2.1 Variables

- Internet use
- Gender
- Medium of instruction
- Grade/ Standard
- Area of residence: Rural/ Urban
- General health
- Physical health
- Mental health
- Social health
- Health Habits
- Eating habits
- Sleeping habits

2.2 Control Variable/ Inclusion Criteria

- Educational Board: GSHSEB
- Co-Ed schools having Grades 9-12
- Same schools having both English and Gujarati medium

2.3 Operational definitions for the variables under study

2.3.1 *Physical Health:* Physical health is a general condition of an individual's well being when all his internal and external body parts, organs, tissues, and cells can function properly as they are supposed to function.

2.3.1.1 *Musculoskeletal pain*: Musculoskeletal pain is defined as the pain that affects the bones, muscles, ligaments and tendons of our body due to overuse, poor posture and immobilization of body movements.

2.3.1.2 *Fatigue*: Fatigues is defined as a state of extreme tiredness and lack of energy resulting from physical or mental exertion.

2.3.1.3 *Immunity*: Immunity is defined as the ability of an individual to resist particular infections and toxins from entering the body.

2.3.1.4 *Stamina*: Stamina is defined as the capability of great physical and mental strength that allows an individual to continue doing something for a longer period of time.

2.3.2 *Mental Health*: Mental health is defined as a state of well being in which every individual realizes his or her own potential, can cope with the normal stresses of life and can work productively and fruitfully without hampering his daily routine.

2.3.2.1 *Mood*: Mood is defined as a conscious state of mind or feeling.

2.3.2.2 *Depression*: Depression is a mental disorder, characterized by sadness, loss of interest or pleasure, feelings of guilt or low self worth, disturbed sleep or appetite, feelings of tiredness and poor concentration

2.3.2.3 *Withdrawal*: withdrawal is defined as a group of symptoms that occur upon the abrupt cessation or discontinuation of Internet use.

2.3.2.4 *Anxiety*: Anxiety is a constant state of nervousness or worry about something that has an uncertain outcome.

2.3.2.5 *Aggression*: Aggression is defined as an act of anger or harmful behaviour or hostility resulting in destructive and violent behaviour.

2.3.2.6 *Isolation/Loneliness*: Isolation or loneliness is defined as an individual tendency to stay alone and separated from others.

2.3.2.7 *Stress*: Stress is defined as any physical or psychological uncomfortable experience accompanied by perceived biochemical, physiological or behavioural changes.

2.3.3 *Social health*: social health is defined as an individual's ability to form and have lasting satisfying interpersonal relationships.

2.3.3.1 *Quality of interaction with parents, peers and teachers*:

2.3.3.2 *Self concept*: self concept has been defined as an individual's belief and perceptions about oneself.

2.3.4 *Eating habits*: eating habits have been defined as an ability to maintain a proper routine and a healthy diet while eating.

2.3.5 *Sleeping habits*: healthy sleeping habits have been defined as an individual's ability to have a proper sleep for the required amount of time and staying asleep.

2.4 Sample:

The following study aimed to find the prevalence and nature of Internet use among school going adolescents in Vadodara district. The researcher also aimed to study the impact of high and low use of Internet over various physical and psychosocial concomitants among the adolescents. The target population for the study included adolescents in the age group of 13 - 19 years, studying in grades 9-12 in English and Gujarati medium schools of Vadodara district affiliated to Gujarat Secondary and Higher Secondary Education Board (GSHSEB).

A representative sample of 1657 participants across Vadodara district was selected for the study through purposive and convenient sampling technique. Of the total participants, 834 participants were males and 822 were females, with their mean age being 15.14 years. Out of the total participants, 571 participants belonged to English medium schools and 1140 participants belonged to Gujarati medium schools. There were 1204 participants selected from the urban areas and 453 participants from the rural areas. From the total sample, 548 participants were from Grade 9, 497 from Grade 10, 319 from Grade 11 and 293 from Grade 12.

Table 1: Sample break up.

		MALE					**FEMALE**					**Total (M+F)**
		9th	10th	11th	12th	**Total**	9th	10th	11th	12th	**Total**	
URBAN	English Medium	90	78	55	38	**261**	71	65	73	47	**256**	**517**
	Gujarati Medium	117	101	59	60	**337**	78	77	87	108	**350**	**687**
RURAL	English Medium	0	0	0	0	**0**	0	0	0	0	**0**	**0**
	Gujarati Medium	112	97	12	15	**236**	80	79	33	25	**217**	**453**
Total		**319**	**276**	**126**	**113**	***834***	**229**	**221**	**193**	**180**	***823***	**1657**

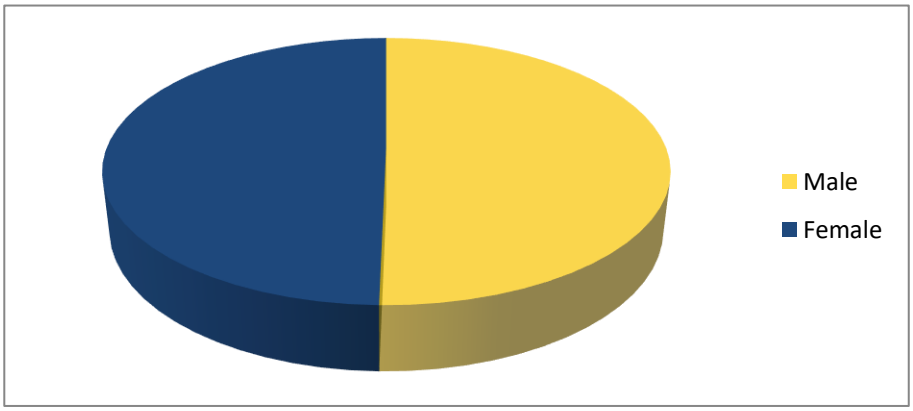

Figure 1: Male and female sample representation

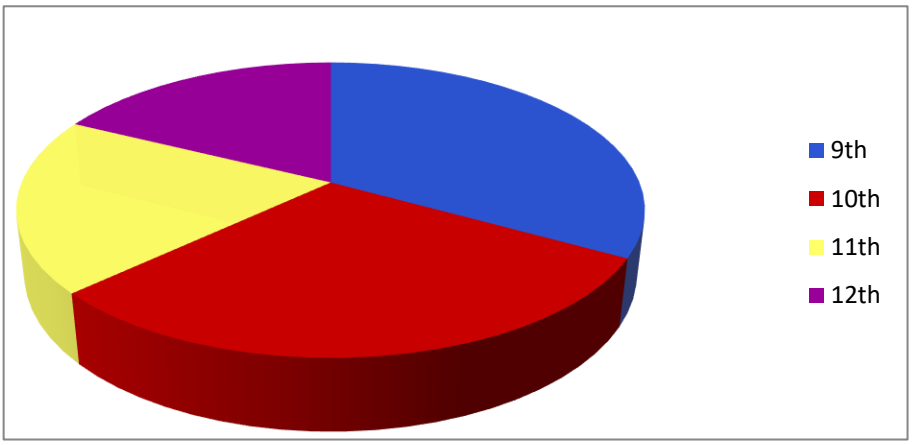

Figure 2: Subjects belonging to different grades

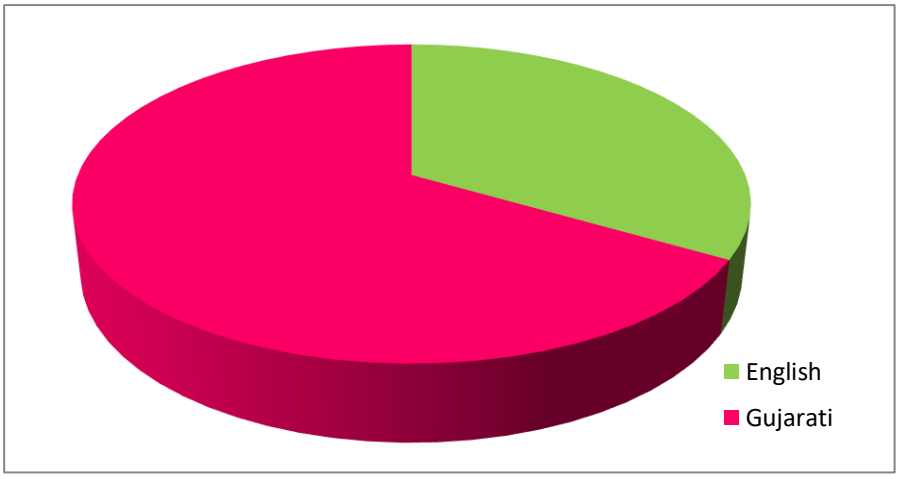

Figure 3: Subjects belonging to English and Gujarati medium schools

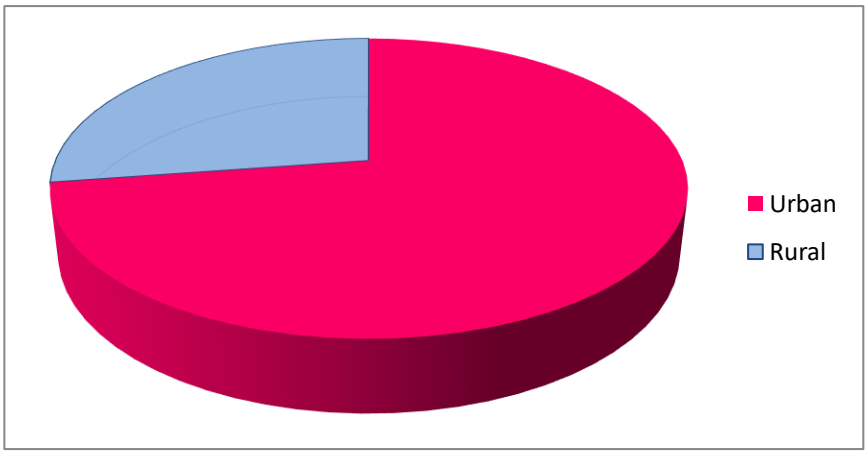

Figure 4: Subjects belonging to Urban and Rural areas

2.5 Tools

- *Internet Addiction Test (IAT),* developed by Dr. Kimberly Young (1996) consists of 20 items that measures mild, moderate and severe level of Internet use. IAT is a 20 item questionnaire covering the degree to which their Internet use affects their daily routine, social life, productivity, sleeping patterns and feelings. The questionnaire is rated on a six point Likert scale, from 0 to 5, where '0' means "Does not Apply", '1' is "Rarely", '2' is "Occasionally", '3' is "Frequently", '4' is "Often" and '5' is "Always". The minimum score is 0 and the maximum is 100; the higher the score, the greater the problem Internet use causes. Young suggests that a score of 0-19, depicts that the person is a below average user of the Internet and does not have problems related to Internet use affecting his/her lives. A score of 20-49 points in an average user of the Internet who has complete control over his/her usage; a score of 50-79 signifies that the person experiences frequent problems due to Internet usage; and a score of 80-100 means that the Internet usage is causing significant problems. Based on the scoring criteria, four categories were made for the users, viz., Below Average Users (BAUs, those scoring 0-19), Average Users (AUs, those scoring 20-49), Above Average Users (AAUs, those scoring 50-79) and Significantly Above Average Users (SAAUs, those scoring 80-100). For the present study, those belonging to the SAAU category were considered as Internet Addicts, who experienced severe problems due to overuse of the Internet.

  Frangos, Frangos and Sotiropoulos (2012) have established the reliability of the tool ($\alpha = .89$) and they have observed this tool to be a frequently used tool to measure Internet Addiction. Mean differences show that it is more reliable in college students and probably in Asia.

- Another questionnaire, named as the "***Nature and Psychosocial Correlates of Internet use Questionnaire (NPCI)***" for the present study, was developed to study the effect and nature of Internet use on various psychosocial correlates. For this purpose, various standardized tests were referred and few items from each of these tests were taken on the basis of previous review of literature on Internet use and the purpose of the present study. Regarding the reliability and validity of the NPCI, Kazi and Khalid (2010) recommend that a thorough literature review on previously validated questions/items can be administered in similar settings and capture variables that are of interest according to the study hypothesis. These questions need not be tested for reliability and results can be compared for different studies and also combined for meta-analysis. However, after completion of the data collection, the reliability coefficient was calculated using the SPSS (version 20) and the Chronbach alpha was found to be 0.86. Similarly, the items could differentiate among the high and low users of the Internet, which indicated the validity of the items on different dimensions. Hyman, Lamb and Bulmer (2006) also suggest that questions which have already been developed and validated, have several advantages. The most important and the obvious advantage is that the questions would have already been tested at the time of their first use, thus the researchers could be fairly confident that they are good indicators of the concept being studied. This leads to the second advantage that it saves both, money and time, as coding and analysis need not be developed and tested again.

  Thus, the questionnaires referred for the development of NPCI are mentioned below:

  - ***General Well Being Scale (GWBS)*** developed by Fahey, Insel and Roth, (2005) is a self-administered 18 item scale developed to assess one's subjective feelings of psychological well-being and distress. The scale

assesses how the individual feels about his/ her "inner personal state". It consists of 18 items covering six dimensions of anxiety, depression, general health, positive well-being, self-control and vitality. The scale includes both positive and negative questions and each item has the time frame "during the last month". The first 14 questions use six-point response scales representing intensity or frequency. The remaining four questions use 0-to-10 rating scales defined by adjectives at each end. There is a total score running from 0 to 110 with: 0-25 reflect "severe distress"; 26-40 reflect "serious distress"; 41-55 "distress"; 56-70 "stress problem"; 71-75 "marginal"; 76-80 "low positive" and 81-110 "positive well being". The test-retest reliability coefficients (after three months) of 0.68 and 0.85 for two different groups. Internal consistency coefficients for the three subscales range from 0.72 to 0.88. Three studies reported internal consistency coefficients over 0.9 (McDowell, 2006). For the present study, items like, "I have been feeling good in general", "I have been worried and concerned about my physical health", "I have been feeling under stress and strain", etc were selected. Thus, in all, 11 items were selected from all the six dimensions (2 items from anxiety, 1 each from depression, positive well being and self control, 3 from vitality and 3 item from general health).

- ***Teen Nordic Musculoskeletal Screening Questionnaire (TNMQ-S)(2014)*** is a musculoskeletal symptom screening tool developed for younger population derived from The Extended Nordic Musculoskeletal Questionnaire (NMQ-E) and other NMQ French versions (Legault, Cantin & Descarreaux, 2014). The questionnaire consists of a total of 27 items, three items each pertaining to 9 body parts (viz., Neck, Shoulders, Spine, Elbow, Wrist-Hands, Lower Back, Hips-Thighs, Knees, and Ankle- Feet).The mean Po for the test-retest was

0.92 for the 6-month symptom prevalence items, 0.99 for the impact of symptoms on school items and 0.96 for the impact on sports and leisure activities items. Kappa values for the reliability assessment ranged between 0.57 and 1.00 for the 27 dichotomous variables. The criterion validity kappa obtained for the agreement between participants' clinical records and questionnaires was k = 0.76.The concomitant validity was observed at Po. = .71 for complete concordance and Po. =.86 for partial concordance. Items like, "I have complains of frequent back and lower back pains", "I experience pain in my shoulders due to sitting online for long hours", "I experience numbness or tingling pain in my hands and legs", etc. were taken for the present study. A total of 7 items were taken for the present study pertaining to seven body parts most used while an individual is at the computer (i.e., lower back, shoulders, neck, elbow, wrist, knees and hands).

- ***The Physical Health Questionnaire (PHQ)*** is a shortened and modified version of the health scale developed by Spence, Helmreich & Pred, (1987) in their study of the Type A behavior pattern. Because the health scale was not the primary focus of their study, their discussion of its development was rather brief. The information available in their article suggests that 32 items were developed to tap four dimensions of somatic health: quality of sleep, digestion problems, headaches, and respiratory problems. Spence et al. reported that the four subscales were significantly correlated (ranging from .17 to .43) and exhibited internal consistency reliabilities aboveα=.75. (Schat, Kelloway & Desmarais, 2005). Only one item related to headaches was taken for the present study.

- ***Mental Health Inventory (MHI)***, developed by Jagadish and Srivastava (1983). This scale consist of 56 items based on 6 dimensions- (1) positive self-evaluation, (2) realistic perception, (3) integration of personality, (4) Autonomy, (5) group-oriented attitude, (6) environmental mastery. The scale has four response categories viz. always, often, rarely and never. The reliability and validity coefficients were found significant as the value of split-half reliability coefficient was r=0.73 and validity i.e. construct validity was r=0.54 which confirm the standardization of the scale. Of the 56 items, 30 items pertaining to mental health, such as, "I do not feel confident", "I am not able to concentrate on my work for a long time", "In adverse circumstances, I act without keeping in view the facts", " I suffer from inferiority complex", etc. were selected for the current study.

- ***Virtual Addiction test,*** developed by Dr. David Greenfield (2013), is an 11 item questionnaire consisting of items related to effects and feelings associated with the use of Internet. The test has been developed and used by Dr. Greenfield to study the prevalence of Internet use in USA and Canada in multiple research works. Three items, viz. "I feel restless or irritable when attempting to cut down or stop using the Internet", I feel loss of control or feelings of timelessness when using the Internet" and "I am preoccupied with the Internet, when I am offline" were selected for the present study.
- ***UCLA (University of California, Los Angeles) Loneliness Scale Version – 3***, developed by Russell (1996), is a 20-item scale designed to measure one's subjective feelings of loneliness as well as feelings of social isolation. The scale was highly reliable, both in terms of internal consistency (coefficient alpha ranging from .89 to .94) and test-retest reliability over a 1-year period (r

= .73). Convergent validity for the scale was indicated by significant correlations with other measures of loneliness. Construct validity was supported by significant relations with measures of the adequacy of the individual's interpersonal relationships, and by correlations between loneliness and measures of health and well-being (Russell, 1996). Items like, "I feel that I have a lot in common with friends around me", "I feel that I can find companionship when I want it", I feel that there are friends whom I can trust", "I feel that I'm no longer close to my family", "I feel that my relationships with my friends are not meaningful", etc. were selected for the current study. A total of 11 items out of 20 were selected for the present study on both the dimensions of social isolation and subjective feelings of loneliness.

- ***Social Anxiety Scale of Adolescents (SAS-A)*** developed by La Greca, (1998) consists of 22 items divided into three subscales: Fear of Negative Evaluation (FNE) - 8 items; Social avoidance and distress in new situations or with unfamiliar peers (SAD–New); 6 items; Social avoidance and distress that is more general (SAD–General) - 4 items and four filler items. Youths indicate on a 5- point continuum how much each item characterizes themselves. Each subscale is scored in such a way that high scores reflect greater social anxiety. Scores are obtained by summing the ratings for the items comprising each subscale, and can range from 8 to 40 for FNE, 6 to 30 for SAD- New, and 4 to 20 for SAD-General: total scores can range from 18 to 90. Internal consistencies for the subscales ranged from .69. (SAD-General) to .78 (SAD-New) to .86 (FNE). Construct validity was supported by patterns of relationships between SASC-R subscales and children's self-appraisals, as well

as peer-rated sociometric status (La Greca & Stone, 1993). Psychometric support for the SAS-A has been satisfactory (La Greca, Dandes, Wick, Shaw & Stone, 1988; La Greca & Stone, 1993).

Items such as, "I worry about doing something new in front of my family", "I only talk to people I really know well", "I am quiet when I'm involved in group chatting", etc. were selected for the present study to examine the social anxiety among adolescents. Thus, in all 9 out of 22 items were selected on the dimensions of FNE and SAD-General.

- ***Sleep and Wake Pattern Assessment Questionnaire,*** developed by Pacific Sleep Program (2005), is a self rating questionnaire consisting of 82 items. The items are rated on a 5 point scale, where the score of 1 means "Never" and the score of 5 is "Always". The questionnaire is divided into 6 parts, General sleep patterns, Sleep Environment, Sleep Onset Period, Sleep Period, Awakening from Sleep Period and Awake Period. Items such as "I wake up in between with sudden jerks", "I experience fatigue due to lack of sleep", "I have disturbed sleep", etc. were taken for the present study. A total of 6 items from the Sleep Onset Period, Sleep Period and the Awake period were taken for the present study.
- Additional 7 items were constructed by considering different lifestyle changes described in the problematic Internet use literature. Participants must estimate how much a given statement describes the influence of Internet use on the changes of lifestyle on a 5-point scale. The eating habits or the dietary pattern change items state "I tend to skip my meals due to being online", "I have meals whenever I feel like eating and not with my family" and "I feel heaviness in my stomach while I'm sitting at the computer."

- A modified version of the European School Survey Project on Alcohol and Other Drugs (ESPAD) Questionnaire, called ***eu.net.adb***, developed by the Hibell et al., (2011) and used in a project funded by the Safer Internet programme of the European Commission, was used to study the nature of Internet use in the present research. The questionnaire, eu.net.adb was a part of international study on Internet use among European students from seven different countries. The questionnaire contains total of 77 questions related to various aspects of Internet use with sub questions within each question. The first 19 questions of the questionnaire were basic demographic and family related questions and 15 questions related to gambling were not taken for the present study. The remaining 43 questions were mostly related to the number of hours of using the Internet, for what purpose the Internet is used, what kind of social networking sites are visited, how many hours do the participants play games, how satisfied are they with their life, etc. were taken as it is for the purpose of the present study. The purpose of the present research was to study the nature of Internet use among adolescents which included factors like use of social networking sites, how often do adolescents use the Internet, etc. Thus, a total of 43 items out of 77 were taken under study for the present research relating to the nature of Internet use.

Thus, the NPCI, consisted of two sections, viz., nature of Internet use and Psychosocial correlates of Internet use. The entire questionnaire consisted of total 132 items. There were 13 items pertaining to General Physical Health, 34 on Mental Health, 27 on Social Health, 8 for Sleeping Habits, 7 for Eating Habits and 43 items related to nature of Internet use among the adolescents. The first 89 items pertaining to different health aspects were scored on a five point rating scale, from 0-4. The total

score for each dimension consisted of the addition of scores of each item on that particular dimension. The next 43 items were scored on the basis of frequency analysis. Each question had a different type of response pattern.

Table 2: Item distributions on various dimensions of the NPCI.

DIMENSIONS	Total no. of Items	Positive Scored Items	Negative Scored Items	Range of scores
General Physical Health	13	10	3	0-40
Mental Health	34	30	4	0-120
Social Health	27	12	15	0-48
Sleeping Habits	8	6	2	0-24
Eating Habits	7	5	2	0-20

Both questionnaires were also translated in Gujarati by teachers teaching Gujarati in schools. For the validation purpose and proof reading, the translated questionnaires were then given to two students and two teachers. Necessary changes were made to the questionnaires to make the language easier for the students to understand.

Pilot study was conducted on 50 students for both the questionnaires to study the reliability of and to check whether the items were comprehensive by the students. Also, it helped the researcher to understand the time frame each questionnaire would take to administer. Based on the pilot study it was found that the questionnaires took almost one and half hours to complete and the items were easily understood by the students. Since the questionnaires were in both the languages, it wasn't difficult for students to comprehend the questions.

2.6 Procedure:

Vadodara district is divided into 8 blocks/talukas, viz., Dabhoi, Karjan, Padra, Sinor, Savli, Waghodia, Vadodara rural and Vadodara city. Since, there is only one block which has the urban population, i.e., Vadodara city; it was separated from the other 7 blocks which included the rural population. Out of these 7 blocks, three blocks were randomly selected viz., Dabhoi, Padra and Sinor. Thus, in all, there four blocks under study, viz., Vadodara city (to study the urban population), Dabhoi, Padra and Sinor blocks (to study the rural population).

Krejcie and Morgan (1970) suggested a sample size of 384 subjects per 1000000 population for a survey research. For the present study a maximum representative sample was taken and different schools were approached in Vadodara city. The city consist of a total of 146 schools affiliated to the GSEB board, out of which 58 schools were Higher Secondary schools, i.e., 58 schools offered education up to Grade 12. Out of these 58 schools, 16 schools were English medium schools, 31 schools were Gujarati medium schools and 11 schools offered both the mediums (English and Gujarati) in the same school. As per the research criteria of taking the same school offering both English and Gujarati medium up to Grade 12, 11 schools were selected for the data collection. However, some schools didn't show the interest and refused to co-operate for the research work. It was then decided to divide these 11 schools in four different zones of the Vadodara city, viz., East, West, North and South, and schools were approached from each of these zones. In this context, seven different schools located in different parts of the Vadodara city gave the permission to collect the data. Thus, the selection of sample for the research work was taken from all 7 schools of Vadodara City.

It was observed that in the rural areas of Vadodara district, none of the schools offered both English and Gujarati mediums in the same schools. All the schools in these blocks were only Gujarati medium schools.

In the Dabhoi block of Vadodara district, there are a total of 27 schools. None of these schools offered both English and Gujarati mediums in the same school. All the schools were Gujarati medium schools. Of these 27 schools, only 6 schools fell into the research criteria of having Co-Education in grades 9- 12. Out of these six schools only one school gave the permission for data collection.

In the Padra block of Vadodara district, there were a total of 30 schools, out of which only one was English medium school and the rest were Gujarati medium schools. Of these 30 schools, only 8 schools (7 Gujarati medium schools and one English medium school) fell into the research criteria of having Co-Education in grades 9- 12. From Padra block, only one school was selected randomly for the data collection which was a Gujarati medium school. The English medium school was approached for data collection in order to study the rural English medium population, but the school authorities did not grant permission for the data collection.

In the Sinor block of Vadodara district, there were a total of 10 schools, out of which only one was English medium school and 9 were Gujarati medium schools. Of these 9 Gujarati medium schools, only 3 schools fell into the research criteria of having Co-Education in grades 9- 12. Thus, one school was randomly selected for the data collection which was a Gujarati medium school. The English medium school was approached for data collection in order to study the rural English population, but like in Padra, the school authorities did not grant permission for the data collection.

Therefore, in all, a total of 10 schools - 7 schools from Vadodara city and one school each from Dabhoi, Padra and Sinor blocks were selected for the data collection. All the students, present on the particular day for the data collection, were taken as the sample for the research.

Once the schools were selected, permission for the data collection was sought from the school authorities. After the permission was sought and the permission letter was signed, an appropriate day and time were fixed for the data collection. On an assigned day, data was collected in a group setting from all the students of grades 9 to 12 who were present on that particular day. Both the questionnaires were stapled, first was the Internet Addiction Test and the second was the questionnaire related to the effect and the nature of Internet use. The participants had to first fill up the IAT and then the other questionnaire. Both the questionnaires were administered to each grade separately.

Following instructions were read out loudly by the researcher and simultaneously students were asked to read the instructions silently.

"Dear Friends,

We are studying Internet habits of students. We request you to go through the following statements and mark the answer that suits you the most. Against each statement, 0-4 numbers are given. These numbers indicate behaviour in different percentages as shown in the following rating key.

Please read each statement and assess to what extent the statement is applicable to you and tick in the appropriate number against that statement. The statements are to be marked keeping in mind how they describe you in the past twelve months (1 year).

Be honest. Your responses are valuable to us and will be kept confidential. Thanks for your time and effort.

Rating key:

0- Seldom

1- Sometimes

2- Often

3- Frequently

4- Most of the times.

Instructions were also given to fill in the preliminary information, where the students were asked to write their full name, encircle or tick the gender initial (M/F), write their age, grade in which they studied, school's name and medium of instruction, and the city/ village's name they resided in".

Once these instructions were given, the students were asked to start filling up the questionnaires. They were also permitted to ask the researcher if they had any further queries or in case they were not able to understand a particular question.

After the students had filled up the questionnaires, the researcher checked whether the student has answered all the questions. Questionnaires were collected class wise, according to different grades.

Similarly, all schools were approached and questionnaires were given to all the participants.

After the completion of data collection, each questionnaire was numbered in a serial order starting with 1. The data was entered in the SPSS (Version 20) for analysis.