

Screen Time: Analysis of Items regarding Knowledge, Attitude, and Practice

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Abstract:

The total amount of time a person spends in front of a screen like any electronic gadget (laptop, computer, smart phone, T.V., etc.) is called screen time. In this era of digital world, it is important for every people to understand the knowledge, attitude and practice regarding screen time. So, in this study, the researcher tried to construct a standardized scale for measurement of knowledge, attitude and practice regarding screen time among the XI grade students. During this study questionnaire was prepared for compilation of the data. In the present study self-made questionnaire regarding knowledge, attitude and practice towards screen time was prepared as suitable scale for collecting data in order to achieve the pre-determined objectives of this study. In case of knowledge section of the scale four (4) dimensions viz. prognosis, academic, addiction and necessity, in attitude section of the scale four (4) dimensions viz. prognosis, socialization, necessity and engagement and the last section of the scale i.e. practice section three (3) dimensions viz. entertainment, engagement and addiction were considered during construction of the questionnaire/scale. Though, at the initial stage there were total forty-four (44) items/statements in the prepared scale but, finally thirty (30) items or statements were retained. Among them twenty-five (25) are favorable and five (5) are unfavorable statements. The scale was highly valid because researcher selected the most determining statements for the final form the scale regarding screen time with the opinion of the experts in this area of research. The test-retest co-efficient of the scale were found as 0.84, 0.81 and 0.83 for knowledge, attitude and practice section of the scale respectively, which is highly significant.

Keywords: Screen time, Knowledge, Attitude, Practice

I. INTRODUCTION

The total amount of time a person spends in front of a screen like any electronic gadget (laptop, computer, smart phone, T.V, etc.) is called screen time. Due to the restrictions imposed to contain the coronavirus disease 2019 (COVID-19) pandemic, different population groups have adapted to varying screen time levels, which may have profound implications on their physical and mental wellbeing [1]. Physical activity, sleep and sleep quality, and stress might be affected in different ways by different types of screen-based device [2]. Increased screen time can lead to obesity, increase in energy intake, decreased time available for physical activity [3]. Many studies have shown that increased screen use might also result in lower academic performance.

Adolescents have shown a growing interest in using electronic media gadgets for a variety of activities, including online classes, social media engagement, video games, e-book reading, and many other things. According to Cambridge Dictionary 'screen time is the amount of time someone spends looking at an electronic device with a screen, such as a computer or television'[4]. Increased availability of new digital media has contributed to a rapid growth in average screen time exposure for children, with total daily screen time across devices in children aged 8 to 18 years rising from five to almost eight hours [5].

Canadian Community Health Survey studies that physical exercise and screen time are both linked to health perceptions among Canadian teenagers [6]. During adolescence, screen time exposure increases and concern as it has been identified as an important risk factor for physical and psychological poor health [7]. Obesity, diabetes, and cardiovascular disease have been linked to electronic devices and screen-based displays [8]. So in this regard we will see that excessive screen time has been shown negative impact on students' mental and physical health. Students experienced a variety of mental health issues, including depression and anxiety, neighborhood disorder, behavioral health problems, and so on arising out of excessive use of electronic gadgets i.e. increase in screen time [5, 9, 10].

Students' screen viewing habits are changing, they spend less time on watching television and spent more time on computers and other devices [11]. Screen time of adolescents is increasing day by day, therefore it is very important to know what is their knowledge, attitude, and, practice (KAP) about their screen time. Knowledge is described as a set of understandings, whereas attitudes are redefined as a predisposition or consistent tendency towards specific objects, individuals, or situations, and practice is defined as an observable response towards the stimuli [12]. Knowledge, attitude, and practice is a representative study that is helpful to know about a person or a certain community and gather data on what is known, believe, and done about specific issues [13]. As there is a dearth of report regarding knowledge, attitude, and practices (KAP) about screen time of adolescent students of Nadia District, West Bengal. An effective scale has been prepared to measure about knowledge, attitude and practice regarding screen time which will be helpful for our educator, social worker, policy planner etc. for future planning of their activities.

II. OBJECTIVE OF THE STUDY

This study aims to explore the quality of each item of knowledge, attitude, and practice related to screen time. So we can identify the ineffective items, and offer ways to improve the item's quality.

III. RESEARCH QUESTION

This investigation is focused on three research questions, these are-

1. In terms of screen time, what are the values of the difficulty index and discrimination index of the knowledge, attitude and practice test items?
2. After analyzing the items based on difficulty values and discrimination values, how many numbers of items are regarded as effective for the final test?
3. Is the test reliable?

IV. METHODOLOGY

1. DEVELOPMENTAL INSTRUMENT

At first, the researcher will develop a draft pool with the assistance of previously published articles, and these items are related to the knowledge, attitude, and practice regarding screen time of adolescent students. The three parts of the item pool consist of different types of dimensions, these are discussed below :-

(a) *Development of knowledge section:*

Knowledge means what is known [13]. The researcher first formed a draft test item after reviewing various literature related to the study and consulted with experts and resource persons in the field of research under discussion. On the basis of the response from the pre-try-out individuals, further analysis, screening and editing of the statements was done [14]. Then the set of items was examined its purposes, clarity of language, intensity, and appropriateness of each statement by the experts and resource persons. After the validation, a set of 19 items was included in the knowledge section of questionnaire regarding Screen Time. The 19 items of knowledge questionnaire consist of four dimensions viz. prognosis, academic, addiction and necessity. The knowledge items are of a three-point Likert-type summative rating. There were three alternative responses for each statement, True (T), False (F), and Don't Know (DK). The scores '1' for correct response and zero (0) for incorrect response were given [15].

(b) *Development of attitude section:*

An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related [16]. Attitude section of the scale comprising of 14 items/statements against four dimensions viz. prognosis, socialization, necessity and engagement for assessment of the attitude of adolescent students regarding screen time. To prepare the attitude items/statements, at first researcher gathered various informations from numerous sources. After this both positive and negative attitude items were formed with the help of expert in this field. The students' opinion on the prescribed items/statements were evaluated by using the 5-point Likert-type scale of strongly agreed, agreed, undecided, disagreed and strongly disagreed [17]. In this regard, the highest number is '5' and the lowest number is '1' for each item [18].

(c) *Development of practice section:*

Practice means what is done [13]. The practice scale consisting of 11 items with three dimensions viz. entertainment, engagement and addiction. The questionnaire was prepared with the help of expert's opinion and measured by a two-points Likert scale 'Yes / No.' In this questionnaire, every right answer was given 1 marks, and the wrong answer was zero (0) [19].

2. DESIGN AND SAMPLE OF THE STUDY

In this study, the population was taken from Nadia District, West Bengal. For this research purpose, random purposive sampling was employed to collect data, which is a type of non-probability sampling or non-random sampling [20]. The researcher purposefully picked 40 male and female students from Nadia District, West Bengal. In this study, data were collected from adolescent students, of them eighteen (18) and twenty-two (22) students were selected from rural and urban areas respectively.

3. DATA COLLECTION PROCEDURE

At first specific instruments for the test was given by the researcher and then questionnaire regarding screen time containing 30 items was administered on 40 IX- grade (adolescent) students in the month of May, 2022.

4. DATA ANALYSIS

After collection of the data, p-value and discrimination value of each item was calculated. To retain the psychometric features of each item, item difficulty and item discrimination indices are used in item analysis [21]. The percentage of the total

number of respondents who supplied correct responses is referred to as the p-value. The formula for calculating an item's p-value is-

$$p = \frac{R}{N} \times 100$$

Where, p denotes the difficulty index, R denotes the number of people who rightly answered questions and N denotes the total number of people that responded. Item discrimination refers to the percentage of students from the upper and lower-scoring groups who gave the right answers, the formula is-

$$DI = \frac{R_U - R_L}{\frac{T}{2}}$$

Where, DI stands for discrimination index and R_U stands for the number of correct responses from the upper group. R_L stands for the number of correct answers from the lower group and T stands for the total number of respondents from both groups. The test-retest method was used to determine the correlation between the two tests, and Pearson's product-moment coefficient (r) was used to determine the reliability of the test items.

V. RESULTS

Research Question - I: In terms of screen time, what are the values of the difficulty index and discrimination index of the knowledge, attitude, and practice test items?

Table 1: p-value and DI value of the items of knowledge scale

Item No.	p- value	DI
K1	0.48	0.63
K2	0.60	-0.09
K3	0.53	0.27
K4	0.20	-0.18
K5	0.85	0.45
K6	0.50	0.09
K7	0.83	0.36
K8	0.55	0.81
K9	0.25	0.09
K10	0.78	0.63
K11	0.48	0.45
K12	0.73	0.45
K13	0.33	0
K14	0.48	0.18
K15	0.85	0.27
K16	0.63	0.36
K17	0.40	0.18
K18	0.60	0.45
K19	0.63	0.36

Table 2: p-value and DI value of the items of attitude scale

Item No.	p- value	DI
A1	0.60	0
A2	0.38	0.18
A3	0.60	0.18
A4	0.33	0.27

A5	0.25	0.45
A6	0.35	0.45
A7	0.65	0.27
A8	0.40	0.45
A9	0.28	0
A10	0.25	0.36
A11	0.38	0.63
A12	0.63	0.54
A13	0.45	0.54
A14	0.40	0.54

Table 3: p-value and of the items of practice scale

Item No.	p- value
P1	0.73
P2	0.58
P3	0.63
P4	0.50
P5	0.35
P6	0.43
P7	0.63
P8	0.45
P9	0.40
P10	0.23
P11	0.28

Research Question – II: How many numbers of items are considered as effective items for the final test after analyzing the items on the basis of difficulty values and discrimination values?

Table 4: Distribution of knowledge, attitude and practice items on the basis of Difficulty Index (p-value)

p-value	Total Item		
	Knowledge	Attitude	Practice
Easy($p > 0.70$)	5	0	1
Moderately Difficult($0.31 < 0.70$)	12	11	8
Difficult($p < 0.30$)	2	3	2

On the basis of set standards for the interpretation of difficulty indices, 12 items of the knowledge test were identified as moderately difficult and 5 items were identified as easy and 2 items were identified as difficult. From Table-1, it is clear that in case of the knowledge section, 5 easy items and 2 difficult items were unable to satisfy the condition, these items were considered as 'poor' items. These 'poor' items were K4, K5, K7, K9, K10, K12, and K15. In case of attitude portion, eleven (11) items were moderately difficult and three items were difficult. So, in the attitude test, three items were considered as 'poor' items. These items were A5, A9 and A10. Table 3 also shows that in practice section, three items were considered as 'poor' items of which one item was easy and two items were difficult. These poor items of the practice section were P1, P10 and P11.

Table 5: Discrimination of knowledge and attitude items based on Discrimination Indices

Discrimination Index	Total Items	
	Knowledge	Attitude
Very Good(D>0.40)	7	7
Reasonably Good(0.30-0.39)	3	1
Marginal (0.20-0.29)	2	2
Poor(D<0.19)	7	4

According to the criteria of the discrimination index, results of the knowledge section indicates that seven (7) items failed to distinguish between students of different abilities, two (2) items were marginal which needs to be reviewed, and three (3) items were satisfactory and the function of the seven (7) items were very well. In case of attitude section, four (4) items failed to discriminate the different abilities of the students, two (2) items were marginal, one (1) item was satisfactory and seven (7) items' function are very good.

Selection of Items for the final form:

On the basis of the p-value and discrimination index (DI), 7 items of the knowledge scale were considered as poor items. On the other hand, two (2) items of the knowledge scale (K4 and K9) that failed to satisfy the condition based on both difficulty index (p-value) and discrimination index (DI) were eliminated. Among the remaining items, the five items of the knowledge scale, i.e. K2, K6, K13, K14, and K17 having moderate difficulty values of 0.60, 0.50, 0.33, 0.48, and 0.40 respectively but their discrimination values are 0.09, 0.09, 0, 0.18 and 0.18 respectively which are very poor, therefore, these five items were also excluded/eliminated from the knowledge scale. On the other hand, although the five items of the knowledge scale, i.e. K5, K7, K10, K12, and K15 had difficulty values of 0.85, 0.83, 0.78, 0.73, and 0.85 respectively and their discrimination values were 0.45, 0.36, 0.63, 0.45 and 0.27 respectively which were reasonably good and very good. According to Varma (2008) item difficulty should not be considered as an indicator for assessing the quality of the item, and only the DI value of the item should be used to assess item quality [22]. Therefore, these five items may be included in the scale without any doubt. For this reason, the items viz. K2, K6, K13, K14, and K17 were rejected and the items viz. K5, K7, K10, K12, and K15 were also accepted. Only seven (7) items were eliminated from the final form of the knowledge scale.

In the case of attitude scale, one (1) item of attitude scale item no. A9 failed to satisfy the condition based on both difficulty index (p-value) and discrimination index (DI) was eliminated. Among the remaining items three items of attitude scale viz.. A1, A2 and A3 having moderate difficulty values of 0.60, 0.38 and 0.60 respectively and poor discrimination values of 0.0, 0.18 and 0.18 respectively. According to Singh (2019), 'a poor item with a p-value of 0.50 is still a poor item' [23], therefore, although these three items were also excluded/eliminated from the attitude scale. On the other hand, although the two items of the attitude scale viz. A5 and A10 had difficulty values of 0.25 and 0.25 respectively but their discrimination values were 0.45 and 0.36 respectively which were reasonably good and very good. According to Singh (2019), p-value near 0.50 does not guarantee that an item will be a good discriminator [23]. The item quality is assessed by discrimination value. Therefore, these two items may be included in the questionnaire without any doubt. Only four (4) items were eliminated from the final form of the attitude scale.

In the practice section, three (3) items were rejected on the basis of the standard set of difficulty index, and eight (8) items were accepted in the final form of the practice scale regarding screen time. According to Bichi (2015), any one of two item statistics like item difficulty or discrimination indices can be used to assess the quality of the items because these two indices produce almost the same result [24]. Here, the items assess their quality by difficulty index in the practice scale.

Table 6: Item analysis of the knowledge scale regarding screen time

SI. No. Items, Before Item Analysis	SI. No. Items, After Item Analysis	p-value	DI
K1	K1	0.48	0.63
K2*	-	0.60	-0.09
K3	K2	0.53	0.27
K4*	-	0.20	-0.18
K5	K3	0.85	0.45
K6*	-	0.50	0.09
K7	K4	0.83	0.36
K8	K5	0.55	0.81
K9*	-	0.25	0.09
K10	K6	0.78	0.63
K11	K7	0.48	0.45
K12	K8	0.73	0.45
K13*	-	0.33	0
K14*	-	0.48	0.18
K15	K9	0.85	0.27
K16	K10	0.63	0.36
K17*	-	0.40	0.18
K18	K11	0.60	0.45
K19	K12	0.63	0.36

Note: * Item rejected

Table 7: Item analysis of the attitude scale regarding screen time

SI. No. Items, Before Item Analysis	SI. No. Items, After Item Analysis	p-value	DI
A1*	-	0.60	0
A2*	-	0.38	0.18
A3*	-	0.60	0.18
A4	A1	0.33	0.27
A5	A2	0.25	0.45
A6	A3	0.35	0.45
A7	A4	0.65	0.27
A8	A5	0.40	0.45
A9*	-	0.28	0
A10	A6	0.25	0.36
A11	A7	0.38	0.63

A12	A8	0.63	0.54
A13	A9	0.45	0.54
A14	A10	0.40	0.54

Note: * Item rejected

Table 8: Item analysis of practice scale regarding screen time

SI. No. Items, Before Item Analysis	SI. No. Items, After Item Analysis	p-value
P1*	-	0.73
P2	P1	0.58
P3	P2	0.63
P4	P3	0.50
P5	P4	0.35
P6	P5	0.43
P7	P6	0.63
P8	P7	0.45
P9	P8	0.40
P10*	-	0.23
P11*	-	0.28

Note: * Item rejected

Research Question - III: Is the test reliable?

After determination of the p-value and difficulty value of test items, the researcher conducted a test-retest on 60 XI-grade students from various demographic locations to determine the accuracy of the test items. According to Best and Kahn - A test is said to be reliable to the degree that it measures accurately and consistently, yielding comparable results when administered a number of times [25]. In this test, Pearson's product moment technique was applied to calculate the correlation between the two tests. The following formula is used to measure the coefficient of correlation- $r = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}}$ Where, r stands for coefficient of correlation, N stands for Number of samples, X stands for Test scores and Y stands for Retest score.

Table 9: Interpretation of Coefficient of Correlation

The range of coefficient (r)	Interpretation
0 (zero value)	No relationship.
From 0.00 to ± 0.20	Negligible relationship.
From ± 0.21 to ± 0.40	Low or small relationship.
From ± 0.41 to ± 0.70	Moderate correlation.
From ± 0.71 to ± 0.90	High correlation
From ± 0.91 to ± 0.99	Very high correlation
± 1	Perfect correlation, identical or opposite relationship.

Interpretation of coefficient of correlation [26].

Table 10: Value of correlation co-efficient between (r) T₁ and T₂

Different portion of the scale	Coefficient of correlation (r)
Knowledge	0.84
Attitude	0.81
Practice	0.83

Table 9 shows that from 0.70 to 0.90 means there is a high correlation. So, it can be concluded that correlation of our T₁ and T₂ regarding knowledge, attitude, and practice that have a strong positive relationship.

The final form of knowledge scale:

The final form of knowledge, attitude and practice scale consists of 12, 10 and 8 items respectively. There are twenty-five (25) positive/favorable and five (5) negative/unfavorable items/statements in the scale regarding screen time.

Table 11: Distribution of the items after item analysis among different dimensions of knowledge, attitude and practice about screen time

Different parts of the scale	Sl. no of the dimension	Dimensions	Sl. no of the Items of the final scale		Total items of the dimension	Total items
			Favorable	Unfavorable		
Knowledge	1	Prognosis	1, 2, 3		3	12
	2	Academic	4, 5, 6, 7		4	
	3	Addiction	8, 9, 10		3	
	4	Necessity	11, 12		2	
Attitude	1	Prognosis	1	2, 3	3	10
	2	Socialization	4, 5		2	
	3	Necessity	8	6, 7	3	
	4	Engagement	9	10	2	
Practice	1	Entertainment	1, 2, 3		3	8
	2	Engagement	4, 5, 6		3	
	3	Addiction	7, 8		2	

IV. CONCLUSION

The purpose of this study was to learn about XI-grade (adolescent) student's screen-time regarding knowledge, attitudes, and practice. We tried to construct a standardized scale/questionnaire through a series of procedures including literature review, draft questionnaire, expert opinion, pilot testing, p-value, DI measurement, test-retest, and so on. This research will be helpful for education planner, administrator, academic counsellor, etc. for providing proper guidance to the adolescent students. This KAP questionnaire may be used to generate a suitable item pool for future educational research. This study will also helpful for teachers and parents to motivate their children to minimize their screen time as it has an ill effect on their physical and mental condition.

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