

The effects on performance of computer familiarity and attitudes towards CB IELTS

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Introduction

CB IELTS is a linear computer-based (CB) version of IELTS that has been under development since 1998 and will shortly be made available to candidates as an alternative to the paper-based (PB) test, initially at a limited number of centres. Prior to its release, CB IELTS has been the subject of extensive user testing and trialling, culminating in a trial conducted world-wide under live test conditions, the first phase of which was reported in *Research Notes* 18, focusing on the comparability of test scores obtained through the two formats.

In addition to the question of comparability of results, levels of computer familiarity and their potential impact on test scores is also of concern. Eignor et al (1998), Kirsch et al (1998) and Taylor et al (1998) explored the effects of computer familiarity on computer-based TOEFL scores. Taylor et al (1998) found that when candidates were required to view an introductory tutorial before sitting the test, there were no meaningful differences between the test scores obtained by computer familiar and non-familiar candidates. CB IELTS is also administered in conjunction with an introductory tutorial and sample materials are provided so that candidates can become familiar with the CB test. O'Sullivan et al (2004) in an investigation of writing on computer-based and paper-based versions of IELTS also found no link between computer familiarity and test performance. However, they caution that, 'although the evidence points to the view that computer familiarity alone may not have a significant effect on CB test results... it cannot be ignored when comparing [PB] and [CB] tests' (O'Sullivan et al 2004:9).

All candidates who took part in the CB IELTS trial also completed a questionnaire addressing computer familiarity and attitudes towards the CB test (see Appendix 1 on page 4). This paper reports on the responses to this questionnaire in relation to two key research questions:

- What are the attitudes of candidates towards CB IELTS?
- How do candidates' computer experience and ability, and their attitudes towards features of CB IELTS as measured by the questionnaire influence their performance on the CB test in relation to their performance on the PB test?

Participants and instruments

Participants included 882 candidates, just over half of whom (50.8%) spoke Chinese as a first language. 56.6% were women and most (72%) were aged between 19 and 29 (see Table 1).

Table 1: Candidates participating in CB IELTS trial

Gender	Per cent
Female	56.6
Male	43.4
Age	Per cent
16-18	8.8
19-22	32.1
23-29	39.9
30-39	15.0
40 and above	4.2

The 26-item questionnaire was developed by the Research and Validation Group and addressed the following areas (the questions with percentage responses are provided in Appendix 1):

- Using writing tools in the CB environment: Questions 11,12,13
- Timing on the objective CB components: Q2,4,8
- Timing on the objective PB components: Q3,5,9
- Reading text on screen: Q7
- Timing on the CB Writing test: Q14
- Timing on the PB Writing test: Q15
- Experience and ability with computers: Q18,19,20,21
- Perceived value of the Specimen Materials CD-ROM (provided in advance of the test administration): Q16
- Perceived value of the introductory CB tutorials (provided at the beginning of the test administration): Q1,6,10
- Preference for the CB or PB test: Q22,24
- Perceived value of computer ability for CB success: Q17
- Previous experience of IELTS: Q23

In an open-ended question, respondents were also invited to make comments on the CB test: 'If you wish to comment further on any of the above statements, or any other aspect of CB IELTS, please do so in the box below.' These comments were collated and analysed for key themes.

Findings

Using writing tools on the computer

The CB Writing component offers candidates the option of composing their responses to the two tasks on screen using the keyboard or on paper, writing by hand. Items Q-11, Q-12 and

Q-13 addressed the editing and word count functions provided to candidates who opted to respond to the writing test on screen.

These text editing features were generally seen as both a user friendly and a helpful feature of the CB test. The 24% of candidates who responded, 'Don't Know/Not Applicable' to Q-11, Q-12 and Q-13 reflects the percentage of candidates who chose to respond on paper and so did not need to use these features. Of those who responded with the other options, 77% agreed that the editing tools were easy to use (Q-11) and 68% agreed that they were useful (Q-12). This compares with 17% (Q-11) and 24% (Q-12) who disagreed with the statements.

Timing

For Listening, candidates were generally happier with the timing on the PB test. 58.2% disagreed with the statement 'On the computer-based test, I had enough time to review my answers at the end of each section' (Q-4), 30.8% selected 'disagree', 27.3% 'strongly disagree'. This compares with figures of 11.6% and 4.4% respectively in response to the parallel statement referring to the PB Listening component (Q-5).

These results were associated with a difference between the CB and PB versions of the test. In the PB test, candidates need to transfer their answers from the question paper to a computer-readable optical mark sheet to allow for machine scoring of responses. This is unnecessary for the computer-based test and no additional time was provided. Comments from candidates made it clear that some felt disadvantaged by not being allowed this time for answer review, as they misconceived it, on the CB test as well. Further investigations were carried out to establish whether candidates were disadvantaged by the absence of the ten minute transfer period and these established that there was no significant effect on scores. The CB Listening test will therefore not include a ten minute transfer period.

For Reading, timing was generally less of an issue on the CB test (Q-8, Q-9), but here the differences were less clear cut than on the Listening component. On the Writing component there seemed to be little difference between the formats. Twenty per cent of those selecting responses other than 'Don't know/Not applicable' to Q-14 (relating to the CB test) and 23% of those responding to item Q-15 (the PB test) disagreed that they had enough time to complete both writing tasks in an hour.

Reading on screen

As set out in the questionnaire responses in Appendix 1, candidates were almost evenly split on whether they agreed or disagreed that long texts were more difficult to read on screen than on paper (15% strongly agreed that the texts were more difficult to read on computer and 13% strongly disagreed). This suggests, encouragingly, that the CB texts are no more difficult to read than the PB texts for most candidates and that overall there is no clear advantage in one mode of presentation over the other. The introduction of CB IELTS should provide candidates with a welcome opportunity to choose the format that they prefer.

Support materials

The reaction to the introductory tutorials and the specimen materials was generally very positive. The proportion agreeing that

the materials had been useful was relatively lower for the introductory tutorial to the Writing module (Q-10) and the general specimen materials CD-ROM (Q-16) than for the introductory tutorial for the Listening and Reading components (Q-1 and Q-6). However, in both cases there were large numbers of 'Not applicable' responses, which probably represent those candidates who completed the Writing CB paper by hand. Only a very small proportion of the candidates (between 2% and 5%) disagreed that the introductory tutorial gave sufficient information on how to answer questions in any test section (Q-1, Q-6, Q-10) and just 3% disagreed that the specimen materials CD-ROM had helped them know how to do the test (Q-16).

Computer ability and experience

Most candidates were confident computer users with some experience of composing written responses on the computer. They generally believed that knowledge of computers would be an advantage when taking CB IELTS: 67.7% agreed that candidates with good computer skills would perform better on CB IELTS than those with only basic skills (Q-17). Among candidate comments collected through the open-ended 'comments' box, it was generally perceived, even by those who preferred the CB test, that doing the IELTS test on computer advantaged those with good computer or keyboard skills.

The majority of candidates felt able to use a computer. The greatest proportion rated their computer ability to be 'intermediate' (44%). However, a range of skill levels were represented with 31% rating themselves as 'basic' and 20% as 'advanced' users. Very few candidates (1%) rated their ability as 'zero'. Thirty three per cent of candidates who responded to Q-21 and did not choose 'Don't know' felt that they were faster typists than writers with 48% believing they were faster at handwriting and 19% claiming to be the same speed. Use of computers was most frequent 'at home' (Q-19) with 64.9% claiming to use computers 'often', followed by use 'at work/ school' (45.8% 'often'). Most also claimed to use computers at least 'sometimes' for writing essays (78.5%) with 15.4% selecting 'never'.

Other issues

Almost half of the sample had taken IELTS before and so would already have been familiar with the PB format. Just over half of candidates preferred CB IELTS to the paper-based version and would choose it over the PB test in the future. The largest proportion (41% of those who responded) had preferred taking the CB test to the PB version with 35% preferring the PB test and 24% expressing no preference.

Relationships between questionnaire scales

Over half of the correlations between questionnaire scales were significant ($p < .01$), but these were generally between 0.1 and 0.4 indicating modest relationships (see Table 2). The strongest correlations were between experience and ability with computers and management of the CB IELTS editing tools and word count features. There was also a relatively strong relationship between computer experience and having enough time to complete the Writing test on the computer, which was in turn also related to using the text editing and word count features of CB IELTS.

Table 2: Correlations between questionnaire scales

	Exp. and ability with computers	Using writing tools in CB	Timing on CB objective components	Timing on PB objective components	Reading text on screen	Timing on CB Writing	Timing on PB Writing	Specimen materials CD-ROM	Introductory tutorial	Preference for CB or PB	Value of computer ability
Using writing tools in CB	0.42										
Timing on CB objective components	0.34	0.32									
Timing on PB objective components	0.12	0.03	0.25								
Reading text on screen	-0.13	-0.16	-0.19	0.08							
Timing on CB Writing	0.44	0.45	0.40	0.15	-0.09						
Timing on PB Writing	0.01	0.06	0.17	0.34	0.02	0.34					
Specimen materials CD-ROM	0.18	0.31	0.28	0.10	-0.08	0.20	0.09				
Introductory tutorial	0.23	0.46	0.34	0.12	-0.13	0.23	0.09	0.46			
Preference for CB or PB	0.30	0.24	0.29	-0.05	-0.21	0.22	-0.03	0.13	0.12		
Value of computer ability	-0.11	-0.05	-0.05	0.01	0.18	-0.07	0.01	0.11	0.04	-0.05	
Previous experience of IELTS	-0.02	-0.02	-0.01	0.07	0.08	0.03	0.07	0.00	0.03	-0.08	0.10

In short, as might be expected, candidates with more experience of computers felt better able to exploit the word-processing tools on offer.

Interestingly, those who agreed that the introductory tutorial and, to a lesser extent, the specimen materials CD-ROM were helpful were also likely to find value in the editing tools, suggesting that some candidates had gained awareness of these tools from the support materials. A preference for the CB test over the PB version was also moderately related to experience with computers, management of writing tools, satisfaction with the timing of the CB test and a preference for reading on screen.

Analysis of Covariance

A shortcoming of the correlational analysis described above is that questionnaire factors are correlated to some extent with each other. They also display variation between groups based on first language or age. This will affect the interpretation of the results because the impact of one factor or background characteristic may mask the impact of another on test scores.

Analysis of Covariance (ANCOVA) enables us to factor out the influence of other variables when investigating the relationship between test performance and features of interest. In this case three separate analyses were carried out, on each of the Reading,

Writing and Listening components. In addition to the questionnaire items, the variables used included the following:

- **Dependent variables:** performances on each of three components: Reading, Writing and Listening (Speaking, the fourth component of the test, is identical for CB and PB versions and so was excluded as a dependent variable from this study).
- **Independent variables:** First language (Chinese and non-Chinese); Gender; Age range (ages 15 and under; 16–18; 19–22; 23–29; 30–39; 40 and above); Previous experience of IELTS.
- **Covariates:** scores on the three PB components and on Speaking; Using writing tools in the CB environment; Timing on the objective CB components; Timing on the objective PB components; Reading text on screen; Timing on the CB Writing test; Timing on the PB Writing test; Experience and ability with computers; Perceived value of the specimen materials CD-ROM; Perceived value of computer ability for CB success; Perceived value of the introductory CB tutorials; Preference for the CB or PB test.

The results of the ANCOVA revealed just two significant ($p < .01$) main effects for variables other than PB scores: Age and Previous

Appendix 1: CB IELTS questionnaire responses

		Strongly agree/ Agree %	Neither agree nor disagree%	Disagree/ Strongly disagree %	Missing %
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THE LISTENING MODULE

Q-1:	On the COMPUTER-BASED test, the introductory tutorial gave me enough information on how to answer the Questions.	90.8	3.9	4.5	0.8
Q-2:	On the COMPUTER-BASED test, I had enough time to read the Q-s at the start of each section.	54.5	17.6	26.9	1.0
Q-3:	On the PAPER-BASED test, I had enough time to read the Questions at the start of each section.	65.2	16.2	17.3	1.3
Q-4:	On the COMPUTER-BASED test, I had enough time to review my answers at the end of each section.	24.7	13.2	58.2	3.9
Q-5:	On the PAPER-BASED test, I had enough time to review my answers at the end of each section.	67.8	14.2	16.0	2.0

THE READING MODULE

Q-6:	On the COMPUTER-BASED test, the introductory tutorial gave me enough information on how to do the test.	93.0	3.9	2.6	0.5
Q-7:	I found the long texts more difficult to read on screen than on paper.	39.8	20.1	38.2	1.9
Q-8:	On the COMPUTER-BASED test, I had enough time to finish the whole paper in one hour.	63.5	16.0	19.2	1.3
Q-9:	On the PAPER-BASED test, I had enough time to finish the whole paper in one hour.	43.5	22.2	32.8	1.5

THE WRITING MODULE

Q-10:	On the COMPUTER-BASED test, the introductory tutorial gave me enough information on how to do the test.	75.7	6.7	1.8	15.8
Q-11:	On the COMPUTER-BASED test, I found the cut, copy, paste and undo functions easy to use.	58.4	13.3	4.4	23.9
Q-12:	On the COMPUTER-BASED test, I found the cut, copy, paste and undo functions useful.	51.7	18.3	6.2	23.8
Q-13:	On the COMPUTER-BASED test, I found the word count function useful.	63.4	9.8	2.7	24.1
Q-14:	On the COMPUTER-BASED test, I had enough time to complete both tasks in one hour.	44.6	17.2	15.8	22.4
Q-15:	On the PAPER-BASED test, I had enough time to complete both tasks in one hour.	51.7	19.6	21.3	7.4

IN GENERAL

Q-16:	The specimen materials CD-ROM helped me to know how to do the COMPUTER-BASED test.	84.2	9.9	3.1	2.8
Q-17:	I think people with good computer skills will do better at CBIELTS than those with basic computer skills.	67.7	16.3	13.8	2.2
Q-18:	In general, I am confident of my ability to use a computer.	63.3	18.8	16.0	1.9

		Never	Sometimes	Often	Missing
Q-19:	How often do you use a computer:				
	a) at home?	3.2	26.6	64.9	5.3
	b) at work/school?	4.6	43.8	45.8	5.8
	c) to write essays?	15.4	44.9	33.6	6.1

		Zero	Basic	Intermediate	Advanced	Missing
Q-20:	How would you rate your level of computer ability?	1.2	31.1	43.7	19.6	4.4
			No	The same	Yes	Missing
Q-21:	I can type faster than I can write by hand.	40.4	15.9	28.2	15.5	
Q-22:	I preferred taking the COMPUTER-BASED test to the PAPER-BASED test.	33.1	23.1	38.7	5.1	
			No	Yes	Missing	
Q-23:	I have taken IELTS before.	50.0	45.0	5.0		
			CB	PB	Missing	
Q-24:	Given a choice in the future, which would you choose?	53.3	41.7	5.0		

experience of IELTS were both found to have an impact on Listening scores. Additionally, there was a significant interaction between Age, Gender, First language and Previous experience of IELTS on the Listening component. However, the impact of these features on scores (as revealed by the eta squared statistic) was minimal. This suggests that, for these self-selecting candidates, scores on the CB test are little affected by differences of background or the issues addressed in the questionnaire regarding the CB format.

Conclusion

CB IELTS is generally popular with candidates and the preparatory materials (i.e. introductory tutorials and specimen materials) were found to be useful. Candidates who chose to compose their responses using the keyboard generally found no problems in managing the writing tasks on computer and found the functions available to them (cut, copy, paste and word count) useful.

The candidates taking part in the trial were reasonably confident in their own ability to use computers, but the majority felt that candidates with more advanced computer skills would perform better on CB IELTS than those with only basic skills. However, this was not borne out in the analysis. In common with results from similar studies (O'Sullivan et al 2004, Taylor et al 1998), candidate ability and experience in using computers was not found to have any significant impact on the difference between PB and CB scores for any of the tested skills.

Candidates expressed some dissatisfaction with the timing of the Listening component of the CB test in relation to the PB test. However, this dissatisfaction was not reflected in any significant difference in scores. Comments from candidates suggest that the dissatisfaction could be attributed to the absence in the CB Listening of the ten minute transfer time provided at the end of the PB Listening component. However, investigation has shown that candidates do not receive any benefit in terms of score increases from receiving the transfer time on the PB component.

There is evidence that candidate background (age range, first language, gender and previous experience of IELTS) had some influence on test scores, but the effects were minimal and would have no meaningful impact on results. However, this is an area which will be made the focus of further research once more data from CB IELTS candidates becomes available.

The opportunity for candidates to choose between composing their responses on paper or on screen is seen as an essential feature of CB IELTS and allows them to select the response mode that reflects their usual practice. In this way, all candidates should have the opportunity to perform to the best of their ability, whether they are more accustomed to composing on computer or on paper. In the next issue of *Research Notes* Andy Blackhurst will report the results of CB IELTS Trial B together with the continuing validation work involved in the roll-out of computer-based IELTS to a number of venues from May 2005 onwards.

References and further reading

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