The NEPTON test: System Overview and functionality

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Abstract

Over the past few decades, a fairly large literature examining various aspects of computer-assisted language testing (CALT) has been developed. The findings indicate that many institutions are now using new technologies for their language testing practices. There are often detailed discussions about the test development processes, the effectiveness of such tests and evaluation of their success. Less is known, however, about their particular features and how the mechanisms 'behind the scenes' make them work and easy to use. The purpose of this article is to give an overview of the key features and mechanisms of New English Placement Test Online (the NEPTON test).

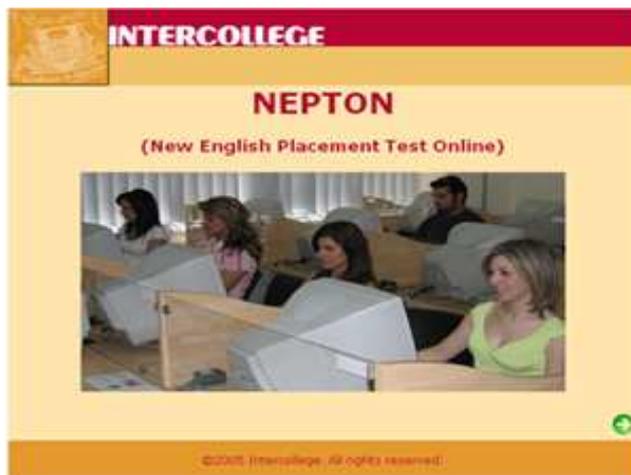## 1. The New English Placement Test Online

Figure 1 NEPTON

NEPTON is an item-banking program that provides for item entry and storage, test creation, online testing, scoring, reporting and analysis of tests. In an earlier paper (Papadima-Sophocleous 2006) and in papers to be published in the near future (Papadima-Sophocleous in press; Alexander & Papadima-Sophocleous submitted for publication), other aspects of the NEPTON test were described such as the development and implementation of the test, the test as a blueprint, test-takers' predispositions, attitudes and feelings towards taking the test, difficulties and constraints involved in developing the test, the hybrid nature of the test, and the cut-off scale used for the test.

1.1   The NEPTON system in general

The NEPTON system offers an English Placement Test Online and uses randomisation to select each item. This includes two types of randomised selection, one on the test level, and the other on the test content. How this works will be presented later on in this article. Some of the NEPTON advantages are that test-takers are tested in all language levels, and they can revisit their answers.

The NEPTON test measures English language proficiency in the following areas: (1) structure, which measures the ability to recognise language that is appropriate for standard written English; (2) vocabulary, which measures the ability to recognise and understand vocabulary that is appropriate to Standard English; (3) reading comprehension, which measures the ability to understand short passages similar in topic and style to everyday and academic situations used in English speaking settings; (4) writing, which measures the ability to write in English on an assigned topic. Writing is a hand-written task. According to Dunkel (1991), electronic tests should be used in conjunction with a guided oral interview and an essay. In the case of NEPTON, the oral interview was not feasible therefore the essay suggestion was followed. Students may be exempt from the test if they have scored well on other specified tests or have completed appropriate courses.

1.2   What does the NEPTON test include?

The NEPTON test is a browser-based program that allows test-takers to take the English Placement Test Online. It comes with a printed guide and an online tutorial. The guide

contains information about the test. It also provides a sample full-length test, in paper form.

The online tutorial provides comprehensive information about the test, the type of test and test activities. It presents test items in a format that mimics the real online test, and includes hands on experience prior to taking the test.

1.3   The NEPTON testing system

The NEPTON testing system consists of the following applications for the construction and delivery of NEPTON test, and the reporting of test-taker performance or responses:

(a) The NEPTON Generator: question and test item bank creation and storage administrator's area;

(b) The NEPTON Reporter: record keeping, scoring, reporting and data analysing administrator's area;

(c) The NEPTON Tester: The online testing area, where test-takers take the test.

1.3.1   The NEPTON test Generator

Test content

Test content is based on a 'corpus' or database of written language that currently contains about 1084 test items (632 questions), written specifically for the NEPTON test, collected and based on ideas suggested by theoretical books (Nunan, 1989, 1991; Heaton, 1995; Hughes, 2000; Harmer, 2001), with such sources as textbooks, course materials, and material from the Internet modified or simplified to suit the test purposes. Reading texts in the test conform to the characteristics of the language in the database. The content on the test is authentic or authentic like, and the language is consistent with that used in everyday, real social and academic settings.

Test items

The test items have been moderated, field-tested, trialled and analysed. The initial item analysis used modified classical statistics to suit the NEPTON test type. Facility value

and discrimination index of each item were first worked out and then it was determined whether each item was well centred and discriminating well.

Question types

The NEPTON testing system provides four types of multiple-choice questions: sentence-based multiple-choice questions (with a blank and five multiple choices), testing structure (SB-S) and vocabulary (SB-V); text-based multiple choice dropdown questions (with four or five blanks and dropdown menus of five choices), testing structure (TB-S) and vocabulary (TB-V) in a more contextualised manner; sign supported multiple-choice questions (with a sign and three to four multiple choices), testing reading comprehension (SB-RC); and text-based multiple-choice questions (with a passage and four questions with four multiple choices each), testing reading comprehension (TB-RC) (Heaton 1995, Hughes 2000, Harmer 2001). To ensure items quality and their fit with the learning objectives of the test, a process of moderation, field test (Henning 1991), item-analysis and trial were carried out. Monitoring of item performance, and item analysis is a continuous process.

Test Item Storage

A test item bank is a collection of test items that may be easily accessed for testing purposes. Good item bank management enables efficient and effective generation of tests and efficient re-use of items. To achieve these benefits, the NEPTON test items stored in the item bank are coded (Ward and Murray-Ward, 1994) with the following codes: test item identification number, item type (skill and type of test question such as SB-S) and language level (1 to 6). The test consists of banks of questions which are stored in libraries, for example the library of Level 1 sentence-based, measuring structure items (SB-S) of 50 items (see table below). Content codes are based on the NEPTON test objectives, and are informed by the Common European Framework Reference CEFR.

Table 1   CEFR equivalents of non-elective ESOL courses

Course code		Level	Equivalent CEFR
BENG50	NEPTON level 1	Beginner	A1

BENG80	NEPTON level 2	Elementary	A2
BENG90	NEPTON level 3	Intermediate	B1
BENG100	NEPTON level 4	Upper-intermediate	B2
ENGL100	NEPTON level 5	Advanced	C1
ENGL101	NEPTON level 6	Upper-advanced	C2

NEPTON Generator - Features and Functions

NEPTON has a simple, friendly and non-text-heavy interface design. The *Item Editor* is the area where test items created in word processing applications can be imported using the cut and paste method. Information such as the item identification number, and the item type and level are entered.
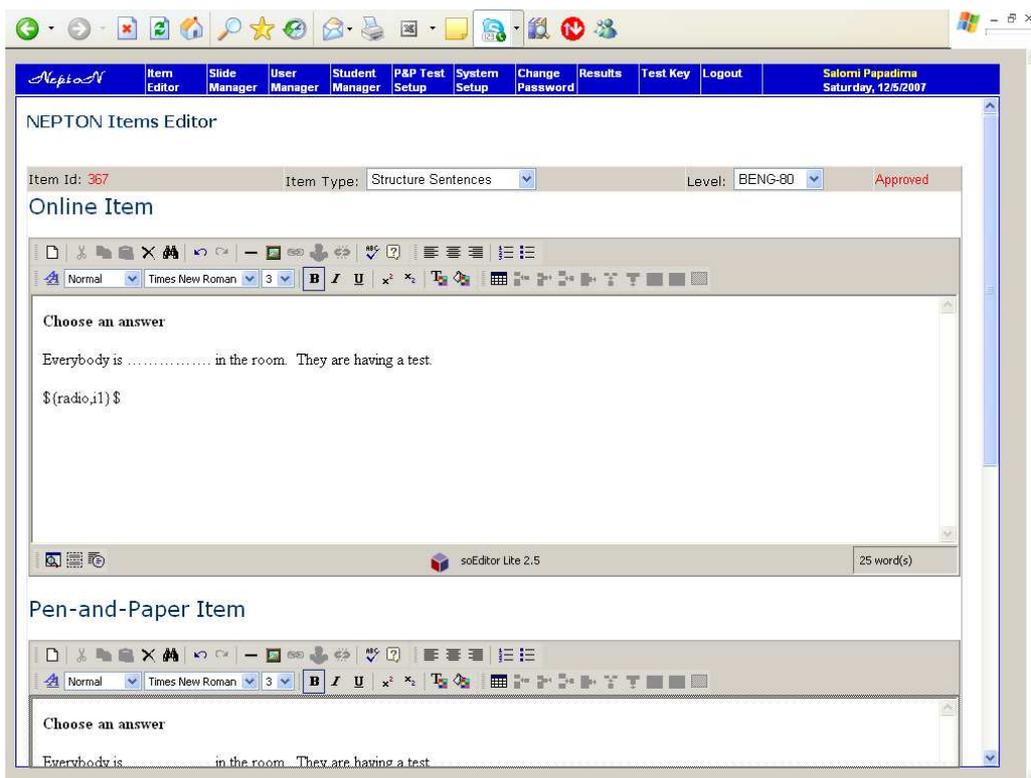
Figure 2   NEPTON Items Editor

There are two sections in the *Item Editor*: the *Online Item,* where items are uploaded for the Online NEPTON version, and the *Pen-and-Paper Item,* where items are

uploaded for the pen-and-paper NEPTON version (although a pen-and-paper version of the test was prepared, practically all students prefer the NEPTON test). There is also a section where the item responses and the weight for each one are entered. The functions of *add responses*, *test preview* and *print* are available, as is a *find-an-item function*, where an item ID number can be entered and the system automatically finds it and presents it on the screen. Other functions in the Generator area include Slide Manager, User Manager, Student Manager, System set up, change password, Results, and test key. In the system set up, the cut-off points, the language levels and the questions types are entered.

NEPTON Test generation

Each test generated for each test-taker is unique and consists of thirty three questions comprising 54 test items. The NEPTON system uses a two test and a 6-slide pre-determined content paradigm for the test generation. In other words, firstly Test 1 or Test 2 is randomly chosen. Each one contains test items from all language levels, reflecting as many different types of activities, measuring structure vocabulary, reading comprehension and writing, but in a different sequence. Then, for each chosen test, its 6-slide pre-determined content paradigm is automatically followed to generate the test.

Table 2   The NEPTON slide paradigm

6 SLIDES	TEST 1	No of items per question type	TEST 2	No of items per question type
NEPTON level 1 **Beginner** **9 items per slide**	SB-S: TB-S: SB-RC:	3 5 1	SB-V: TB-V or TB-RC: SB-RC:	4 4 1
NEPTON level 2 **Elementary** 9 items per slide	SB-V: TB-V / TB-RC: SB-RC:	4 4 1	SB-S: TB-S: SB-RC:	3 5 1
NEPTON level 3 **Intermediate** 9 items per slide	SB-S: TB-S:	4 5	SB-V: TB-V or TB-RC:	5 4
NEPTON level 4 **Upper-**	SB-V: TB-V or TB-RC:	5 4	SB-S: TB-S:	4 5

intermediate 9 items per slide				
NEPTON level 5 **Advanced** 9 items per slide	SB-S: TB-S:	4 5	SB-V: TB-V or TB-RC:	5 4
NEPTON level 6 **upper-advanced** 9 items per slide	SB-V: TB-V or TB-RC:	5 4	SB-S: TB-S:	4 5
9 items x 6 slides	**54 items (33 questions)**		**54 items (33 questions)**	

NEPTON test Cut-off points

After considering different ways in determining test cut-off points, depending on such aspects as test purpose, test type, test context, and institutional considerations such as number of places available in the course, number of applicants, and availability and constraints in human and other resources suggested by various theorists (Heaton, 1995; Hughes, 2000; Alderson et al. 2003), and taking into consideration the nature of the NEPTON test, a process of iteration was undertaken to calculate six slide cut-offs. Figure 4 shows part of a series of iterations that resulted in the slide cut off point system of 5-4-4-5-4-5.
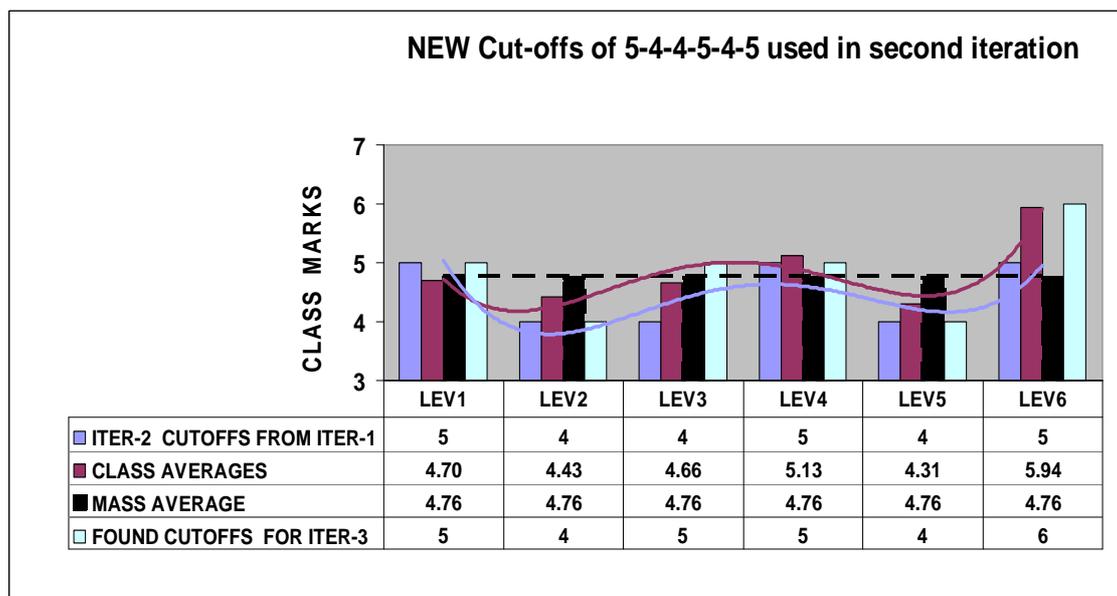

NEW Cut-offs of 5-4-4-5-4-5 used in second iteration

	LEV1	LEV2	LEV3	LEV4	LEV5	LEV6
ITER-2 CUTOFFS FROM ITER-1	5	4	4	5	4	5
CLASS AVERAGES	4.70	4.43	4.66	5.13	4.31	5.94
MASS AVERAGE	4.76	4.76	4.76	4.76	4.76	4.76
FOUND CUTOFFS FOR ITER-3	5	4	5	5	4	6

Figure 3   Results of the second Iteration using the slide averages of 5-4-4-5-4-5

1.3.2 The NEPTON Reporter

In the *Results* area, administrators have access to students' results. They can also upload the mark of the hand-written component of the test and see the final score calculated and presented. In this area, administrators or instructors can also have access to students' test history.

Results

In this area, the administrator can find specific results by determining the campus, date, and time a particular test was taken. Once this is presented on the screen, the administrator has access to the following information: the test-takers' identity number, their first and last name, their date of birth, the date the test was taken, the points accumulated and the cut-off point reached, the levels reached in both the online and the essay components of the test, the final decision, when the test started and when it finished, and the time it took each test-taker to take the test.

Figure 4 Results

By clicking on the *Student ID* number, the administrator enters the results for the Essay, and updates so that the final combined score appears in the overall results. By clicking on *Details*, the administrator has access to the test history of each individual test-taker.

Figure 5   Details, Result history

Scoring system

The score report shows six slide scale scores and a total scale score. Each correct answer counts equally towards the score for that section. Each level has a cut off point that was calculated and determined by the iteration process mentioned earlier. The six level cut off points are converted to a number on what is called the NEPTON test scale. Once the test-takers reach the cut off point of each level, they are automatically given a point. The total number of points determines the Language level the test-takers are placed for the electronic part of the test. The total NEPTON test score is reported on a scale that ranges from 1 to 6. Once the written essay is read and rated, its score is entered in the results area, and shown separately under the heading 'essay score'. The score from both the electronic test section and the written essay rating are then automatically combined to

calculate, determine and report the final score. Placement is announced to the student a day after taking the test by the institution administration. Test delivery options include: setting a time limit, question sequencing, user information, and feedback options. Answer files are created, password protected and saved on a mounted server volume.

1.3.3   The NEPTON Tester

So far, we have presented the way the NEPTON system works on the administrator's side, as a Test Generator and Reporter, and what mechanisms or paradigms have been used to make everything work in these areas. In this section, we are going to give an overview of the Tester, in other words, the secure area where the test-taker enters and takes the test. The overview will be accompanied by a description of the necessary knowledge behind the way its features have been selected and made to work.

The NEPTON test can be taken on any computer with an Internet Connection at any time. However, for official placement test results, arrangements are made for such testing to be done supervised. Most students take the test, invigilated by staff, however, there were cases where students have taken the test overseas, before coming to Cyprus.

NEPTON test tutorial

On entering the NEPTON test, users first see a welcome screen. This is followed by a brief description of the NEPTON test. Users are then taken for a guided virtual tour of the different features of the NEPTON test. The test item skills and activity types are explained and the navigation features are introduced. At the end of this tour, test-takers have the opportunity to trial the test. Once they complete the test tutorial and trial, they are prompted for a user name and a password, which are given to test-takers by the invigilator on entry to the computer lab, in order to enter the secure test area and take the test.

NEPTON test Features and Functions

In the secure test area, test-takers are presented with thirty three questions, ranging from lower to higher level. Each question consists of either one or four to five test items, depending on their format. Students use the mouse to answer questions.

The designers have made an effort to make the interface clear and easy to use including the type of functions. User interactions take place within the 33 numbered buttons at the top of the screen which lead to the 33 test questions, and their multiple choice options. The only time test-takers have to scroll down is with some long texts, and these appear mainly in the last two levels. Test-takers can answer the questions in any order and they can revisit any question at any time during the test, review or change their answers. Colours depict different messages: any question number in **grey** indicates a question which has not yet been answered; any question number in **red** indicates a question which is currently seen on the screen; any question number in **green** indicates a question which has already been answered; any question number in **yellow** indicates a text-based question with more than one question items to answer, which points out that some of those questions have not been fully answered[1].

The name of each test-taker appears at the left bottom side of the screen. Next to it on the right, there is a clock indicating the time left until the completion of the test. Further on the right, there is a "Next" question button. At the right bottom side of the screen is the "Finish Test" button. Once the test-takers click on that, they exit the secure area and cannot re-enter it. The answers are electronically recorded and the results are calculated automatically. As the above description of the system indicates, the NEPTON test is neither an ordinary computer-based test nor a computer adaptive test.

Immediate feedback on scores

It is possible to give students information about their score immediately after they finish the online test. However, because the placement test also includes a hand-written component, the students are not able to know their total score until the test component is corrected by markers. This mark is uploaded in the test administration area and calculated with the online test score to come up with the total score for the test. The results are made known to the students the next day.

2. NEPTON test reliability and validity

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[1] Please note that this colour system only works in an actual NEPTON test. It currently does not work in the online tutorial. However, it is hoped that the tutorial will be upgraded shortly to show this colour system effectively.

The NEPTON test has been field-tested and trialled and many types of analysis have taken place to make sure it functions successfully, is administrated efficiently, and places students efficiently. Apart from the measurements mentioned so far, there were also mechanisms to ensure the test reliability and validity.

2.1 Ensured test reliability

Test reliability was ensured in various ways suggested by relevant literature (Weir, 1990; Hughes, 2000; Alderson et al. 2003; Bachman, 2003): The substantial test item bank; field testing on a substantial number of students, representative of the population; data analysis carried out establishing test-takers' perceptions of the test and taking it online; item moderation; provision of online tutorial prior to taking the test for test-taker familiarity; measures to ensure test administration conditions' uniformity and non-destructiveness.

2.2   Ensured test validity

Test validity was ensured in various ways suggested by relevant literature (Anastasi, 1982; Weir, 1990; Dunkel, 1991; Hughes, 2000; Alderson et al. 2003; Bachman, 2003): test item pool and sample size, testers' preferences towards online testing (internal face validity); six experts comparing the test with the Test Specifications (content validity); test-takers' and instructors' feedback (external construct validity).

3. Conclusion

The present article aimed at giving a brief overview of the NEPTON test and its distinctive features: the Generator (which creates and stores the questions and the test item bank), the Reporter (which keeps the records, scores, reports and runs data analysis), and the Tester (which allows test-takers to take the test), and the background information needed to understand how these features work: the item-analysis paradigm, the item storage and retrieval system, the 6-slide paradigm, the cut-off paradigm, the friendly interface features and navigation, and colour-coordinated tools.

There are aims to develop a future component for the NEPTON test. The authors hope that incorporating an automatically graded online listening component will be

feasible, provided that a server upgrade is undertaken to cope with large numbers of students taking the test at certain times during the year.

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Note: