CHAPTER 1
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Due to the concept of westernization, globalization and liberalization, India has witnessed drastic changes among its citizen in many spheres of life like education, Booming of IT industries, increase in world trade, Brain drain and so on. The country has progressed in different area and proved itself to be a global competitor. In terms of Internet usage also India has witnessed fast growth; Globally China gets the first position with 731.4 million users, India in its second position with 462.1 Million users followed by United States with 286.9 users according to Internet world usage statistics (2017). Internet use as become a vital part of one’s life without which many of them could not image their life. With the easy accessibility of smart phone and the minimal expenses of Internet use, Internet has boomed in business as well in private life. The Internet provides multifariousness of possibilities for communication, entertainment, and dealing with everyday-life requirements (e.g., making restaurant reservations, searching for information, keeping updated with respect to political and society issues, etc.).

MEANING AND DEFINITION OF INTERNET

The term Internet is defined as “a global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols”. This definition clearly states that Internet is referred to global system of interconnected Internet protocol which is a means of connecting computers worldwide with the help of servers and routers, when theses computers are connected with the help of internet the users can send and
receive videos, photos, exchange text message and voice messages, documents, mails etc. Not only we can have exchange of photos and videos with the help of worldwide webs we can get any information which could be historical, research based, entertainment anything and everything at our finger tips just by giving the key words.

Specifically certain sites like social networking sites, pornography sites, online shopping sites, have very appealing properties, the attractiveness towards such sites can be addictive also, which can be collectively named as Internet addiction.

**MEANING AND DEFINITION OF INTERNET ADDICTION**

The Center for Internet addiction which was founded by Dr. Kimberly Young in 1995 defines Internet addiction as “Any online-related, compulsive behaviour which interferes with normal living and causes severe stress on family, friends, loved ones, and one’s work environment. Internet addiction has been called Internet dependency and Internet compulsivity. By any name, it is a compulsive behaviour that completely dominates the addict’s life. Internet addicts make the Internet a priority more important than family, friends, and work. The Internet becomes the organizing principle of addicts’ lives.”

The above definition states how and when internet use can be considered as internet addiction, accordingly any online related activities say from chatting to online shopping which becomes very much compulsive that these compulsive behaviour may hamper and influence in day to day social, physical, personal and even to work environment and use of internet would become an integral part of an adductors life. Internet addiction is called by different names like Compulsive Internet Use (CIU), Problematic Internet Use (PIU), or iDisorder.
It was Dr. Ivan Goldberg, the first person to use the term Internet addiction disorder in the year 1995 after which many researchers made an extensive study on Internet addiction.

**INTERNET ADDICTION AND DIAGNOSTIC STATISTICAL MANUAL**

Block, (2008) in his research article, DSM-5 has suggested four important behaviours which is essential to diagnose Internet addiction disorder:

1. **Excessive Internet use** - associated with a loss of time sense and neglect of vital drives

2. **Withdrawal** - wherein the person feels anger, tension, depressed when he is not able to access the internet.

3. **Tolerance** – the craving for better computer equipment, more software, or more hours of use.

4. **Adverse consequences** – it includes arguments, lying, failure in school or vocational performance, social isolation, and fatigue.

Tao et al., (2010) argues that a major survey was being conducted to develop diagnostic criteria for IAD and to evaluate its validity and reliability in the general population. The diagnostic criteria explains seven clinical symptoms of Internet addiction disorder, which can be broadly classified under

a) **Impairment criteria** - which includes impairments in functional and psychological aspects.
b) **Course criteria** – which includes duration of addiction which lasts from past 3 months and usage of internet for non essential purpose for more than 6 hours a day.

c) **Exclusion criterion** – which talks about exclusion of internet dependency due to psychotic disorder.

Though internet addiction disorder is recognized as a disorder but it is not included in DSM-5, nonetheless, Internet Gaming Disorder is included in the DSM-5.

The study by Griffiths (2000) has identified six important core components of internet addiction which are commonly seen among other types of addictions.

**THE SIX COMPONENTS OF INTERNET ADDICTION ARE AS FOLLOWS:**

1. **Salience** – salience here refers to any particular activity which becomes an important activity to a person and he is so obsessive and show compulsive behavior for that particular activity.

2. **Mood modification** – Mood modification here refers to subjective experience that a person reports as a result of engrossing in addictive behavior which can be considered as coping strategy.

3. **Tolerance** – tolerance refers to the process of increased amount of addictive behavior which is required to attain the earlier effect.

4. **Withdrawal symptoms** – withdrawal refers to the unpleasant state which affects both physical health as well as mental health when the addiction to particular product is discontinued or reduced suddenly.
5. **Conflict** – It refers to the conflict, that a person face between addict and among others or sometimes within themselves that are concerned with addictive behavior.

6. **Relapse** – relapse refers to the tendency of showing the same pattern of addictive behavior, thus reappearance of addictive behavior even after controlling it for many years.

**SIGNS OF INTERNET ADDICTION**

The Illinois Institute for Addiction Recovery (2010) has identified the following signs of Internet addiction:

- Constant concern with the internet which can be otherwise called as preoccupation about internet.
- To be engaged in internet related activities most of the times and find satisfaction with such internet activities.
- Having unsuccessful and repeated efforts to control internet use.
- When the use of internet is cut down or reduced person may undergo some unpleasant feeling and also show other behaviors such as restlessness, depression, irritability etc.
- Person may remain online longer that needed.
- Person with Internet addiction may find a serious problem in interpersonal relationships, academic achievement and lose many job opportunities because of excessive use of internet.
- Individual may hide the time spent on internet use with the family members and significant others.
Escape mechanism, many people get addicted to internet as a way of getting rid from real life challenges and also to be away from dysphonic mood

**TYPES OF INTERNET ADDICTION**

Internet is used for various purposes as online chatting, online games, gambling, online shopping, using social networking, as an information tool and so on. We name it internet addiction when a person engages himself in a particular internet related activity and its becomes so excessive that it interferes in his day to day life. Young, Pistner, O’Mara, and Buchanan (2000) in their study indicate that internet addiction is a wide term that includes a variety of behaviour. According to them there are five types of internet addiction:

1. **Cyber sexual Addiction** – people with this type of addiction get into cyber sexual addiction and constantly engage themselves in watching and downloading online pornography or attending to the adult chat room.

2. **Cyber related Addiction** – people who are engaged in cyber related addiction, involve themselves in the online relationships, which effects their real life family relationships.

3. **Net-Compulsions** – people with Net compulsive behavior show the compulsive behavior of online gambling, shopping, stock trading, online games etc due to which they lose enormous amount of money and even hamper their job related duties as well as significant interpersonal relationships.

4. **Information Overload** – here people spend huge time for searching the data from the internet and other organizational information, but ultimately his work efficiency will be not up to the expectation.
5. **Computer addiction** – computer addiction refers to show obsessed thing and compulsive behavior towards computer games.

**THEORETICAL FRAMEWORK OF INTERNET ADDICTION**

The extensive fast growth of Internet usage motivated many researches and practitioners to the theoretical and conceptual perspective regarding the main motivation behind Internet usage. The fast life in metropolitan city has a great demand of internet as it gratifies the need within reach at the earliest, due to same many people are spending a great deal of time online every day. There are many empirical researches are taking place to understand the need and kind of need behind Internet use (Diddi & LaRose, 2006; Kim & Haridakis, 2009; Roy, 2009).

- **THE U&G THEORY**

The U&G theory is otherwise called as use and gratification theory which explains how people use media for their need gratification. Many research studies have been undertaken to explain, how internet use can be explained with the help of U&G theory (Kim & Haridakis, 2009; Leung, 2004; Leung, 2014; Song, Larose, Eastin, & Lin, 2004). Roy, 2009 attempts to study the various reasons behind media use and the study regarding the positive and negative implication of individual media use was undertaken by (Lin, 1999). The U&G theory studies has also been extended to understand the use and gratification of many different medias namely Instant Messaging (IM) apps (Lo & Leung, 2009), the Internet (Korgaonkar & Wolin, 1999; Leung, 2009; Papacharissi & Rubin, 2000; Stafford, Stafford, & Schkade, 2004), social networking sites (Park, Kerk, & Valenzuela, 2009), television (Rubin, 1983), text messaging (Thurlow, 2002), and web-blogs (Shao, 2009).
The U&G theory explains that every media user have his or her own purpose of using media, due to which different users uses different media platform to gratify their needs (Severin & Taknard, 1997). Rubin, 1983 explained that the psychological need of any user by their motivation and decision following a given media platform. In the same way, each person have his own social and psychological needs for media use, such as use of media for the purpose of seeking information, communication, to be connected, to coordinate and so on. (Dimmick, Sikand, & Patterson, 1994; Lin, 1999; Rubin, 1983). Literature review on motivation behind media use indicates the individual emotional and cognitive by nature (Maslow, 1970) but the other studies indicates that the purpose of media use are goal oriented and utility driven (Palmgreen & Rayburn, 1979) which is further explained in terms of use and gratification of specific media use for attaining the goal (Leung, 2014).

- COGNITIVE–BEHAVIOURAL MODEL ON PATHOLOGICAL OR PROBLEMATIC INTERNET USE

The cognitive behaviour model on pathological or problematic internet use was introduced by Davis in 2001. This model of internet use explains the internet use in terms of differentiating the generalized Internet addiction (GIA), and a specific Internet addiction (SIA) which is otherwise called as specific pathological Internet use.

According to David (2001) generalized Internet addiction is developed when a person frequently uses internet application due to lacks real life social support, loneliness and feeling of isolation may contribute to the development of generalized internet addiction behavior. These maladaptive strategies of intense internet use may intensify and the users for every real life problem make use of internet which may
have negative consequences (Caplan, 2005). Whereas specific Internet addiction is the
use of specific internet sites such as social network site, gambling, phonograph etc.
Davis further argues that, generalized internet addiction is directly associated to the
options the internet itself extends, but specific internet addiction is also possible
outside the Internet it is motivated by the gigantic functions presented by the internet
applications. He further explains how problematic internet use adults exhibits a
unique pattern of internet related cognitions and behaviours. Generally the vital and
all reward circuits in the brain related to food, water and sex are activated by natural
positive reinforce whereas the unnatural reinforces such as drugs, alcohol, gambling
and the internet can have negative impact causing the adductor to neglect the essential
components of life like such as food, health, sex, work etc.

OTHER THEORIES

- In terms of Learning theory which signifies the role of positive reinforcement,
  indicates that use of internet has a reinforcing effects on its users, which
  includes pleasure while using internet, feeling of well- being, question of
  status among the peer group etc (Wallace, 1999).

- According to Blum et al.,(1996) the reward deficiency hypothesis indicates
  that an individual with less satisfaction from natural reward may try to seek
  the satisfaction from external modalities such as alcohol, drugs in a same way
  internet also provides immediate satisfaction with minimum delay.

- Shaffer (1996) opines that internet use is associated with sensation seeking
  behavior, which is an important trait of impulsivity. Further he emphasizes
  that those who are impulsive by nature tend to use internet as a sensation
  seeking agent and prolong use leads to addiction.
Shotton (1991) study implies that introverted, educated, technologically sophisticated males are more prone to develop internet addictive behavior. He further argues that people with low self-esteem are more susceptible to pathological internet use and become internet addicts, thus individual who are shy by nature use internet to overcome their social skills deficiencies, social relations and communication.

**CAUSES OF INTERNET ADDICTION**

The University of Iowa studies indicated that Internet addiction is commonly seen among the male aged 20 to 30 years old who are suffering from depression. Literature review suggests that the causes and symptoms of internet addiction is almost similar to any other type of addiction, thus an internet addicts life can be just as detrimental as that of an alcohol or drug addiction. The major causes of Internet addiction can be understood under different dimensions:

- **NEUROBIOLOGICAL CAUSE:**

  The neurobiological causes of addiction attempts to explain the role of heredity, neurochemical imbalance in the brain as a casual factor of any form of addictive behavior (Ferris, 2003). The literature review in this connection indicates that some drugs act to fill in the synaptic gaps of the neurons in the brain, fooling the brain into sending out faulty information. This might be one reason for the adductors to get into activities such as running, drug use, and gambling etc, which can also extended to Internet addiction.

  Mitchell (2000) in his study points that internet related activities may lead to release of dopamine, which is considered to be an important neurotransmitter that acts as a pleasure providing event in the development of addiction.
Aviv Weinstein and Michel Lejoyeux (2013) in their study New developments on the neurobiological and pharmaco-genetic mechanisms underlying internet and videogame addiction showed that playing videogame and internet addiction may be supported by parallel neural mechanisms underlying drug abuse. Similar to drug and alcohol abuse, internet addiction results in sub-sensitivity of dopamine reward mechanisms, indicating that internet addiction is equivalent to substance addictions. The researchers further stated that through Brain imaging studies of the resting state have revealed that continuing internet game playing affected brain regions responsible for reward, impulse control and sensory-motor coordination.

Kuhn et al (2011) in his study on both structural and functional neural correlates of Internet/computer gaming with a sample of 154 adolescents indicated that frequent/excessive internet users had showed higher gray matter volume in left ventral striatal region compared to infrequent players, while analyzing functional study of neural correlates of Internet or computer gaming on the same sample showed that activity in the region of the ventral striatum was higher in frequent compared to infrequent players in the loss condition of a monetary incentive delay task. Gray matter density was also examined by Yuan et al. (2011).

- **ESCAPE MECHANISM**

Escape mechanism here refers to a defense mechanism which is utilized in order to escape from anxiety provoking situation, thus many people who suffer from anxiety disorder, depression, shyness, loneliness who find it difficult to face the society and societal challenges may develop their own internet world which mimics the virtual society. By using internet these people get a euphoric feeling of relief their by avoid social contacts.
• **PHYSICAL CAUSES**

People with internet addiction experience physiological changes when using Internet. The well known neurotransmitter endorphin which acts as a pain killer agent is released in the brain when a person is online, this neurotransmitter activates the brain rewarding system which plays an important role in all types of addiction. The visa versa happens in withdrawal symptoms, thus when an individual wants to reduce his internet usage, making a person feel physically discomfortable and show the both physical and behavioral symptoms of addiction.

• **DIATHESIS – STRESS MODEL**

Another important cause of internet addiction is using internet as a coping strategies. Many people who are stressed out in their family life, experience job stress and other forms of stress reported that use of internet and online chatting with friends is a form of stress buster and also reported playing online games acts a very good coping mechanism instead of getting into other bad habits. But the prolong use of same may also becomes a habit their by forms an Internet addiction.

**SYMPTOMS OF INTERNET ADDICTION**

The symptoms of Internet Addiction can be broadly classified under two broad categories:

(A) **PSYCHOLOGICAL SYMPTOMS**

- Using Internet and its services every day.
- Loosing track of time after making a connection.
- Spending very less time on meals at home or at work, and eating in front of the monitor and even using mobile phones while eating.
• Denying the time too much spent on Internet related activities.
• Lacks interpersonal and intrapersonal relationships.
• Compulsively checking for the inbox.
• In spite of being busy at work, logging to internet.
• Thinking that internet use is as good as a stress buster and very good coping strategies.
• Skipping social gathering and family function just to engage for the purpose of internet related activities.
• Mood swings
• Lack of sense of prioritization and maintaining schedules.
• Euphoric feeling when using internet

(B) **PHYSICAL SYMPTOMS**

• Carpel Tunnel Syndrome – thus complaining of pain, numbness, and burning in hands that can radiate up the wrist, elbows and shoulders.
• Dry eyes and other vision related problems
• Backaches, neck pain, pain in fingers
• Severe headaches
• Eating irregularities such as, skipping meals
• Failure to attend to personal hygiene
• Sleep disturbance and Insomnia
• Either increases or decrease in weight

**INTERNET ADDICTION AMONG ADOLESCENTS**

Adolescence is a period wherein adolescents are highly attracted towards electronic, technological and more sophisticated gadgets. Among many such internet usage gets top priority. Many literature reviews suggested that it is the adolescent
group who are highly vulnerable to problematic internet use. Scherer (1997) in his study identified that nearly 73% of college going adolescents make use of internet at least once in a day and approximately on an average they spend 8.1 hours a week on internet. The main purpose of using internet by college going adolescents is for academic purpose, online chatting, e-mail, playing games, downloading of movies and songs.

Jones (2002) study reports that adolescents prefer to communicate with online social network sites more than e-mail, and instant messages for the purpose of online chatting with friends and family members.

Young (2004) in her studies has identified the factors that contribute to adolescent’s internet abuse

a) When adolescent students have huge blocks of unstructured time,

b) When the adolescent students are provided with free internet connection by school and college authorities.

c) When these students are not monitored by their parents and teachers regarding their use of internet.

d) When the adolescents are exposed to new environment such as new school or college and wherein they find it difficult to find friends and seeks out for the companion through online mode.

e) When adolescent students are reinforced by their parents and college authorities for using internet applications for academic purpose.

f) When adolescents are equipped with newer knowledge of technological inventions especially the internet.

g) When adolescent students experience academic work as stress and to avoid those stressors.
h) When adolescent students thinks that university life is alienated from social activities and felling of poor recreational activity from the college or school they tend to get into the world of internet.

**PSYCHOLOGICAL PROBLEMS RELATED TO INTERNET ADDICTION**

From the understanding of psychological perspective use of internet has more of negative consequences that benefits. Many researches has been undertaken in order to understand the excessive use of internet and its consequences on physical and psychological problems (Greenfield, 1999; Griffiths, 2000). Studies indicated that excessive internet use is associated with work negligence, poor academic and social responsibilities, poor interpersonal and intrapersonal relationships, decrease in psychosocial wellbeing (Young, 1998a; Weiser, 2001; Beard, 2002; Widyanto & Griffith, 2006)

Orzack (1999) in his study indicates that, people who are highly prone to internet use are easily bored, lonely, depressed, shy, and suffering from other addictions (Chebbi, Koong, & Liu, 2000). The literature review suggests that the commonly associated psychological problems related to internet use are loneliness, depression, anxiety, low self-esteem, shyness etc.

The clinical and research practices implies that the pose a great deal of negative impact on the adolescents.

The literature reviews in connection with neuroscientific evidence (Kuss & Griffiths, 2012c) revealed that internet addiction among adolescent have a negative impact on one’s identity formation (Kim et al., 2012), leads to structural change in the developing brain (Lin et al., 2012; Yuan et al., 2011). Along with it, internet addiction
negatively affect cognitive functioning (Park et al., 2011), and leads to the problem of poor academic achievement and commitment towards risky activities (Tsitsika et al., 2011), it leads to poor dietary habits (Kim et al., 2010), poor and negligible interpersonal relations (Milani, Osualdella, & Di Blasio, 2009), and development of self-injurious behaviour (Lam, Peng, Mai, & Jing, 2009) among adolescents.

By many research studies related to negative consequences of internet addiction it was evident that there are variety of detrimental psychosocial and physical outcomes witnessed by adolescents, which requires professional intervention (King, Delfabbro, & Griffiths, 2012). Not only internet addiction is associated with psychological problems, it is also comorbid with many types of clinical disorders and their symptoms such as depression, insomnia (Cheung & Wong, 2011), suicidal ideation (Fu, Chan, Wong, & Yip, 2010), attention-deficit hyperactivity disorder, social phobia, and hostility (Ko, Yen, Chen, Yeh, & Yen, 2009), schizophrenia, obsessive-compulsive disorder (Ha et al., 2006), aggression (Ko, Yen, Liu, Huang, & Yen, 2009), drug use (Gong et al., 2009), and problematic alcohol use (Ko et al., 2008). These problems may be suggestive of a bidirectional causality relationship and similar etiology (Ko, Yen, Chen, Chen, & Yen, 2008; Mueser, Drake, & Wallach, 1998), and has increased risk of psychopathology relative to a single presenting mental health problem (de Graaf, Bijl, Spijker, Beekman, & Vollebergh, 2003).

Since many research has been conducted in association with internet addiction and its influence on different variables such as emotions, academics, psychological disorders, personality traits etc, The present study attempt to understand the effects of internet addiction on select psychomotor functions.
PSYCHOMOTOR FUNCTIONS

Psychomotor functions or psychomotor performance is the resultant of coordination between sensory and motor system through the integration and organizational processes of central nervous system and brain. Here the sensory process is influenced by our personality, memory and individual motivation, whereas the overall functions of the integrative mechanism are ruled by the state of arousal and the central nervous system. Complex feedback and adaptive systems complete the process by which environmental stimuli produces appropriate, coordinative behavioural responses.

Psychomotor functions are the psychological processes that involves the motor functioning which influences the kinetics behaviour, example dancing, driving car, typing a letter, digit span memorizing, attention and concentration involved in auditory memory etc. many of these functioning also involves the cognitive efforts specially memory related tasks, attention and concentration related tasks, car driving etc.

The cognition is explained as higher mental processes that include information processing in brain which are contingent upon sensation, perception and recognition. Cognitive skills include attention, concentration, memory, learning, reasoning, problem solving, decision making, planning and execution, creativity and so on.

Tomas Paus (2005) study on mapping brain maturation and cognitive development during adolescence indicated that the non-invasive mapping of the structure and function of brain with the help of magnetic resonance imaging has indicated the neural substrates underlying cognitive development during adolescence period. During the adolescent period there is an increase in the volume of white matter in the brain at the same time there is less agreement on the meaning of
asynchronous age related decreases in the volume of grey matter in different cortical regions; these might equally represent loss or gain of tissue.

The development of psychomotor skills is grounded in behavioural learning theory. Among the numerous applications of psychomotor domain objectives are in teaching, physical education and personal fitness skills and various sport, dance, music, drama and visual arts classes. Psychomotor skills are largely confined to the physical acts and behaviours of performing and ways of moving. They are composed of the physical activities individuals become involved in and the physical procedures they use to negotiate daily life (Beane et al., 1986; Gage & Berliner, 1988; Haladyna, 1997; Marzano, 2001).

The development of the adolescents psychomotor functioning is necessary for fostering creativity, specifically fields with practices in other realities in addition to the perceptual. Psychomotor abilities not only facilitate the learner’s practices but also motivate the learner to try different alternatives. Many of the research studies have confirmed that using multiple representations, including virtual demonstrations, are beneficial in preparing students for actual live performances of psychomotor skills.

The literature review on psychomotor functioning and addiction to drugs showed that drug dependency and drug abuse will impair the psychomotor functioning and cognitive functioning which includes judgment decision making etc. the reinforcing character of any addiction dependency depend on the mesocorticolimbic dopamine system which aggravates the nucleus accumbens (Wise, 1981; for review, see Koob, 1992), specially the cells of subregions (Bassareo and Di Chiara, 1997).
Many theories of addiction are contingent upon the adaptation and association of both sensitization to and withdrawal from repeated exposure to psychomotor stimulants (Robinson and Berridge, 1993; Koob and Le Moal, 2001). Many researches has been proved the nature of cellular and molecular adaptations in animal models of addiction (Hyman and Malenka, 2001; Koob and Le Moal, 2001; Nestler, 2001), many of which are similar, if not identical, to those implicated in models of learning and memory (Hyman and Malenka, 2001; Nestler, 2001). Since the characteristic features of drug dependency and Internet addiction are similar in nature the same dependency related psychomotor impairment can be extended to the people suffering from internet dependency. Hence to have a clear understanding of the effects of internet addiction the present research has been initiated.

To have a clear understanding of selected psychomotor functioning, in the present research, the researcher has selected the following psychomotor functions which also requires the role of cognition.

- Visuomotor coordination
- Psychomotor speed
- Attention and concentration
- Auditory memory

**VISUOMOTOR COORDINATION AND PSYCHOMOTOR SPEED**

Visuo motor coordination is the eye hand coordination which includes both sensing the objects through visual channel and interpretation is made in the brain after which the information is sent to selected motor pathway to react to the situation. Eg: - Driving a car, typing, dancing etc. Psychomotor speed refers to precise movements requiring eye hand coordination under highly speeded conditions.
The above cited literature review relating to psychomotor functioning and addiction indicates how psychomotor impairment is caused due to drug dependency and other drug addictive behaviour. Visuo-motor coordination and psychomotor speed being an important psychomotor functioning needs a study in terms of how internet addiction has an impact over these functioning. The lack of previous studies in this notion needs the researcher to fill the research gap and answer the question has to how addition especially internet addiction affects the visuo-motor coordination and psychomotor speed. Weinstein, Livny, Weizman (2017) study investigated the Functional Magnetic Resonance Imaging (fMRI) of the resting state and measures of gray matter volume of online game players, revealed that Internet game playing was allied with changes to brain regions in charge for attention and control, impulse control, motor function, emotional regulation, sensory-motor coordination. It was further observed that Internet game playing was also associated with lower white matter density in brain regions that are involved in decision-making, behavioural inhibition and emotional regulation. Thus the study indicated that internet usage had a serious impact on the cognitive functioning of its users.

However considering visuo-motor functioning and psychomotor speed as a cognitive functioning we can also indirectly assert that internet addiction has a negative consequence on visuo-motor functioning and psychomotor speed

**ATTENTION AND CONCENTRATION**

Attention is an important cognitive and behavioural process of selective concentration on a given aspect of information.
DEFINITIONS OF ATTENTION

William James defines attention as “Focalization, concentration, of consciousness are of its essence. It implies withdrawal from some things in order to deal effectively with others, and is a condition which has a real opposite in the confused, dazed, scatterbrained state.” (Principles of Psychology, 1890)

Titchner defines attention as “Attention is a state of sensory clearness with a margin and a focus. Attention is the aspect of consciousness that relates to the amount of effort exerted in focusing on certain aspects of an experience, so that they become relatively vivid”.

Attention is the area of interest by psychologist, neurologist, neuroscientist and cognitive psychologist. Many research related to attention concentrating on the source of signals that elicits attention, the role of these signals in energizing the sensory neuron, the role of attention in other cognitive functions such as memory and learning etc.

CLINICAL MODEL OF ATTENTION

Sohlberg and Mateer explains the hierarchic model of attention based on recovering of attention processes of brain damage patients after coma. They are:

- **Focused attention**: refers to ability to respond continuously to specific visual, auditory or tactile stimuli.

- **Sustained attention**: refers to the ability of a person to maintain a constant behavioural response during continuous and repetitive activity.

- **Selective attention**: refers to person’s capacity to maintain a sustained attention to selected stimuli when faced with many other distracting stimuli.
• **Alternating attention**: refers to a person’s ability to have mental flexibility which helps him in concentrating on and shifting his attention on and move between tasks having different cognitive requirements.

• **Divided attention**: considered to be the highest level of attention, wherein it refers to the ability to respond concurrently to multiple tasks or multiple task demands.

**FACTORS INFLUENCING ATTENTION**

**Objective factors (characteristic of stimuli)**

• Intensity of stimulus

• Frequency of repetition

• Size

• Movement

• Change of stimuli

• Novelty

**Subjective (Qualities of the observer)**

• Habit or familiarity

• Immediate need

• Profession – interest or motivation

• Innate tendencies

**ASSESSMENT OF ATTENTION**

Attention can be assessed through measuring the attention span of a person. Attention span is the duration or the amount of time a person can be able to concentrate on a particular given activity. Focused attention on a particular task is
considered to be the vital component of attaining the goal. People with longer attention span during their task imply that the person is enjoying the given task.

**Attention span can be assessed clinically by using the following test**

- Ask the patient to name the month of the year or days of the week forwards or backwards,
- Digit Span test
- Serial subtraction test
- Random letter test
- Face hand test

In the present study, the researcher has made use of Digit span test in order to assess the attention among the Internet addict adolescents. The review literature pertaining to effects of internet addiction and attention being one of the key components of cognitive functioning indicates that attention and concentration among internet addicts are seriously hampered and further research is needed in order to have a better understanding of how attention per se is affected by internet use.

**AUDITORY MEMORY**

Memory is the process of encode, storage and retrieval of information. Memory is considered to be an important cognitive functioning which is very much essential for day to day functioning. The key process involved in memory are a) encoding – taking in of the information. b) Storing – storing the encoded information c) retrieval – using of stored information when the situation demands.
Memory could be better understood with the help of models of memory, which talks about different types of memories namely a) sensory memory b) short term memory c) long term memory.

In the present research our main focus of attention is auditory memory. Auditory memory is phonetic representation of memory that occurs when the stimuli is presented in of sound or orally. Literature reviews suggest short term retention is better for auditory memory compared to visual memory. Many Researches investigated the effects of Internet use on cognition in adolescents. Specific concerns about how the Internet might impact adolescent cognitive development include how having near constant access to information might disrupt memory abilities or the utilization of effortful thinking (Näsi & Koivusilta, 2012). The first ever attempt of understanding internet use and cognitive processes were conducted by Sparrow, Liu, & Wegner (2011). This study experimentally tested how Internet use affect memory with special reference to how access to information stored in an external source could render individuals less likely to store information in their own memory. Sparrow et al. (2011) study suggests that near constant access to the Internet could influence the kind of information an individual chooses to remember.

Manfred Spitzer (2013) a German neuroscientist coined a term digital dementia. Digital dementia refers to how overuse of digital technology leads to breakdown of cognitive abilities in a way that is more commonly seen in people who have suffered a head injury or psychiatric illness. Spitzer further suggested that people who heavily rely on digital technology may have the problems associated with deterioration in cerebral performance which causes short term memory dysfunction. Excess use of smart phones and game devices hampers the balanced development of the brain leading to cognitive impairment.
Use of smart phone has reduced the human efforts of memorizing phone numbers, birthday dates and other relevant information, which is easily done by the Smartphone, but in actual reality the brains neuronal activities related to these functioning getting deteriorated and the long term consequence of having poor working as well short term memory. Few studies indicated that constant connection and overuse of technology lead to lateralization of brain functioning, thus these imbalance in brain functioning may damage the other part of the brain which results in deficits in ability to concentrate, short attention, memory span, and emotional disturbances such as depression.

**CONCLUSION**

To sum-up in the above chapter an attempt has been made to explain the concepts and the theoretical background of each concept with research evidence. Through investigating the existing studies, the research gap is also being explained and the research questions will be answered in the upcoming chapters. Thus in the upcoming chapters an attempt has been made to explain how internet addiction affects various select psychomotor functions.
NEED FOR THE STUDY:

The purpose of this study was to internet addiction and its effects on select psychomotor functions among adolescents. Internet addiction can be found at any age and in any social condition, but most of the research major attention has been focuses on adolescents because adolescents seem to be a critical period of addiction vulnerability (Pallanti, Bernardi and Quercioli 2006). The research of Van Rooji and Van den Eijinden (2007) had reported that, using internet has become one of the most popular leisure-time activities among adolescents in western societies. Adolescents in Netherlands of ages between 11 to 15 years use the internet for leisure activities and for adolescents aged 14 and older regard internet usage as an important leisure-time activity than watching TV (Van den Eijinden, Spijkerman, Vermulst, Van Rooji and Engels, 2009). Internet addiction has been defined by symptoms of lack of control, intolerance, abdication, functional defect, curtailed decision-making ability (Ko, Yen, Chen, Chen, & Yen, 2005), substance experience (Ko et al., 2006; Yen, Yen et al., 2007), anxiety, psychomotor agitation, passion (Ferraro, Caci, D’Amico, & Di Blasi, 2007), enmity (Yen, Ko, Yen, Wu, & Yang, 2007), and permanent web surfing thought here are many negative influences on social and psychological well-being. Studies related to Internet addiction revealed that there are some connections with Internet addiction and social phobia, depression (Yen, Ko et al., 2007; Young & Rogers, 1998), loneliness (Kraut et al., 1998; Nalwa & Anand, 2003; Whang, Lee, & Chang, 2003), diminished self-esteem and life satisfaction (Ko et al., 2005), weak mental health (Yang, 2001; Young & Rogers, 1998), subjective vitality (Akin, 2012), and subjective happiness (Akin, 2012).
According to Douglas, Mills, Niang, Stepchenkova, Byun, & Ruffiniet (2008), conceptual model of internet addiction which concludes that overuse of internet is generally defined by the inner need and motivations of an individual or so call push factor. This model state that, the perceived attractive features of the medium or pull factor moderate the relationship between push factors and the severity of negative effects of internet overuse. Negative effects of Internet addiction disorder can include not only academic, social, financial, occupational, and physical impact, but extend to various deviant behaviours. Adolescents & young adult’s cognitive functions have been affected due to the excessive Internet addiction. Adolescents & young adults are always glued to phones, and are constantly multi-tasking. They study and at the same time are involved in the usage of phones and social networking. This may also lead to deficit in the attention & memory span of students; therefore affecting their academic performance, social functioning and emotional instability. In the present study the researcher has focused on how Internet addiction affects adolescent’s visuo-motor coordination function which is very important ability to synchronize visual information with physical movement. The present research study also addresses the effect of Internet addiction on psychomotor functions because psychomotor behaviours specifically contain elements of cognition and affective behaviours within them. It is very important that Internet addiction has to be addressed at this adolescent age because Internet addiction has ultimate impact on normal growth & development. Present research focuses particularly addressing effect of Internet addiction on selected psychomotor functions such as visuo motor coordination, psycho motor speed, attention and auditory memory in the Indian context with adolescent’s age group between 12-18 years of age, as the internet addiction may manifest due to many
other reasons of adolescence. There have been scanty studies and also there is lack of documentation on the topic. Hence the researcher has taken up the proposed study.

AIM

The aim of the study was to assess internet addiction and its effects on select psychomotor functions among adolescents.

OBJECTIVES

- To examine the effects of varied levels of internet addiction on visuo-motor coordination and psychomotor speed among adolescents.
- To examine the effects of varied levels of internet addiction on attention among adolescents.
- To examine the effects of varied levels of Internet addiction on auditory memory among adolescents.
- To examine the interaction effects between varied levels of internet addiction and developmental span on visuo-motor coordination, psychomotor speed, attention and auditory memory.
- To examine the interaction effects between varied levels of internet addiction and gender on visuo-motor coordination, psychomotor speed, attention and auditory memory span.
HYPOTHESES

Following hypotheses have been formulated in the present study.

H1 - Adolescents with mild, moderate & severe internet addiction differ significantly in their visuo-motor coordination and psychomotor speed.

H2 - Adolescents with mild, moderate & severe internet addiction differ significantly in their Attention.

H3 - Adolescents with mild, moderate & excessive internet addiction differ significantly in their auditory memory.

H4 - There will be a significant interaction effects between levels of internet addiction and developmental span on visuo-motor coordination, psychomotor speed, attention and auditory memory span.

H5 - There will be a significant interaction effects between levels of internet addiction and gender on visuo-motor coordination, psychomotor speed, attention and auditory memory span.

OPERATIONAL DEFINITIONS OF THE VARIABLES

Internet Addiction

Internet addiction is operationally defined as any online related activities such as browsing internet use of social network sites for various purposes like chatting, posting photos and videos, playing online games which becomes very excessive that it can be considered as compulsive behaviour and these compulsive behaviour interferes in their day to day activities and seriously affects their daily routine and has a serious
Adolescence

Adolescence is a transitional age from childhood to adulthood wherein they come across psychological, social and physical changes and these changes may influence their behaviour. For the present study the researches has categorized the adolescent into two groups mainly to know whether the age of the adolescent influences level of internet addiction and its impact on the other dependent variables.

The categories that has been made are

Early adolescence - Adolescent belongs to age group of 12 to 15 years of age

Late adolescence: – Adolescent belongs to age group of 16 to 18 years of age.

Psychomotor functions

Psychomotor functioning refers to a wide variety of actions involving physical movement related to conscious cognitive processing.

Here the researcher has selected few cognitive/psychomotor functions such as

- Visuo motor coordination - visuo motor coordination is the eye hand coordination which includes both sensing the objects through visual channel and interpretation is made in the brain after which the information is sent to selected motor pathway to react to the situation. Eg:- Driving a car .

- Psychomotor speed - Psychomotor speed refers to precise movements requiring eye hand coordination under highly speeded conditions.

- Attention – attention is operationally defined as a person’s level of attention and concentration in listening and reciting the numbers in forward and
backward manner

- Auditory memory – for the present study auditory memory is operationally defined as person’s ability to listen to the numbers told and reciting the numbers in forward and backward manner.

VARIABLES

INDEPENDENT VARIABLE

- Internet addiction
- Developmental span (Early & late)
- Gender (Male & Female)

DEPENDENT VARIABLES

- Visuo-motor coordination
- Attention & Auditory memory span
- Psycho-motor speed