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Construction and Validation of Computer Phobia Scale

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Abstract

This paper highlights the process of construction and validation of the Computer Phobia Scale for higher secondary students. Computer phobia is a concept-specific anxiety as it is a feeling associated with a specific situation, in this case when a person interacts with computers. This study aims to construct and validate a standardized scale to measure computer phobia across multiple dimensions including cognitive, affective, behavioral, physiological, and programming-related fears. The pilot study was conducted with 100 samples and 50 statements. The scale initially consisted of 50 statements and finally 40 statements in the final study after the item analysis. The present pilot study was conducted with 100 higher secondary students studying in Kanyakumari District of Tamil Nadu. The test–retest reliability of the test was computed to be 0.90. The validity coefficient (the correlation coefficient obtained between total score on the present scale and CARS) was 0.77 and the scale was found to be valid.

Keywords: *Computer Phobia, Scale, Construction, Validation.*

1. INTRODUCTION

In today's rapidly advancing digital world, computers have become an essential part of daily life, influencing education, communication, healthcare, and nearly every professional sector. However, not everyone adapts to this technological shift with ease. Computer phobia, also known as cyber phobia or technophobia, refers to an irrational fear or anxiety associated with the use or even the thought of using computers and digital technology.

This psychological phenomenon manifests in various ways, such as avoiding computers altogether, feeling nervous or overwhelmed when required to use them, or experiencing physical symptoms of anxiety when interacting with computer-based tasks. Computer phobia can stem from several factors, including a lack of exposure, negative past experiences, low self-efficacy in handling technology, or apprehensions about privacy, data security, and rapid technological changes.

Recognizing and addressing computer phobia is crucial, as it can hinder personal, educational, and professional growth in an increasingly digital society. Understanding its

dimensions and effects helps in developing supportive interventions and training programs that build confidence and promote healthier attitudes toward technology.

2. COMPUTER PHOBIA

Computer phobia is a psychological condition characterized by excessive fear, anxiety, or apprehension toward computers and related technologies, often resulting in avoidance behaviors, reduced performance, or resistance to technology adoption. This condition can affect individuals across all age groups, particularly those with limited exposure to computers or past negative experiences.

It may also involve emotional, cognitive, and behavioral responses such as frustration, confusion, and fear of failure when using computers. Computer phobia is not simply a dislike for technology; it is a form of situational anxiety that occurs specifically in contexts involving computers or digital tools. It can be mild or severe, ranging from slight nervousness to complete avoidance.

3. DIMENSIONS OF COMPUTER PHOBIA

3.1. Affective Dimensions (Emotional)

- Feelings of fear, anxiety, or panic when using or thinking about using a computer.
- Low self-efficacy in technological tasks.

3.2. Cognitive Dimensions (Anxiety, fear, frustration, irritability)

- Negative beliefs: "I'm not good with technology."
- Catastrophizing: "I'll break the computer if I do something wrong."
- Fear of incompetence or being judged.

3.3. Behavioral Dimensions

- Avoidance of computer-related tasks.
- Procrastination when using digital tools.
- Preference for traditional or manual methods.

3.4. Physiological Dimensions

- Increased heart rate, sweating, trembling when asked to use a computer.

3.5. Programming Anxiety Dimension

4. NEED AND IMPORTANCE OF THE STUDY

Computer phobia is a concept-specific anxiety as it is a feeling associated with a specific situation—in this case, when a person interacts with computers. Computer phobia is "the phobia that people feel they will experience when they are interacting with computers—the anxiety associated with the concept of computers" **(Oetting, 1983)**.

There are many researchers who have developed scales to measure computer phobia. Studies have focused on the various factors involved in this phenomenon such as gender, computer experience, parental and peer influences, and self-efficacy. **Maurer and Simonson (1984)** designed the Computer Anxiety Index (CAIN), a 26-item **Likert-like scale (1932)** that measures participants' anxiety toward computers by examining avoidance, negative attitudes, anxiety, and computer comfort.

Rosen, Sears, and Weil (1987) introduced the Computer Anxiety Rating Scales (CARS) to measure a variety of aspects and features of technological anxiety. These include anxiety about the machines themselves, their role in society, computer programming, computer use, consumer uses of technology, problems with computers, and technology in the media **(Rosen & Weil, 1990)**.

The Computer Anxiety Rating Scale (CARS) developed by **Heinssen, Glass, and Knight (1987)** has been cited in many studies. This self-report inventory, designed to assess individuals' levels of computer anxiety, consists of a 19-item questionnaire based on a five-point Likert Scale (1 = strongly disagree to 5 = strongly agree).

Meier (1988) introduced a computer aversion scale consisting of 31 items, using a true–false scale to produce four scores for computers: (a) efficacy expectations, (b) outcome expectations, (c) reinforcement expectations, and (d) total score of the cumulative effects of reinforcement, outcome, and efficacy expectations. This scale was designed for mental health clients and workers, high school age students, and older individuals.

To measure computer anxiety, **Harrison and Rainer (1992)** used the Computer Anxiety Rating Scale (CARS) administered to 693 university personnel to assess perceptions regarding specific computer-related knowledge and skills. Data analysis using principal components factor analysis and orthogonal rotation identified two factors: (a) high anxiety toward computer use, and (b) confidence, enthusiasm, and/or anticipation of computer use.

A review of existing tools revealed that most scales were constructed in foreign countries

and designed for adults, making them less suitable for Indian educational settings or for measuring computer phobia among students. This gap prompted the researcher to develop a tool specifically for assessing computer phobia in students. The construction of the Computer Phobia Scale was carried out in three phases: (i) planning phase, (ii) construction phase, and (iii) validation phase.

5. PILOT STUDY OF COMPUTER PHOBIA SCALE

For the pilot study, 50 items were tentatively framed in the form of statements. The pilot study of 50 items was shown to experts to examine the content, repetitiveness, and ambiguity of the items, as the editing process is very important in the Likert technique of scale construction.

Table 1: Distribution of Positive and Negative Items for the Pilot Study

Statements	Dimensions	Item No.	Total
Positive Items (+)	Affective	1,2,4,6,7,9,10	22
	Cognitive	11,12,13,15,17,18,19	
	Behavioral	21,22,25,26,29	
	Physiological	35	
	Programming Anxiety	48,49	
Negative Items (-)	Affective	3,5,8	28
	Cognitive	14,16,20	
	Behavioral	23,24,27,28,30	
	Physiological	31,32,33,34,36,37,38,39,40	
	Programming Anxiety	41,42,43,44,45,46,47,50	
Total			**50**

Pilot Study and Evaluation: The experts were personally requested to carefully reflect on each statement and respond critically and objectively with comments and observations. The investigator, along with the supervisor, reviewed the experts' judgments over several sittings. Based on their feedback, 10 items were discarded and some were reframed or reworded. This process resulted in a final pool of 40 statements for the main study.

Final Study and Evaluation: The final version of the Computer Phobia Scale, consisting of 40 items, was administered to a sample of 100 Class XI students from four schools for item validity testing.

Table 2: Selection of Students for Pilot Study

S.No	Name of the School	Total
1	P.P.M Hr. Secondary School, Anducode	25
2	Good Shepherd Matric Hr. Secondary School, Marthandam	25
3	Government Hr. Secondary School, Arumanai	25
4	Mount Carmel Hr. Secondary School, Muzhucode	25
Total		**100**

6. ITEM ANALYSIS

The responses of the subjects were scored according to the allotted weightage. The weighted score for each item and for each subject was calculated and summed to obtain total scores. Based on these scores, the top 27% of subjects formed the high group, and the bottom 27% formed the low group. The responses of both groups for each item were analyzed to determine their discriminating power.

Item analysis was carried out using the *t*-test for the 50 items, comparing the means of the high and low groups. Items with positive and significant *t*-values at the 0.05 level of confidence or higher were retained, as they effectively discriminated between students with high and low computer phobia. Items with *t*-values that were not significant even at the 0.05 level were discarded. In this study, the *t*-ratio for 10 items was not significant, and those items were removed. The remaining items were significant at

the 0.01 level of significance, resulting in a final scale of 40 items—ten items for each of the five dimensions of computer phobia: Affective, Cognitive, Behavioral, Physiological, and Programming Anxiety.

Table 3: *t*-ratio of the Pilot Study of Computer Phobia Scale

Item No.	t-ratio	Item No.	t-ratio
1	0.30	26	3.11**
2	0.65	27	3.23**
3	2.86**	28	4.08**
4	2.87**	29	2.87**
5	1.33	30	3.06**
6	3.96**	31	2.75**
7	0.21	32	4.71**
8	4.66**	33	1.89
9	3.93**	34	2.92**
10	4.26**	35	3.66**
11	4.19**	36	4.25**
12	3.59**	37	1.85
13	4.39**	38	3.68**
14	4.09**	39	3.95**
15	3.56**	40	3.58**
16	2.79**	41	4.66**
17	2.66*	42	3.93**
18	0.82	43	4.26**
19	3.39**	44	4.19**
20	1.74	45	3.59**
21	4.59**	46	1.33
22	2.72**	47	4.09**
23	4.29**	48	4.59**
24	1.33	49	2.72**
25	3.59**	50	4.29**

* Significant at 0.05 level (Critical Value = 2.01 at 0.05 level, *df* = 33)
** Significant at 0.01 level (Critical Value = 2.68 at 0.01 level, *df* = 33)

From Table 3, it is evident that items numbered 1, 2, 5, 7, 18, 20, 24, 33, 37, and 46 were not significant and thus were dropped. The final scale retained 40 items for further study.

7. FINAL STUDY OF COMPUTER PHOBIA SCALE

The final version of the Computer Phobia Scale consisted of 40 items. The distribution of positive and negative items is presented in Table 4.

Table 4: Distribution of Positive and Negative Items for the Final Study

Statements	Item No.	Total
Positive Items	4, 6, 9, 10, 11, 12, 13, 15, 17, 19, 21, 22, 25, 26, 29, 35, 48, 49	18
Negative Items	3, 8, 14, 16, 23, 27, 28, 30, 31, 32, 34, 36, 38, 39, 40, 41, 42, 43, 44, 45, 47, 50	22
Total		**40**

8. SCORING

Each item has a response option on Likert's five-point continuum: *Strongly Disagree*, *Disagree*, *Undecided*, *Agree*, and *Strongly Agree*. For positive statements, the respective weights are 1, 2, 3, 4, and 5. For negative statements, the scoring is reversed—5, 4, 3, 2, and 1 respectively. The scoring procedure is presented in Table 5.

Table 5: Scoring Procedure for Each Item of Computer Phobia Scale

Items	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Positive	1	2	3	4	5
Negative	5	4	3	2	1

The total computer phobia score for a subject is the sum of the item scores for all statements. The theoretical range of scores on this scale is from 25 to 125. A higher score corresponds to a higher level of computer phobia among students, and vice versa.

9. RELIABILITY

Reliability refers to the accuracy, consistency, and stability of measurement by a test. Guilford (1954) suggested several methods to determine reliability, such as:

- Alternative forms reliability
- Test–retest reliability
- Internal consistency reliability (split-half method)

For the present study, the coefficient of internal consistency was determined using the split-half method, and the coefficient of stability was determined using the test–retest method.

Since the scale is heterogeneous and the items are arranged logically, identical halves could not be prepared; therefore, the test–retest method was found most suitable for determining reliability. To establish reliability, the scale was administered to 100 students of L.M.S. Girls Higher Secondary School, Marthandam. The same scale was re-administered to the same students after a gap of two weeks.

The product–moment correlation coefficient between the two sets of scores was found to be **0.90**, indicating high stability of the scale. The split-half reliability coefficient was calculated to be **0.85**. These results confirm that the scale is highly reliable.

Table 6: Reliability Coefficient of the Computer Phobia Scale

Method	No. of Samples	Boys	Girls	Total	Reliability Coefficient
Split-Half	100	50	50	100	0.85
Test–retest	100	50	50	100	0.90

The reliability results demonstrate that the Computer Phobia Scale is both stable over time and internally consistent, making it a dependable instrument for measuring computer phobia among higher secondary students.

10. VALIDITY

Content validity refers to the extent to which a scale represents a comprehensive sample of the behavior or concept to be measured. For this study, the content validity of the Computer Phobia Scale was established through systematic expert evaluation. The scale was shown to a panel of experts, and only those items that received consensus approval were retained.

Items were carefully selected after reviewing multiple definitions and dimensions of computer phobia to ensure adequate coverage of the construct. Thus, the scale possesses a fair degree of content validity.

To establish **concurrent validity**, the Computer Anxiety Rating Scale (CARS) developed by Heinssen, Glass, and Knight (1987) was administered alongside the newly developed Computer Phobia Scale to a sample of 100 students. The correlation coefficient between the total scores on the two scales was found to be **0.77**, indicating a strong positive relationship and confirming that the new scale effectively measures computer-related anxiety and phobia.

11. CONCLUSION

The present study successfully developed and validated the Computer Phobia Scale for higher secondary students, addressing the need for a culturally relevant instrument in the Indian educational context. The final scale, comprising 40 items across five dimensions—Affective, Cognitive, Behavioral, Physiological, and Programming Anxiety—demonstrated high reliability, with a test–retest coefficient of 0.90 and a split-half reliability of 0.85. Concurrent validity, established through correlation with the Computer Anxiety Rating Scale (CARS), further confirmed the tool's robustness (r = 0.77).

The scale offers educators, researchers, and policymakers a reliable and valid instrument to measure computer phobia among adolescents, enabling the identification of anxiety-related barriers to technology adoption. Its application can facilitate targeted interventions, digital literacy programs, and counseling strategies aimed at fostering positive attitudes toward computer use.

In an era of rapid digital transformation, addressing computer phobia is essential to ensuring equitable access to technological opportunities. The Computer Phobia Scale developed in this study provides a practical and psychometrically sound tool for advancing this goal.

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