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**PRACTICAL PC SKILLS OF
NEWLY QUALIFIED CHARTERED ACCOUNTANTS: A
STUDY OF THE
TRAINING PROGRAMME OF
THE INSTITUTE OF CHARTERED ACCOUNTANTS IN
IRELAND**

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Abstract

Substantial literature here examined the need for practical personal computing (PC) skills among accounting professionals. However, the effectiveness of PC courses designed to inculcate these skills in accountants has not been investigated. This article examines the perceptions of newly qualified members of ICAI on their PC skills prior and post undertaking the Institute's PC skills programme. It finds significant perceived improvement in PC skills after completing the programme. However, notwithstanding this improvement, concern was expressed among newly qualified members that the Institute was not taking advantage of students' existing PC knowledge and developing more advanced and integrated programmes which are necessary to meet the needs of their work environment and professional careers.

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1. Introduction

Information Technology (IT) continues to have a major impact on business in general and on the role of the accountant in particular. The accountant, if s/he is to be effective in carrying out her/his role as preparer, assimilator and communicator of information, must be relatively computer literate. As a consequence, professional accountancy bodies around the world have included practical PC skills, to varying degrees, as part of their educational programmes for training accountants. This study investigates the PC skills programme of one such body, the Institute of Chartered Accountants in Ireland (ICAI), by analysing the extent to which newly qualified members of the Institute believe they have acquired or improved their practical PC skills as a result of attending the Institute's PC skills training programme. It also focuses on the adequacy of the programme in terms of providing PC skills which are relevant to chartered accountants in the workplace. The overall objective of this study is to provide information which will assist the ICAI in planning and developing future PC skills programmes. To this end, descriptive results of this study have been made available to the ICAI (McCourt-Larres, 1998).

A survey methodological approach has been employed with questionnaires distributed to newly qualified members of the ICAI. Their responses were analysed in line with the objective of the study. Statistically significant differences were found in the self-perceived PC skills of newly qualified accountants *before* and *after* undertaking the Institute's PC skills course and examination. This suggests substantial perceived PC knowledge acquired as a result of the programme. However, despite the perceived knowledge gained, comments provided with respect to the programme revealed that respondents felt that the skills were relatively basic and that the programme could be improved by including a more advanced element and adopting a more integrated approach to including PC skills in professional accounting curricula.

By way of background to the study, a description of the current PC skills programme of the ICAI is provided. The importance of integrating computers into accounting curricula is then discussed. The main body of the paper advances a statement of hypothesis and considers the survey design and methodology. Finally, the significance of the findings is analysed and the conclusion presented.

2. The *Personal Computing for Accountants* Course and Examination

Membership of the ICAI, irrespective of the trainee's degree, depends on passing a PC skills examination entitled *Personal Computing for Accountants (PCA)*. The course and examination programme is currently devised and administered by the National Distance Education Centre at Dublin City University in co-operation with the ICAI and is held at various centres throughout Ireland.

Originally entitled *Microcomputers and Accounting*, the programme was introduced by the Institute in 1988 (Hurley, 1997). The title was changed to *Personal Computing for Accountants (PCA)* in 1994 when all of the software, with the exception of the integrated accounting software, moved over to a windows-based environment (McCourt and Lynch, 1994). It is designed to facilitate independent learning with support from tutors if required. To this end, manuals covering all of the examinable areas are provided to each student who enrolls on the course. The skills are taught at a basic level independently from each other. Course attendance is not compulsory and students who consider they have already attained adequate practical computing skills may opt to sit the examination without having attended the course. The proportion of students opting for the examination only route is currently about 33 per cent (McCourt-Larres, 1998, p.10). Furthermore, the examination can be sat at any stage during a student's training.

3. The Importance of Computer Skills in the Accounting Curriculum

For the ICAI's *PCA* course to be responsive to the needs of today's newly qualified chartered accountants, their views on its usefulness and relevance must be sought and carefully considered. The programme developers must be reassured that they are delivering the requisite basic PC skills before they can concentrate on integrating these skills into the mainstream accountancy subjects as recommended by International Education Guideline, IEG11, (IFAC, 1995a). Indeed the integration of PC skills into core accountancy subjects is an issue which has been discussed by the IT Task Force of the ICAI, set up recently to review the future of IT within professional training (ICAI, 1998). IEG11, to which the ICAI Task

Force refers at length, emphasises the importance of integrating practical IT skills into courses which are not specifically identified as IT courses such as management accounting, financial accounting, auditing and taxation courses. It represents a view with respect to the incorporation of practical IT skills into accounting curricula which many involved in accounting education, at both tertiary and professional levels, have held for some time.

The issue of how best to integrate computers into accounting curricula has been debated for a number of years spanning many developments and improvements in technology. Early studies carried out in the US into the use of mainframe computers in management accounting (Anderson, 1976) and financial accounting (Throckmorton and Talbot, 1978) revealed a generally favourable reaction. In the UK the importance of integrating mainframe skills into accounting curricula was also addressed at an early stage, (Bhaskar, 1982; 1983). Subsequent developments in microcomputers, helping to ensure their widespread availability, accelerated the integration of computers into accounting curricula, (Helmi, 1986). In the US, Armitage and Boritz (1986) emphasised integrating computers across a range of accounting courses and provided an analysis of specific computer skills which should be included in financial accounting, management accounting/information systems, auditing and taxation courses. Studies have also been carried out in the UK on the incorporation of spreadsheets into management accounting courses (Chandler and Marriott, 1994) and financial accounting courses (Marriott and Mellett, 1994). The Certified General Accountants' Association of Canada (CGA), offered a professional accounting programme which fully integrated the use of computers as early as 1984, the first professional body to do so, (IFAC, 1995b, p. 1). In Scotland, the Institute of Chartered Accountants of Scotland (ICAS) is including more PC skills in core accounting subjects, i.e. financial accounting, management accounting, auditing and taxation. The development of this programme by ICAS was significantly influenced by responses to a survey recently carried out among newly qualified Scottish Chartered Accountants (ICAS, 1997), thus underlining the importance of gauging the views of those who actually make use of the course.

The success of the ICAS PC programme depends on trainee accountants possessing basic PC skills before commencing professional studies. To this end, ICAS accredits basic PC skills courses provided at undergraduate level and provides its own basic PC skills course, early in professional training, for those trainees who do not hold an accredited degree. Relegating the teaching of basic PC skills to tertiary programmes and concentrating on developing these

skills at a professional level by integrating them into the core accounting subjects would appear to be the most rational approach to teaching PC skills to professional accountancy students since their work experience gives them an advantage over most undergraduate students. Acquiring an integrated PC skills set “may be difficult to achieve . . . in a traditional classroom setting. Learning about integration requires a sufficiently complex environment so that students can observe how disparate parts are brought together” (Trauth, Farwell and Lee, 1993, p.229).

Currently, the ICAI makes little or no concession to entrants possessing PC skills. The *PCA* programme has been developed to assume no prior knowledge of any aspect of computing and no exemption from the examination is given to students who enter professional training with a tertiary qualification of which computing forms a part. The only concession offered is that the *PCA* course is not compulsory. These regulations remain despite the increased computer literacy among entrants to professional training. As the CGA points out, “It is no longer a safe assumption that the majority of (professional) students know little about computers” (IFAC, 1995b). Indeed the current survey confirms this insofar as 62 per cent of respondents to the questionnaire held undergraduate or postgraduate accountancy degrees, which included some element of computing skills, when they joined the ICAI as trainees.

Such entrants into the profession who already hold tertiary accountancy qualifications will undoubtedly possess some knowledge of basic PC skills given the importance which has been placed on including IT in undergraduate and postgraduate accountancy syllabi. Studies into the PC skills taught at undergraduate level and their relevance to the work environment (Waller and Gallun, 1985; Bean and Medewitz, 1987; Heagy and McMickle, 1988; Heagy and Gallun, 1994a) all identify a knowledge of spreadsheets, integrated accounting software, database systems, word processing and, to a lesser extent, operating systems as the skills most valued by employers although the weighting, in terms of desirability, attached to each skill varies among the studies. These are also the PC skills which are included in the *PCA* course as well as being the minimum PC skills set outlined in IEG11 as those demanded of professional accountants upon qualification (IFAC, 1995a, Sc. 58). If these skills are being provided at tertiary level and, as the study shows, a large percentage of professional entrants already possess an accountancy qualification, the ICAI appears to be wasting resources teaching skills which students already possess.

The PC skills outlined above are currently taught at a basic level by the ICAI. To go beyond the basics and fully integrate PC skills into the professional accounting curricula may make certain demands upon educators and accountancy students alike, if the right entry-level computing requirements are not set. Research shows that the move towards including PC skills in tertiary accounting curricula has had a significant impact on resources in terms of developing course materials and training staff. In a survey of Australian universities and colleges, Kent and Linnegar (1988) found that most PC training with respect to worksheets and special purpose journals take place at an introductory level on account of the resource commitment involved. Rivett (1986), referring to American Accounting Association's report into integrating microcomputers into accounting curricula, pointed out that their inclusion in financial accounting courses was time consuming and represented a potential drain on teaching resources. Furthermore, not only is considerable time spent developing and teaching computer skills in tertiary accounting courses but students must also devote a great deal of their study time to mastering computer skills, (Er and Ng, 1989). "Mastery of information technology concepts and skills demands considerable time and effort" (Bromson *et al.*, 1994, p.104). Consequently, if such constraints exist with respect to undergraduate students, then the problem for professional accountancy students must be greater given the extensive syllabus which they must cover. Furthermore, they have to acquire these skills, for the most part, on a part-time basis. The problem increases when important new computing subjects such as the Internet (Sangster, 1995; Sangster and Mulligan, 1997; Soriano, 1997) compete with the more traditional accounting subjects for curriculum space and students' learning time. Consequently, it is imperative that students' attitudes to the adequacy of PC skills currently taught and examined as part of the ICAI professional syllabus are investigated before further resources are committed to designing new, more advanced courses: a step which the ICAI is currently considering (ICAI, 1998).

4. Hypothesis Statement

To determine whether newly qualified members believe that they have acquired PC skills knowledge as a result of their involvement in the *PCA* programme, their self-perceived PC knowledge *before* and *after* studying for and sitting the *PCA* examination was compared. To analyse this attitudinal data, a null hypothesis of non-differential in PC skills was formulated as follows:

H₀: There is no significant difference between the self-perceived practical PC skills of newly qualified members of the ICAI *before* commencing the *PCA* training programme and *after* completing the programme.

5. Survey Design and Methodology

A postal questionnaire was used for data collection. It was distributed to all newly qualified members admitted to the Institute in 1997. Recipients were asked to evaluate their level of PC knowledge *before* and *after* the *PCA* programme. The retrospective, self-assessment approach adopted in this study reflects an approach used in earlier studies to assess the adequacy of undergraduate IT training as preparation for a career in accountancy (Bean and Medewitz, 1987; Heagy and McMickle, 1988). Respondents whose returns are analysed in this paper completed the *PCA* programme within the last four years, thereby ensuring that they “have had enough experience to be knowledgeable about computer applications in professional accounting, but near enough to their own . . . education to be somewhat familiar with the current content” (Bean and Medewitz, 1987, p.244)

Questions were designed to reflect a series of PC skills important to an Irish chartered accountant as outlined in Book 1 of the *Personal Computing for Accountants Course* (National Distance Education Centre, 1997, p.1). These are also the fundamental skills identified in IEG11, (IFAC, 1995a, Sc. 58).

Once these software categories had been identified, those involved in *PCA* course development specified the level of expertise which they expected from students who had completed the programme. An average of the course developers’ knowledge expectations was then calculated for each of the software categories. The results of this exercise are set out in Table 1. The four levels of knowledge identified by the developers were incorporated into a Likert scale with (1) reflecting no knowledge of the software through to (4) reflecting an expert knowledge. Respondents applied this scale to identify their perceived level of knowledge in each of the software areas *before* and *after* undertaking the *PCA* programme.

Table 1
Level of Knowledge Expected by the ICAI Educators
From Students as a Result of the Personal Computing for
Accountants Course and Examination

Area	<i>No Knowledge</i>	<i>Basic Knowledge</i>	<i>Relatively Proficient</i>	<i>Expert</i>
Basic components of the computer		2%	96%	2%
Basic operations carried out in an operating system		2%	96%	2%
Use of spreadsheets		2%	96%	2%
Operation of Integrated Accounting Software	2%	19%	77%	2%
Report generating facilities of IAS ^f	2%	19%	77%	2%
Database creation	2%	19%	77%	2%
Database manipulation	2%	48%	48%	2%
Basic word-processing skills	2%	2%	94%	2%

^f Integrated Accounting Software

Besides questions which required answers using a Likert scale, open questions were posed to provide respondents with an opportunity of assessing the relevance of the PC skills in terms of usefulness in their work environments. The importance of assessing the relevance of PC skills, included in accounting curricula, to an accountant's working environment has been addressed in a number of articles, (Bean and Medewitz, 1987; Heagy and Gallun, 1994a; Goldsworthy, 1996).

An extract from the questionnaire has been set out as an appendix to this article.

5.1 Pilot Survey

The questionnaire was piloted on a sample of 30 recently qualified members selected at random from the Members' Directory (1996). Difficult or ambiguous questions revealed as a result of the pilot survey were amended in the final draft of the questionnaire.

5.2 Main Survey

5.2.1 Data Collection

A four page questionnaire together with a covering letter explaining the purpose of the survey was mailed to all (557) newly qualified members of the ICAI admitted in 1997. Details of names and addresses for the survey were supplied by the ICAI. Since all of the population was surveyed, no sampling bias was envisaged. Respondents were alerted to the fact that the questionnaire had been pre-numbered to facilitate follow-up mailing. At the cut-off date, four weeks after the questionnaires were mailed, a total of 237 responses had been received. Three spoiled responses were not included in the analysis. The effective response rate of 42% was considered satisfactory and a follow-up mailing was deemed unnecessary¹.

During the first two weeks following the mailing, 161 responses were received. The remaining responses were returned in the last two weeks. A chi-square test of homogeneity revealed no statistically significant differences between the early and late responses².

Of the 234 useable responses, 158 attended the course, the remaining 76 sat the examination only. Consequently, to evaluate the PC skills which students required as a result of taking part in the *PCA* programme, only the 158 responses from course attendees were included in the statistical analysis.

5.2.2 Data Analysis

Since the data collected to test H_0 are on an ordinal scale of measurement, non-parametric statistical tests were considered to be the most appropriate analytical tools, (Siegel and Castellan, 1988, pp. 33-35).

¹ Bean and Medewitz (1987), for example, considered a 35 per cent rate to be satisfactory, and returns below 30 per cent have been justified and reported in accounting literature over the last three decades (see Drury et al, 1993; Scapens et al, 1982; Tomkins, 1973; Mautz, 1968; for example).

² Late respondents were used as surrogates for non-respondents. See Wallace and Mellor (1988) for an explanation of these procedures.

Information to test the hypothesis was gathered by asking newly qualified chartered accountants to evaluate their level of skill with respect to eight areas of PC knowledge. They were asked to rank their skills using an ordinal Likert scale of 1 (no knowledge) through to 4 (expert) in each of the eight areas, set out in Table 2 below, at the following two stages:

- prior to commencing the Institute's *PCA* training programme;
- after completing the Institute's *PCA* training programme.

The hypothesis was tested using the Wilcoxon matched-pairs signed-ranks test. This is a nonparametric version of the paired-difference t-test (Siegal and Catellan, 1988, p. 87). The responses to the two sets of questions were paired and the differences between these pairs analysed. Unlike ordinary sign-rank tests, the Wilcoxon test also considers the magnitude of differences within the pairs. The results of the test are presented in Table 2.

Table 2
Wilcoxon Matched Pairs Signed Ranks Test of PC Skills of Newly Qualified Accountants Before and After the Personal Computing for Accountants Course and Examination

Experience of: ¹	Mean Ranks		PrePCA ² > PostPCA ³	PrePCA ² < PostPCA ³	Ties	Z	p (2-tailed)
	PrePCA ²	PostPCA ³					
Components of basic computer system [#]	12.00	13.04	1	24	132	-4.0495	.0001 ^a
Basic operations of an operating system	26.00	32.60	1	63	94	-6.7811	.0000 ^a
Use of spreadsheet packages	00.00	37.00	0	73	85	-7.4244	.0000 ^a
Operation of IAS ^f	00.00	54.50	0	108	50	-9.0207	.0000 ^a
Reporting facilities of IAS ^f	00.00	52.00	0	103	55	-8.8104	.0000 ^a
Databases creation	00.00	59.50	0	118	40	-9.4273	.0000 ^a
Databases manipulation	00.00	56.50	0	112	46	-9.1855	.0000 ^a
Basic word processing skills	00.00	22.50	0	44	114	-5.7767	.0000 ^a

^f Integrated Accounting Software

² PC knowledge before PCA course and examination.

[#] n = 157.

1. Unless otherwise stated, n = 158.

³ PC knowledge after PCA course and examination.

^a indicate that differences are significant at 1% level.

6. Discussion of Results

The hypothesis of no difference in self-perceived pre- and post-*PCA* PC skills among newly qualified members is rejected in all areas of PC knowledge under consideration. There are statistically significant increases in the self-perceived knowledge of newly qualified accountants in relation to components of basic computer systems, basic operations of operating systems, use of spreadsheet packages in accounting, operation of integrated accounting software, reporting facilities of integrated accounting software, database creation and manipulation and basic word processing (all significant at the 1% level). Respondents to the survey appear to have benefited from attending the *PCA* course.

The *PCA* programme appears to be improving basic PC skills in the categories of software which have been identified as those most commonly used by accountants in practice and in industry (Heagy and Gallun, 1994b). The ICAI does not recommend the use of a particular software package. Indeed since the course's inception, the actual software packages have changed a number of times, although the categories have always stayed the same. This policy corresponds with the view that recommending a specific software package in accounting curricula is not advisable "because industry standards can change and because the knowledge of one package is generally transferable to another" (Heagy and Gallun, 1994b, p.27).

The survey also addressed the usefulness of these self-perceived skills in the context of the respondents' work environment. Sixty-four per cent of those who attended the course believed that these basic skills were useful in the work environment. However, within the same group, 69 per cent were of the opinion that course developers could go further. They urged the ICAI to recognise the level of PC skills which accounting trainees have already acquired prior to commencing the *PCA* programme, either through tertiary education or in the workplace, and to direct its resources to developing the more advanced features of the course, such as macros in spreadsheet software, as well as concentrate on the application of these skills to general accounting issues. It is encouraging to see that the respondents' view on the integration of PC skills into core accounting subjects reflects the approach recommended by IEG11 (IFAC, 1995a).

The results of the analysis and the views expressed by the majority of the respondents on future developments for the course are not inconsistent. The perceived increase in computer

literacy as a result of attending the course is understandable because, at the very least, the programme would have provided revision for some, and taught some new feature of the software to most. Furthermore these new, improved or even revised skills could not fail to be useful since the software covered in the programme corresponds to that used by accountants in practice and industry (Heagy and Gallun, 1994b). This acknowledgement of the course's benefits does not preclude discussion of its shortcomings or presenting suggestions for improvement.

7. Conclusion

The study has revealed that newly qualified Irish Chartered Accountants perceive themselves as having gained new or improved existing PC skills as a result of having attended the ICAI's *PCA* programme. However, despite the increase in self-perceived PC skills and the acknowledged usefulness of the skills in the workplace, the majority of the respondents who attended the course believed the skills were too basic. Whilst their knowledge of these basic skills may have increased, they felt that a more integrated approach would be even more useful. The ICAI should, on the one hand, be encouraged that its *PCA* programme is having the desired effect by providing certain basic PC skills to new members and on the other, be conscious that it must embrace technology and incorporate PC skills more fully into its professional curriculum to reflect the realities of the business world. The increased level of computer literacy, which appears to exist among those commencing the *PCA* programme would make such a development possible.

8. Areas for Future Research

Whilst the findings of the survey are interesting and potentially helpful from the point of view of planning future programmes within professional accounting curricula, it should be pointed out that the study did not test newly qualified members' actual PC skills. Newly qualified members' level of expertise *before* and *after* the *PCA* course was self-assessed and consequently may reflect over or under estimation of abilities among the respondents. In view of this, an interesting area for future study would be to compare the actual results of the *PCA* examination, if such data are made available, with the self-perceived post *PCA* levels of expertise identified in this study to discover whether any significant difference exists.

Appendix: Survey Questionnaire (relevant extract only)

Section II

9. How many times did you sit the *Personal Computing for Accountants (PCA)* examination? _____

Please refer to your SUCCESSFUL attempt at the PCA examination when answering questions 10,11,12&13

10. When did you sit your successful attempt at the *PCA* examination?

Month _____ Year 19 ____

11. Please indicate (✓) which version of the *PCA* examination you passed.

Windows ____ DOS ____

12. Please indicate (✓) at which stage during your training you sat the *PCA* examination you passed.

- (i) Prior to passing Professional II _____
 (ii) Prior to passing Professional III _____
 (iii) Prior to passing FAE _____
 (iv) After passing FAE _____

13. Why did you sit the *PCA* examination at the stage indicated in 12 above?

14. Please indicate (✓) whether you attended any part of the *PCA* course.

Yes ____ No (examination only) ____

If your answer to question 14 was 'YES', answer questions 15-20, otherwise proceed to question 21(page 4)

Section III

15. Did you acquire or improve the following skills as a result of your attending the *PCA* course, and studying for and sitting the examination? Using the scale below, please write in the number from 1 (no knowledge) through to 4(expert) which best describes your knowledge level at each of the two points in time indicated below.

1	2	3	4
No Knowledge	Basic Knowledge	Relatively Proficient	Expert

		<i>Level of knowledge</i>	
		Before studying for PCA course and sitting the exam	After PCA course and exam
(i)	the components of a basic computer system i.e. CPU, hard disk, keyboard, mouse etc.		
(ii)	the basic operations carried out in an operating systems: i.e. copying, backing up, deleting files etc.		
(iii)	the use of spreadsheet packages in accounting		
(iv)	the operation of integrated accounting software, e.g. Pegasus, Sage etc.		
(v)	the report generating facilities of integrated accounting software		
(vi)	database creation		
(vii)	database manipulation		
(viii)	basic word-processing skills		

16. Did you acquire or improve practical IT skills OTHER THAN those outlined in question 15 as a result of your attending the PCA course and studying for and sitting the PCA examination? Yes___ No ___

If your answer to 16 was 'YES', proceed to question 17, otherwise proceed to question 18

17. Please identify and rate the additional practical IT skill(s) referred to in question 16 using the following scale.

1	2	3	4
No Knowledge	Basic Knowledge	Relatively Proficient	Expert

<i>Additional Acquired and/or Improved Practical Skill(s)</i>	<i>Level of skill</i>	
	Before studying for PCA course and sitting the exam	After PCA course and exam
(a)		
(b)		
(c)		
(d)		
(e)		

18. Overall, have the skills that you acquired and/or improved as a result of your attending the *PCA* course and studying for and sitting the *PCA* examination been useful in your job?

Yes ___ No ___ No skills acquired ___

If your answer to 18 was 'NO', proceed to question 19, otherwise proceed to question 20

19. Please explain briefly why you believe that the skills that you acquired and/or improved as a result of your attending the *PCA* course and studying for and sitting the *PCA* examination have NOT been useful for your job.

20. Do you have any suggestions as to how the Institute's *PCA* course and examination should be changed or developed, and why?

Thank you for your time and effort in completing this questionnaire.

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