

**Future Trends Report****Based on Analysis of the Team's Chosen Community / Organisation in Mid-Term and Final Evaluation****Community / Organisation Studied:** Education**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:**

Education system might not change due to society's concern or lack of understanding of 4th IR

According to our survey conducted, 46.2% still think that subjects would still be relevant to our education system in 2030. (Observation) While some might understand that the 4th Industrial Revolution could bring about much change to society and thus schools need to change accordingly, many others do not and as a result, the parents in the 4th Industrial Revolution might not see the importance of certain skills that their child needs to be equipped with in the 4th Industrial Revolution like creativity and emotional intelligence (according to weforum) . This might cause them to oppose the changes in the education system and ultimately delay the development of students to prepare them for the 4th Industrial Revolution. (WHY) According to a staff writer for "the ubiquity" a news source for quartz high school, teachers spend too much time during English lessons, an important language for the 4th industrial revolution, analysing novels and writing poetry when in future, a much more important skill in the English language would be writing formal letters and craft formal resumes, thus showing that society still does not truly understand the impact of the 4th Industrial revolution and what skills future employees need to be equipped with. According to the book "future shock" written by Alvin Toffler, "The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn and relearn.". So education must become a lifelong endeavour, and sources for education need to evolve to provide that opportunity but right now, schools are overly focussed on getting students good grades. According to effielcorp, there are key areas that humans will always be far superior to machines like creative endeavours, social interaction and physical dexterity, digital skills & mobility but schools are not preparing youths to apply these skills for the future as we have a schooling system that is rigid and where the testing of knowledge is based on one-way learning and repetition. (RESEARCH)

**Challenge #2:**

Education system might not be able to adapt constantly to our ever-changing demands of society and different industries as it is not flexible or adaptable

According to a survey we conducted, everyone thought that change needed to take place in our education system as we enter the 4th Industrial Revolution. (Observation) Due to the rapid advancement of technology, different jobs with different requirements and skill sets will begin to surface and disappear at a fast rate. This means the education system needs to constantly adapt to satisfy the needs of the world. Changes to education will be necessary and this means the education system must be able to be flexible and adapt to fit both the student's needs and the world's requirements. However, this might pose as a challenge to education systems around the world as we have been stuck in a similar education system of passing down knowledge for so many years, making change to adapt to the needs of the world could be difficult. (WHY) According to McGill Summer School, a unique forum that discusses on the current issues of the world, the education system has to be flexible and adaptive enough to equip them with a range of skills and competencies. Relocate magazine also states that adaptability and flexibility are skills that the school systems should teach in the future since we definitely need in the future to solve and conquer problems. Weforum also states that the need for flexible, responsive schooling is acute due to the rapid change of technology and common sight of people working well past retirement age. (RESEARCH)

**Challenge #3:**

Students from all 3 generations might take a longer time to be cultivated into the learning path they want to take, causing difficulties in lifelong learning

According to our survey, 96.2% state that their elderly family members are not studying with people of other age groups. (observation). Due to the different maturity levels and different capabilities many students from different age groups might not be able to learn together due to the society's views on education as a whole. Students might not be able to communicate with the teachers due to the generation gap, resulting in their use of language and communication being different. Societies views might also affect the time taken for all 3 generations to learn together (why) An example is according to the New Star the Our "Think New" approach which promotes inquisitive and project-based learning for the 4th Industrial Revolution while providing flexible learning pathways for students. According to theuniversityworldnews.com, technologies are predicted to have a significant effect on our daily lives, including the way we learn, especially if we are to prepare the younger generation and re-educate the current generation for changing work, social and cultural environments. According to weforum, It's beyond doubt that education is at the heart of preparing present and future generations to thrive through cultivating all 3 generations into one learning path. (Research)

**Challenge #4:**

Educators need to adapt much more quickly than before one example being teaching methods but change is happening too slowly, often with much delay.

96.8% of our respondents said that educators should begin to explore or adopt alternative teaching methods (Observation) Due to the 4th Industrial Revolution, the education system will have to undergo many changes and transformations meaning that the educators would also have to adapt and change accordingly in order to maximise productivity and efficiency.

Furthermore, since teachers have to adapt to new things, they might not always be mentally prepared to adapt fast. However, this is not being done smoothly as educators are not adapting well enough or are not susceptible to these changes in the education system, causing education to evolve at a slow pace. This might become a potential challenge with the coming of the 4th Industrial Revolution because if we are unable to quickly prepare for and adapt to the 4th Industrial Revolution in time, the education system might lack behind and students will be missing out and not learn sufficiently or learn correctly. (Why) According to a 2018 report by The Economist Intelligence unit, very few countries have begun to address the impact of automation through educational policy. "Intelligent automation is expected to boost the importance of both education related to STEM (science, technology, engineering and mathematics) and of so-called soft skills, which allow workers to trade on their uniquely human capabilities," This is extremely alarming as we would have to educate the people properly as they would have to learn differently than previous generations. Furthermore, according to The Economic Intelligence Unit, "in all but the highest-scoring countries, little has been done to prepare future workers through school curricula or, just as importantly, teacher training. At the same time, some experts warn that a focus on soft skills would be a distraction in countries where basic education is still not up to scratch." This shows that educators not being able to adapt quickly would be an extremely alarming issue and would impact the future greatly if not done well.(research)

**Challenge #5:**

Education might not be able to structure a very organised programme that allows independent learning through application

According to a survey we conducted, about 90% of the community felt that schools are unable to provide students with the opportunity to practice self-directed learning, which will play an important role in the 4th Industrial Revolution, with one of the respondents commenting that teachers tend to spoon feed students too much, resulting in students' inability to independently learn. (OBSERVATION) The education system will have to oversee major changes such as changing the school's curriculum to come up with a better timetable/program to better develop and prepare students to be able to apply their skills and knowledge to real-world situations and at the same time be able to encourage independent learning among students. However, this "organised programme" designed to help students with their learning will be difficult to carry out and there might be multiple attempts before a successful programme is created. The idea of an "organised programme" however will be difficult to establish and complete successfully and there will definitely be problems to be overcome in trying to have such a programme capable of helping students to learn independently. Furthermore, educators who might be overly focussed on test results might find it difficult to allow students to conduct self-directed learning out of fear that students are not matured or independent enough. (WHY) This point is reaffirmed by weforum, as it states that "altering higher education is more necessary than ever before. However, the challenges ahead have to be considered in order to ensure effective and immediate transformation" This shows that a potential problem that will arise due to the 4th Industrial Revolution is that the education system might not be able to come up with a good programme to help students learn effectively. (RESEARCH)

## 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) # 2,3,5

Given that there is a high probability that our current education system may not prepare school leavers with the correct skills and opportunities for the future, it appears that there is a need to re-think education (CP). How might we enhance the current education system (KVP) so that school leavers can be ready for the challenges faced in the 4th Industrial Revolution (Purpose) in years 2030 and beyond in Singapore (FSP)?

**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:**

We, Revolutionary 4.3, will recommend the government our app that can make use of the advanced technology through data observed from students assignments to ensure each student has a personalised timetable catered to his strengths and needs. With the app, our government can enhance the current education system by cultivating specific skills for students. The app can also give enjoyable assignments through project work to teach students the importance of teamwork and also spark joy in their learning which will encourage the students to be proactive learners. Through being proactive learners, many soft skills that are important can be learnt and equipped on students. This will prepare them for the challenges of the 4th Industrial Revolution as they are able to apply the skills they have learnt to solve their problem.

**Solution #2:**

We, Revolutionary 4.3, will lobby to schools around Singapore to revamp the grading and testing systems. For example in engineering programmes, undergraduates are graded based on skills like a strong knowledge base, problem analysis, design and the use of engineering tools, (technical skills) but these will no longer be enough to become successful by 2030 with the advent of the 4th Industrial Revolution due to the growing diversity of demands in the professional world. Instead, non-technical skills will become increasingly important to work effectively in a business environment. Some non-technical skills include communication skills, project management and life-long learning. These can be graded through everyday tasks like presentations and even written reports. This enhances the education system by ensuring all students come out of the education system as well-rounded students that are equipped with the appropriate skills for the future.

**Solution #3:**

We, Revolutionary 4.3, will educate teachers on how to facilitate learning for students through creating opportunities for students to develop skills. With teachers that have a deeper understanding on how to facilitate learning for their students, more opportunities to develop skills can be developed through Project Work, assignments or self-learning. These opportunities can teach soft skills like teamwork, communication, flexibility and perseverance. Through the skills developed, students can then apply it into the opportunities they get later, giving them experience and how to apply their soft skills efficiently. This will prepare them for the challenges of the 4th Industrial Revolution as they are able to identify and apply the skills they have learnt to solve their problems efficiently.

**Solution #4:**

We, Revolutionary 4.3, will lobby to the government to implement one non-written 'subject' in national exams like GCE O Levels and PSLE exams. Some non-written subjects could include Project Work or Debates. With such a recommendation, students can no longer simply memorise words and phrases and expect to pass with flying colours. Instead, they will have to practice their soft skills like teamwork, communication and flexibility in order to do well. This is beneficial to the students as it is a much more realistic take on the professional world where beyond a strong knowledge base, students also need to have a strong set of soft skills so they can work well with co-workers. This enhances the education system by ensuring students are equipped with the appropriate skills, creating opportunities for them when they enter the workforce in 2030.

**Solution #5:**

We will construct a flexible and adaptable curriculum and have certain schools to try out a different curriculum to better accommodate and prepare students for the 4th Industrial Revolution. With this proposal, we hope to implement a different curriculum for students with less emphasis on current academic subjects and include more subjects which would be essential for students to have in order to survive in the 4th Industrial Revolution and experiment on different teaching methods. Such subjects that could be newly introduced to the students could be subjects similar to the Thinking Programme, Project Work, or even a new subject called "Application Skills" to teach students to apply their skills and knowledge in real situations. With this proposal, we will be able to observe and learn how to help students to learn effectively by pilot testing certain schools with new curriculums and teaching methods. The different teaching methods can also vary from the way the teacher conducts his/her lessons to where the lesson is held, be it in classrooms or through the internet, better known as E-Learning. The few schools which have been selected to test out these new teaching methods and curriculums can then give feedback to us regarding their opinion on the new plans and give constructive criticism. If the plan is deemed successful and is proven to be useful to help students develop skills required of them, we can then impose this new changes in curriculum and teaching methods to all the schools. When the new system is in place, students will be able to have a smoother and more efficient transition into the 4th Industrial Revolution as they are able to develop and apply important skills. Furthermore, society will gradually become used to the new changes in the education system and learn that soft skills and teamwork etc. is more important as compared to academic subjects such as history and science and will gradually come to accept the significance of these new skill sets.

### 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:**

Which solution has the most lasting impact on the education industry

**Criterion #2:**

Which solution will be the most futuristic for students such that students can be ready for the unpredictable future challenges faced in the 4th Industrial Revolution

**Criterion #3:**

Which solution is most effective at equipping students with the correct skills and opportunities

**Criterion #4:**

Which solution is the most effective for students so that they are able to be equipped well and understand how to apply their skills for future challenges faced in the 4th Industrial Revolution

**Criterion #5:**

Which solution will be the most organised for the education system so that students are able to learn most efficiently and productively under the 4th Industrial Revolution

**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 New App	<b>Mobile App</b>	3	4	4	2	4	17
#2 Grading and Testing	<b>Revamping of Grading and Testing Systems</b>	1	2	1	3	1	8
#3 Use of AI	<b>Use of Artificial Intelligence</b>	4	5	3	5	3	20
#4 Non-written subjects	<b>Implementation of non-written subjects</b>	2	1	2	1	2	8
#5 New Curriculum	<b>Creating a new curriculum for improved learning</b>	5	3	5	4	5	22

**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 # 5 :****Outline**

Who: Department Of Futuristic Education (sub-department of MOE), Selected Schools with their relevant teachers and students

What will be done:

Identify schools to pilot test new subjects, new teaching methods and other changes to the education system to decide which changes to implement on a larger scale.

After looking at pilot test results on the various schools selected, the DOFE will implement these changes on a large scale, making any necessary changes along the way

Who: Henry Park Primary School, Concord Primary School, Swiss Cottage Secondary Yishun, Beatty Secondary, Junior College and Catholic Junior College

Why:

Henry Park: This school already has an applied learning programme called "Science for Life@HPPS" which seeks to develop an Applied Learning Programme (Science) that hones 21CC skills through inquiry-based learning. As such, the school will be able to transition more smoothly into a curriculum which emphasises more on applied learning, making the school a great pilot test as we can assess how far the schools in Singapore have progressed.

Concord Primary: Concord Primary School has an applied learning programme known as "E3 reasoning" which stands for enabling, enriching and empowering students to acquire critical and inventive skills which are essential in the 21st Century. Thus, it will be a good choice to pilot test new curriculums as their applied learning programme already focusses on helping students develop skills for the 4th Industrial Revolution.

Swiss Cottage: Swiss Cottage Secondary already has an applied learning programme called "Applied Science For Sustainable Development Programme" which was developed in 2014 to educate their students about sustainable development. Applied learning is important as it enables science to be more applicable in real life.

Beatty Secondary: Beatty Secondary schools also has a large emphasis on Applied Learning programme, which puts a lot of focus on STEM, and is important as it pervades in every aspect of our lives

**Action Plan derived from Solution # 5 :****Outline continued / Implementation**

What will be done:

During the pilot test, show students how to apply their skills and put a greater emphasis on applied learning so students are able to apply what they have learnt effectively. Additionally, they can make the necessary changes to the existing implementations to what suits their school best, giving timely feedback to DOFE so that a final plan can be drafted which benefits as many students and schools as possible. Students in these schools can also give feedback to the schools, suggesting ways that the implementation can be improved to further enhance applied learning or any other changes that might be made.

1st : Ministry of education will set up the Department of Futuristic Education (DOFE), whose members include professors in the field of computer science, teachers and Education Ministry leaders so that there is an all-round view for changes and implementation. The DOFE is in charge of pushing out changes to the education system like introducing new subjects that can help students cope with the 4th Industrial Revolution, or introducing new teaching styles that will help educators adapt to the 4th Industrial Revolution more easily with the rise of artificial intelligence

2nd: Members of DOFE will commence discussions and brainstorm teaching methods that will spark the interest of lifelong learning in students as well as any changes that might need to be made to the education system to prepare students for the 4th Industrial Revolution. Discussions will also include what schools to conduct pilot tests on. We already have a proposed list of schools which have preexisting learning programmes in place so integration of additional subjects or changes to their system will not be as challenging to implement.

3rd: After deciding on what schools to implement the pilot test on, DOFE can begin implementing new changes to the schools and see if students and teachers can cope with the changes and whether the changes are effective or not. The effectiveness of these new programmes can be measured with practical tests, integrated assignments that allow students to see how concepts relate to one another instead of written exams. Practical tests measure applied learning ability better than a written exam can, according to the Straits Times article "Applied Learning in schools: Making lessons more in tuned with real life"

4th: After end of pilot test, both teachers and students will be required to do a survey to evaluate the effectiveness of the programme. From there teachers and students can provide constructive feedback and point out areas of refinement. The DOFE will then use constructive feedback to refine their system and also discuss areas of refinement based on their observations. DOFE will then work on refining their system before implementing it on a large scale

**Action Plan derived from Solution # 5 :****Evaluation****Potential Challenges:**

While carrying out the action plan, the DOFE will come up with a new curriculum with new content. However, this curriculum might be productive for some schools while inefficient for learning in other schools. As such, the DOFE might find it hard to improve upon the implemented curriculum as it may help some students to develop skills necessary while on the other hand, other students may find it difficult to develop the same skills.

The test results of students in schools involved with pilot testing might be adversely affected if they are unable to cope. Teachers might also find it difficult to cope with the additional workload in their already busy schedules. When the test results of students are adversely affected, both teachers and students might become resistant to further changes made to the education system.

The public might be against this plan as they might be unsure of removing the focus on current academic subjects to these new subjects

**Solutions**

To address this issue, the DOFE can assess the different situations and problems which come up with these schools. This can be done via an online forum with the schools involved as teachers or key personnel can feedback to the DOFE the possible reasons for failure regarding any aspect of the plan which was unsuitable. The DOFE can then come up with personalised curriculums, teaching methods or guidelines for schools which are similar, and are therefore likely to face the same problems so as to decrease the number of problems that surface due to the curriculum.

The implementation of changes can be done on a termly basis, with an evaluation at the end of each term to measure the effectiveness of these changes. The results of the evaluation can be analysed with artificial intelligence to better understand the effectiveness of these changes. Additionally, students with 'important' exams around the corner like PSLE or 'O' level exams could be exempted from these implementations so students can focus on their studies.

The DOFE must hold talks and also have a face to face virtual meeting with school leaders to affirm their child is making progress. They can also track their child's progress with data analysis through the teachers comments and school leaders advises towards each child which reassures parents that the subjects are more beneficial

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Cite the resources you consulted using the APA format.

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