The Role of Computing Teachers in Australian Schools

A Pilot Study for the Australian Council for Computers in Education by Mark Weber and Lorraine Kershaw

For some time now, members of the state professional associations involved in computers in education have expressed many concerns over the difficulties in maintaining quality in the teaching of computing in secondary schools. This appears to be reflected in part by job satisfaction and the subsequent loss to the profession of competent computing teachers. These feelings and conjectures have been expressed throughout Australia and discussed at the national level by the members of the Australian Council for Computers in Education (ACCE).

The ACCE was keen to investigate these concerns. At the February 1990 meeting of the ACCE a proposal was accepted by the council members to conduct a pilot study which would gather information about computing teachers in Australia.

The aims of the study were to describe:

1. computing teachers' backgrounds;
2. teachers' computing tasks;
3. teachers' computing role in the school;
4. school expectation of the computing teacher;
5. computing teachers' attitudes; and
6. computing teachers' levels of job satisfaction.

A summary of this project was presented at the World Conference on Computers in Education in Sydney (WCCE 90) at a meeting attended by over forty delegates. They were invited to comment on the issues raised and to make recommendations to the ACCE on a proposed plan of action.

Methodology

A questionnaire was devised containing the following four sections:

1. **Background information** - age, type of school, type of training with computers.
2. **Teaching role** - position, type of school support, job attitudes.
3. **Former computing teachers** - background, attitudes.
4. **Perceptions of computing teacher's role** - difficulties / advantages in teaching computing.

Items in the first three sections allowed respondents to make choices from a list of multiple statements and to add their own comments wherever they wished to explain or expand a response. A six point Likert scale was used for the last section to obtain information on teachers' attitudes about teaching computing.

A selected sample was used. It consisted of teachers currently in government and private schools and some former teachers who had been involved with computing in schools. Only those who had spent 50% or more of their time teaching computing were asked to complete the questionnaire.

The Computer Education Groups (CEGS) of each state in Australia had undertaken to administer ten questionnaires to selected sample members in their state.

Each state returned the required number of completed questionnaires, but as some were delayed from the Eastern states, results were analysed twice, giving an interesting perspective to the data.

The responses from Western Australia were analysed first followed by a second analysis which included all states, though a total of only fifty three completed questionnaires were available at this time.

It is acknowledged that this pilot study had some methodological limitations and therefore the results should be treated with caution. The responses and findings, however, were particularly useful in gathering information upon which a future extensive survey could be based.
Results and Discussion

Part A : Background Information

Question 1 : Age

The initial analysis showed that four out of every five teachers were aged between 35 and 45. When all the responses were collated the age ranges were more evenly distributed.

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Under 35 years</th>
<th>35 - 45 years</th>
<th>Over 45 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of teachers</td>
<td>20</td>
<td>30</td>
<td>9</td>
</tr>
</tbody>
</table>

It seems reasonable to assume that these results are biased, but age of computing teachers may be a factor influencing job satisfaction. It would be interesting to investigate this area in relation to level of training and teacher motivation of those seeking a computing career.

Question 2 : Males and females

The majority of computing teachers were males, as could be expected. It is interesting to note that the average age of females was 35, while the average age of males was 38. The oldest group were those who had left teaching. Their average age was 59.

Questions 3, 4 and 5 : Government and private schools

While most of the teachers were in the government system (37 : 10), almost all respondents had taught in a government school at some stage in their career. Nearly forty percent, therefore, of teachers who had started in the government system chose to leave. A larger survey would need to probe for some possible reasons for this exodus.

Question 6 : Time spent teaching computing

The purpose of this question was to ascertain the amount of time spent by the computing teacher in teaching, developing systems / materials and in administrative tasks.

<table>
<thead>
<tr>
<th>Amount of time spent teaching computing</th>
<th>&lt; 20%</th>
<th>20%-50%</th>
<th>51%-75%</th>
<th>&gt;75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of teachers</td>
<td>3</td>
<td>8</td>
<td>12</td>
<td>36</td>
</tr>
</tbody>
</table>

Most teachers seem to have a full teaching load. This needs to be seen in context as half of these teachers had reported they had no time allowance for duties related to keeping their respective departments operational.

Question 7 : Qualifications

An unexpected result was the number of teachers qualified in computing. Of the 53 teachers surveyed, 39 had a degree or diploma with substantial units in either computer education or computer science. Of this latter group, 19 had computer science qualifications. This perhaps reflects a mathematics or science background for those who chose computing as a career.

More than three quarters of the delegates who attended the WCCE 90 meeting indicated they had a mathematics or science background.

It would seem reasonable to suggest that the majority of people involved in teaching computing would have completed tertiary qualifications in computing on a part time basis while still teaching full time. This area of study would not have been available to most of the teachers in this survey during their initial teacher training as most tertiary institutions have only offered this type of course within the last ten years. As the results of Question 10 show the majority of these teachers had completed their pre-service training prior to the introduction of such courses.

Question 8 : Industrial experience

Some industrial experience was reported by 9 out of 52. It would be interesting to see if the current down turn in the economy has an effect on those in the commercial world seeking employment as computing teachers in schools.

Question 9 : Inservice training

Teachers across Australia indicated that they had received varying amounts of inservice training in computing. Those in Western Australia, however, said that the Ministry of Education (W.A.) had provided almost no inservice courses for their teachers.

Perhaps a more appropriately worded question should have been used, for example, inservice "supplied by your employer...", as many respondents appeared to confuse this question with the one about undertaking study in computing.

Question 10 : Computing course in pre-service courses

Most people surveyed indicated that no computing courses had been offered during their initial teacher training.

Question 11 : Current study

Given that 39 of the respondents already had computing qualifications, it is not surprising that most were not
"...about one third of the teachers had to teach computing immediately they had first begun to use a computer."

currently engaged in any study (see Table 3). It may be that teachers consider the Higher Education Contributory Scheme (HECS) costs to be too high and have chosen therefore not to undertake further studies.

Perhaps the question could be rephrased to avoid ambiguity, as respondents may have inferred that studying computing meant studying computer science units.

<table>
<thead>
<tr>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Areas of current study</td>
</tr>
<tr>
<td>Teaching Computing Computing Other None</td>
</tr>
<tr>
<td>Number of teachers</td>
</tr>
</tbody>
</table>

Question 12: Length of use of computers

All except two of the teachers said that they had been using computers for more than three years. This shows that the teachers surveyed were experienced users. The question now to be asked is what proportion of computing teachers are particularly inexperienced in the use of computers. If there is a group of such teachers we need to know if they are newly graduated teachers who have only received very basic computing training in their teaching course and are expected to be confident in a computing teacher's position. Perhaps there is no cause for concern as all schools have computers and the school system may now have developed sufficient expertise in this area.

Question 13: Length of computing experience prior to teaching computing

The results show that about one third of the teachers had to teach computing immediately they had first begun to use a computer. We need to know if teachers in this position feel confident in their job and if employers need to consider the degree of training required for a computing teacher to be appointed.

<table>
<thead>
<tr>
<th>Table 4</th>
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</thead>
<tbody>
<tr>
<td>Amount of computer use before teaching computing</td>
</tr>
<tr>
<td>Number of teachers</td>
</tr>
</tbody>
</table>

Question 14: Time spent in computing lessons preparation

About half of the respondents indicated that they needed at least five hours per week to prepare for classes involving the use a computer. Eighteen teachers said their computing lessons required more than ten hours per week preparation time.

Part B: Computing teacher's role

Questions 1 and 2: Substantive position

This question appeared to cause some confusion as different states seem to use different terminology. It was meant to ask if the respondent held a senior teacher position in the school, with the accompanying financial reward, status and participation in the school decision making processes. The suggestion that this question referred to the advanced skills teacher as a future teaching position also seemed to confuse the issue.

Question 3: Computing courses being taught

As was expected most were engaged in teaching applied computing rather than computer science. The statements offered in this item, however, were not suitable choices for teachers in all states. The teachers in Queensland, for example, run an Information Technology unit and this area was not catered for in the questionnaire.
Questions 4 and 5: Time allowance for computing preparation

From 48 responses, 23 said they were given no time allowance for computing preparation and 15 said they received half a day a week. Some 29 reported no time allowance for other duties, presumably these relating to administration, inserviceing staff, maintenance of equipment and other similar tasks (see Question 7 this section).

Questions 6: Laboratory technical support

Teachers received no technical support for computing. This lack of support is of great concern. Many tasks such as equipment maintenance and arrangement can be carried out by a technical support person. This would leave the computing teacher free during class time to conduct the lesson without needing to spend quality education delivery time on such tasks.

Question 7: Other duties of the computing teacher

It had seemed from informal discussions that computing teachers were expected to spend time providing assistance for the school administration system and results from this question were intended to support this conjecture. It was found that teachers were involved in many other tasks as well as providing support for the administration system (see Table 5).

Table 5
Other responsibilities of the computing teacher

<table>
<thead>
<tr>
<th>Task</th>
<th>Number of teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide administration support</td>
<td>27</td>
</tr>
<tr>
<td>Inservice computing staff</td>
<td>29</td>
</tr>
<tr>
<td>Inservice other staff</td>
<td>32</td>
</tr>
<tr>
<td>Maintain equipment</td>
<td>29</td>
</tr>
<tr>
<td>Review software</td>
<td>36</td>
</tr>
<tr>
<td>Manage finances</td>
<td>39</td>
</tr>
<tr>
<td>Assist with system queries</td>
<td>39</td>
</tr>
</tbody>
</table>

Question 8: Additional computing funds for school

There had seemed to be a feeling among some schools that extra funds were being allocated to computing to attract good students. It was surprising then to find that only 17 respondents said this had occurred in their school and 13 believed these additional funds had influenced the decision to include computing in the curriculum. This issue needs further investigation.

Questions 9, 10 and 11: Degree of job satisfaction

Most teachers said they scanned the newspapers regularly for employment opportunities, though 30 out of 48 had not applied for any positions within teaching and 35 had not applied for any jobs. This may indicate that computing teachers are satisfied with their present teaching conditions, though other measures of job satisfaction need to be explored in a further study.

Part C: Attitudes of former computing teachers

The information on this section was sparse. A small group of former teachers in Western Australia appeared to have negative attitudes towards teaching computing. Many of those who were not teaching at the time of this data collection had been seconded to other projects and expected therefore to return to teaching computing at the conclusion of the project.

Part D: Perceptions of computing teacher’s role

All teachers, except one, said they enjoyed computing, though 32 of these believed their job to be more stressful than teaching in other areas. They believed there were "more rewarding job opportunities in computing outside school", though they did not feel that teaching computing had "been detrimental to (their) promotion path in teaching". Other states may have identified career paths open to computing teachers. In Western Australian Ministry schools the position of senior master in computing has only been available to teachers since late 1989 and this is at the principal's discretion. The senior computing position can be designated only if another senior subject position is discarded as the total number of senior masters' positions has not been increased to accommodate computing.

Only 6 teachers strongly agreed with the statement that "principals make special allowances" for them, while 32 out of 57 expressed strong disagreement. Teachers were not asked if they felt special allowances should be made for computing teachers, therefore, it was not known if this was a significant concern.

Overall the teachers did not appear to have any polarised perceptions about the availability of curriculum materials nor did they feel strongly about computing units having "clearly stated teaching objectives". The group of teachers from Western Australia, however, indicated a dissatisfaction with this aspect of the computing syllabus. Perhaps this concern is isolated to Western Australian teachers. A sharing of this type of information across the states may remedy this situation.

Most teachers felt comfortable with the level of support offered to computing outside the school. This was not the case in relation to repairing machines, which was considered to be a difficult task to accomplish.
Summary of Findings

The majority of teachers in this survey were males, who had initially taught in the government school system and had computing qualifications. Due to their age, very few had received any computing training at the tertiary institution where they had undertaken their teacher training. Few were engaged in a course of study when this data were collected. Most appeared to have quite extensive experience with the use of computers.

Concerns expressed by the teachers included the expectation that they would be responsible for a broad range of associated computing tasks, they lacked technical assistance, they found it difficult to get machines repaired and they believed their job was more stressful than teaching in other areas.

Although this study used a biased sample, some interesting questions have been raised. A further study is needed to examine more fully all aspects of the computing teacher’s role in an attempt to identify those factors which could influence the effectiveness of those involved with children, education and computing in secondary schools in Australia.

Recommendations of WCCE 90 Delegates

Those present recommended that a comprehensive national survey be conducted by the ACCE to examine the computing teacher’s role in more detail. They recommended that the ACCE consider such aspects as:

(i) the time spent by teachers in associated computing activities outside school hours;
(ii) usage of time within the school day;
(iii) the full range of financial allowances available for computing tasks;
(iv) the nature of supportive networks used by teachers;
(v) the nature of school support;
(vi) the scope of equipment management responsibilities; and
(vii) perceptions of computing teaching as a career.

These recommendations have been adopted by the members of the ACCE. A comprehensive questionnaire has been designed for administration to a random sample of teachers in charge of computing in all states and territories of Australia. Results of this study will be made available to the ACCE early in 1991 for discussion and consideration.

Navigating the NINETIES

The Computer Education Group of Queensland (CEGQ) is proud to host the Ninth Annual Australian Computers in Education Conference, held under the auspices of the Australian Council for Computers in Education. The venue is University Park Hotel, Bond University on the fabulous Gold Coast from 22 to 25 September, 1991.

Keynote speaker: Dr Jan Hawkins, Director, Centre for Children and Technology, Bank St College, New York

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