

**Feasibility of
Web-based
Computerized Adaptive Tests
on Primary School Mathematics**

Education Department

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Abstract

The Study

In February 2000, the Chinese University of Hong Kong was commissioned to conduct a study on Feasibility of Web-based Computerized Adaptive Tests (CAT) on Primary School Mathematics with the following objectives:

- study the feasibility of the web-based computerized adaptive tests of Mathematics at P3 and P6;
- construct informative reports at pupil, class and school levels; and
- examine pupils' and teachers' attitude towards this mode of assessment.

2. A web-based computer testing programme on primary school mathematics (Key stages 1 and 2, end of P3 and P6 levels) was developed by the research team. The CAT was conducted in June and July 2001 in six primary schools of mixed IT readiness, and their P4 and P6 pupils (total 1,754 pupils) were tested on two or more occasions on all domains of their respective curriculum. After the tests, pupils (1,754) and teachers (63) completed questionnaires to indicate their attitude and feeling towards the Web-based tests.

Major Findings

3. The major findings from the study were as follows:
- (a) Most of the teachers were satisfied with the content of the pupils' reports (62%), and the school or class reports (67%), which were designed with normative (compared to HK norms), criterion reference (items correct/wrong), and domain specific (strength and weakness) information condensed into the same graphs.
 - (b) The computer skills required for the students to conduct the Web tests were very basic or could be easily learnt.

- (c) A great proportion of pupils (87%) found the Web tests easier to use than paper-pencil ones, while about half of the teachers (47%) felt the using of the Web tests to be easier than paper-pencil tests.
- (d) Most of the pupils and teachers found the immediate feedback of the Web tests (73% in pupils, 92% in teachers), convenient accessibility at home and in school (76% in pupils, 95% in teachers), and the feedback on pupils' ranking among all HK pupils as beneficial to teaching and learning (65% in students, 86% in teachers).
- (e) A majority of teachers (59%) and pupils (58%) found the item content and display on the computer to be clear, nice and acceptable even though the items in the Web tests were just primitive multiple choice questions.
- (f) Both teachers and pupils got the same percentage (65%) in finding the Web tests interesting, and a large proportion of pupils preferred to have mainly or totally Web tests in the future (73% in pupils and 36% in teachers).
- (g) A large majority of teachers believed that the Web tests were beneficial in reducing their workload (84%), analyzing the strengths of different classes (95%), and helping them handle pupils' individual differences in learning through the detailed pupils' reports (100%). In general, almost all teachers were very positive towards the Web tests.
- (h) Pupils' attitude towards the Web tests was not directly related to their IT readiness. The perceived difficulty was affected more by pupil's subjective feeling than by their actual computer knowledge.
- (i) P4 pupils generally preferred the Web tests (versus paper-pencil tests) than P6 pupils.
- (j) Pupils who were good at school mathematics tests were also good at the Web tests.

Limitations to the Study

4. The study was on the subject Mathematics only, and it was possible that there would be less optimistic views of the Web tests in Chinese and English subjects where multiple-choice items were inadequate in assessing the

wide spectrum of language competence. Besides, the views of parents on the Web tests were not collected in the study.

Conclusions

- ♦ Web tests were easy to use even for pupils with minimal IT competence, and their attitude to the Web tests was affected by a lot of contextual (e.g. school culture) and subjective factors (e.g. own feeling).
- ♦ Teachers should have more first hand experience of using the Web tests, and the Web tests should be advocated as a convenient supplemental assessment tool to help rather than to take over their role as a teacher.
- ♦ More diversified item types that make full use of the interactive nature of Web testing (e.g. video, audio information, case studies, situational items) should be explored to make Web tests more interesting and attractive.