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John King
James Cook University of North Queensland

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PREVIOUS COMPUTER EXPERIENCE OF PRESERVICE TEACHER EDUCATION STUDENTS

Dr John King
James Cook University of North Queensland

INTRODUCTION

The rapid expansion in the use of computers in schools over the last decade has increased the need for preservice teacher education institutions to provide courses which take account of students' previous computer experience. Only limited information is available on the patterns of microcomputer use of secondary school students (Hattie and Fitzgerald, 1987; Carey and Gall, 1986).

No information is known to be available on the previous microcomputer use of students entering tertiary institutions in Australia or overseas. As part of an evaluation of the effectiveness of computer education subjects introduced in the combined DipTeach/BEd course offered at James Cook University, the 1986 to 1988 cohorts of first year teacher education students were surveyed in order to ascertain their previous computer experience.

It was anticipated that by 1986 and beyond, a significant proportion of incoming teaching education students would have computer experience. This relates to a 1984 policy decision of the Queensland Department of Education, which led to the provision of fifteen Sperry computers to all State High Schools in Queensland (Matheson, 1985). In order to complete the implementation of the Computer Literacy Project an additional fifteen IBM compatible machines were provided at a later stage to school with a population beyond 1000. This expectation of increasing computer experience was further supported by the more recent introduction of school-based 'Computer Studies' subjects and a Practical Computer Methods subject in years 11 and 12.

Methodology and Context

All commencing students in the first year Technology in Education subject in the combined BEd/DipTeach were asked to complete a questionnaire providing information about themselves, as well as information on previous hardware and software use at home and at their previous school. Questions on software use related to the type of use as well as frequency of use. The same questionnaire was used for the three cohorts involved in order to make comparisons over the time span involved.

The characteristics of the cohorts are described in Table 1 in terms of age, sex, previous school and first-year course undertaken. It was of interest to the researcher to see to what extent previous computer experience was related to each of these characteristics. Significant changes in the cohorts from 1986 to 1988 include a 4-5% increase in students 25 years or more in age, a 5-6% increase in males, and a marked reduction in popularity of the DipTeach in favour of the BEd (Primary). Also included in the cohorts are students from the DipTeach Aboriginal and Islander Teacher Education Program (DipTeach AITEP). This program allows these students an additional semester at the beginning before merging into the mainstream DipTeach. Most students (85-90%) are residents of North Queensland, a geographical area extending from Mackay to Cooktown on the coast, and west to Mt Isa. The remaining students are drawn mainly from southern Queensland.

Analysis and Interpretation of Data

PREVIOUS COMPUTER USE

Students were asked if they had used a computer previous to attending University. The results shown in Table 2 indicate that just over two thirds of the 1986 cohort had done so, rising to 82% for the 1988 cohort. Given the developments in computer-related subjects previously described, this increase is to be expected. The substantial 18% of students claiming no previous computer use may be explained by the introduction of the Computer Literacy Project into lower rather than higher grades in some State High Schools in 1985-86. This group may also contain mature-age students who attended high school before the computer era.

Table 2 also shows the brands of computers used at school and at home for previous computer users. Percentages are calculated against the total population in each cohort. Some students indicated more than one brand used. Apple has commanded the greatest school usage for these cohorts, with the Sperry gaining increased use over the three-year period. Only 25% of all students in 1988 indicated that they used the Education Department supplied Sperry machine which could suggest that access to these machines in State High Schools is limited. This observation is supported by the low percentage of use in the 'IBM' and 'Other' categories, which may have been expected to increase as a result of the supply of an additional fifteen IBM compatible (CCS) machines to large High Schools. In home usage, the Commodore appears more popular. This is no doubt attributable, in part at least, to its lower price. All brands show a percentage increase in home usage in the three-year period, reflecting an expansion in the use of microcomputers in this area.

Software Use

Table 3 lists the software used at home and at school over the three-year period. The percentage of students using word processing software at school appears

to have increased dramatically in the last year whereas word processing use at home has increased at a more steady rate. The use of spreadsheets and databases does not appear to have increased to the same extent over this period for either home or school. These figures seem to suggest that the impact of the Computer Literary Project has only had a significant effect in the word processing area, since this has the greatest percentage (38%) of at school use. Database and spreadsheet activities seem to have been given relatively scant attention.

The use of computer games at school and at home appears, surprisingly, to be keeping pace with the use of word processing software over the three-year period. The similar level of use of games at home and at school may be explained by the greater number of students having access to school computers (e.g. in lunch hours) compared to those with home computers: or by their use in schools for computer-club activities. Games and word processing enjoy the highest percentage in the 'high' frequency of use column for 1987 and 1988, displacing programming which appears to have dropped in popularity over the time span involved.

The use of subject-specific software has shown a significant rise in 1988 compared to the previous two years. This may be related to the increased awareness of teachers to the availability of computer-based resources through expanding inservice and preserviee training in this area.

Results of a study of sample of 983 secondary school students in the Eugene, Oregon school district in the US reported by Carey and Gall (1986) indicate word processing, together with programming (in BASIC) and games as the most common microcomputer-based activities for home and for school. A relatively greater use of programming is the most noticeable difference between their findings and those reported here for Australian students.

Influences on Previous Use of Computers

Possible influences on previous computer use by first-year teacher education students are considered in Table 4. Gender influences appear quite variable over the three-year period, with little difference in previous computer use between males and females in 1986, a significant difference favouring males in 1987, and a greater, but not significant use by females in 1988. Hattie and Fitzgerald (1987), in a study of 1000 Australian schools, reported that, in secondary, there were "many fewer females using computers than males" (p.17).

Age was insignificant factor relating to previous computer use for every year, suggesting that mature-age entrants have not been able to obtain equivalent computer experience in their previous situation. While this may be a potential case for concern, the experience of the author suggests that this type of student is more likely to take advantage of programs providing computer experience at the tertiary level than normal entrants. This appears to relate to their greater awareness of the need to do so.

The relationship between previous computer use and type of school was also investigated in Table 4. While State High Schools tend to have produced a greater percentage of students with Computer experience over the three-year period, this difference is not significant. This suggests that students from non-State schools are obtaining access to computers at about the same level. Whether this access is due to greater home use, has not been investigated.

Possible gender influences on the level of software use for previous computer users were investigated in Table 5. The level of use of word processors has changed from a predominantly female use in 1986 to a more balanced use by the sexes in 1988. For all three years, males appear to have a higher level of use of games. Programming, on the other hand, shows a fairly constant level of activity by females and a marked drop in the level of activity by males. These results reflect those reported by Hattie and Fitzgerald (1987). They found that the only differences between male and female usage was that females tended to use computers more for word processing and graphics and that word processing was the activity reported by principals to be increasing the fastest. They also reported that programming was one of the declining uses of computers.

Conclusions and Implications

The past three years has seen a significant increase in the previous use of microcomputers by first-year students in teacher education courses in James Cook University. In terms of frequency of use, these changes are due in the main to increased activity in the use of word processing, database, games and subject-specific software, in that order. This increase is reflected by greater use at home as well as at school.

Of the three influences on previous computer use investigated, the age of entering students is the only one which is a significant factor affecting previous computer use. Gender influences are apparent in relation to the level of use for the three types of use investigated. The way in which males and females are using computers is changing over time for word processing and programming whereas males have remained more frequent previous users of computer games over the three-year period.

Implications of these findings for teacher education programs are that a continuing need exists to upgrade students' use of the computer as a productivity tool not only by using word processors for assignment writing purposes, but also for modelling with spreadsheets and information storage and retrieval with databases. Also, while the use of subject specific software in schools appears to be increasing, the level of use is so low that students are gaining little pre-tertiary experience of models of use of computers in specific curriculum areas. Continuing strong emphasis in this area needs to be made in preservice teacher education courses.

The need for special programs for particular groups of students does not appear warranted from the results of this study given that no significant differences were found in the previous computer use of students in different courses. This suggests, in particular, that Aboriginal and Islander students are obtaining a similar level of previous computer experience to other students. While the level of previous computer experience of mature age students is significantly less than other students, they appear to compensate sufficiently by a greater involvement in the subjects offered at the tertiary level in this area.

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TABLE 1: CHARACTERISTICS OF THE 1986 TO 1988 COHORTS

AGE

	1986		1987		1988	
	N	%	N	%	N	%
25 years	245	83	225	78	146	79
25 years	51	17	61	22	39	21
	296		286		185	

SEX

	1986		1987		1988	
	N	%	N	%	N	%
Female	227	77	202	71	133	72
Male	69	23	81	29	52	28

PREVIOUS SCHOOL

	1986		1987		1988	
	N	%	N	%	N	%
State High	199	67	175	62	127	69
Private High	82	28	85	30	44	24
Other	15	5	23	8	14	8

FIRST YEAR COURSE

	1986		1987		1988	
	N	%	N	%	N	%
DipTeach	180	61	127	45	13	7
BEd (Primary)	35	12	70	25	86	46
DipTeach (AITEP)	22	7	18	6	17	9
BEd (Secondary)	57	19	65	23	60	32
BEd (ECE) AITEP	2	1	1	1	2	1
Other	-	-	2	1	7	4

TABLE 2: PREVIOUS COMPUTER USE OF THE 1986 to 1988 COHORTS

(Percentages expressed in terms of the number in each cohort.)

PREVIOUSLY USED A COMPUTER

	1986		1987		1988	
	N	%	N	%	N	%
Yes	201	68	206	73	152	82
No	95	32	77	27	33	18

COMPUTERS USED AT SCHOOL

	1986		1987		1988	
	N	%	N	%	N	%
Apple	87	29	73	26	69	37
Commodore	29	10	26	9	12	6
Sperry	41	14	58	21	46	25
BBC	8	3	12	4	14	8
Microbee	37	13	29	10	16	9
IBM	8	3	3	1	15	5
Other	32	11	17	6	10	5

COMPUTERS USED AT HOME

	1986		1987		1988	
	N	%	N	%	N	%
Apple	23	8	24	9	27	15
Commodore	37	13	35	12	39	21
Sperry	6	2	1	1	5	3
BBC	3	1	3	1	3	1
Microbee	15	5	4	1	10	5
IBM	6	2	20	7	18	10
Other	36	12	31	11	24	13

TABLE 3: PREVIOUS SOFTWARE USE OF THE 1986 TO 1988 COHORTS

SOFTWARE USED AT SCHOOL

	1986		1987		1988	
	N	%	N	%	N	%
Word Processing	73	25	70	25	70	38
Spread Sheet	16	5	26	9	16	9
Database	15	27	5	10	27	15
Games	78	26	84	30	68	37
Prog. Language	99	33	84	30	54	29
Graphics Package	15	5	21	7	12	6
Subj. Specific Soft.	21	7	20	7	30	16
Other	1	1	4	1	5	3

SOFTWARE USED AT HOME

	N	%	N	%	N	%
Word Processing	38	13	49	17	440	24
Spreadsheet	14	5	18	6	7	4
Database	12	4	26	9	11	6
Games	64	22	64	23	76	41
Prog. Language	20	7	26	9	21	11
Graphics Package	21	7	16	6	9	5
Subj. Specific Soft.	14	5	9	3	12	6
Other	6	2	3	1	4	2

FREQUENCY OF SOFTWARE - School/Non-School Combined (Expressed as a percentage)

	Low*	High*	Low*	High*	Low*	High*
Word Processing	75	24	76	24	63	35
Spreadsheet	94	5	90	11	84	8
Database	94	6	87	13	77	15
Games	72	28	75	25	62	35
Prog. Language	68	32	76	25	66	24
Graphics Package	95	5	92	8	86	4
Subj. Specific Soft.	90	9	98	2	77	16
Other	96	4	98	2	87	4

*Low = Never to Infrequently *High = Frequently to Very Frequently

TABLE 4: POSSIBLE INFLUENCES ON PREVIOUS COMPUTER USE

(Expressed as percentages)

SEX VS PREVIOUS COMPUTER USE

	1986		1987		1988	
	Yes	No	Yes	No	Yes	No
Male	68.1	31.9	81.5	18.5	74.4	25.6
Female	67.8	32.2	69.3	30.7	84.1	15.9
	n.s. for p 0.05		s. for p 0.05		n.s. for p 0.05	

AGE VS PREVIOUS COMPUTER USE

	1986		1987		1988	
	Yes	No	Yes	No	Yes	No
Less than 25 years	73.9	26.1	80.2	19.8	86.44	13.6
25 years or more	39.2	60.8	45.9	54.1	63.6	36.4

All years significant for p 0.01

TYPE OF SCHOOL VS PREVIOUS COMPUTER USE

	1986		1987		1988	
	Yes	No	Yes	No	Yes	No
State High	69.8	30.2	76.6	23.4	83.3	16.7
Other	65.9	34.1	71.8	28.2	79.1	20.9

No year significant for p 0.05

TABLE 5: POSSIBLE GENDER INFLUENCES ON THE LEVEL OF SOFTWARE USE

SEX VS LEVEL OF WORD PROCESSOR USE

	1986		1987		1988	
	Low	**High**	**Low**	**High**	**Low**	**High**
Male	88.4	11.6	74.1	25.9	64.0	36.0
Female	72.1	27.9	76.2	23.8	64.9	35.1
	n.s. for p 0.01		n.s. for p 0.05		n.s. for p 0.05	

SEX VS LEVEL OF USE OF COMPUTER GAMES

	1986		1987		1988	
	Low	**High**	**Low**	**High**	**Low**	**High**
Male	69.6	30.4	63.0	37.0	60.0	40.0
Female	72.6	27.4	79.7	20.3	65.6	34.4
	n.s. for p 0.05		s. for p 0.01		n.s. for p 0.05	

SEX VS LEVEL OF PROGRAMMING ACTIVITY

	1986		1987		1988	
	Low	**High**	**Low**	**High**	**Low**	**High**
Male	63.8	36.2	71.6	28.4	82.0	18.0
Female	70.4	29.6	77.2	22.8	72.5	27.5

All n.s. for p 0.05