be considered to be

competent professionals and to have a progressive outlook on technology education.

Five teachers were selected from Australia, these coming from government high schools in the greater Brisbane metropolitan area. Five teachers were selected from Russia from three regions: Nizhny Novgorod, St. Petersburg and Karelija. All were from state schools. As an exploratory study the study was as much concerned with ways to explore the issue, both in terms of the issue itself, and in terms of exploring it in a cross-cultural context

### **Instrument**

The instruments for data collection consisted of two parts. The first one was a structured interview that explored: the values teachers expressed about technology education and the relationship between their views about values and effective teaching; values in technology education and values in other subject areas; teachers personal values; and the relationship between values and effective teaching. The second data collection instrument was a survey where teachers ranked their responses to a number of statements about professional values. The survey was designed to explore the degree to which teachers' values reflected an emphasis on functional success or moral values, and the relationship between these two values dimensions. Some demographic data were also collected. The interview contained six questions and the survey contained sixteen statements and two questions. One question asked teacher to indicate the proportions of their professional time spent on various aspects that related to values and the second question asked them to describe how they implemented their values in their classrooms. All interviews and surveys were conducted at the schools where the teachers worked, at a time convenient to each teacher.

As an interpretive framework, a model developed by Oser (1994) was used to both develop the interview and survey questions and as the basis for analyzing the teachers' responses. That is, Oser provides a framework based on the analysis of the relationship between the concepts of effectiveness and responsibility in terms of teaching. Oser argues that teachers' professional action should not be guided only by: functional criteria of means and end relations under the perspective of functional success but that: A responsible professional action must be informed by a structure of moral values (Oser 1994, p.60). Oser describes two kinds of relations between functional success and moral values. The first Oser calls the regulative model which is described as the situation where teachers approaches to academic success are moderated by moral considerations. The second is called the additive model, which is described as the situation where moral considerations are seen as additional to functional success.

### **Analysis**

The analysis of data consisted of transcribing each of the tapes of the interviews and sending the transcripts back to interviewees to verify the content. After establishing the final content of transcripts, the interview data were summarised and patterns of responses examined.

The survey data were compared and patterns established for those components of the survey where rankings were used. In this initial study trends and tendencies were

analysed. A trend was defined as a set of responses to a statement where all responses were contained in two adjacent ratings. For example, in response to the statement The role of the teacher is to reconstruct the moral climate of school by transferring responsibilities to students, three Australian respondents ranked it as important and two as very important. A tendency was defined as a set of responses that while not in only two adjacent ratings, loaded to either left or right. For example, in the Russian response to the statement The most important goal for you is to establish interpersonal relationships with your students, three indicated that it was very important, one that it was quite important and one that it was less important. The responses are interpreted as a tendency to view the statement as being important.

As the survey covered material related to and overlapping the interview data, the two were examined separately initially, and then together to establish an overall picture, identify inconsistencies and to provide a small measure of triangulation for the data.

## Results

The interview data for the teachers are summarised in Tables 1 and 2.

## Analysis

### Analysis of the interview data

#### *Australia*

Overall, there was a high degree of congruence in terms of the responses to the interview questions. Technology educators regarded the development of problem-solving skills, development of knowledge about safety, the hands-on nature and the ability to put theory into practice as the important values in technology education. When comparing the values in technology education to those of other subjects, all felt that most could be found in other subjects, but felt that the values were achieved in technology education because of the more authentic contexts. Technology teachers felt that learning values through practical application was the most appropriate approach to teaching values. The responses to the question about values they observed received a variety of responses which included egalitarianism, innovation, work ethic, quality, team problem-solving, lateral thinking and respect for other people's ideas. The variation in response seemed to be a reflection of different observations. That is, some appeared to be thinking of teaching values while others appeared to be thinking of the values observed among students.

The topic of professional morality appeared to elicit caution and vague responses along the lines of, it is important and there should be lots of it. However, apart from one respondent suggesting technology teachers' professional morality should be based on involving students in making the world a better place, no other specific responses were elicited. The question concerning the relationship between teaching effectiveness and moral considerations elicited a consistent response that the two should be integrated, and dealt with through project work.

**Table 1**

Summary of interview responses by Australian Technology teachers

INVOLVE- MENT IN TE	ACTING HOD	HOD	HOD	HOD	HOD
LENGTH OF TIME IN TE	18 YEARS	15 YEARS	22 YEARS	6 YEARS	9 YEARS
What do you see as the values in TE?	Safety, Problem-solving, hands-on, practical application, creative thinking, promoting "smart state"	Problem-solving, understanding the world	Ability to put theory into practice, skills for work and life, safety	Thinking skills, creative thinking,	Development of the person, problem-solve and develop ideas, value for work and leisure
Are they similar or different to values in other subjects?	Different in being based in "real activities", similar to subjects like Art in the design aspect	Similar values to other subjects like Maths and English but TE can achieve them in practice	Similar to Home Economics, students regard TE as more enjoyable than English, Maths or Science	Different, more student-centred	Similar to other areas but TE provides the opportunity to relate to practical skills
How should teachers deal with values in TE?	Through practical application	By integrating them into the projects they give students	Integrated within the subject content	Not sure	By giving students the opportunity to make their own decision
What categories of values do you observe or recognize in TE?	Egalitarianism – kids don't observe a pecking order in TE. Innovation	Strong work ethic, value of quality work,	Safety, respect for other people's ideas, team problem-solving	Lateral thinking, creative thinking, engaging in authentic tasks	Appreciation of quality
What are your beliefs about professional morality?	Teachers should be of high moral character, Involve students in making the world a better place	Teachers should have high moral values (none stated)	Effective teachers should be able to include moral aspects within their teaching	A moral teacher is one who does it for the right reasons, to benefit students	Poor tape quality
What should be the relationship between effectiveness of teaching and moral considerations in TE?	Moral aspects should be integrated into the projects students do	The two need to be integrated, so they are meaningful for kids	An effective teacher should be a moral teacher, effectiveness should incorporate moral considerations	They should be complimentary	Needs a stronger relationship, more emphasis being put on content and its relation to prior knowledge

**Table 2**

Summary of interview responses, Russia

INTERVIEWEE	A	B	C	D	E
GENDER, LOCATION	MALE, N. NOVGO-ROD	FEMALE, N. NOVGO-ROD	MALE, N. NOVGO-ROD	FEMALE, ST.PETERS-BURG	MALE, PETRO-ZOVODSK
INVOLVEMENT IN TE	TEACHER, 28 YEARS	TEACHER, 6 YEARS	TEACHER, 19 YEARS	TEACHER, 5 YEARS	TEACHER, 3 YEARS
What do you see as the values in TE?	Technology is the main subject. It provides a framework to link all subjects in terms of knowledge.	Development of problem solving skills and development of students as creators, not as consumers	To educate a boy, a future head of the family, to teach those skills that he will require at the house to maintain, to fix, etc.	To develop the student and his qualities. It is general educational values as well	To develop the student – not to give him a specific knowledge
Are they similar or different to values in other subjects?	Similar, as moral values are general, but in TE this happened from the first hand experience	Similar, but the paths - how they are presented in the subjects are specific	Different, students learn skills that they do not receive through the other subjects	Similar, personality of the student is a holistic. Specific - possibility for the student to be more active	Similar, moral values can be developed by the other subjects
How should teachers deal with values in TE?	To approached moral issues through the real work, not through lecturing. React on the classroom situations; observe students and guide them in the right direction; involve the class tutors	It is not possible to teach about moral issues - cover issues during product analysis. Resolve all moral dilemmas in the classes + consult with the class tutor. You can teach how to get out from some situations	There is a relationship between technology and up-bringing and the teacher relates it to the students' family	Discuss moral issues through the projects, have some projects on ecological issues, (no time on social issues). React on what students did and on the situations from the real life. Deal with peoples needs	Depends on the situation and on the student - what values to touch. Discuss ecological issues, social (in the senior classes), regional specificity - traditions, economy profile; have a close link with a class tutor

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INVOLVEMENT IN TE	TEACHER, 28 YEARS	TEACHER, 6 YEARS	TEACHER 19 YEARS	TEACHER, 5 YEARS	TEACHER, 3 YEARS
What categories of values do you observe or recognize in TE?	Moral values relate to 'collective': team work, help, friendship, not to do bad things	Different qualities in the students and issues: ecology, spiritual-moral values, historical, nature-person relationships	Ecology, family values	"Did not think about classification"	Different qualities in the students
What are your beliefs about professional morality?	You analyse the situation, the relationships with the students and try to avoid conflict moments. You should not press the child	To be a model, not to thrust on my opinion and to teach them to work for the well-being of the people. Morality - do not harm (as for doctors)	Help students to develop, to support different kids those who like to create and those who like to do the same	To be a model and to teach about values in the senior classes	To be a model and equal to the students but not to be a close friend. Teachers have to use different methods to develop student
What should be the relationship between effectiveness of teaching and moral considerations in TE?	Both are important and interrelated: good moral climate in the class help to learn better.	Teachers spend more time on the first one. In the program they do not touch a deep moral issues.	Without moral it is impossible to exist, but we spend almost all time on development of a technically literate person. Orientation should be on family, not society	Two should be in balance. However, high moral issues are considered by the other subjects. We do not have a chance to do this.	Should be both. The ratio should be 70%/30% (effectiveness /responsibility )

*Russia*

Development of the person was seen as the major value of technology education as well as the possibility for technology education to provide a framework where all subjects can be linked was given as the initial response to the question of values. Subsequent responses regarded moral issues as values in technology education. A majority of teachers believe that values in technology education and other subjects are the same but they can be presented in technology education differently through practical experiences. Other subjects can spend more time on moral issues. Talking about values in TE teachers refer to moral values only. Technical, economic, aesthetic values were not

considered as values. In Russia this relates to historical interpretation of values, where during the Soviet time there was one official view on values which gave the emphasis to spiritual, all-human, moral values. Technical and economic values were not discussed. Most mentioned ecological issues that they consider during their teaching, but they did not consider them as values unless the researcher asked them about it.

Many teachers indicated that in dealing with personal relationships among students and between the teacher and the students, a teacher can deal with values. Moral values closely relate to the person's relationships with the other people. These correlate with Rokeach's (1973) interpretation of moral values that refer to those: that have an interpersonal focus which, when violated, arouse pangs of conscience or feeling of guilt for wrongdoing (Rokeach 1973, p.8). They refer mainly to modes of behaviour and: do not necessarily include values that concern end-states of existence (Rokeach 1973, p.8). Thus, teachers can deal with moral values through the process of doing projects using the following ways: react to classroom situations and on the events in the outside world; observe and guide students; orient students' work on the well-being of the people. They believe that it is not possible and it is dangerous to explicitly teach about moral values. Teacher should be a model, thus moral values are implicitly included in the process of teaching (a complimentary model, according to Oser 1994). However, two of them mentioned that it is possible to teach about values in the senior classes, summarising what have been learnt in the other subjects.

Most teachers categorise values on the basis of students' characteristics. They all do something in their teaching using informal strategies. One teacher expressed the view that moral issues should not be included in the curriculum, otherwise all issues related to moral values will become formal and this would be non-productive. However, the teacher should pay attention to them. Another teacher believed that it is important to explicitly include values in curriculum, at the moment only some elements of etiquette and rules on how to behave in different situation are specified.

In responding to the question related to effectiveness versus moral considerations, all teachers agreed that both should be present, but acknowledged that they pay more attention and time to effectiveness (teaching the content and skills to the desired level of proficiency). The general request from the teachers' side was to have more time for the subject so teachers can pay more attention to values. However, this demonstrates an implicit value related to the interpretive model of teaching. That means that effectiveness (more knowledge, better quality of hand skills) is considered as morally good. This correlates with the survey results, where they demonstrated the belief that subject content knowledge is the most important quality of a good teacher and that during their teaching they give priorities to academic performance and competencies.

The teachers provided contradictory responses to the topic of values in technology education. Two female teachers believe that it should be a broader discussion and understanding of value issues in technology education. Another teacher stated that he is



not interested in values, because it is difficult to conceptualise it and if you do so, it will become 'dry'. Values are incorporated in the people's relationships and because of that it is the best way to deal with them.

#### **Analysis of the survey data**

##### *Australia*

Trends were identified in responses to eight of the sixteen survey statements. In summary teachers believed that:

- Developing academic performance was a priority,
- Moral content was a valuable aspect of technology education programs and should be developed gradually
- Morality is best developed through action and observing modelling of others
- Transferring responsibility to students is one way of reconstructing the moral climate of schools

There was also a trend in the responses to the final question in the survey which asked them to indicate how they implemented their beliefs in practical teaching. All indicated they that addressed moral aspects of technology education by attempted to model appropriate behaviours. The interviews and surveys raised a number of issues to be addressed in future research. For example, there appeared to be a variety of understandings of the words value, moral and belief. There also appeared to be some inconsistencies in responses suggesting, possibly, particular interpretations. For example, all teachers indicated that their main emphasis was on academic performance but then indicated that subject content knowledge was not important for the teacher. It may be that technology teachers considered process to be the important factor in achieving high academic performance. Two survey statements elicited responses that could be considered as tendencies. One involved the importance of establishing interpersonal relations with students and the other concerned involving students in resolving ethically problematic situations. In both cases, the responses suggest a tendency to see both as important.

##### *Russia*

Teachers strongly supported statements that describe their teaching practice in terms of both effective and responsible types of teaching. Trends were identified in responses to four of sixteen statements. In summary teachers believe that the following are the most important and very important for their teaching:

- subject content knowledge is the most important quality of a good teacher
- the morale culture of school is established by each subject
- it is important to involve students in seeking solutions when a classroom situation is ethically problematic.

Another trend is that they do not believe strongly that:

- teaching moral content (knowledge concerning norms, rules, justice matters) is in itself a valuable enterprise because it helps students to develop a moral point of view.

These results correspond strongly with the interview results.

Three of these tendencies were quite opposite to the beliefs of the Australian teachers:

- importance of the subject content knowledge as an important quality of a good teacher (not important for Australians, a tendency);
- importance of teaching moral content (very important for Australian, a trend);
- the role all subjects should play in establishing a moral culture of a school (not important for Australian, a tendency).

Another two statements that had been interpreted differently by Australian and Russian participants were

- a tendency among the Russian teachers to believe that the moral quality of schooling is defined from the ends, not means
- a negative tendency among the Russian teachers towards the statement that students create the moral climate of the school by participating in its decision-making structure.

## Conclusions

Theoretical models used as a framework for this research helped to identify that teachers pay a lot of attention to effectiveness in their teaching practice, however, they realise that moral issues are also important and should be in balance. It is possible to suggest that Russian teachers are moving closer towards the regulative model of teaching that is based on the involvement of students in discourse on the moral conflict solving. This can be explained by traditions of moral upbringing through all school subjects. All Russians refer to moral values when talking about values in technology education. Australian views correspond more with the additive model. They do not relate values in technology education to moral values, in the interview. Answering a survey question they expressed a belief that it is possible to teach moral content. However that may be related to the difference in the interpretation of moral values, that in Russian language relates to the spiritual, all-human values and in Australian has a close association with sexual behaviour. Technology education teachers in both countries did not express values in technology education in terms of technical, economic, aesthetic, social, etc.

In terms of the comparisons across the Australian and Russian teachers, certain patterns were observed. Firstly, there appeared to be a consistency of response between survey and interview data for both groups. That is, within both groups teachers' responses to the survey were consistent with their responses to the interview. In terms of the responses to the study the Russian responses are more spread out than the Australians.

Some different views were expressed by teachers in the two countries on how to deal with values. Australians believe that it is important to teach values and that they should be embedded in project work or modelled. Russians believe that it is not possible to teach values and there is no need to teach about values. They should be implicitly

embedded into the teacher-student relationships. Teacher also should be a model for the students so that moral values are implicit in the work. This issue requires further investigation, as the interpretation of teaching values appeared to be different in two countries.

## References

- Barlex, D 1993, 'The Nuffield approach to values in design and technology', *Design and Technology Teaching*, vol.26, no.1, pp.42–45.
- Breckon, A 1998, 'National Curriculum Review in Design and Technology for the Year 2000', *The Journal of Design and Technology Education* vol.3, no.2, pp.101–105.
- Curriculum Corporation 1994a, *Technology – A curriculum profile for Australian schools*, Curriculum Corporation, Victoria.
- Curriculum Corporation 1994b, *A statement on technology for Australian schools*, Curriculum Corporation, Victoria.
- Curriculum Development Council 2000, *Learning to learn: Key learning area technology education, consultation document*, Curriculum Development Council, Hong Kong Special Administrative Region of The People's Republic of China, Hong Kong.
- DES/WO 1988, *Summary of Interim Report of the National Curriculum Design and Technology Working group*, Author, London.
- Ericsson, K A & Simon, H A 1993, *Protocol analysis: Verbal reports as data*, MIT Press, Cambridge MA.
- Habermas, J 1974, *Theory and practice* (J Viertel, trans), Beacon, Boston. (Original work published 1963)
- Holdsworth, I, Conway, B 1999, 'Investigating values in secondary design and technology education', *The Journal of Design and Technology Education*, vol.4, no.3, pp.205–214.
- International Technology Education Association 2000, *Standards for technological literacy: Content for the study of technology*, ITEA, Reston, VA.
- Jarrett, J I 1991, *The teaching of values: Caring and appreciation*, Routledge, London.
- Layton, D 1991, *Aspects of National Curriculum: Design and Technology*, NCC, New York.
- Lednev, V S, Nikandrov, N.D & Lazutova, M N (eds) 1998, *Uchebnye standarty shkol Rossii. Gosudarstvennye standarty nachalnogo obshchego, osnovnogo obshchego I srednego (polnogo) obshchego obrazovaniya. Kniga 2. Matematika I estestvenno-nauchnye diszipliny* [Learning Standards for Russian Schools. State Standards for primary, secondary education. Book 2. Mathematics and Science], Sfera, Prometej, Moscow.
- Ling, L 1998, 'Conclusion', in *Values in education*, eds J Stephenson, L Ling, E Burman & M Cooper, London and New York, Routledge, pp.209–212.
- McLaren, S 1997, 'Value judgements: Evaluating design – A Scottish perspective on a global issue', *International Journal of Technology and Design Education*, vol.3, no.3, pp.259–278.
- Oser, F K 1994, 'Moral perspectives on teaching', in *Review of Research in Education*, ed. L. Darling-Hammond, American Educational Research Association, Washington, DC, pp.2057–127.
- Petrovski, A & Jaroshevski, M (eds) 1990, *Psychology Dictionary*, Politizdat, Moscow.
- Prime, G M 1993, 'Values in technology: An approaches to learning', *Design and Technology Teaching*, vol.26, no.1, pp.30–36.
- Queensland School Curriculum Council 2002, *Technology Years 1 to 10 Draft Syllabus*, QSCC, Brisbane.
- Rokeach, M 1973, *The nature of human values*, Free Press, New York.

Steiner-Khamsi, G & Dawson, W P 2000, 'Moving from the Center to the Pacific Rim: Applying a cross-national perspective for understanding values education in Hawai'i', *Educational Practice and Theory*, vol.22, no.2, pp.23–37.

Stephenson, J, Ling, L, Burman, E & Cooper, M (eds) 1998, *Values in education*, London and New York, Routledge.

