



LEARNING LOSS AND LEARNING DIFFICULTIES OF JUNIOR SECONDARY STUDENTS IN SCIENCE SUBJECT DUE TO COVID-19 OUTBREAK

- STUDY BASED ON J/ATTIAR HINDU COLLEGE, NEERVELY

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Abstract

Students from remote schools are the victims who face learning loss and difficulties during the COVID-19 risk vacation. The objective of the study is to find out the learning loss and difficulties of junior secondary students in Science subject during the COVID-19 risk holiday. It was a mixed method study, conducted with forty five students from Grade Nine of J/Attiar Hindu College, Neervely. Pre and post unit examinations scores of Science subject before and after the risk holiday were compared using t- test to find the learning loss. A structured questionnaire and Focused Group Discussion were used to inquire the learning difficulties and factors. All students have experienced a learning loss; especially the average performers have highest learning loss. Lower socio economic background is the prime factor leads to learning loss. Reduced learning hours, less educational support from home, passive learning methods, unavailability of study materials and digital gadgets, low cognitive capabilities are the identified learning challenges. Furthermore forgottenness of the lesson, apathetic behaviour on studies, inability to compensate with rapid teaching, fear on COVID-19 and upcoming examination, dropouts are the emerging challenges in reopening of school. School administrators and teachers have taken many remedial actions to overcome the learning loss. Government, NGOs and community are expected to build resilient education systems for equitable and sustainable development.

Key words: Learning loss, Learning difficulties, Risk vacation, COVID - 19, Educational challenges

Introduction:

Short period of missed school, due to illness, may have influence in consequences for learning development (Needham et al., 2004). But students were absent to school more than 120 days in the past months. The COVID-19 crisis has forced school closures in 188 countries, heavily disrupting the learning process of more than 1.7 billion children, youth, and their families. They have missed consistent, ongoing guidance from their teachers and the structure offered by a classroom. Researchers have estimated that disadvantaged students could be facing learning losses of between four and six months (Viner et al., 2020).

The digital platform has been newly introduced to school students to continue the learning. Wealthier families are in comfortable homes, have good internet

connections, can hire a private tutor, and may be better placed for home schooling by well-educated parents. Poor families, especially the extreme poor, live in inferior homes, may not have internet connection or digital gadgets, don't have the resources to hire a tutor, and will struggle to keep up with their children's homework (Esposito and Principi, 2020). In this scenario, the wealthy will pull ahead, and the poor will fall further behind. This scenario highly influences education of poor in Sri Lanka.

Most of the remote schools and the schools exist in difficult and high difficult area especially in Northern Province do not pertain the benefits from the online and digital learning (Aturupane, Glewwe and Wisniewski, 2011). Moreover the families of low socio economic background, female headed families, and victim students of the ethnic war never get any learning in the period of school closure in Sri Lanka. When schools close, this type of families are not able to facilitate the learning of their children at home (Schrijvers, 1999). These vulnerable learners mostly depend on the schools for the learning rather than the outer sources and missed a stimulating and enriching environment, learning opportunities, social interaction.

Hence the long lasting closure of schools highly makes loss knowledge and skills of students and it makes an adverse effect in the academic performance of the students (Cooper, et al;1996).

J/Attiar Hindu College is a provincial co-education school in Neervely, Sri Lanka. It consists around 550 pupils from Neervely North, East, South and West. Neervely is a village located in Jaffna, Sri Lanka. It is located 8 km from Jaffna along the Point Pedro road and the villagers mainly depend on farming and small scale business for their earning (Divisional Secretariat statistical report, 2018). The socio economic background of most students is merely below average and they were unable to follow the online and digital learning methods while the school closed.

The study tends to find the existence of learning loss and learning difficulties of students due to the long term school closure and it can find measures of alternative ways and solutions to regain the academic performances of students in Attiar Hindu College.

Statement of the problem:

The long break risk holiday can have a greater negative effect on the learning of children. A new study suggests that even temporary school closures can result in large medium-term lost learning (Maldonado and Witte, 2020). Especially the slow learners and the pupil need special care can be definitely affected by the long lasted vacation and it ruins the performance of them more. It leads to forget the subject matters as well as the interest in the study. Some of them

can be permanently dropped out too. Additionally, the learning loss can make impact to teachers, students, as well as the reputation of the school. Since the school belongs to lower socio economic community, there are ample amount of challenges has to be faced such as unavailability of digital learning gadgets, lack of family guidance, inappropriate learning climate. These defects should be mitigated in near future for building resilient education systems for equitable and sustainable development.

Purpose of the study:

To find out the learning loss of junior secondary students and learning difficulties in Science subject due to the COVID-19 attack

Objectives of the study

1. To determine the existence of learning loss and analyse the trend of academic performance during pre and post period of COVID-19 attack
2. To find the challenges and difficulties in learning during the OVID-19 outbreak
3. To find the factors affect the learning loss in students and its impacts in students
4. To recommend viable solutions to retrieve the learning in the upcoming times

Literature review:

Educational impacts of COVID-19

UN Educational, Scientific and Cultural Organization (2020) estimated that 107 countries had implemented national school closures related to COVID-19, affecting 862 million children and young people, roughly half the global student population. The UN Secretary-General Policy Brief 'Education in the time of COVID-19 and beyond' warns that the pandemic has created severe disruption in the world's education systems in history and is threatening a loss of learning that may stretch beyond one generation of students. It calls national authorities and the international community to come together to place education at the forefront of recovery agendas and protect investment in education.

Severe learning poverty has been found in the lower middle income countries. The poverty of learning can be increased by the long time closure of the school (Renchler, 1993). The ability of learning can be reduced with the COVID-19 risk holiday.

The definition of “Learning loss”

Huong and Jatturas (2020) define that learning loss as “any specific or general loss of knowledge and skills or to reversals in academic progress, most commonly due to extended gaps or discontinuities in a student’s education”. This is mostly caused by disrupted formal schooling.

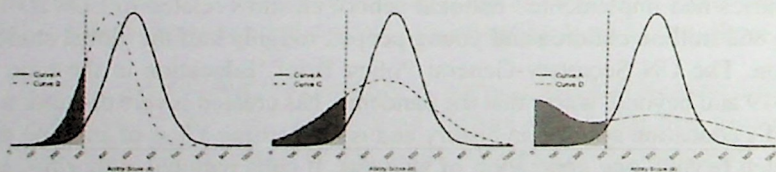
Huong and Jatturas have divided possible ways for learning loss in to three categories due to the COVID-19 crisis can occur:

- Reduction in the level of learning,
- Unequal levels of learning
- Dropouts

The authors further explained, closure of schools more than 4 months delays skill improvement, augments the disparity in learning, and therefore leads to the reduction in the learning levels of students, learning loss is still unavoidable as several national examinations have been postponed or rescheduled, thereby creating delays or information gaps on student learning advancement without recognising their efforts. This may lead to misinformed or biased decisions on their educational progression. The prolonged absence to school may lead to the dropouts of the school. This is worrying, particularly for the most marginalised or at-risk students, whose learning path is discontinued, leading to limited choices of work options.

Theories related to learning loss

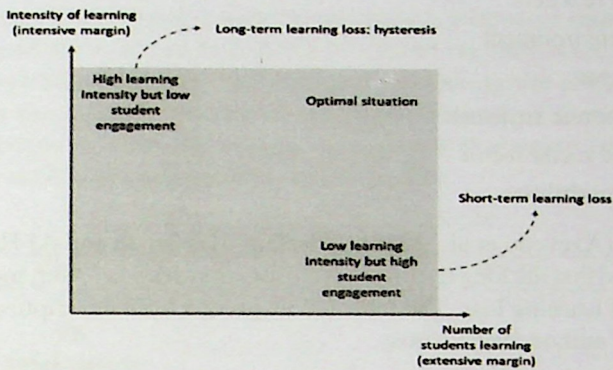
World Bank (2020) has predicted three possible scenarios of how the learning curve may evolve in the coming months.



(Source: www.worldbank.org)

First is the most straightforward transformation, which is caused by a reduction in average learning levels across the distribution; secondly, consider how the curve may flatten (or skew) due to highly unequal effects of the crisis. This is a scenario in which children who are at the top will pull ahead, while students at the bottom fall further behind. Thirdly, consider how the curve may change due to dropouts. The factors affect the learning loss should be pointed out to mitigate new solutions to reduce the learning loss rate in the crisis period.

A theoretical model for learning loss during school closure



source: www.OECD.org

The Organization for Economic Co-operation and Development (OECD) policy responses for COVID-19 proposed the theoretical model describes potential hysteresis of the COVID-19 crisis in education as some students went off the grid during the school closures. It stems from the many elements, often linked to the socio-economic background, leading to a withdrawal from the school system that will induce a long term impact on students' outcomes. Such elements encompasses for instance the struggle some students face to maintain their learning pace from home due to inadequate resources; the erosion of their basic academic skills due to lack of practice; the difficulty in re-engaging with education activities; their demotivation as they fall further behind; and the curbing of their educational aspirations due to the uncertainty of the learning environment.

Hippel did many studies in learning loss says as follows:

I'm no longer sure that the average child loses months of skills each year, and I doubt that summer learning loss contributes much to the achievement gap in ninth grade.

Factors affect learning loss

There are number of factors related to the learning loss as educational institutions, teachers, parents and students are main factors assumed to be contributing the quality of learning during the closures of the educational institutions (Sandberg Patton and Reschly, 2013)

Bolton (1978) mentions teacher performance; student knowledge and skills can influence the learning loss. The following additional factors play a important role in the learning of a students.

- Curriculum
- Educators/Teachers
- Learning environment
- Family factors
- Socio economic structure
- Gender and racial factor
- Learning disabilities

Many studies (Azevedo et al., 2020), (Alrefaie, Hassanien and Al-Hayani, 2020) have implied that the long term school closure may lead to lower, moderate and higher level of learning loss. The table below gives a brief description of the literatures that the authors came across.

Mitigation of learning loss

Harris Cooperb (2020) proposes 3 different types of remedies as extending the school year, providing summer school, and modifying the school calendar to mitigate the learning loss for long term closures of school.

Policy Brief: Education during COVID-19 and beyond (2020) suggested following policy responses which could be remedial techniques to overcome the recession in the learning:

- Suppress transmission of the virus and plan thoroughly for school re-openings
- Protect education financing and coordinate for impact
- Build resilient education systems for equitable and sustainable development.
- Reimagine education and accelerate change in teaching and learning

Methodology

This qualitative and quantitative study explores the existence of learning loss in the students, its impacts and learning difficulties.

Study location

The study was conducted in Jaffna Attiar Hindu College, Neervely, The provincial school belongs to Kopay Educational Division, Jaffna Educational zone in Northern Province, Sri Lanka where 553 students attended. It is IC type of school consists grade 1 to Advanced level. Prior to the study the approval was taken from the principal of the school.

The sample of case study

The sampling technique used in this study is purposive sampling which contain 45 students from Grade 9 studies in Tamil medium were selected (Including 20 boys and 25 girls). The reason for selecting the above class is that they are in the transitional class from junior secondary to senior secondary, the challenges in learning will be crucial and this grade of students can have more challenges and stammering in studies.

Table 01: The detail of sample

Grade	Female	Male	Total
9A	12	08	20
9B	12	13	25
Total sample number	24	21	45

(Source: Attendance registrar of Attiar Hindu College)

Research Instruments and data collection

The pre and post Unit examination marks of Science subject, structured questionnaire for students and the Focused Group Discussion (FGD) are the research instruments for the study.

Pre-test

The first term consists five units of the government text book. Five unit examination marks of the first term which held prior to the COVID-19 outbreak in Sri Lanka were collected. The average marks of the five unit examinations were calculated.

Post-test

After the reopening of school, another examination was held which consists equally distributed questions from above five units according to the weight of the chapter.

The modified questionnaire which inquires the difficulties of learning and the factors for the learning loss throughout the COVID-19 outbreak period was prepared and issued for the responses from the students.

Interviews were organized to the parents and a focused group discussion was arranged to teachers for the purpose of finding the factors of learning loss and the difficulties in their learning.

Data analysis

The average marks of the five unit exams were collected and compared with the post test which consisted the questions from the same units held after the restarting of the school. Both sets of marks were compared and analysed in order to find the existence of the learning loss by using the one sample t test in the SPSS statistical software.

The students were categorized in to five categories as Very weak, Weak, Average, High and very high with their performance in the Final term examination marks of last year (2019).The marks class intervals were 0-20, 21-40, 41-60, 61-80, 81-100 and the comparisons were done in each categories separately in order to find the trend of the learning loss after the COVID-19 outbreak.

Data from the focused group discussion from teachers were used to understand the learning difficulties and the impacts of the learning loss in COVID-19 time period.

Findings

Objective 1: To determine the existence of learning loss and analyse the trend of academic performance during pre and post period of COVID-19 attack

Figure 1 compares the performance of students from the Pre and Post Competency Test.

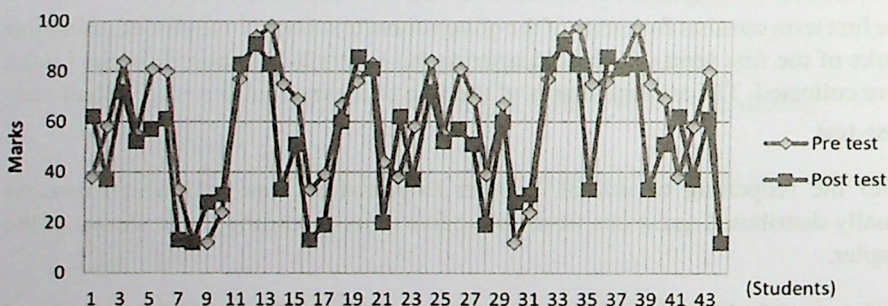


Figure 1: Illustration of the performance differences of individual students in pre and post COVID-19

The trend of academic performance during pre and post period of COVID-19 attack

The students in grade 9 were classified into 5 categories by using the average term examination marks of the last year and the performance of pre and post COVID-19 were compared in order to explore the trend of performance in

the different performance clusters.

Table 2. The comparison of performance of different cluster of students in grade 9

Marks scored	Performance level	Number of students	Pretest marks mean	Posttest marks mean	P value
0-20	Very low	3	12	9	-
21-40	low	6	33.5	32.5	-
41-60	Average	9	52.33	36.33	-
61-80	High	12	74	62.33	0.097051
81-100	Very high	15	89.25	75.75	0.079447

The first three clusters had the sample number less than 10; therefore the impact of learning loss can be interpreted by comparing the means. The very low, low, and average students had learning loss. The average performers have higher amount to learning loss when comparing the means (x_{\square_1} 52.33, x_{\square_2} 36.33). At the same time high and very high performers also had a significant learning loss ($p=0.097051$, $p=0.079447$).

Perception of learning loss from the view of teachers and students

The view of teachers

Among the forty teachers participated in the focused group discussion 65% reveal that a learning loss can be observed in the students and the rest felt that there is not.

The view of students

From the answers of the students from the questionnaires 72% of them believed that they don't have any learning loss. The following graph shows the illustration.

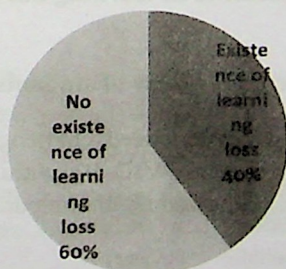


Figure 2: Perception of teachers on learning loss on students

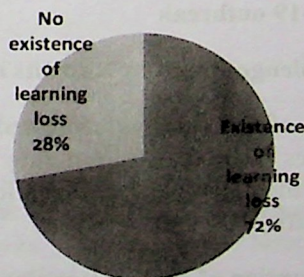


Figure 3: Students perception about learning loss

Objective 2: To find the factors affect the learning loss in students and its impacts in students

The factors affect the learning loss in students and its impacts in students

Many factors which affect the loss of learning are indicated by the teachers in the focused group discussion. The factors are as follows:

The socio economic background is the leading factor plays learning loss. The subordinated factors are follows:

- Occupation of the parents and the monthly income
- Educational qualification of the parents
- Siblings and their educational status
- Comforts and the facilities for learning in home
- The learning climate
- Guidance for the learning
- Complexness of the subjects
- the attitude and the mental well-being of students and parents

Teachers have further commented that the students attended in this school are from the lowest income family. Their monthly income is always below 30,000 rupees, which is enough to live from hand to mouth. Most of the parents are coolies, small scale business entrepreneur and farmers. The educational qualification of their background is merely low. All of them have studied below Ordinary Level. Though the parents have desire to send the kids to school they won't be able to guide them properly in learning. Nearly 6% of the students reveal that they don't have anybody in home for learning guidance. The rest of the students have a moral support from their parents, siblings and the neighbours. All of them were fully depend on the school teachers.

Objective 3: To explore the challenges and difficulties in learning during the COVID-19 outbreak

The challenges faced by students in learning from the view of students

70% of the students confessed that they had experienced challenges and difficulties while they learn during the risk holiday of COVID-19; within them 80% felt their learning has been affected by the unexpected and unprepared long term vacation.

Disruption of routine learning activities

Students were highly affected by the COVID-19 holidays. The learning hours

were completely reduced than their normal school days, Therefore the student believed they can have a reduction in their academic performance; it reduces the self-confidence too.

30% of them have told that they have spent 0-1 hours of time per day for their studies;

40% spent 1-2 hours; 30% of them studied for 2-4 hours. Nobody has studied more than 4 hours per day. The time they spent in learning was not enough for grade 9.

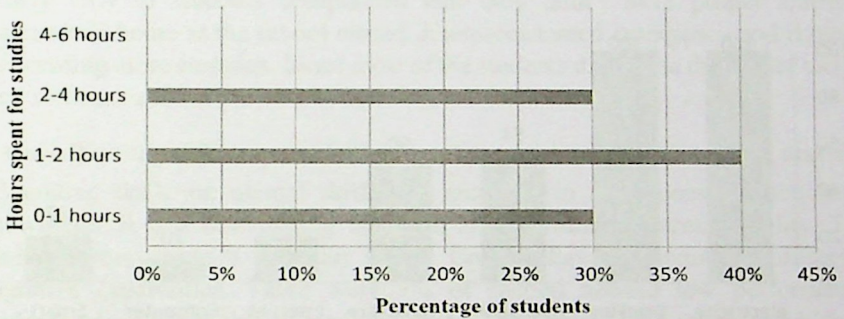
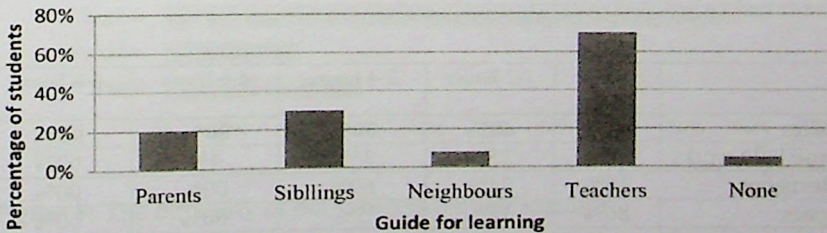


Figure 5: Average hours spent by the students in a day

• Lack of guidance in learning

All the grade 9 students from Neervely Attiar Hindu College were from low and middle socioeconomic status. 20% of students revealed they managed the studies with the help of the parents during the vacation. 30% of them had guidance from their elder siblings; 8% of them were helped by the neighbours in their studies; But 70% of them told that they totally depend on their school teachers.



• Unavailability of learning environment in home

Most of the students from Attiar Hindu College belong to the poverty line. Their economic deprivation leads to unfilled essential needs of the students. The learning facilities that the grade 9 students acquired are portrayed in the figure 4.3.3

88% of the students don't have the digital devices such as smartphones; computers and internet connection in their home. 46% of them never have a study room and table for their spontaneous learning. All the students have the essential house hold facilities such as electricity and the drinking water.

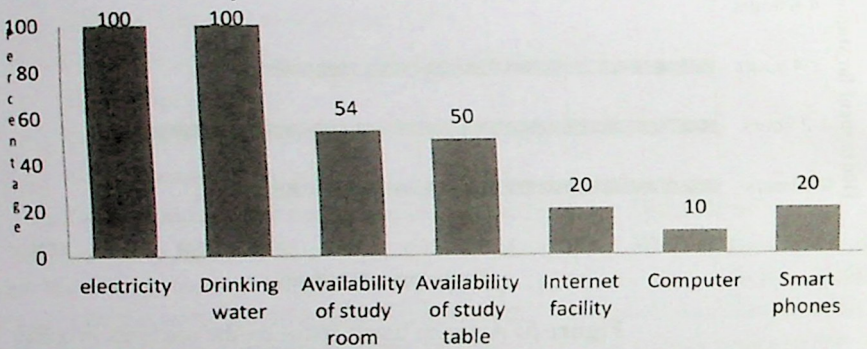


Figure 7: Facilities for learning in home

• Lack of time for learning

The usual learning hours have been scattered for various activities during the COVID-19 vacation. The time has been prioritized to the leisure. 40% of the students said that they have lost their interest to study. The table below shows the time spent for variety of activities.

Table 3: Daily time allocation of students in a day time of COVID -19 for the different task

	0-1 hours	1-2 hours	2-4 hours	4-6 hours	6-8 hours
Studies	30%	40%	30%	00%	00%
House hold works	46%	25%	25%	4%	00%
Televisions	16%	24%	60%	00%	00%
Phones	80%	15%	5%	00%	00%
Leisure games	00%	00%	20%	36%	28%
Others	24%	20%	12%	10%	00%

• Lack of active learning methods

Active learning is an approach to instruction that involves actively engaging students with the course material through discussions, problem solving, case studies, role plays and other methods.

The active learning strategies couldn't be applied during the vacation. Students felt bore to read and write alone; it makes them stress and unhappy.

• Unavailability of exercises materials and feedback

Nearly 78% of students complained that they didn't have proper learning materials in home as the school closed in unprecedented emergency and it made the learning more complex. Since most of the students didn't use the digital media they were not able to grab the materials from the internet.

• Cognitive capabilities and lack of explanations related to subject matters

Cognitive skills are mental skills that are used in the process of acquiring knowledge. It is a determining factor of an individual's learning ability. The students from grade 9 in Attiar Hindu College have a mixture of different cognitive capabilities. There were 9% of special needed low performance students who are not able to read and write. They have faced severe troubles in the risk holiday in learning. The higher performed students were able to follow the self-learning with guidance. 60% of the students complained that they faced trouble in understanding the lessons. The following graph shows the hardness of the subjects that students faced while they were in self learning.

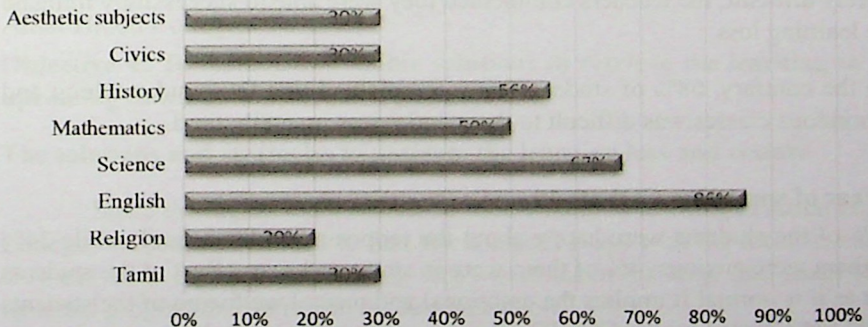


Figure 8: The difficulty of the subjects for self learning

The challenges and difficulties faced after the reopening of school

• Forgetfulness of the lessons after reopening of school

From the focused group discussion of the teachers said that they could be able to observe short term learning loss. When the school opened; 3/4 of students have forgot the lessons which they have studied in the previous term and teachers needed to revise it again within the short term period. But they could come back to form with the hard effort of teachers and school administration. The students have mitigated the learning loss by reinforcement with learning remedial programmes which implemented by teachers with extra classes and additional supplementary learning material were very helpful to student to mitigate from the loss.

• Apathetic behavior on studies

There was delay can be observed in restoring the usual performance of students. Many of them haven't shown interest in studies. Many teachers have indicated the students have been tried with many fancy looks in their appearance such as haircut, dressing etc. It was hard to teachers to convert the concentration of the students to studies again after 150 days of absence.

Inability to compensate for rapid teaching

Attiar Hindu College, being a school with multi categories of students in performance; teachers had come up with the various type of remedial programmes. There was a need to revise the previous lessons as well as they were in the rush to cover the syllabus to all categories of the students in a short time period. It was merely difficult; the teachers commented they were able to successfully mitigate the learning loss.

On the contrary, 68% of students have complained that the rapid teaching and continuous classes was difficult to them and it was mentally tired.

• Fear of spreading COVID-19

48% of the students were happy about the reopening of the school; while 24% of them were anxious; 4% of them were in stress and scary. Rest of the students felt as it is normal. It implies the emotional and mental wellbeing of the students were not affected by the COVID-19 risk vacation. The cumulative emotions on the reopening is given in the below chart

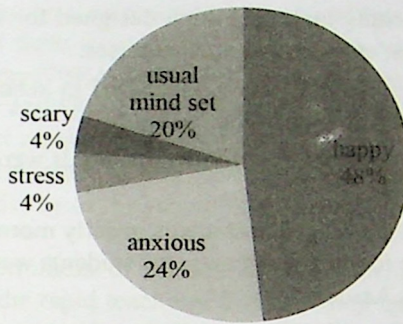


Figure 4.3.5: Emotional status about the reopening of school

• Fear of facing upcoming examination

The 96% of student reveals no fear on upcoming examinations. Only few of them worried. From the discussion with the teachers they have said; from the perception of students; they have thought the exams would not be take place in near future. So the students were not ready and scary for the examination.

• Dropouts and newcomers

There were no any dropouts found in the grade 9 classes in Attiar Hindu College; there were 4 newcomers who were migrated from other schools in order to the carrier changes of their parents. From the teachers perspectives; there were few dropouts in Attiar Hindu College in grade 10 and 11 during the COVID-19 vacation period which could be place a major impact in the educational performance of Attiar Hindu College.

Objective 4: To recommend viable solutions to retrieve the learning in the upcoming times

The solutions and strategies to mitigate the learning loss and restore

Since the digital tools cannot be used widely to learning in Attiar Hindu College; the teachers needed to find the domestic ways with the local resources they can have in school. Following steps were taken for large and small scale remedial programmes to regain the lost education.

- Teachers have created social website communities for students to send the learning materials during the lockdown time; but it was not successful for them since most of the students couldn't participate in it.
- Teachers needed to find alternative ways for distance learning; they have

prepared hard copy of study material which designed for self learning; consists with short notes, experiments and exercises.

- The hardcopy of study materials were distributed in schools once the curfew has been relaxed and to be guided to study.
- After the reopening the school the distributed materials were revised and discussed again in the class.
- Additional classes were conducted to students in early morning and after schools; meanwhile the food requirements for students were completed by the fund of Old boys Association
- The chapter-wise revisions, reinforcement, assessments and feedback with remedial actions were taken place to strengthen the students. Marginalised students were targeted with separate remedial programmes to enhance the performance.
- Although teachers have regained students' education in ways that have been explained they believe switching to digital and online learning methods will be more effective and easy in the time of unexpected long term closure of school; and the facilities should be implemented to all students in Attiar Hindu College to prove them equal learning opportunities.

Conclusion

The COVID-19 risk holiday have made a significant impact in learning. Especially the students from low socio economic background are the victims of learning loss. In the case of Attiar Hindu College, the average performers from Grade 9 were found with highest learning loss after the reopening of school. Though $\frac{3}{4}$ of the students never realize that they had a learning loss, teachers could experience the learning loss in students and they have struggled with many remedial programmes such as hand notes, short notes with additional classes, to restore the learning loss.

Occupation of the parents, the monthly income, Educational qualification of the parents, Siblings and their educational status, Comforts and the facilities for learning in home, The learning climate, Guidance for the learning, Complexness of the subjects, the attitude and the mental well-being of students and parents can be crucial factors affect the learning in the COVID-19 risk holidays. Since the students of Attiar Hindu College from low socio economic background, the above reasons play a negative role in the learning.

There are many challenges found in the learning of the school students. They have spent holiday in vein with television, household works, and farming and

leisure games. Lack of proper guidance and less moral and educational support in home pull them towards the learning loss and they have fully depended on school teachers (70%). Most of the students never have a study room nor haven't a study table and 88% of them haven't got a facility of smart or digital gadgets such as smart phones and computers. Unavailability of exercise materials and feedback in learning, lack of active learning methods, cognitive capabilities of students, difficulty of the subjects also contribute to their learning loss.

The forgetfulness of lessons, apathetic behaviour on studies, inability to compensate the rapid teaching, fear of facing upcoming examination, dropouts and new joiners are few challenges and difficulties found after the reopening of school.

Teachers have given their vast contribution to fulfill the learning loss via distributing reading and exercise materials with additional classes. The revision, reinforcements, assessments and feedback with remedial actions have undertaken to uplift the marginalized students. Support and actions from the educational authorities, care takers, and communities are needed in this crucial time to reimage the learning loss. Effective remote schooling approaches must be effectively scheduled by the policy makers. The policies for promote the quality of remote schooling should be raised by switching their education in to digital and online methods and ensuring the equal learning opportunities for students to mitigate the learning loss.

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