CONSTRUCTION AND STANDARDIZATION OF COMPUTER AWARENESS TEST FOR PROSPECTIVE SECONDARY SCHOOL TEACHERS

Dr. Reena[1] and Dr. Vishal Sood[2]

Abstract

The present task was undertaken to construct and standardize a test for measuring computer awareness of prospective secondary school teachers. For this, data were collected from prospective secondary school teachers by adopting random sampling technique. An item pool was created initially by consulting various sources and theoretical and empirical literature available in the concerned area. This item pool was put to evaluation and criticism by technical as well as language experts. The preliminary draft of computer awareness test was further subjected to item analysis to select only highly discriminating items. The reliability of test was established with the help of test-retest and split-half method which were found to be appreciably high. The validity of computer awareness test was ascertained and norms were established for interpretation of obtained scores on the test. In the last, conclusions have been presented and applicability and implications of computer awareness test have been discussed.

Keywords: Construction, Standardization, Computer awareness.

INTRODUCTION

Technology plays an important role in accelerating economic growth and promoting development. Perhaps no other single technological innovation during the second half of the 21st century that has touched so many lives, than the computer. Computers and computerized devices have become an integral part of society. In fact, many people use them in schools, homes, and the workplace. It has become imperative to know basic computer skills to survive in the world. Computer awareness is awareness of the computer's importance, knowledge of what computers are and how they work and interaction (ability to interact with computers. A person is considered "computer aware" if he/she possesses all of the following characteristics: Knowledge about the fundamentals of computers (i.e. Hardware and software computer systems, Computer generations etc.), Knowledge about the fundamentals of Internet (i.e. what is Internet, what are the services offered by the Internet? etc.). Cagiltay et. al. (2001) found that teachers were not sufficiently trained to use computers in their classroom but they agreed that technology will significantly influence education and that the ultimate goal of teacher computer literacy training should be to have computer-literate teachers who utilize computer technology successfully in the classroom. Asan (2002) found that pre-service teachers and classroom teachers practiced developing instructional materials and integrating technology in subject content areas, became more comfortable with the technology and developed greater proficiency in their computer use. Asan (2003) found that many teachers were not computer users. Many teachers lacked a functional computer literacy foundation upon which to build new technology and skills. Hall

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[1] Assistant Professor, Abhilashi College of Education, Ner-Chowk, Mandi-175008
[2] Assistant Professor (Education), H. P. University, Shimla-171005

(2007) examined that teachers with more constructivist beliefs were more likely to use computers more frequently, to use a greater variety of software, and to use computers in constructivist oriented ways. Variables, such as staff development, software availability and teacher's expertise had a positive impact on the computer use of all teachers. Further, Gross and Latham (2009) found that undergraduate students were computer information proficient, but their knowledge and information searching skills were insufficient. Rafeedali (2009) found that most of the higher secondary school teachers have basic computer knowledge. Higher secondary teachers were not using the IT resources in the class room interactions. Only 13% of higher secondary school teachers were using power point in the class room. Son, Robb and Indra (2011) indicated that the self-evaluation of basic computing skills of teachers are generally high but their frequency of using computer applications is very limited to few types of applications such as word processing. Moreover, Alabi and Yisa (2013) found that the teachers' level of computer literacy was 44% and there was significant relationship between computer literacy and teacher job effectiveness. Ananthula and Maheswari (2015) found that boys had high computer awareness than secondary school girls. This study also showed that private school students of secondary schools had high awareness than government school students at secondary level. Further, Gbenu, Jimoh and Lawal (2016) indicated that public primary school teachers were aware of the use of computers in a classroom setting; there was a statistically significant difference between the male and female teachers on the computer awareness and application; and there was no significant difference between the younger and older teachers on the subject matter of computer awareness and application.

On the basis of above discussion, it appears that the most of the research studies on computer awareness of prospective secondary school teachers have been carried out in foreign countries and there is a lack of studies in India. There is no research tool available at present which can be safely used for measuring computer awareness level of prospective secondary school teachers. Hence, it was thought worthwhile to construct and standardize computer awareness test for prospective secondary school teachers.

PURPOSE OF THE TEST

The present test is intended to measure the computer awareness of prospective secondary school teachers.

OBJECTIVES OF THE STUDY

1. To prepare the preliminary draft of computer awareness test for prospective secondary school teachers.
2. To carry out item analysis of preliminary draft of computer awareness test.
3. To estimate reliability of computer awareness test through test-retest and split-half methods.
4. To ascertain the validity of computer awareness test.
5. To establish norms for interpretation of scores obtained on computer awareness test.

METHODOLOGY

For construction and standardization of computer awareness test for prospective secondary school teachers, survey technique under descriptive method of research was employed.

Sampling

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Multistage sampling with stratified random sampling technique was employed in this research work. Firstly, a sample of 150 prospective secondary school teachers was selected for carrying out item analysis of preliminary draft of computer awareness test. At the second stage, a sample of 55 prospective secondary school teachers was selected to compute test-retest reliability of computer awareness test. At the time of second administration, 10 prospective teachers were not present. Therefore, test-retest reliability was computed on the basis of responses given by 45 prospective secondary school teachers. At the third stage, 90 prospective secondary school teachers were selected to estimate split-half reliability index of computer awareness test. At the last stage, a sample of 928 prospective secondary school teachers was chosen for establishing norms for interpretation of scores obtained on computer awareness test.

Planning and Preparation of Initial Draft of Computer Awareness Test

First of all, it was considered worthwhile to plan for the content matter of computer awareness test for prospective secondary school teachers. For this, the investigator thoroughly screened the related literature, computer education syllabus, different inventories and tests on computer awareness and carried out discussions with the experts in the concerned area. On the basis of this, investigator prepared a list of 86 test items, out of which 80 items were of multiple choice type and 6 items were of true / false nature. These items were pooled from various sources and by getting the help from experts, researchers, experienced teachers and computer instructors. The multiple choice items had four options out of which only one alternative was correct. For scoring of the items in this test, there was 1 mark for each correct response and 'zero' mark for each incorrect response. These questions were written in English language by taking into consideration the understanding level of the student-teachers and nature of the content matter of the test.

Editing and Revision of Initial Draft of Computer Awareness Test

After writing the test items of computer awareness test, they were edited and revised. For this, the initial draft of the test containing 86 items was given to experienced teachers, computer instructors and experts in the concerned area to judge the content and linguistic accuracy of each item and its relevance. Each item was personally discussed with experts and their valuable comments and suggestions were taken into consideration in order to remove any type of logical, technical and linguistic ambiguity in the test items. On the basis of expert opinion, 6 items were rejected from the preliminary draft and it was decided to have 80 items in preliminary draft of computer awareness test out of which 76 items were of multiple choice type and 4 items were true / false nature.

DATA ANALYSIS AND RESULTS

Item Analysis of Preliminary Draft (Try-Out Form) of Computer Awareness Test

Data were analyzed by employing appropriate statistical techniques. The details are given as under:

The technique of item analysis was employed for selection / rejection of test items for preparing final draft of computer awareness test. To carry out item analysis, the preliminary draft of computer awareness test was administered on a sample of 150 prospective secondary school teachers of two B.Ed. colleges of Shimla district of Himachal Pradesh. The selection of these prospective secondary school teachers was made by employing multistage sampling along with random sampling technique. Afterwards, the scoring of was done by following the procedure mentioned earlier. Afterwards, 27% of the prospective secondary school teachers (40 prospective teachers) with highest total scores and 27% of the prospective secondary school teachers with lowest total scores on preliminary draft of computer awareness test were taken into consideration. These two groups were named as 'top group having high scores' and 'bottom group having low scores' respectively. The middle 46% cases were weeded out and not considered for further analysis. Afterwards, the validity index for each item was computed by using biserial 'r' and only those items were retained for final draft of test which were having r_{bis} value greater than 0.25. Further, difficulty index for each item was calculated and only those test items whose difficulty index lied between 0.21 and 0.80 were selected for the final draft of computer awareness test.

After computing the value of difficulty index and validity index in respect of 80 items, 26 items were rejected and 54 items were retained for final draft of computer awareness test. The final draft of the computer awareness test comprised of 54 test items out of which, 52 items were of multiple choice type and 2 items were of true / false nature.

Reliability of Computer Awareness Test

The reliability of computer awareness test was determined by using two methods i.e. test-retest method and split-half method.

1.   Test-Retest Reliability

The test-retest reliability of computer awareness test was estimated by administering the final draft of the test twice on 55 prospective secondary school teachers after a time gap of fifteen days. It is important to mention that, at the time of second administration, 10 prospective teachers were not present. Therefore, test-retest reliability was computed on the basis of responses given by the 45 prospective secondary school teachers. Then, the coefficient of correlation was calculated between the two sets of scores by using "Karl Pearson's Product Moment Correlation Method". The correlation coefficient 'r' i.e. reliability index came out to be 0.76 which was significant at 0.01 level of significance and thus, can be considered as fairly high in terms of reliability.

2.   Split-Half Reliability

For estimating the reliability of computer awareness test by split-half method, the items of the final draft of the test were divided into two halves by following odd-even procedure. The two halves of the scale were administered on 90 prospective secondary school teachers selected from three B.Ed. colleges situated in Shimla district. Further, scoring was done separately for two halves of the test and the value of correlation coefficient was

computed between the scores of two halves by using Karl Pearson's Product Moment Correlation Method and Spearman-Brown Prophecy Formula. Thus, the split-half reliability of computer awareness test came out to be 0.80 which was significant at 0.01 level of significance and thus, indicates high internal consistency of the test.

Validity of Computer Awareness Test

The validity of computer awareness test was ascertained in terms of content validity, intrinsic validity, cross validity and item validity. The content validity of the computer awareness test was established by carrying out critical discussions with field experts at the time of development of preliminary draft of the test. The experts were of the opinion that the items in computer awareness test were fully accurate to measure the computer awareness of prospective secondary school teachers. In addition to this, only those items were retained in the preliminary draft of the computer awareness test which were related to course content of teacher education programmes. Thus, the computer awareness test was found to possess adequate content validity. Furthermore, the computer awareness test can be considered to have adequate intrinsic validity because split-half reliability of the test was found to be 0.80 which is a high correlation index. The cross validity of the computer awareness test was ensured by taking entirely different samples of prospective secondary school teachers in order to carry out item analysis, establishing reliability and developing norms. Computer awareness test was considered to be valid enough in terms of item validity because only those items were retained in the final draft of the test which were having validity index greater than 0.25 and difficulty index values between 0.21 and 0.80.

Norms for Interpreting Computer Awareness Scores

The test was administered on a sample of 928 prospective secondary school teachers from 38 B. Ed. colleges selected from 7 districts of Himachal Pradesh. On the basis of collected data, the mean and standard deviation in respect of overall computer awareness score of all sampled prospective secondary school teachers was calculated which came out to be 28.41 and 8.875 respectively. Then, the raw scores were converted into z-scores by taking into consideration the values of mean and standard deviation for the purpose of establishing norms for interpretation of obtained computer awareness scores. The following range of z-scores on a continuum can be used as suggestive norms for interpreting scores obtained on computer awareness test for prospective secondary school teachers.

Table 1. Norms for Interpretation of Scores on Computer Awareness Test for Prospective Secondary School Teachers

Sl. No.	Range of Raw Scores	Range of z-Scores	Interpretation (Level of Computer Awareness)
1.	47-54	+2.01 and above	Extremely High
2.	40-46	+1.26 to +2.00	High

3.	33-39	+0.51 to +1.25	Above Average
4.	24-32	-0.50 to +0.50	Average
5.	18-23	-0.51 to -1.25	Below Average
6.	11-17	-1.26 to -2.00	Low
7.	0-10	-2.01 and below	Extremely Low

CONCLUSIONS

Following conclusions were drawn with respect to construction and standardization of test for measuring computer awareness of prospective secondary school teachers:

1. The present computer awareness test has been specifically constructed for prospective secondary school teachers. However, it can be employed for measuring computer awareness of in-service and pre-service teachers at other levels of education by taking proper precautions and care.

2. The initial draft of computer awareness test was comprised of 86 items which was put to strict and rigorous examination in terms of expert opinions. After such critical examination and taking into consideration the suggestions of field experts, six items were rejected and certain items were modified/revised. The preliminary draft of the test was thus comprised of 80 items. After carrying out item analysis, 26 items were rejected and final form of the test has 54 items out of which, 52 items were of multiple choice type and 2 items were of true / false nature.

3. The reliability coefficients computed through test-retest and split-half method were found to be 0.76 and 0.80 which were highly significant and thus, computer awareness test possessed fairly high index of stability and high internal consistency respectively.

4. The validity of computer awareness test has also been ascertained in terms of content validity, intrinsic validity, cross validity and item validity which have been found to be satisfactory.

5. The suggestive norms for interpretation of obtained scores on the computer awareness test have been developed on the basis of which, the level of computer awareness of prospective secondary school teachers can be ascertained.

APPLICABILITY AND IMPLICATIONS

The present research work was carried out to construct and standardize a test for measuring computer awareness of prospective secondary school teachers. This test can be used for any diverse group of respondents differentiated on the basis of level of education, gender etc. This test can also be used for measuring and comparing computer awareness of in-service and pre-service teachers at different levels of education. The test is highly reliable and valid to measure the computer awareness level of prospective secondary school teachers. This test can be easily administered in individual situations as well as group situations and can be scored and interpreted conveniently. On the basis of scores obtained on this test, necessary steps can be taken to improve computer awareness of prospective secondary school teachers. Necessary changes can be brought in curriculum of pre-service teacher education programmes with special reference to computer education.

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