

## Loganathan and Sivakumar's Baum Test: A Psychodiagnostic Tool to Identify Internet Addiction

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### Abstract

The objective of this study is to examine the prevalence of internet addiction in urban secondary schools and the impact on school discipline problems and academic performance. A qualitative research design was used to identify internet addiction through a non-verbal projective test. Purposive sampling was used to select ten F4 students as respondents. The respondents had to own smart handphones or laptops and must have access to the internet. The non-verbal projective test used was Loganathan and Sivakumar's Baum Test (LSBT). LSBT required the respondents to draw four fruit-bearing trees and the drawings were interpreted by using hermeneutic science. The findings of the LSBT showed 90% of the respondents had mild to severe internet addiction. The LSBT projective test provided more in-depth information as it accesses the unconscious mind. In addition, the respondents have no control over their tree drawings as their unconscious mind is being projected on the paper. In conclusion, this study proposes that the LSBT can be used to identify internet addiction. A questionnaire was used to obtain information on the respondents' usage of the internet. The findings of the questionnaire showed that all the respondents owned smartphones and had easy uncontrolled access to the internet. The school records showed that none of the respondents had discipline problems in school. The academic records showed that 80% of the respondents had obtained excellent results in their examination. Thus, there was no negative impact on school discipline and academic performance. The implication of this study is internet addiction can be identified early and intervention can be done to help those who are addicted to the internet. The study has provided a new insight into students who habitually use excessive internet. Teachers can use this information to encourage the use of the internet in a positive manner. School counsellors can use the LSBT to get a better understanding of the students' discipline problems so that they can be counselled and advised correctly.

**Keywords:** Internet addiction, Tree test, Projective test, Baum test, Psychology

## INTRODUCTION

Internet has become an important part of our daily lives. It is used widely to communicate, to look for information, as an educational tool and for entertainment. The internet provides a range of websites that are useful and fulfill our needs. Some of the popular sites are social media sites, online gaming sites and entertainment sites. A person who uses the internet for long hours daily other than for work purpose can become addicted to the internet.

Internet addiction is defined as a compulsive behaviour which interferes with normal living and causes severe stress on family, friends and loved ones. According to Talwar et al., (2019) internet addiction refers to an individual's inability to control his internet usage. This inability can cause many problems in his personal life and at work. This can further lead to mental, psychological, social and physical disorders. In addition, according to Awaluddin et al., (2019), internet addiction can have a negative impact on education, cause financial problems, create problems in personal relationships, cause physical health and create problems in the workplace. According to Omar, Saharuddin, and Bolong (2019), internet addiction causes discipline problems and poor academic performance among students in schools. According to Carlisle, Carlisle, Polychronopoulos, Goodman-Scott, and Kirk-

Jenkins (2016), internet addiction causes social isolation, problems in family relationships and low academic grades.

According to Abdul Aziz, Wan Ismail, Bahar, Mahadevan, and Azhar Shah (2018), internet addiction is prevalent among adolescents in many Asian countries. Internet addiction among adolescents in South Korea is 13.7% and 50.9% in the Philippines. Studies done in Malaysia too show a high prevalence level of internet addiction among adolescents i.e. between 2.4% and 16%. The prevalence of internet addiction among adolescents in Malaysia has given rise to this study which investigates internet addiction among urban secondary school students by using a projective test.

The past studies done in Malaysia mainly focused on the usage of the internet by university undergraduates and college students. The studies investigated the use of social networking sites, the prevalence of cyberbullying and the use of social media such as Facebook, WhatsApp, and Instagram. Past studies also investigated the correlation between mental health and internet addiction, factors that caused internet addiction and the impact of internet addiction on academic performance and gadget addiction. Past studies mainly used questionnaires such as Internet Addiction Test to identify internet addiction among the university undergraduates. Thus, this study on the prevalence of internet addiction among urban secondary school students is appropriate and relevant especially since internet and electronic devices are used in the classroom to enhance learning and teaching.

## **PROBLEM STATEMENT**

Internet addiction has increased with the increased availability of the internet and there is a need to identify this accurately. According to Karaer and Akdemir (2019), the number of people using the internet in the world has increased by 1052% between 2000 and 2018. They also said nationwide studies done in seven regions of the world showed a six percent prevalence of internet addiction. Karaer and Akdemir (2019) say that the prevalence of internet addiction among adolescents in Turkey is between 1.6% and 19% depending on the region. They did a study in Turkey to identify the factors of internet addiction among adolescents. The results showed a positive correlation between the number of hours spent online and internet addiction.

In Malaysia, local studies have reported internet addiction prevalence rates of between 2.4% to 16% among adolescents. This indicated internet addiction as a rising concern among adolescents especially as the mental health issues too were increasing among the adolescents. Abdul Aziz et al., (2018) conducted a study among adolescents to investigate the prevalence of internet addiction and mental health issues related to internet addiction. They used the Malay version of Young's Internet Addiction Test to identify internet addiction. They found that 49.2% of the 199 secondary students in the study had internet addiction. However, convenient sampling was used in this study, thus the findings may not represent the actual situation in Malaysia. Abdul Aziz et al., (2018) also said that findings of another study done in Malaysia reported 3.3% secondary school students use the internet excessively while 54.2% were moderate users. This shows that there is a need to do more studies on Malaysian adolescents to get reliable data on the level of internet addiction among adolescents in Malaysia.

According to Carlisle et al. (2016), internet addiction can be identified by using a few diagnostic tools such as Young's Internet Addiction Test (IAT), Young's Internet Addiction Diagnostic Questionnaire (IADQ), Chen Internet Addiction Scale (CIAS) and Problematic Internet Usage Scale (PIUS). These diagnostic tools are mainly questionnaires which require individuals to answer questions by choosing the most suitable option from a given Likert scale. Many studies done on the prevalence of internet addiction have used IAT and PIUS as the instruments to identify internet addiction.

Projective tests have rarely been used to identify internet addiction. Eichenberg, Schott, Decker, and Sindelar (2017) used the Rorschach Inkblot Test (RIT) which is a projective test in their study to investigate the attachment style and the tendency towards internet addiction. It was used only on 16 voluntary male subjects. Eight of them showed excessive use of the internet and three of them showed an inclination to internet addiction. As very few studies have used projective tests to identify internet addiction there is a research gap in the use of projective tests to identify internet addiction.

This study has used LSBT i.e. a projective test which requires participants to draw four fruit-bearing trees. LSBT was developed from the Baum (Tree) Test which was introduced by Emil Jucker in 1928 and further developed by Charles Koch in 1952. According to Koch (1952), an individual who draws a tree is projecting his own personality onto the piece of paper. Loganathan (1986) used the Baum

Test with an associate, Yoshikawa in 1985 to measure the cognitive development of Japanese students studying in Singapore. Loganathan (1986) modified the original single fruit tree Baum Test into the New Baum Test where four fruit trees are drawn. The New Baum Test was later developed further to include Sivakumar's Principles of Interpretation in 2015. It was renamed as Loganathan and Sivakumar's Baum Test.

## OBJECTIVES

The objective of this study is to identify the prevalence of internet addiction among urban secondary school students through Loganathan and Sivakumar's Baum Test (LSBT). The objectives of this study are:

1. To identify the characteristics of internet addiction through Loganathan and Sivakumar's Baum Test in adolescents in urban secondary schools.
2. To identify internet addiction through Loganathan and Sivakumar's Baum Test in adolescents in urban secondary schools.
3. To investigate the impact of internet addiction on the discipline and academic performance of the respondents.

## METHODOLOGY

A qualitative research design was used in this study to investigate the prevalence of internet addiction among urban secondary school students. A purposive sample was selected from a population of Form 4 urban secondary school students. The 10 students selected must have access to the internet and smartphones. The selected students were labelled as Respondent 1 (R01), Respondent 2 (R02) and so forth until Respondent 10 (R10).

Three research instruments were used in this study i.e. a questionnaire, LSBT and school records. The questionnaire was used to collect data on respondents' access and usage of the internet as well as the type of digital devices used. The respondents were given the self-administered questionnaires and asked to answer the questions in 10 minutes. The data was analysed and tabulated manually.

The second instrument used was the Loganathan and Sivakumar's Baum Test (LSBT). The respondents were asked to draw four fruit-bearing trees according to the specific instructions given to them. This instrument is easy to use and it is non-invasive. In addition, it puts the respondents at ease as it is a drawing activity, thus reliable data can be collected.

The respondents were given a blank A4 paper and asked to fold it over twice to divide the A4 paper into four equal quadrants. The two quadrants on the top were then labeled as A and B from left to right. The two quadrants at the bottom were labelled as C and D from left to right. The respondents were also given a 2B pencil to draw.

The respondents were given the following instructions to draw the fruit bearing trees:

- i) Please write down your name, age, gender, and date of birth at the back of the paper.
- ii) Draw a tree bearing fruits as it comes to your mind in Quadrant A.
- iii) Draw a tree bearing fruits as REALISTIC as you can in Quadrant B.
- iv) Draw a tree bearing fruits which is your own CREATION in Quadrant C.
- v) Draw a tree bearing fruits of a kind that does not exist in the world, purely IMAGINARY in Quadrant D.

All the 10 respondents were given the instructions in the above sequence at the same time. The respondents were given between 5 - 10 minutes to complete their drawing in the quadrant before the instruction for the next quadrant was given. The respondents were not allowed to look at pictures

or real trees in their surroundings as they drew their trees. The respondents were given between 20 – 30 minutes to complete the LSBT. The Principles of Interpretation developed by Sivakumar (2015) were used to enable proper and accurate interpretation of the LSBT. These principles will ensure the same interpretation is given to a specific feature of the tree by all LSBT analysts. This will make the interpretation valid and reliable.

The third instrument used was the school discipline and academic records. These were analysed to obtain data on the school discipline problems and academic achievements of the respondents. The findings were tabulated manually.

## RESULTS

### Findings For Research Question 1:

**What are the characteristics of internet addiction identified through Loganathan and Sivakumar’s Baum Test in adolescents in urban secondary schools?**

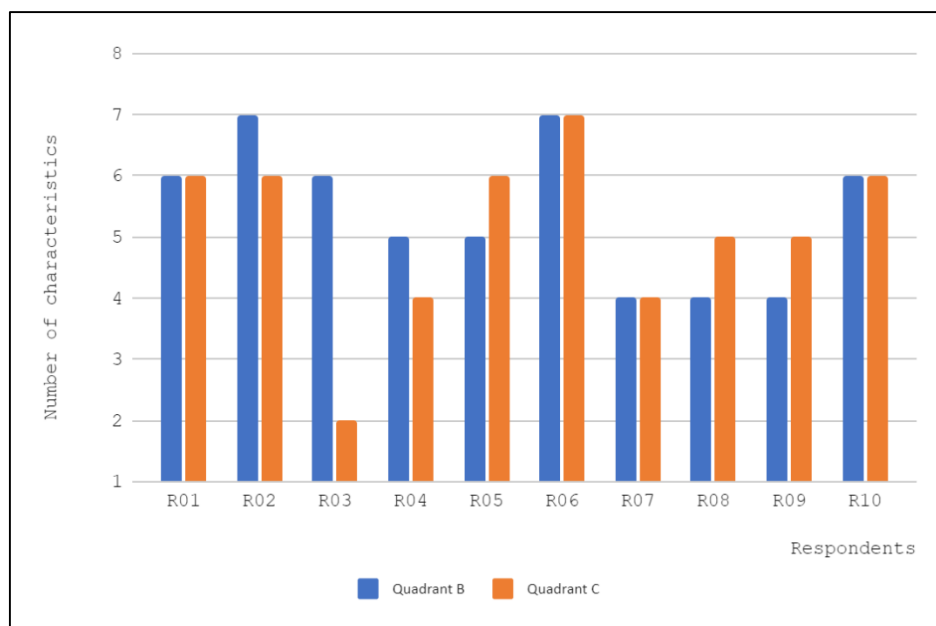


Figure 1: Local structure analysis of the crown in Quadrant B and Quadrant C.

Figure 1 shows the local structure analysis of the crown in Quadrants B and C. This figure shows the number of features in the crown of the tree which indicate characteristics of internet addiction in Quadrants B and C for each respondent. Respondent R01, R06, R07 and R10 have drawn the same number of features in the crown for Quadrants B and C. This indicates that there is no difference in the way they used the internet previously as compared to now. Respondents R02, R03 and R04 have displayed more characteristics of internet addiction in Quadrant B as compared to Quadrant C. This indicates that the respondents displayed more characteristics that show internet addiction previously as compared to now. Respondents R05, R08 and R09 have drawn more features in Quadrant C as compared to Quadrant B. This indicates that the respondents have more characteristics that indicate internet addiction now as compared to previously.

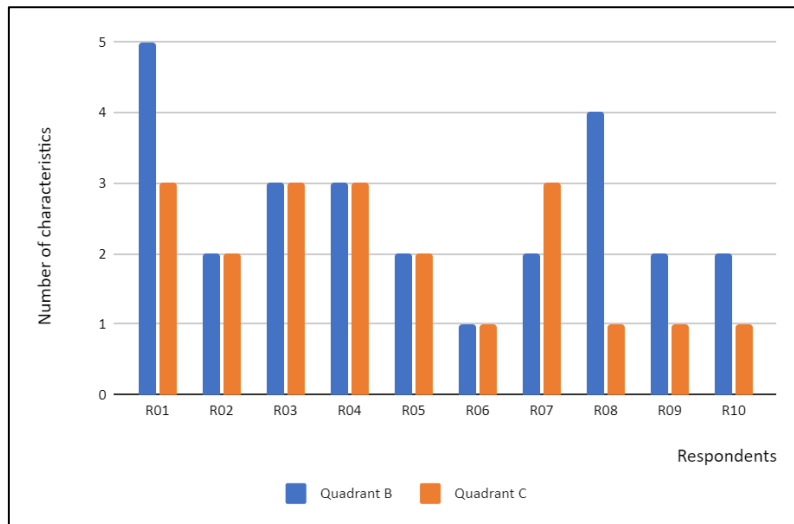


Figure 2: Local structure analysis of the trunk in Quadrant B and Quadrant C.

Figure 2 shows the local structure analysis of the trunk in Quadrants B and C. Respondents R02, R03, R04, R05, and R06 have drawn the same number of features that indicate characteristics of internet addiction in both Quadrants B and C. This indicates that the respondents show no difference in the way they used the internet previously as compared to now. Respondents R01, R08, R09 and R10 have drawn more features which indicate characteristics of internet addiction in Quadrant B as compared to Quadrant C. This indicates they had more characteristics of internet addiction previously as compared to now. Only Respondent R07 has drawn more features in Quadrant C as compared to Quadrant B. This shows that he showed fewer characteristics of internet addiction previously as compared to now.

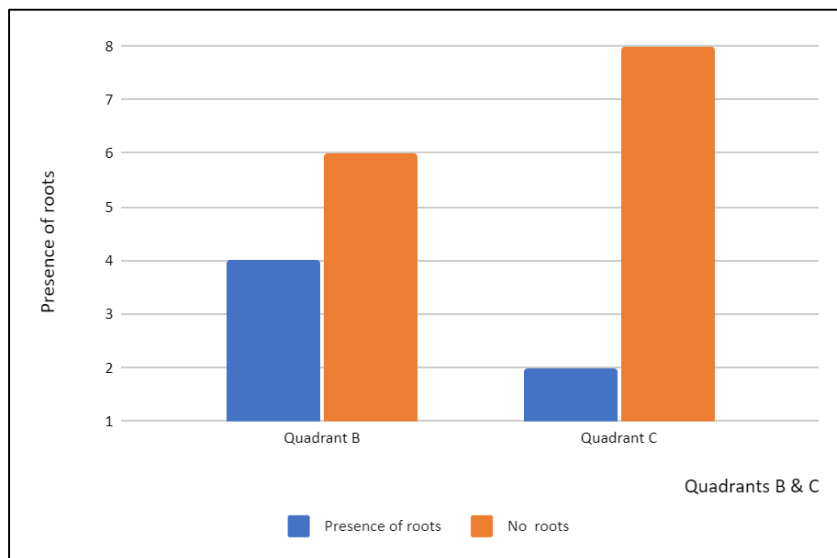


Figure 3: Local structure analysis of the root in Quadrants B and C

Figure 3 shows the local structure analysis of the roots in Quadrants B and C. It indicates the presence of roots and the absence of roots. Many of the respondents did not draw any root in both the quadrants. Only four respondents drew roots in Quadrant B whereas six respondents did not draw roots in Quadrant B. Only two respondents drew roots in Quadrant C and eight respondents did not draw roots in Quadrant C. This indicates that six respondents in Quadrant B and eight respondents in Quadrant C are detached from reality. This clearly shows that there is an increase in the number of respondents who are detached from reality now as compared to previously.

**Findings For Research Question 2:  
 How is internet addiction identified through the analysis of the Loganathan and Sivakumar's  
 Baum Test?**

**Table 1:** *Tree Features and Characteristics of Internet Addiction*

Tree Features	Characteristic of Internet Addiction
Large crown Leaves Ball shaped crown Crown to the right Shadings on the left side of the trunk	Living in fantasy / dream world
Closed crown Crown displaced to the left The whole tree is displaced to the left	Lonely / Introvert
The trunk has a broad base with diminishing breadth Tremulous outline of the crown	Lack of inner strength
No roots	Detached from reality
<b>Anthropomorphization</b> - Drawing human features on the tree such as a face, mouth, nose, ears and arms.	Has a role model and is living like the role model
Presence of knotholes on the trunk Curls and dark patches on the trunk Shadings on the left side of the trunk	Tendency to hide and lie

Table 1 shows the features of the tree drawings and the meanings of the features. A total of 15 features were identified in the tree drawings. The presence of these features indicate that the respondents used the internet excessively. Each tree drawn by the respondents was analysed for the presence of these features and it was interpreted according to the meaning of the feature present in the tree drawing. A conclusion was drawn after careful analysis of the trees drawn.

**Table 2:** Analysis of the Internet Addiction of Each Respondent.

Characteristics of internet addiction	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10
Dreamy / World of fantasy	X	/	/	/	/	/	X	/	/	/
Lonely / Introvert	/	/	/	/	/	/	/	/	/	/
Lack of inner strength	/	/	/	/	X	X	/	/	/	/
Detached from reality	X	/	/	/	/	X	X	/	/	/
Humanoid Forms / Role models	X	/	X	X	/	X	X	X	/	/
Tendency to hide and lie	/	X	/	X	/	X	/	/	X	X
Total characteristics of internet addiction	3	5	5	4	5	2	3	5	5	5

**Note:** / = present, x = not present

Table 2 shows the presence of the characteristics which indicate internet addiction in the trees drawn by the respondents. A total of six characteristics were identified as indicating internet addiction. An analysis of the tree drawings indicated the presence of these characteristics in the drawings. Table 2 also shows the number of characteristics shown by each respondent. Six respondents had five of the six characteristics, one respondent had four characteristics, two respondents had three characteristics and only one respondent had two characteristics.

### Findings For Research Question 3:

**What is the impact of the internet addiction on the discipline and academic performance of respondents?**

**Table 3:** The Impact of Internet Addiction on Discipline Problems and Academic Performance

Respondent	Level of internet addiction	Discipline Problems	Academic performance
R01	Mild	None	10A
R02	Severe	None	8A
R03	Severe	None	3A
R04	Moderate	None	10A
R05	Severe	None	10A
R06	None	None	10A
R07	Mild	None	10A
R08	Severe	None	10A
R09	Severe	None	10A
R10	Severe	None	10A

Table 3 shows the impact of internet addiction on the respondents' discipline and academic performance. All the respondents did not have any discipline problem in school. Even the respondents identified as severely and moderately addicted to the internet did not have any discipline problem in school. The respondents also achieved good academic results in their examination. Four of the respondents identified as severely addicted to the internet scored 10A's in the examination. Only one respondent who showed severe addiction to the internet scored 3A's in the examination. Another respondent who also showed severe internet addiction scored 8A's. All the other respondents scored

10A's in the examination. This clearly shows that internet addiction did not have a negative impact on the respondents' discipline and academic performance.

## DISCUSSION

### Research Question 1:

#### **What are the characteristics of internet addiction identified through Loganathan and Sivakumar's Baum Test in adolescents in urban secondary schools?**

This study's first objective was to identify the characteristics of internet addiction through LSBT. The findings of the LSBT were based on the local structure analysis of the tree drawings. The trees drawn were divided into three main parts i.e. the crown, the trunk and the root. The features in these three parts of the tree were analysed separately for the presence of tree features which indicated the characteristics of internet addiction.

Figure 1.1 shows the findings of the local structure analysis of the crown in Quadrants B and C. The features of the crown which identified the characteristics of internet addiction are a large crown, a closed crown, presence of leaves, presence of fruits, ball shaped crown, tremulous outline, crown displaced to the left and crown displaced to the right. These features indicated one's need for recognition, low self-esteem, inability to interact with others in the environment, living in a dream and fantasy world, a search for pleasure and an introvert character. It was found that seven of the ten respondents had shown inclination towards internet addiction in Quadrants B and C. In Quadrant B respondents R01, R02, R03, R04, R05, R06 and R10 showed an inclination towards internet addiction. In Quadrant C respondents R01, R02, R05, R06, R08, R09 and R10 showed an inclination towards internet addiction.

However, it was found that Respondent R03 and Respondent R04 who showed inclination towards internet addiction in Quadrant B did not show it in Quadrant C. Respondents R08 and R09 who did not show an inclination towards internet addiction in Quadrant B showed signs of internet addiction in Quadrant C. This indicates their compulsive use of the internet is worse now as compared to the period in Quadrant B. Only respondent R07 did not show any inclination towards internet addiction in both the quadrants. Thus, Respondent R07 has maintained his good internet habits from Quadrant B to Quadrant C. As Quadrant B shows the near past experiences and Quadrant C shows the present life experiences of the respondent, it clearly shows that some of the respondents have carried on their internet habits from Quadrant B to Quadrant C. As a conclusion we can say that respondents' internet habits in the near past (Quadrant B) is an indication of what the respondents' internet usage will be like in the present (Quadrant C).

The findings of the local structure analysis of the trunk in Quadrants B and C is shown in Figure 1.2. The features of the trunk which identified characteristics of internet addiction were a uncovered straight upright trunk, a broad base with diminishing breadth, presence of knotholes, presence of curls and dark patches, shadings on the left of the trunk and human features on the trunk. These features of the trunk indicated a lack of inner strength, exhibitionist characteristics, a tendency to lie and hide, a tendency to involve in activities not sanctioned by society, a dreamy nature and following a role model. The findings show that four respondents (R01, R03, R04 and R08) have drawn trunk features in Quadrant B that indicate internet addiction. In Quadrant C, we also have four respondents (R01, R03, R04 and R07) who have drawn trunk features that indicate internet addiction. However, there are five respondents (R02, R05, R06, R09 and R10) who did not draw features that show internet addiction in both quadrants. As the respondents move from Quadrant B to Quadrant C there has been a change in internet habits for respondents R07 and R08. Respondent R07 did not draw trunk features which indicate internet addiction in Quadrant B but has drawn them in Quadrant C. This shows that he is using the internet excessively now compared to his immediate past. Respondent R08 on the other hand drew trunk features which indicate excessive use of the internet in Quadrant B but not in Quadrant C. This shows that respondent R08 has experienced a positive change in his internet habits.

The findings of the local structure analysis of the root in Quadrants B and C were shown in Figure 1.3. The features of the root which identified internet addiction characteristics were the presence of roots and the absence of roots. The characteristics identified were a need for praises and support from



the family and a need for emotionally satisfying gratifications. In Quadrant B four respondents (R05, R08, R09 and R10) had drawn roots for their tree and six respondents (R01, R02, R03, R04, R06 and R07) did not draw any root for their trees. This indicates that only four of them are attached to their family and they need constant support and assurance from their families as they constantly seek emotionally satisfying gratifications. The remaining six respondents do not show any attachment to their families and they do not depend on constant family support and assurance.

The local structure analysis of the crown, trunk and root in Quadrants B and C have shown some characteristics of internet addiction such as loneliness, low self-esteem, a tendency to live in a dream world, a need for recognition, anxiety in interacting with the environment and social alienation. Respondents who showed a tendency towards internet addiction displayed more of these characteristics as compared to those who did not show a tendency towards internet addiction.

### **Research Question 2:**

#### **How is internet addiction identified through the analysis of the Loganathan and Sivakumar's Baum Test?**

The local structure analysis of the crown, trunk and root were compared with the internet characteristics identified by past studies. Table 2.1 shows the tree features and the corresponding internet addiction characteristics. The respondents' level of internet addiction can be identified by identifying the tree features that correlate to the characteristic of internet addiction. Table 2.1 shows that there is more than one feature of the tree that can show a characteristic of internet addiction. As an example, a large crown, presence of leaves, a ball shaped crown, a crown displaced to the right and shadings on the left side of the trunk all indicate the respondents are either living in fantasy or in a dream world.

Table 2.2 shows the analysis of the internet addiction of each respondent. Respondent R06 only shows two of the six internet addiction characteristics. Respondent R01 and R07 show three of the six internet addiction characteristics. Respondent R04 shows four of the internet addiction characteristics. Respondents R02, R03, R05, R08, R09 and R10 display five of the internet addiction characteristics. The findings show that one respondent (R01) has no internet addiction, two respondents (R01 and R07) show mild internet addiction, one respondent (R04) shows moderate internet addiction and six respondents (R02, R03, R05, R08, R09 and R10) show severe internet addiction. Thus, the findings of the LSBT showed that 60% of the respondents are severely addicted to the internet, 10% are moderately addicted, 20% are mildly addicted and 10% are not addicted to the internet.

### **Research Question 3:**

#### **What is the impact of the internet addiction on the discipline and academic performance of respondents?**

The findings of this study shows that internet addiction did not have a negative impact on the respondents' discipline and academic performance. Table 3.1 shows the findings of the impact of internet addiction on the respondents' discipline and academic performance. Eight of the respondents scored 10As in their examination. This indicates excellent academic performance. Two of the respondents identified with severe internet addiction scored 8As and 3As respectively. This shows that only one of the respondents performed below average in the examination. This could be due to other factors as well and not only due to severe internet addiction as four respondents identified with severe internet addiction scored 10As in their examination. All the respondents did not have any discipline problems in school. They were described as responsible students by their teachers. In addition, many of these respondents were active in co-curricular activities and held leadership posts in school.

## **IMPLICATION OF FINDINGS**

The main implication of the findings in this study is that it will benefit school counsellors and teachers in understanding the problems faced by their students. School counsellors can choose to use LSBT as a tool to get a historical understanding of the problems faced by their students. They will also get more information as the tree drawings reveal the contents of their unconscious mind which the students

themselves may have forgotten. In addition, this will enable the school counselors to take appropriate action before the problem becomes worse. It will enable them to counsel the students appropriately and help the students to solve their problems.

Another implication of this study is teachers will be able to use internet effectively to enhance learning in the classroom. They will be able to prepare interactive lessons to increase classroom participation. Teachers too can encourage students to use suitable websites and teach them the computer literacy skills to source for information efficiently. In addition, teachers can promote independent learning by preparing suitable tasks and giving good feedback to the students.

The findings have a big implication on schoolteachers and counselors. Teachers can encourage efficient use of the internet in the classroom to enhance learning. This can produce students with excellent academic achievement. School counselors can use LSBT to get more in depth information on the students who have problems in school. They can then provide better counselling to the students. In addition, school counselors too will be aware of the prevalence of internet addiction among secondary school students. Thus, they can consider other forms of addiction such as social media addiction and online gaming addiction when counselling students. They will be able to look at school discipline problems in a different perspective and counsel accordingly.

## CONCLUSION

This study has shown that internet addiction can be identified by using LSBT, a non-verbal projective test. This can be done by interpreting the features of the trees drawn by the respondents. Sivakumar's Principles of Interpretation are used as guidelines to identify the features of the tree that show characteristics of internet addiction. According to Sivakumar (2015), the Principles of Interpretation can provide reliable and valid data findings. In addition, Sivakumar (2015) has also given meanings to certain features of the trees drawn.

The respondents' tree drawings revealed tree features which indicated the common characteristics of internet addiction such as loneliness, an introvert character, living in fantasy and dreamland, lack of inner strength, detachment from reality and the presence of a role model. The LSBT has shown that the respondents have projected their unconscious onto the paper when drawing the fruit trees. Thus, the features are not manipulated by the respondents and the tendency to draw something false is not there if the LSBT has been administered correctly.

The findings also show that internet addiction does not have a negative impact on discipline problems and academic performance. It can have a positive impact on discipline problems as students practice self-discipline in using the internet and observe good time management skills. They are also able to perform well academically as they can use the internet effectively to increase their knowledge and to source for relevant information.

The findings will be useful to schoolteachers as they will be able to create a better learning environment for the students. They can impart digital literacy to their students confidently knowing the positive impact of internet on the students. School counsellors too can approach school discipline problems in a different manner as they are now aware of the prevalence of internet addiction among secondary school students. In addition, they now understand the factors that cause internet addiction and the characteristics of internet addiction. Thus, they can provide good counselling to the students.

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