Unlocking a Student's Potential by Motivating them Toward a Growth Mindset

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Contents

Biography

Sarifah Noor Aini Bte Syed Mahmood is a Lead Teacher for Social Studies and has extensive professional experience in her 35 years in the education service in Singapore. Her journey in the education service has provided Sarifah with opportunities for leadership experiences both in schools and with the Singapore Ministry of Education (MOE). Prior to becoming a Lead Teacher, Sarifah held different portfolios – Head of Department (Pupil Welfare), Curriculum Specialist (Social Studies), Head of Department (Humanities), and Mentor Coach.

As a professional, Sarifah exemplifies lifelong learning. She received her Certificate in Education (Merit) from the then Institute of Education in Singapore in 1987. She received her undergraduate studies at the National University of Singapore, majoring in English Language and History. She completed her postgraduate studies at the University of British Columbia (Canada) and the University of Western Australia.

Her current role as a Lead Teacher sees Sarifah working with teachers not only in her school but also in the South 7 cluster of schools, South Zone and the national level. She serves as a role model and mentors teachers to develop and grow them in their pedagogical practice. By virtue of her strong knowledge in assessment and content, Sarifah has guided teachers on how to use the Level of Response Mark Scheme (LORMS) to assess student responses in answering source-based questions and in the teaching of Social Studies, at the national level.

Executive Summary

Growth mindset (Dweck, 2016) is the belief that intelligence and abilities are not fixed, but rather can be developed through effort, perseverance, and learning. Students with a growth mindset are more likely to be motivated to succeed, even in the face of challenges. They are also more likely to view mistakes as opportunities for learning and growth (Dweck,

2016). This research project aims to study how educators implement growth mindset in their classrooms. Based on the findings, a list of research-based instructional strategies and tools to foster growth mindset to help students unlock their potential and strive for success is compiled, which will then be shared in two 2.5-hour professional development workshops. The first workshop session, conducted in the first term of the school year (Jan-Mar), focuses on exploring growth mindset and discussing research-based instructional strategies and tools that foster growth mindset. The second session, in the third term of the school year (July-Sept), invites and encourages participants to share their experiences applying the instructional strategies or tools in their classrooms to motivate their students toward a growth mindset.

Relevance of Project

This project began with a question that one of my colleagues asked. "How are you using and, in particular, implementing growth mindset in your teaching?" I was stumped by the question and my mind started racing to get an answer to it. Reflecting on my own practice, I realised that it was actually hard to explicitly articulate or pinpoint any particular tool or instructional strategy that I use that facilitates or harnesses growth mindset. My immediate response to that question was that I focused on the power of yet in terms of language and actions associated with it, and process instead of person. But it stopped there. I was quite bothered by it and persisted in reflecting on my own practice. One tool that I felt harnessed growth mindset in my classrooms – success criteria – came to mind.

As the conversation with my colleague continued, the focus grew bigger. We started to ask how the teachers in my department and the other departments in the school were implementing growth mindset. The colleague who asked me the question shared that generally, the response was the same from the teachers – focus on language or they shook their heads. Beyond that, the teachers were not able to overtly share the instructional strategies or tools that they use to facilitate growth mindset. I tested this with some of the

participants who are in the Fulbright programme with me and teachers in the schools that I visited. Generally, I got the same response. It seems that we were not clear what instructional strategies or tools that foster growth mindset look like. That was the spark that lit the fire for this research project.

As a teacher leader, I work with teachers to support them develop their pedagogical practices. Teachers look to me for guidance and support. My personal experience of initially struggling to identify the instructional strategies or tools that I use to implement growth mindset in my classrooms made me feel that this is an important area that I could research on. This research became a personal mission for me as I feel it has the potential to enhance our understanding of how teachers are implementing growth mindset in the classrooms, in particular the instructional strategies and the tools that we use that can facilitate growth mindset in our practice.

Originally studied by Dweck (2016), growth mindset involves the belief that abilities are flexible and can improve with deliberate effort, feedback, and appropriate strategies. In addition, growth mindset exists on a continuum, where it can be more present in some domains or situations than in others (Anderson, 2017). Embracing a growth mindset is about seeking help and recognising when one needs to accept mistakes and challenges and switch strategies as a part of the journey to reach a certain level of ability. In contrast, a fixed mindset is the belief that some people are naturally good at certain subjects and that this cannot be changed substantially.

According to Dweck (2016), cultivating a growth mindset is an ongoing process that requires self-awareness, effort, and a commitment to learning and growth. Most learners, when supported or provided with the appropriate tools, can learn to unlock their levels of motivation, resilience, and achievement (Bowman & Levtov, 2020; Macnamara & Burgoyne, 2023). Providing students with the skills to tackle challenges can ignite a sense of motivation

that drives them to actively engage in their learning (Bowman & Levtov, 2020; Macnamara &Burgoyne, 2023). Students will feel empowered to persist when faced with challenges and will ultimately improve. As such, it is important for educators to harness growth mindset and use it to support their learners to unlock and realise their potential.

This research topic is relevant in my context for the following reasons:

1) growth mindset is a strategic area of focus that guides the teaching and learning in our school as well as the schools in the South 7 Cluster of schools that we are a part of,

2) many educators are familiar with the concept of growth mindset, however when asked how we are practicing it in our classrooms, find it a challenge to identify and articulate the instructional strategies or tools that we use, and

3) it appears that not much research has explicitly reported on instructional strategies or tools used in the classroom that harness or facilitate the integration of growth mindset.

This study has the potential to offer authentic examples of growth mindset practices and instructional strategies or tools for how teachers can help students develop a growth mindset that serves to motivate them in their learning.

Background

The Singapore education system has undergone huge change to meet the differing needs of each student and the political and economic needs of the nation (Heng, 2011). As a tool, education has successfully transformed Singapore from a struggling post-colonial society plagued with problems of survival to an economically stable and prosperous country.

Central to the transformative journey of the Singapore education system is the recognition that education should be inherently student-centric and values-driven. This involves a recognition of the unique strengths, interests, and learning styles inherent in each student. Such an approach not only readies students academically but also equips them with the resilience and adaptability crucial for navigating an ever-changing global landscape. This

signifies an understanding of the significance of cultivating a growth mindset among learners, wherein effort and perseverance are valued for long-term success.

The Singapore education system has achieved significant and widespread gains in student outcomes on international and national assessments. Several international studies on academic attainment such as the Trends in International Mathematics and Science Study (TIMSS), Progress in International Reading Literacy Study (PIRLS) and the Programme for International Student Assessment (PISA) have ranked Singapore education among the top global education performers. The 2018 Organisation for Economic Co-operation and Development (OECD) PISA study (OECD, 2019) reported that Singaporean students exhibit 86% self-efficacy, confidently navigating challenging situations compared to their OECD peers with an average of 84%. This focus on nurturing students' confidence aligns with the student-centric, values-driven education system that aims not just at academic excellence but also at the holistic development of essential life skills in students. However, confidence in their abilities is juxtaposed against a concerning fear of failure, with approximately 72% of Singaporean students expressing apprehension about others' perceptions when confronted with failure - surpassing the OECD average of 56% (OECD, 2019). This apparent paradox hints at the intricate interplay between students' self-assurance and societal pressures.

Acknowledging the potential pitfalls associated with the fear of failure, Singapore has taken initiatives to reshape its educational landscape (Kwek, et al., 2023). The implementation of the new PSLE scoring system in 2021, marked by reduced grade differentiation, and the Full Subject-Based Banding (FSBB) and the abolition of academic streams in secondary schools by 2024, represent a strategic departure from the focus on academic outcomes. This shift aims to foster a more nuanced perspective on success, transcending just grades and embracing a more holistic view of student capabilities. It also underscores deliberate efforts towards cultivating a growth mindset, with the essential

message that intelligence is not a fixed entity, but an evolving construct shaped by concerted effort and resilience. Cultivating a growth mindset will support students to learn to overcome their fear of failure hence empowering them to actively take ownership of their learning.

As the education system in Singapore navigates the intricate balance of bolstering students' confidence in their abilities while mitigating the potential fallout of excessive apprehension about fear of failure, the overarching goal remains clear, that is, to equip students not only with the fortitude to rebound from setbacks but also with the insight to perceive challenges as opportunities for personal and intellectual growth. These initiatives, ingrained within a student-centric and values-driven education, acknowledge success as a multi-faceted concept extending beyond mere exam scores to encompass the cultivation of life skills. Within this context, it is important to know the instructional strategies or tools that teachers use to foster growth mindset in the classrooms which help motivate students to learn and do better in school.

Growth Mindset

Growth mindset (Dweck, 2016) is the belief that intelligence and performance can be improved through effective effort and strategies. In contrast, a fixed mindset is the belief that intelligence is largely stable over time and cannot be changed substantially (Dweck 2016). These mindsets can affect how learners approach their studies. Learners with a growth mindset do not see their intelligence or personality as fixed traits, and are likely to learn by a mastery approach, embrace challenges and put in the effort to learn from their mistakes to help them achieve their academic goals (Claro et al., 2023; Dweck, 2016; Yeager et al., 2022). They are not easily defeated by the threat of failure and perceive task setbacks as a necessary part of the learning process. They "bounce back" by increasing their motivational effort and work towards achieving their goals (Claro et al., 2023). Conversely, learners with a fixed mindset consider their abilities will remain much the same for the rest of their lives and

are more likely to learn by a performance approach. They see themselves as smart or not, have talents or do not. Learners with a fixed mindset view criticism as evidence of a lack of ability and challenges as threats to their sense of competence. For them, it is more important to protect their self-worth from negative feedback (Zarrinabadi, 2021), to look good and say they can do something, rather than try and risk failure. So, instead of trying to risk and repair failures, they may simply "try to repair their self-esteem" (Dweck, 2016, p 36).

Dweck (2016) identified five key areas in which the actions of people of opposing mindsets often diverge: challenges, obstacles, effort, criticism and success of others. People with a fixed mindset are more likely to respond to any of the five situations in ways that make them look smart and avoid failure, while people with a growth mindset are more likely to respond in ways that allow them to learn and improve. This is articulated in Figure 1, Responses of Fixed and Growth Mindsets.

Figure 1

Responses of Fixed and Growth Mindsets

SITUATION	FIXED MINDSET (Desire to look smart)	GROWTH MINDSET (Desire to learn)
CHALLENGES	Avoid challenges to maintain the appearance of intelligence.	Embrace challenges, stemming from a desire to learn.
OBSTACLES	Get defensive and give up in the face of obstacles and setbacks.	Persevere in the face of obstacles and setbacks.
EFFORT	View having to try or put in effort as a negative; if you have to try, you are not very smart or talented.	Doing hard work and putting in effort paves the path to achievement and success.
CRITICISM	Ignore negative feedback, regardless of how constructive.	Accept criticism and feedback as important that can aid in learning.
SUCCESS OF OTHERS	View other people's success as a threat and evoke feelings of insecurity or vulnerability.	View other people's success as a source of inspiration and education.

Growth and fixed mindsets are dichotomous ideas that exist on a spectrum, with many different mindsets and beliefs in between. It is not an either—or situation. While some people are situated closer to one end of the spectrum, most lie somewhere in the middle of the two extremes (Anderson, 2017). As such, we must recognise and accept that we are all a mixture of the two mindsets and always be intentional about employing our growth mindset (Brock & Hundley, 2016).

Research on Growth Mindset Interventions

There has been much research conducted on how growth mindset influences behaviour. Generally, these studies show that growth mindset has been effective in improving students' grades, increasing student retention, enjoyment and engagement in learning. On the other hand, there have been studies that have failed to find positive effects of growth mindset.

One study that reported positive impact of growth mindset intervention was by Blackwell and colleagues on seventh graders, all doing poorly in math. (Blackwell et al., 2007). In their study, the math students were taught about the brain, its malleability and the potential to improve skills through neural changes. The control group did similar activities but was not taught the growth mindset materials. They found that the students in the intervention group showed a positive change in motivation and their math grades improved.

Other studies reported that growth mindset interventions have been effective at improving students' grades or GPA (Yeager et al., 2016), increasing student retention (Yeager et al., 2016), and enjoyment and/or engagement in academics (Yu et al., 2022). In addition, these effects are most pronounced for students from disadvantaged backgrounds such as racial minorities and persons from low-income backgrounds (Rattan et al., 2015; Spitzer & Aronson, 2015; Yeager et al., 2016). Another important finding from this body of work is that these interventions are also particularly relevant at periods of transition such as from high school to college (Yeager et al., 2016). The 2018 PISA included a growth mindset instrument to gauge students' beliefs about intelligence malleability (OECD, 2021). The 2018 PISA reported that on average across OECD countries, students who present a growth mindset scored higher in reading, mathematics, and science than their peers with a fixed mindset. In addition, growth mindset is associated with a larger score gain for disadvantaged and immigrant students when compared to advantaged and non-immigrant students. These results

are in line with the literature on growth mindset that highlights a positive association between growth mindset and academic performance.

Despite the positive evidence for growth mindset interventions, research is beginning to surface which questions the value of these interventions. Several studies have not found positive effects for growth mindset interventions (Burgoyne et al., 2020; Burnette et al., 2018, Sisk et al., 2018) or the effects have been short-termed (Orosz et al., 2017). Burgoyne et al. (2020) found no support for the effect of mindset intervention on motivation and achievement. They concluded that self-efficacy and need for achievement seemed to play a more important role. Sisk et al. (2018), published a meta-analysis highlighting the lack of effects between individuals' mindsets and academic achievement. Of the 129 studies that they analysed where there was no form of interventions, 37% found a positive relationship between mindset and academic outcomes while 58% of the studies found no relationship and 6% found a negative relationship between mindset and academic outcomes (Sisk et al., 2018). In the second set of analyses, they looked at the relationship between growth mindset interventions and academic outcomes. They found 29 studies of this type and reported that 86% of the studies found no effect of the interventions and 2% found a negative effect of the interventions (Sisk et al., 2018). Only 12% had a positive effect, meaning that the growth mindset interventions improved academic achievement. Consistent with earlier published studies, Sisk et al (2018) found that the interventions seemed to work for low SES populations, but not higher SES populations.

The literature on growth mindset is still under development as researchers identify causal mechanisms using random control trials (OECD, 2021). Rather than making claims about large gains in student achievement and performance outcomes overall, the most recent research developments focus on heterogeneity of treatment effects to better understand how a growth mindset may influence various groups of students differently. Bryan et al. (2021) for

example, suggest that failures to replicate in psychology are due to failures to recognize heterogeneity in treatment effects. Despite this development, one argument for continuing to promote growth mindset interventions in schools is that, even if the effects do not flow all the way downstream to academic achievement, growth mindsets may promote other benefits such as motivation to try harder, a greater focus on learning, and embracing mistakes and challenges.

Instructional Strategies and Tools to Foster Growth Mindset

Research has shown that growth mindset is important for students because it can help them to achieve their academic goals (Claro et al., 2023; Dweck, 2016). Given the importance of a growth mindset for student success, it is essential for teachers to create a classroom environment that fosters growth mindset. This can be done by praising students' effort and perseverance, encouraging them to take on challenges, and providing them with opportunities to learn from their mistakes. It is the aim of this research project to study how educators implement growth mindset in their classrooms and based on the findings, compile a list of research-based instructional strategies and tools to foster growth mindset to motivate students unlock their potential and strive for success (Appendix A). The instructional strategies and tools shared here are based on the literature on growth mindset, classroom observations and interviews.

There are various ways to foster growth mindset in the classrooms. One way is to teach students about brain plasticity (Brock & Hundley, 2016; Dweck, 2016). At the start of the academic year, teachers could introduce the science of brain development and acquaint students with how their brains learn and store new information (Brock & Hundley, 2016). There are billions of neurons in our brain, and they store information and send and receive messages all over our bodies. Blackwell et al. (2007) did a study on about 100 seventh graders, all doing poorly in math. The students were randomly assigned to workshops on

good study skills. One workshop taught students how to study effectively, while the other taught them about the brain's expanding capacity for intelligence. Students in the latter workshop learned that the brain forms new connections every time we learn something new, and that this makes us smarter over time. Therefore, learning about brain plasticity can help students put aside destructive ideas like people are born stupid or intelligent, and embrace challenge as an essential part of learning. The study (Blackwell et al., 2007) shows that the more we work on a task or practise a skill, the faster our neurons work and the better our brain becomes at carrying out the task. Like plastic, the human brain is malleable and can grow and change over time. This underpins the growth mindset theory.

Another important way that teachers can foster growth mindset in the classroom is to create a safe classroom culture. The learning process is filled with mistakes and setbacks, and it can be stifled by preconceived notions and interrupted by environmental challenges (Brock & Hundley, 2016). Hence, it is important for teachers to create a classroom environment where students feel safe to ask questions, take risks, tackle challenges and make mistakes. Teachers can do this by harnessing the power of mistakes. For example, when providing students with feedback, teachers should ensure that they focus on the process instead of the person. This means that their feedback is focused on students' effort and learning, rather than their intelligence, and students are praised for their effort and perseverance, even if they do not succeed at a task (Claro et al., 2023). This helps students to see that their intelligence is not fixed but can be developed through hard work. Another example is to explicitly teach students about growth mindset (Claro et al., 2023). This can be done through discussions, activities, and readings, or teachers can talk about their own challenges and how they learned from them (Claro et al., 2023).

According to Yu et al. (2022), instructional practices that focus on learning and promote student agency are likely to cultivate a growth mindset while instructional practices

that focus on ability and discourage student agency are likely to foster a fixed mindset. Yu et al (2022) suggest guided inquiry and group work as two examples of instructional strategies that foster growth mindset. Guided inquiry, as defined by Furtak et al. (2012), is a teaching approach between teacher-led instruction and student-led discovery, where students explore their own ideas, discuss their explanations with each other, and share their thinking aloud. In guided inquiry, teachers play a supporting role, facilitating the learning process, guiding student discussion, and answering students' questions (Furtak et al., 2012). Group work, on the other hand, is a collaborative learning approach where students work together in small groups to complete learning tasks. So, how do guided inquiry and group work foster growth mindset? According to Lombardi and Shipley (2021), guided inquiry and group work are active learning strategies that empower students to solve problems independently and think critically, thereby fostering student agency. Yu et al. (2022) suggest that when teachers provide students with opportunities to solve problems independently, while also providing the scaffolding needed for students to achieve their goals, students may experience a sense of effectiveness and greater control over the learning process, which can facilitate the view that intelligence and ability are malleable and controllable. This finding corroborates previous research, which has demonstrated a positive correlation between teachers' autonomy support and students' growth mindset in middle school and university settings (Ommundsen, 2001; Zarrinabadi et al., 2021).

Challenge is at the crux of growth mindset. Without challenge, students do not get the opportunities to take risks, face and overcome failure. Dweck (2016) explains this as a sense of progress. Align with this, she recommends that students be taught to make a growth mindset plan. The growth mindset plan is a tool to help students visualise what and how to carry out the actions when faced with a problem or challenge so that they will not be easily set off course. With the growth mindset plan, students will be better equipped to overcome a

problem or take on a new learning challenge. Figure 2 below is an example of such a plan by

Brock and Hundley (2016).

Figure 2

My Growth Mindset Plan for Facing a Problem

MY GROWTH MINDSET PLAN FOR FACING A PROBLEM

My problem is _____

_____

I'll resolve my problem by this day: _____

The resources I need to solve my problem are _____

_____

I'll solve my problem by _____

_____

_____

Barriers to solving my problem are _____

_____

_____

I'll overcome my barriers by _____

_____

_____

If my plan doesn't work, I'll _____

_____

My fixed mindset might say _____

_____

My growth mindset will respond _____

_____

Here are some ways I'll know I've solved my problem:

1. _____

2. _____

3. _____

Brock and Hundley (2016) also suggest the "Ask Three then Ask Me" instructional strategy. When faced with setbacks, students are encouraged to ask three classmates for help before going to the teacher. By using this strategy, students learn to persevere through challenges on their own, which builds their confidence, resilience, and autonomy. This instructional strategy promotes collaboration in problem-solving and allows students the opportunity to use metacognitive strategies to think through a mistake or error, and encourages student agency.

In addition to the instructional strategies and growth mindset tool described above, based on my conversations with teachers and observations of classroom practice, there are other instructional strategies that foster growth mindset. Success criteria, performance rubrics, "5 Habits of Success" and "SUPER" are other instructional strategies that foster growth mindset in the classrooms. I would like to focus on the latter two.

In a classroom that I observed, "5 Habits of Success" (Figure 3) was used to help students develop life skills. The "5 Habits of Success" is a thinking framework that help students to think critically, solve problems and approach complex situations effectively, and forms a crucial part of developing students' intellectual and personal growth. Through small case study scenario and storytelling using *The Oldest Student: How Mary Walker Learned to Read* (Hubbard, 2020), the teacher in the classroom invited the students to identify the habits demonstrated by the main character and explain their reason (Appendix B). From their discussion and the follow-up written activity, the students learned how through the habits of success, people can actually grow and achieve their goals.

Figure 3

5 Habits of Success
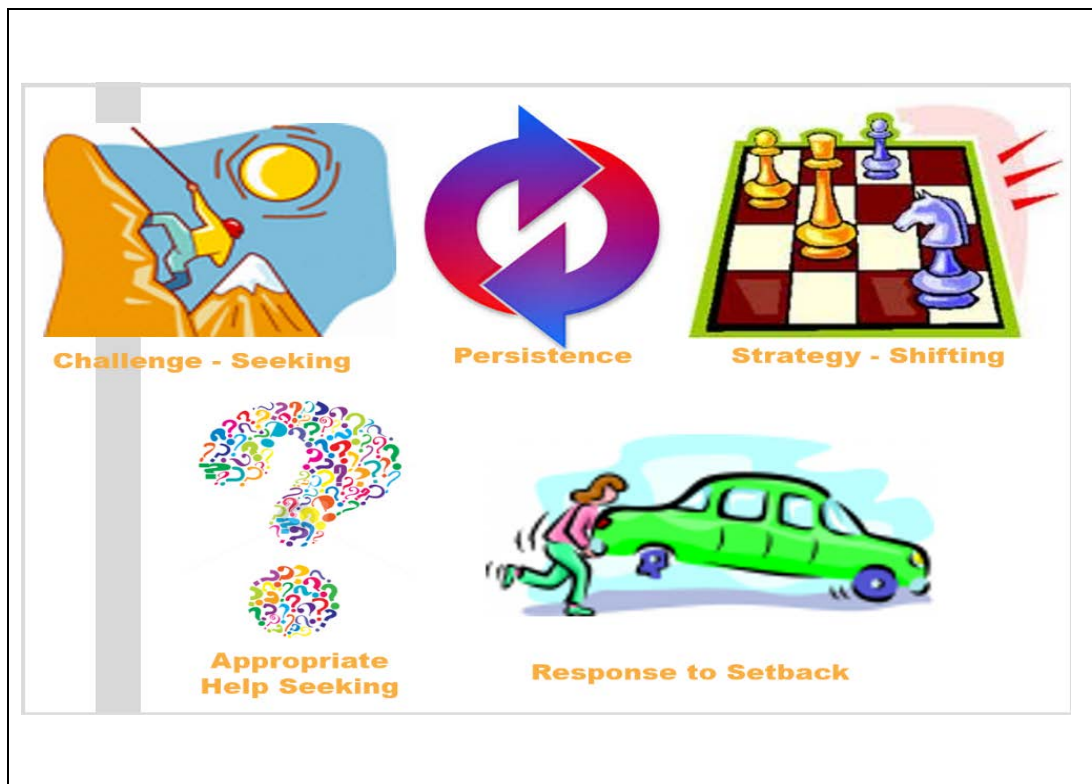
In another school, the teachers in the department use the "SUPER" model approach (Figure 4) to teach mathematics. This approach is based on George Polya's (2020) four-step method in problem solving. The department teachers came up with the mnemonic, "SUPER" and included question prompts into Polya's four steps. The teachers use the SUPER model's four steps to guide students to elucidate their problem-solving ideas, make connections to their prior knowledge to the problems and formulate solutions to solve the problems (Appendix C). According to the teachers, often when students face a mathematical problem that they do not easily know how to solve, they just give up. The SUPER model helps to instil a thinking routine that the students can use consistently whenever they are tackling problems. Giving the students the opportunity, and with the ability to access and solve difficult problems on their own promote self-directed learners. The teachers reported that they have

seen their students persevere to solve problems instead of giving up as they did before. Persevering and not giving up easily when faced with challenges and setbacks indicate that the students have indeed embraced a growth mindset of a can-do attitude and work towards achieving better.

Figure 4

SUPER Model
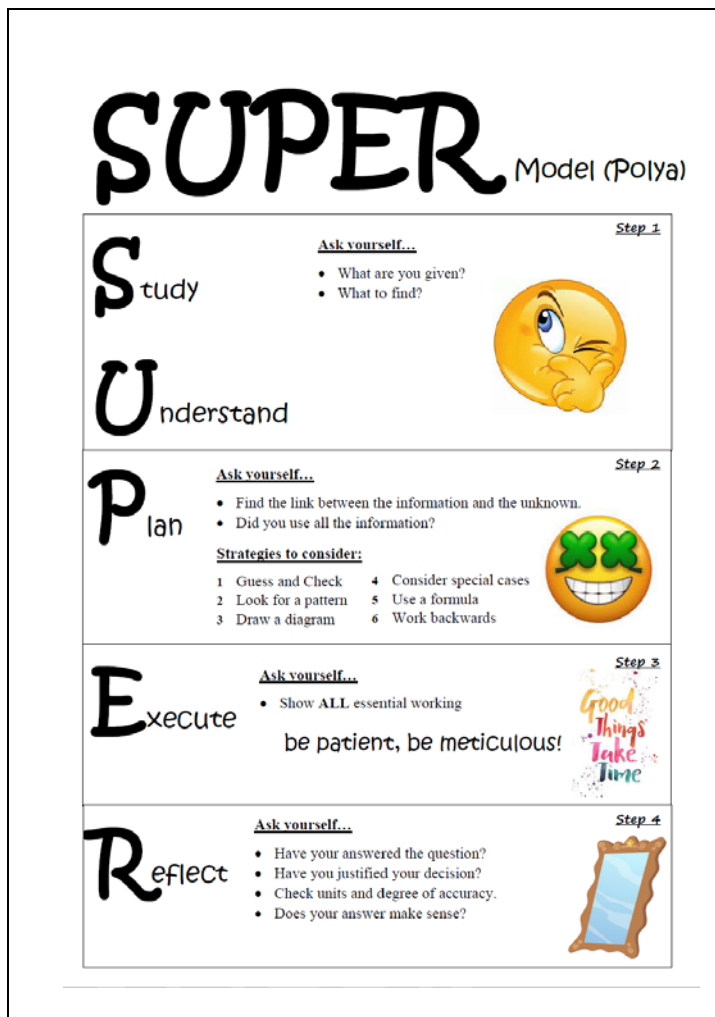
Contextual Factors Affecting Growth Mindset

In order to foster growth mindset in students, it is crucial to recognise contextual factors that may convey to students the limitations or possibilities for their growth (Yu et al., 2022). Schools that emphasise competition, standardized testing, and grades over learning

may be inadvertently hindering student growth mindset (Blackwell et al., 2007; Cannata et al., 2017; Yu et al., 2022). By understanding the contextual factors that can affect growth mindset, we can better support students to develop a growth mindset and achieve their goals.

In their study on students in grades 6-8, Yu et al. (2022) found that students who attended schools with a fixed mindset culture (characterized by tracking, ability grouping, and a focus on standardized testing) were more likely to have a fixed mindset themselves, even when controlling for other factors such as prior achievement and socioeconomic status. Similarly, Cannata et al. (2017) found that students who attended schools with a focus on competition and grades over learning were more likely to have a fixed mindset. They reported that competitive school cultures may lead students to view their peers as adversaries rather than allies. This can make it difficult for students to learn from each other and support each other's growth. Additionally, schools that focus on grades over learning may send the message to students that their worth is determined by their academic performance (Cannata et al., 2017). This can lead students to feel pressured to succeed at all costs, and it can discourage them from taking risks and trying new things.

Blackwell et al. (2007) also found that students who attended schools with a high-pressure environment were more likely to have a fixed mindset. High-pressure school environments may lead students to feel anxious and stressed which in turn can make it difficult for students to focus on learning and to develop a growth mindset. Additionally, high-pressure school environments may send the message to students that they need to be perfect in order to succeed. This can lead students to feel discouraged and to give up easily when faced with challenges and setbacks.

As teachers, often many of us may prioritise the knowledge and skills that we want students to learn. However, research has shown that focusing on students' knowledge and skills that have yet to develop can perpetuate bias and inequity in the classroom (Garriott,

2020; Williams & Toldson, 2020). Cultivating a learning environment based on assumptions about students' shortcomings without providing opportunities for growth can lead teachers to adopt a deficit model.

Teaching from a deficit model lens is especially harmful to students. Teachers tend to overlook the students' strengths, diminish the value of their lived experiences, and invalidate their communities' sense of agency by assuming that educational institutions are the only valid sources of knowledge and rejecting long-standing cultural practices and ways of knowing. An example of working from a deficit model is a teacher assuming that girls, especially girls from a particular ethnic group, are not good at doing engineering course and thus communicate that belief to the students. Not only is this belief inaccurate, but it also places unfair expectations on students' performance. As teachers, it is important to be conscious of our belief system, and if we subscribe to the deficit model, to be intentional to reject it because it has the potential to predispose students to disengagement and undermines their success.

Although academic success is highly valued in school, research shows that an emphasis on grades and achievement can result in fixed mindset among students. When students are constantly evaluated and compared to their peers, they may begin to believe that their intelligence and ability are fixed traits. This can lead to them giving up easily in the face of challenges and setbacks, and discourage them from taking risks and trying new things. To create a learning environment that fosters a growth mindset in all students, schools should emphasise on holistic development of students by supporting students' social-emotional functioning alongside academic learning. This emphasis on holistic development of students could make students less concerned about their academic abilities (Roeser & Midgley, 1997). Additionally, teachers should focus on collaboration, effort, and learning over competition and grades. Teachers should also be mindful of their own beliefs and assumptions about

students and avoid teaching from a deficit model lens. By creating a supportive and inclusive learning environment, teachers can help students to adopt a growth mindset and unlock their potential to succeed.

Potential Impact and Future Directions of Project

This research project aims to study how educators are implementing growth mindset in their classrooms. Based on the findings, a list of research-based instructional strategies and tools to foster growth mindset is compiled, which will then be shared in two 2.5-hour professional development workshops. This project has the potential to make a significant contribution to the field of education by providing insights into how educators are implementing growth mindset in their classrooms and by developing a professional development workshop to help teachers promote growth mindset in their own classrooms to help their students to unlock their potential and achieve success.

The professional development workshop will comprise two sessions of a maximum of 2.5 hours each. The first session will focus on exploring growth mindset and discussing the instructional strategies and tools that can foster it in the classroom. The second session will invite participants to share their experiences on how they have applied their learning from the first session and implemented or facilitated growth mindset in their own classrooms and practice. The professional development workshop would help teachers to develop a deeper understanding of growth mindset, learn about evidence-based instructional strategies and tools that can foster it in the classroom, reflect on their own teaching practices and identify ways to promote it, and share best practices with other teachers.

The project's findings and professional development workshop could have a number of positive impacts on students, including improved academic achievement, increased motivation and perseverance, reduced anxiety and stress, enhanced self-confidence, and a greater willingness to challenge oneself and take risks. Additionally, there could also be

broader implications for the field of education, such as raising awareness of the importance of growth mindset, helping schools to create more supportive and inclusive learning environments, and promoting a more equitable education system.

In the future, this project could be expanded in a number of ways. For example, researchers could conduct longitudinal studies to track the long-term impact of growth mindset on student achievement and other outcomes. They could also develop and evaluate additional professional development resources for teachers and create resources for parents on how to promote growth mindset at home. Additionally, research could also be conducted on how to implement growth mindset in other educational settings, such as early childhood education and adult education. Overall, this research project has the potential to make a significant contribution to the field of education and the lives of students and teachers, particularly by helping students to unlock their full potential and achieve their academic and personal goals.

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Appendix A

Instructional Strategies/Tools to Foster Growth Mindset

	Possible Instructional Strategies / Tools	Growth Mindset Message / Purpose
1.	Brain plasticity	Intelligence can be developed; it is not fixed. The brain forms new connections every time we learn something new and the more we work on a task, the better our brain becomes at carrying out the task.
2.	Focus on process not person when giving feedback	Creates a safe classroom environment as learning process is filled with mistakes and setbacks; focus on students' effort and learning and harness the power of mistakes.
3.	• Guided inquiry • Group work	Opportunity for students to experience a sense of effectiveness and greater control over the learning process, facilitating the view that ability is malleable and controllable.
4.	"Growth Mindset Plan for Facing a Problem"	Helps students visualise what and how to carry out the actions when faced with a problem or challenge so that they will not be easily set off

	Possible Instructional Strategies / Tools	Growth Mindset Message / Purpose
		course; be better equipped to take on a new learning challenge.
5.	"Ask Three then Ask Me"	Promotes collaboration in problem-solving and allows students the opportunity to use metacognitive strategies to think through a mistake or error. Builds their confidence, resilience, and autonomy, and encourages student agency.
6.	"5 Habits of Success"	Developing these habits (Persistence, Challenge seeking, Appropriate help-seeking, Strategy shifting, Response to Setback) helps student to think critically, solve problems and approach complex situations effectively, and can set them up for success in life.
7.	**S**tudy **U**nderstand **P**lan **E**xecute **R**eflect	Guides students to elucidate their problem-solving ideas and persevere to formulate solutions to solve problems instead of . giving up easily. Embrace a growth mindset of a can-do attitude and work towards achieving better.

	Possible Instructional Strategies / Tools	Growth Mindset Message / Purpose
8.	• Success Criteria • Performance Rubrics	Focus on different levels of performance. Students know what is expected of them and track their progress. This helps them to feel more in control of their learning and to develop a sense of self-efficacy, confidence and motivation.

Appendix B

Worksheets on "5 Habits of Success"

Directions: As we review each **Habit of Success** in class, please write a definition for each

one in your own words in the table below.

Habits of Success:	Definition (in my own words)
Persistence	
Strategy-Shifting	
Seeking Help	
Challenge-Seeking	
Response to Setbacks (Failure)	

Directions: Match each example with the correct **Habit of Success**. Write the letter in the table beside each habit.

Habits of Success:	Which example is a good match? (write the letter in the space provided)	
Persistence		
Strategy-Shifting		
Seeking Help		
Challenge-Seeking		
Response to Setbacks (Failure)		

A. My mom told me to make flashcards to study and I tried that, and they just don't help me learn. I didn't remember them, and I didn't do well on the test. For the next vocab test, I tried to make a video to help me remember the words and definitions and I did much better!

B. I have no idea how to do the homework for Algebra. I think my partner knows what to do so I'm planning to ask him in study hall. If he can't help me, maybe I'll ask for a pass to see my teacher during 10th period.

C. We only have to do the odd numbered problems for homework tonight. I know that I need more examples before Algebra really clicks with me so I think I might do a few of the even problems just to make sure I understand it.

D. I got a new desk for my room, and it required assembly. It was really simple, so I tried it, and I had a lot of extra pieces and some spare bolts. I then realized I didn't install the bottom shelf. I had to take the desk apart, read the directions in the manual, and put it together again.

E. I have been trying for 3 years to reach my own personal record of being able to bench press 220 pounds. Yesterday after school, I finally did it.

Directions: While listening to the story, *The Oldest Student*, please record examples of each habit of success from this story.

Habit of Success:	Example(s) from the story:
Persistence (grit)	
Strategy-Shifting	
Appropriate Help-Seeking	
Challenge-Seeking	
Response to Setbacks	

Appendix C

Worksheets on "SUPER" Model

GY Secondary School
Secondary 1E Mathematics
Chapter 5.4 – Formulate Linear Equations to Solve Word Problem

Name: _____   Class: 1E_____   Date: _____

What are some of your concerns?
Share with us!

<u>Level 1 </u>(Book A, Ex 5.4: Q5, Page 140)
Tom is twice as old as Arul.
In 4 years' time, the sum of their ages will be 32
years. Find Arul's age now.

Step 1: Study and Understand
- What are some of the key words in this question? Highlight/ underline it!
- What am I supposed to find?

_____

Step 2: Plan
- Transform word statements into mathematical statements.

- Have you defined your variable?

Define variable	
Word Statements	**Mathematical Statements**
Tom is twice as old as Arul.	
In 4 years' time… Arul's age Tom's age sum of their ages will be 32 years.	

Step 3: Execute

Answer ……………………

Step 4: Reflect

- Does your answer make sense? [common sense vs numerical sense]

- What are some of your considerations:

   - _____

   - _____

_____

Level 2 (Book A, Ex 5.4: Q10, Page 140)

A triathlon includes swimming, cycling and running in one event.

The cycling distance is 4 times the running distance.

The swimming distance is 8.5km less than the running distance and 38.5km less than cycling distance.

Find the total distance of the race.

Step 1: Study and Understand

- What are some of the key words in this question? Highlight/ underline it!

- What am I supposed to find?

_____

Step 2: Plan

- Transform word statements into mathematical statements.

- Have you defined your variable?

Define variable	
Word Statements	**Mathematical Statements**
cycling distance is 4 times the running distance.	
swimming distance is 8.5km less than the running distance	
swimming distance is 38.5km less than cycling distance.	

Step 3: Execute

Answer ……………………

Step 4: Reflect

- Does your answer make sense? [common sense vs numerical sense]

- What are some of your considerations:

  o _____

  o _____

Answer …………………….

_____ Level 3

(Book A, Ex 5.4: Q6, Page 140)

Halim has 4 more $50 notes than $10 notes in his wallet.

If the total value of the notes is $380, how many $10 notes does Halim have?

Step 1: Study and Understand

Step 2: Plan

- Transform word statements into mathematical statements.

- Have you defined your variable?

Define variable	
Word Statements	**Mathematical Statements**
4 more $50 notes than $10 notes	
total value of _____ notes	
total value of _____ notes	
total value of the notes is $380	

Step 3: Execute

Answer …………………….

Step 4: Reflect

- Does your answer make sense? [common sense vs numerical sense]

- What are some of your considerations:

    o _____

    o _____

_____

Write down one thing that you have learnt to address your concern!

Appendix D

Facilitation Plan for Professional Development Session 1

Title:	Unlocking a Student's Potential by Motivating them Toward a Growth Mindset
Objectives:	By the end of the workshop, participants will: 1. gain a deeper understanding of the concept of growth mindset 2. explore effective teaching and learning strategies/tools/ that foster growth mindset 3. apply and share instructional strategies/tools, successes and challenges faced in harnessing growth mindset for motivation in teaching and learning. (more for PD Session 2)
Resources: Padlet (Pre-workshop activity)	https://padlet.com/gyssedutech/my-growth-mindset-gm-classroom-nszrjaaguvwtq13g (Resources on growth mindset and prompts to gather data on participants' understanding and perspectives on growth mindset.)
Video on growth mindset	https://www.youtube.com/watch?v=BWRm1qBeyBc *Growth Mindset: Don't Tell Kids They're "Smart"* is a short animation by Nick Standlea, a former research associate for Mike Csikszentmihalyi at the Quality of Life Research Center. It dives into how to speak to students to foster resilience, long-term success, and a growth mindset.
Participants' Handout	

	Seating arrangement	Participants to sit in groups of 4-5 people.
	Duration	Approximately 2hr 30ms

Time	Activity	Objectives	Description	Resources
10 ms	Welcome and Introduction	Participants will know the workshop objectives and agenda.	Welcome participants, introduce self, and review the workshop objectives and agenda. (Acknowledge that participants come with knowledge and experience, there is collective wisdom to be shared and learned from.)	- Slides - Padlet - Handouts
35 ms	Connecting Activity: Experiencing Growth Mindset as Students	Participants will experience growth mindset as students and reflect on their own growth mindset.	**<u>Draw or Write</u>** 1. Invite participants to think of how they would like to describe who they are. They can write in the form of a short four-line poem, mnemonics, or sketch/draw. Give participants 8-10 ms to work on this. 2. After participants have completed, invite them to share	- Slides, - Papers, pen, coloured markers - Padlet

Time	Activity	Objectives	Description	Resources
			with a partner. Start by introducing their name and school then share – 5ms	
			3. Lead a discussion about the activity. What challenges did participants face? What did they do? Did/How did they try to overcome those challenges?	
			4. From participants' responses and sharing, connect to growth mindset, e.g. persevere instead of giving up, try to draw even though not skillful at it etc.	
			5. Sum up the activity by linking participants' experience to their students in their classroom – invite participants to think of their students; refer to the Padlet on participants' description of their students (pre-workshop activity).	
			OR **<u>Something Creative</u>**	

Time	Activity	Objectives	Description	Resources
			1. Divide participants into small groups of 3-4 people. Give each group small objects (e.g., paper clips, rubber bands, toothpicks, etc.) and a piece of paper. Invite participants to work together to build something creative and innovative using only the objects and the paper. Give participants 5-10 minutes to work on their challenge. 2. After participants have completed their challenge, invite each group to share their creation. 3. Lead a discussion about the activity. What challenges did participants face? Did they give up? How did they overcome those challenges? 6. Close the activity by connecting what participants experienced with students in their classroom – invite participants to think of	

Time	Activity	Objectives	Description	Resources
			their students; refer to the Padlet on participants description of their students. **Seque** – Had the opportunity to experience a challenge and what participants did when faced with a challenge. Next, participants will watch a video on growth mindset and be more aware of how to foster growth mindset.	
30 ms	What is Growth Mindset?	Participants will be able to define growth mindset and explain its benefits.	<u>**Video, Partner Share, Big Group Share**</u> 1. Foreshadow participants that they would be watching a video-clip and respond to some prompts to share after watching the video. 2. Invite participants to reflect on and hold their thoughts to the following question: How have you been implementing growth mindset in your classroom?	- Slides - Video-clip by Nick Standlea - Padlet

Time	Activity	Objectives	Description	Resources
			Participants will share after the break.	
			3. Share prompts for video:	
			- What do you understand are the characteristics of growth mindset?	
			- How would you speak to students to foster growth mindset? Explain why.	
			4. After video, participants to do Partner Share and post their responses to the prompts on Padlet.	
			5. Invite a few participants to share their postings and reflections.	
			6. Close the discussion by connecting participants' postings and reflections and the following:	
			GROWTH MINDSET **(Desire to learn)** Embrace challenges, stemming from a desire to learn.	

Time	Activity	Objectives	Description	Resources
			Persevere in the face of obstacles and setbacks.	
			Doing hard work and putting in effort paves the path to achievement and success.	
			Accept criticism and feedback as important that can aid in learning.	
			View other people's success as a source of inspiration and education.	
			Seque – Had the opportunity to learn how to help students to foster resilience, long-term success, and a growth mindset. Go for 15ms break and after the break will look at research-based instructional strategies and tools for implementing growth mindset in the classroom.	
15 ms	Bio Break			
45 ms	Implementing Growth	Participants will learn	**Instructional Strategies /Tools for Growth Mindset**	- Slides - Padlet

Time	Activity	Objectives	Description	Resources
	Mindset Strategies in the Classroom	about research-based instructional strategies and tools for implementing growth mindset in the classroom.	1. Welcome participants back. 2. Invite participants to share their thoughts to the question that was given before the break: How have you been implementing growth mindset in your classroom? 3. Chart participants' responses and have a brief look at the responses. (Discussion will depend on what participants shared). 4. Share with participants the compiled list of instructional strategies and tools (Appendix A with the right column left blank for participants to complete during their group discussion). Highlight that list has been compiled based on research, classroom observations and interviews. 5. Group discussion – assign each group to look at two	- Handout - Chart

Time	Activity	Objectives	Description	Resources
			instructional strategies/tools and to discuss what and how they promote growth mindset. Complete the right column of Appendix A as they discuss. (Possible discussion questions: - How can **X** (e.g. inquiry-based learning) foster growth mindset in the students? - What can teachers say and or do to encourage students to embrace challenges, learn from their mistakes, and persevere in the face of setbacks?) 6. Invite groups to share their learning from their group discussions and questions they may have. Invite comments, or comment where appropriate. 7. Close the activity by inviting participants to think back to the discussion just before this activity: How have you been implementing growth mindset in	

Time	Activity	Objectives	Description	Resources
			your classroom?" → Has there been any change? Allow participants a couple of minutes to pen down their thoughts using for e.g. "I used to think…now I think…" or other routines of their choice.	
			8. Share with a Stand-up Partner.	
			9. Invite participants back to their seats.	
			Seque – The list of the instructional strategies and tools shared are not exhaustive, and some participants, may already have been using them in their classrooms, just was not aware of the link to growth mindset.	
15 ms	Closing and Q&A	Participants will be able to summarise the key takeaways from the	**Closure and Feedback** 1. Review the agenda and key takeaways from the workshop. Also, answer any questions that participants may have.	- Slides - Padlet - Feedback on Google doc

Time	Activity	Objectives	Description	Resources
		workshop and start to think of how they plan to implement growth mindset in their classrooms.	2. Invite participants to start thinking of how they plan to implement growth mindset in their classrooms. Remind participants of the second workshop that will be conducted in the second semester and look forward to them sharing their application of learning and experiences. 3. Thank participants for their participation, stories, sharing and time. 4. Invite participants to complete feedback for the session (Appendix E) on Google doc.	

Appendix E

Feedback on Unlocking a Student's Potential by Motivating them

Toward a Growth Mindset

Date of Session: _____

Your feedback will assist us in future planning.

Comments on Workshop	Strongly Disagree	Disagree	Agree	Strongly Agree
1. The objectives were achieved.	○	○	○	○
2. The learning resources (e.g. articles, videos, websites, notes, etc.) supported me in my learning.	○	○	○	○
3. I can apply the ideas/knowledge/skills learnt from the workshop.	○	○	○	○
4. The presentation was clear.	○	○	○	○
5. The workshop met my learning needs.	○	○	○	○
6. I would recommend the workshop to my colleagues.	○	○	○	○

Comments on Workshop		Strongly Disagree	Disagree	Agree	Strongly Agree
7.	The questions were adequately addressed.	○	○	○	○
8.	The facilitator/s were skilful at facilitating the participants' learning.	○	○	○	○
9.	The duration of the workshop was sufficient to meet the objectives of the workshop.	○	○	○	○

10. Some useful idea(s) from the session which I would like to apply:

11. Some ways that this learning experience can be improved:

12. Some suggestions for future PD sessions:

I allow my comments to be quoted for promotion of the workshop.

□ Yes □ No

Name of participant: (Optional)

_____

School: (Optional) _____

Thank you for your feedback.