

**Based on Analysis of the Team's Chosen Community / Organisation in Mid-Term and Final Evaluation****Community / Organisation Studied:** Education Sector**STEP 1. Identify Challenges**

Read the Future Scene carefully and generate ideas for challenges, concerns, and possible related problems. Choose the 5 most important challenges and write them in the space provided. Include applicable research with appropriate in-text citations.

**Challenge 1: Learning effectiveness is compromised by remote learning**  
Observation

- Future trend is towards more digitalisation and remote learning. However, the survey results on home based learning (HBL) experience showed that remote learning may not be as effective due to greater distractions. We conducted a survey involving 211 participants who are students, teachers or parents. According to our survey findings, 44% of students were unable to stay focused during HBL. 18% indicated they had issues keeping up with the lessons. Among students, the most common distraction was giving in to temptation to use their mobile devices for gaming or social media during lessons, due to the convenience of their phones being beside them. Another issue that they had was that their home was an unconducive environment to study in, because of noise created by their family members or because of their younger siblings disrupting them during lessons. Lastly, some students also felt that it was harder to stay focused or awake during HBL as it was more comfortable at home as compared to school.

Problem

- Some remote learning encourages students to be independent learners. However, the way remote learning was conducted, and remote learning materials were not engaging enough, as it was a challenge for teachers to constantly come up with new ideas for lessons. As a result, students were bored by the monotonous lessons and some were distracted by temptations to engage in media multitasking.
- Less privileged students were plagued with additional issues, such as not having proper learning devices or a noisy learning environment, and were also affected due to lack of space and technological support at home. This resulted in a less conducive learning environment. Along with the issues listed above, they had a harder time coping with HBL, impacting their learning.
- In addition, with remote learning being at home, teachers were unable to supervise the students at all times. According to our survey, some students tuned the teachers out even during lesson time instead of paying attention.

**Research**

- According to a Straits Times article, only about 6 in 10 students surveyed by MOE were able to cope well with HBL. According to our survey, interviewees shared a similar opinion that HBL could not match face-to-face interaction, as it takes away part of the two-way communication between students and teachers which is essential for learning. It also makes it more challenging for teachers to gauge their students' learning capacity and understanding.
- Another Straits Times article highlighted that HBL exposed a digital divide, with uneven access to devices and spaces. Although MOE has made arrangements to loan learning devices to students who have insufficient devices at home, it was not possible to support every student in every way possible. Some of the problems students faced was that they had to share learning devices with their siblings. This caused their online learning to be greatly impeded as the amount of time they could spend on their devices were a fraction of their peers. Another problem was that their learning environment was unconducive, with much noise generated in their house. An example of this source of noise is from their parents or siblings having live video conferences, whereby they would have to talk over each other to be heard if conducted simultaneously.
- When students use devices, such as laptops or phones at home, they usually use it for leisure activities. At school, they are used to not being able to freely use their smartphones whenever they want. However, when it comes to online lessons, they tend to use their smartphones more due to lack of supervision.. Usage ranges from checking messages or watching online videos. According to research, there is a small but significant negative effect of media multitasking with smartphones on learning. Research suggested that one potential contributing factor to the disruptive effects of smartphones on academic distraction is its association with the fear of missing out (FOMO), defined as a general fear of missing an important message. FOMO resulted in the susceptibility of being interrupted by smartphone notifications, which resulted in shallower learning.

**Challenge 2: Physical and mental well-being are affected by shift towards remote learning****Observation**

- Long hours spent on digital devices has an impact on the health of students. Survey results showed that there is a significant increase in screen time during Covid-19 period, especially during days dedicated to home-based learning. 67.8% of the students surveyed spent up to 4 hours a day on electronic devices pre-Covid. During HBL, 84.6% of the students indicated they spent between 4 to 12 hours on electronic devices daily.
- Moreover, there is a marked decrease in the hours spent on physical activities during days of remote learning. On non-HBL days, 35.7% of the students surveyed exercised less than one hour a day, with 10.2% not having done any exercise. During HBL, 64.3% of students surveyed exercised less than one hour a day, with 32.7% not having done any

exercise. According to an article by the CDC, Children and adolescents ages 6 through 17 years should do 60 minutes (1 hour) or more of moderate-to-vigorous intensity physical activity each day. From our survey results, we can see that HBL results in an additional 28.6% of students doing less physical activity than recommended each day.

### Problem

- Long hours spent on digital devices has an adverse impact on the eyesight of students. Less time spent on physical activities has an impact on physical health and mental well-being. Physical exercises help to improve attention span and memory, which is important for learning. Further, physical education classes are social activities and help in bonding and team-building. Even if physical education lessons can be moved online, the degree of interaction between students is impacted and may be less effective.

### Research

- The Straits Times reported that myopia is rising among kids in Singapore as screen time goes up during the pandemic. There are more first-time bespectacled children aged five and six, and more myopic children need to change their lenses in 6 months instead of the usual 1 year. Majority of these cases are largely caused by the increased use of digital devices for online learning or leisure.
- According to a Straits Times article, there is a rise in cases of overweight kids in Singapore during the Covid-19 pandemic. The weight Management Clinic at KK Hospital has seen a 12% uptick in the number of cases while the Division of Paediatric Endocrinology at NUH has seen a more than 15% increase in children who are obese.
- Based on a study of children attending KK Hospital's Weight Management Clinic, about 70% of overweight children had already developed at least one health problem. Having high cholesterol levels was the most common condition, followed by high blood pressure.
- According to research, there is a clear causal link between exercise and children's cognition, defined in terms of executive functions of attention, memory and intelligence. Hence, physical exercises will aid in the learning process.

### Challenge 3: Social relationships and bonding are affected.

#### Observation

- Based on the survey, 19.4% of students do not socialise with their friends during remote learning periods at all, not even online or through social media. Before the pandemic, students had an abundance of opportunities to interact with one another in school and outside. However, due to the pandemic and HBL, students had to be cooped up at home

and could not interact with their peers physically. Some students also faced difficulties such as the sharing of devices with their siblings or screen time limits, which further restricted their interaction with their peers.

- 45.9% of the students surveyed indicated that a negative impact of online learning is that social relationships with friends are affected. With regards to the earlier points, we can see that online learning does, in fact, harm student-to-student relationships, as students spend much time away from one another with no interaction and that will result in a weakened relationship.

### Problem

- Decreased social interaction with friends affected students' ability to relate to others. As students spent much time at home with only their devices, they did not have any peers to communicate with, which may also cause their communication skills to take a toll.
- Reliance on devices decreased meaningful communications with others, affecting emotional intelligence. Through excessive use of digital devices during HBL, students may have lost the ability to relate to one another with ease.

### Research

- Research has shown that having a strong network of support fosters emotional intelligence, and that both emotional intelligence and personality traits were associated with reports of satisfaction with social relationships. Specifically, emotional intelligence has been found to be positively correlated with relations with others, perceived parental support and fewer negative interactions with close friends. Through interactions, humans learn to relate to others. In turn, this ability to identify, manage and use emotions, has been shown to have an important impact on work and academic performance.

## Challenge 4: Feasibility of Online Co-Curricular Activities

### Observation

- Co-Curricular Activities (CCA) play an important role in the school life of students, as CCAs allow them to pursue their interests in sports, the performing arts, etc. According to an Income article, CCAs give students a fun way to beat stress. Throughout the schooling life of a student, their workload will gradually increase as time passes, adding stress to them constantly. To counteract this, CCAs allow them to try something they enjoy, giving them a means to release their pent-up pressure. Another benefit of CCA is to broaden their experiences and views. As the education given to students is more theoretical, it does not give them many chances to use it practically. However, CCAs can let them use what they have learnt in real life and also give them a greater variety of experiences.

- According to our survey, 80.6% of students found that sport CCAs could not be conducted effectively online. MOE has stated that about one-third of students participate in sports CCAs, which is the most out of the four categories of CCAs.
- According to our survey, 35.7% of students felt that non-sports CCAs could not be conducted effectively online, with 6.1% agreeing to this statement fully.

### Problem

- Main issue of the feasibility of CCA during HBL is found in sports CCAs, as they need the equipment and appropriate spaces to carry out their CCA. For team sports, this is even more so as they cannot practise by themselves. Based on personal experiences, the variety of things we can do online is minimal, with most time being spent on physical training or drills, leaving out any hands-on experience of the sport due to restrictions at home. Currently, there is no solution for effective sport CCA sessions carried out online.
- Online CCA may reduce opportunities for sports competitions as such competitions will have to be carried out face to face, unlike competitions such as programming which can be fully carried out online.

### Research

- According to a Straits Times article, although teachers and students alike have gotten used to online sessions, it is still unable to replace face-to-face interaction. Before Covid struck, CCAs would often include learning journeys or excursions to give students hands-on experiences. These have been converted online as schools invite organisations over for online talks and sessions, but it is nowhere as effective as before. It also stated that CCAs provide an avenue for students to befriend like-minded peers beyond their class. However, this has been greatly affected as there is much less interaction on online meetings.

## Challenge 5: Interactive feedback to students, which aid in learning, is made more difficult during remote learning

### Observation

- Based on the survey, some parents have expressed concern about how teachers can monitor the progress of students during remote learning, so as to provide immediate feedback to aid learning. Although tracking the completion of assignments and automated marking features on online learning platforms such as student learning space are ways to do this, there are less chances for interactive question-and-answer sessions between students and teachers where teachers can help students learn and provide feedback on their learning progress.
- Teachers surveyed indicated that some form of human interaction is necessary for knowledge acquisition, and that it is important for teachers to address problems along

the way to bridge the learning gap.

- Teachers surveyed indicated HBL can be made more discussion based. However, there may be some time constraint if the teacher has to work within a tight timeline to complete the syllabus.

#### Problem

- Monitoring the progress of students and providing immediate feedback is made more difficult during remote learning. If teachers can provide early clarifications on key concepts, the process of learning will be easier. The problem is how to make remote learning more interactive, so that it complements face-to-face learning.

#### Research

- Research has shown that providing opportunities for formative feedback can be one of the most beneficial things tutors can do for their students.
- Formative assessment, conducted throughout the educational process with a view to enhance student learning, can be as important as summative assessment, involving formal testing or examinations.

### **STEP 2. Craft the Underlying Problem**

Using the challenges listed in Step 1, identify a problem of major importance to the chosen community / organization in the future. Write your Underlying Problem making sure your question clearly explains the action that will be taken and the desired results/goal of that action.

Incorporating Challenge(s) # 1 to 5

Given that there is a high probability that the increased use of **digital** devices may bring about negative health impacts and compromise learning effectiveness and social relationships for the students (Condition Phrase), how might we adapt and develop the education system (KVP) so that our learners can continue to thrive (Purpose) in Singapore in 2026 and beyond.

### **STEP 3. Produce Solution Ideas**

Generate solution ideas to the Underlying Problem in Step 2. Choose the 5 most effective solutions and write the elaborated ideas in the space provided. Include applicable research with appropriate in-text citations.

#### Solution 1 : Use of Artificial Intelligence (“AI”) tools

- AI tools can be used so that learning materials can be made available to students based on their aptitude. This will create a personalised learning experience and enable students

to stay engaged.

- Online assignments can be non-standard. AI tools can make available to students more questions in their area of weakness so that they can improve their academic performance
- If a student demonstrates higher ability in a specific area, the software can make available more in-depth material to encourage self-directed learning in the students' area of interest/strength
- According to research, AI can make a significant impact on student's educational journey, including production of smart content, personalisation based on student's unique experience and preferences, expanding the range of education, tutoring via an AI-powered chatbot and quick responses through automation and conversational intelligence
- Some self-assessment materials/modes can be made available online for students to gauge their own ability to encourage them to take responsibility for their learning. Assessment results should be made available to teachers for their reference. They can build upon it to provide meaningful feedback to students to aid the learning process.

#### Solution 2 : Improving the technological infrastructure

- A good technological system is vital to facilitating teaching and learning, as well as putting in place administrative processes to improve productivity and efficiency.
- Technological infrastructure can be improved so that every student has ready access to learning materials.
- It is also important for the infrastructure to be adaptable so that it can evolve based on changing needs and technological improvements.
- Technology may also enable further stratification of students based on their abilities, interest and talents to enable diverse learning pathways. According to research, pedagogical practices related to student centredness, real-life activities and group work is linked to increased use of digital technology. There is also a significant and positive relationship between technological infrastructure and readiness.

#### Solution 3 : Continuous training for teachers and parents

- Besides improvement in learning materials and technology, teachers and parents should have continuous training so that these tools are used effectively. Research has shown that professional development of teachers is important in ensuring they are better prepared to

use technology to promote 21st century learning. Fast changing technologies have contributed to transforming learning into a lifelong process and people have to continue to develop and refresh their skills to keep abreast with constant innovations and new development in the digital world. It is further estimated that technology skills have to be updated every three years in order to have continued relevance.

- During training, focus can also be directed to how these tools can be used flexibly to help students who lag behind in their learning as well as students who are ahead.
- Continuous training will enable teachers and parents to adapt to the use of new tools enabled by technology. They are important sources of support for students who may reach out to them when they need help. While the teacher is the main educator, training for parents is also important, especially for students of younger age groups, who may not be able to learn independently and need more support from parents.

#### Solution 4 : Health Campaign

- According to research, screen time and a lack of sunlight increase the risk of myopia. With increased digitalisation, students spent much time on their devices, straining their eyes.
- There should be continuous research in medical areas on cures for myopia among children. Breakthrough is required. Based on current research, sunlight exposure reduces myopia in children. Light intervention reduces both myopic shift and axial elongation. Risk of rapid myopia progression was also 54% lower. Therefore, we can campaign for a healthy lifestyle with more time spent outdoors in the meantime.
- New ways of group work involving physical activities can be designed to encourage students to exercise more, preferably outdoors. It will also mean time away from devices.
- Teachers can educate students on the importance of good posture so students will be more aware of how they sit while doing schoolwork or resting.
- According to Healthline, students can make use of the 20-20-20 rule when spending much time on digital devices. The 20-20-20 rule refers to for every 20 minutes spent staring at a screen, take 20 seconds to look at something 20 metres away. This will help reduce the impact of the light glare on students and protect their eyes and wellbeing. Parents can and should instil this 20-20-20 rule into their children so they can be rest assured that their children will not be too affected by screen usage.it seems like our point seems weak, idk which part tho

#### Solution 5 : More collaborative work among students

As students interact less with each other during remote learning periods, they may experience more stress and their mental health will be affected as they have less social interaction with their friends. Studies have indicated social support is essential for maintaining physical and psychological health. A rich network of social support fosters resilience. Most research also found that the quality of relationships is a better predictor of good health than the quantity of relationships, although both are important. The optimal source of social support depends on the development stage of the student, and support from friends and parents are both important. When adolescents felt more supported by their friends or parents, they experienced increases in their happiness and social connectedness.

- There can be a shift towards more collaborative work, which could be leisurely in nature, to provide chances for students to interact with one another
- Teachers should also encourage students to interact with each other physically or through online platforms to talk and bond with their classmates.
- Through interacting with their friends, their mental and physical health will be improved and they will not be as stressed.

**STEP 4a. Select Criteria**

Generate criteria to determine which solution idea does the best job of solving your Underlying Problem and/or addressing the Future Scene situation. Select the 5 most important criteria for measuring solution ideas and write them in the spaces provided.

**Criterion #1: Effectiveness**

Which solution is the most effective to achieve the aim of a good education for students

**Criterion #2: Ease of implementation**

Which solution can be adopted in the shortest time

**Criterion #3: Cost**

Which solution has the lowest cost

**Criterion #4: Acceptance**

Which solution will be accepted most widely by all the stakeholders as an effective way to create a desirable outcome

**Criterion #5: Sustainability and Flexibility**

Which solution is the most enduring and can be adapted in the most flexible manner to cater to future changes

### STEP 4b. Apply Criteria

List the solution ideas from Step 3 on the grid. Use each criterion to rank the solutions on a scale from 1 (poorest) to 5 (best). The weighting for one important criterion may be doubled if necessary.

Step 3 Sol'n #	Solution Idea	Criteria					Total
		1	2	3	4	5	
#1	Use of AI tools	5	2	2	5	5	<b>19</b>
#2	Improving the technological infrastructure	4	1	1	3	4	13
#3	Continuous training for teachers and parents	3	3	3	4	3	16
#4	Health Campaign	1	4	4	2	2	13
#5	More collaborative work among students	2	5	5	1	1	14

## STEP 5. Develop an Action Plan and Evaluate its Feasibility

Develop your top-scoring solution idea into an Action Plan. Thoroughly explain how the Underlying Problem is solved, how the plan will be implemented, and how the community / organisation will be affected. Explain how this Action Plan is feasible with secondary research consulted, preferably also with primary research (feedback from chosen community / organization)

Action plan derived from Solution #1:

Outline of Action Plan :

Based on the scoring of criteria, Solution 1 is the best plan. Learning materials should be reviewed and more in-depth research conducted on the design of educational materials to adapt to a new digital world. Current technology and AI tools and how they can be applied in the area of education can be researched and included. Personalisation of learning experience, will allow students to stay engaged, maintain continued interest in lessons, enabling them to learn more effectively. Effective and innovative use of AI will also help to provide interactive feedback to students and aid in the learning process.

Who : Teachers and students, as well as those with technological expertise can work on this together to first gather opinions from both ends, then work on the most suitable platforms or technological systems to implement

What can be done : Can ask students about preferred educational materials online and teachers can evaluate the feasibility of these materials to change the means of learning online. Delivery of the changes via the most appropriate systems can then be explored and improved during implementation.

Details on the process : The schools can do more research and maybe find out what is most engaging for the students. They can also test different teaching styles and materials to find out which is the best and most effective method. This is best done across spectrums of students in different age groups as age may have an impact on the best delivery method. Based on the students preferences, the teachers can adapt accordingly to better provide for the students needs. AI can also be implemented which, based on the students work can analyse what the student's weaknesses are. With the information it collects, it can create work that is catered specially for that particular student. This would greatly reduce manpower needed for such a task to be carried out, allowing schools to implement such a system. The system would help with the students learning, allowing him/her to improve, especially in areas of weakness. In addition to helping students in their weaker areas, the AI can also detect higher ability students and come up with more in-depth and challenging lesson materials to allow the students to further develop themselves outside of the basic syllabus. When the students have more advanced materials, it encourages them to be curious and nurtures them to be self-directed learners. Lastly, byte-sized quizzes can be issued for students to be able to identify their mistakes and correct them on their own. By doing so, students would have to be responsible for their own learning.

Refer to Key Verb Phrase ("how might we adapt and develop the education system") and explain the link : The definition of an effective education is not only that students go through as much content as possible, but instead have more interesting lessons so the important content can be easily remembered and will help them not only for examinations, but also for their future. In this digital age, both students and educators have more digital tools available to aid in the learning process but adaptation and development is required so that these tools can be used effectively. With time and effort, a shift towards digitalisation may make overall education using both digital and traditional face-to-face approaches better than face-to-face approaches alone.

## Action Plan (continued)

Refer to Purpose ("So that our learners can continue to thrive in Singapore in 2026 and beyond") and explain the link : We believe that with technology and effort to believe in change in the means of education, we can improve the effectiveness of education. Although this transition period will be tough, it will test the students on their ability to adapt to various changes and to thrive in Singapore in 2026 and beyond. If students play an active role adapting to changes in education, they can also have first-hand experience at what teachers go through to have effective lessons. This will allow them to feel grateful to teachers for all the effort they put into their work. In the near future, the world will develop exponentially, with various technological advancements. With the skill of adapting easily and being in other shoes, we believe that students can continue to thrive in Singapore 2026 and beyond.

### Implementation Schedule :

The first step is to solicit feedback on the current design of the learning materials, including delivery methods from teachers and students. Parent's feedback is also welcomed. Focus group discussions can also be held. Current delivery models in institutions of higher learning in Singapore can also be examined. As university students are older, some of the digital approaches to encourage independent learning may already have been implemented. We can learn from best practices and evaluate which of the measures can be adapted and adopted by secondary or primary schools. There are also a few universities in Singapore offering AI courses, including SUTD, NUS and NTU. Opinions can be sought from professors and students in these courses as they will be able to offer additional insights. This can be carried out in 3 months.

Then improvement to materials including enhancement to existing systems and development of new systems can be conducted. This could easily take another 3 to 6 months.

Pilot testing and further refinement of the systems based on test results will be the next stage, before final implementation.

The above plan can be conducted on learning materials of students in secondary level first. Primary students can be a second phase, as they may need more parental supervision.

### Possible Assisters and Resistors to the action plan:

#### Assisters

Support from the government and MOE is necessary, in terms of funding as well as implementation. As a good education benefits the country, the government is likely to support it.

#### Resistors

There could potentially be resistance from a small group of teachers, parents as well students. They could be used to more traditional approaches and need time to adjust to changes.

**How to overcome difficulties :** This plan can be implemented in schools which are supportive of it. Gradually, the effects of the plan will become evident and the resistors may realise that this plan is indeed more effective than traditional methods alone and allow it to be implemented in more schools.

**Evaluate the action plan :** The action plan is feasible as it is a gradual change from physical education to online education, which is already taking place. Over the years, AI has flourished with computers that are faster, cheaper and more accessible. With improvement in machine learning algorithms and

techniques that allowed computers to learn using experience, we believe our plan is feasible. The action plan is also humane and realistic, even if there are no groundbreaking technological advancements in this sector in the next 5 years. We are also able to relate to this action plan better as we play a first-hand role in this, being students who feel the impact of the transition from physical lessons to more online learning.

Through this solution, including new ideas and adoption of AI to improve efficiency, students can also have more time to socialise with their friends, improving their ability to relate to others. This will also help students relax and have more time for outdoor activities, fulfilling the objective of a well-rounded education. AI broadens the horizon of possibilities for teaching and learning, but based on current technology as well as infrastructure, AI is not ready to replace teachers. The solution is an enhancement of the current system.

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