



STUDENTS' MINDSET TOWARDS LIFELONG LEARNING IN THE AGE OF ARTIFICIAL INTELLIGENCE

Anna C. Bocar¹ⁱ,

Ruel F. Ancheta²,

Gina G. Jocson³,

Agustin Cortez, Jr.⁴

¹Assistant Professor, Dr.,
Department of Business and Management Studies,
Gulf College,
Sultanate of Oman

²Assistant Professor, Dr.,
Department of Business and Management Studies,
Gulf College
Sultanate of Oman

³Assistant Professor, Dr.,
Department of Business and Management Studies,
Gulf College,
Sultanate of Oman

⁴Assistant Professor, Dr.,
Department of Business and Management Studies,
Gulf College,
Sultanate of Oman

Abstract:

Learning should continue to be applied even outside the four walls of academic institutions; thus, this study aimed to identify participants' mindset towards lifelong learning. The mixed methods research design was used in this study to collect and analyse both quantitative and qualitative data. A researcher-made survey questionnaire was formulated and encoded in Google Forms to collect the data. Furthermore, it was followed by the participants' interviews through a Focused Group Discussion (FGD), and a thematic analysis was employed to analyze the gathered information. The 180 participants consisted of 91 males and 89 females. They came from different academic levels, and their ages were not recorded since they were not part of the problems to be addressed. Purposive sampling was employed in selecting the participants. The scale of measurement was designed for interpretation purposes. The overall results revealed that the participants are moderately growth-minded ($\mu=2.26$) in terms of how they perceived lifelong learning.

ⁱ Correspondence: email anna@gulfcollege.edu.om

Keywords: growth mindset, fixed mindset, lifelong learning, artificial intelligence

1. Introduction

A mindset is a series of beliefs and repeated thoughts (Durden, 2024) and a way of thinking, attitudes, opinions, and mentality of a person (Triantis, 2013) that is domineering to describe human judgment and decision making which, in some cases, can correct or worsen decision bias. It is built to infer everything we see and experience. When the mindset tends to be pessimistic, then our lives will also be negative, and when the mindset tends to be optimistic, the results will also be positive; similarly, the mindset in the face of change.

A student's mindset articulates how they deal with failure and success in a learning environment, and reflects the image they have of their own learning abilities. As such, it greatly impacts their motivation and the learning habits they develop in the future. Dweck (2019) distinguishes two main types of students' mindsets as *growth* and *fixed*. Students with a *fixed mindset* consider that people's intelligence and capabilities are constant and easily give up. They are resistant to facing challenges and want to remain in their comfort zone. They are also discouraged from using their full potential and perseverance level (Chrisantiana & Sembiring, 2017), while those with a *growth mindset* know that these can be improved and enhanced. When facing a challenge, one will take the struggle as a sign of their limited capabilities.

The existence of modern technology, characterized by what is popularly known as artificial intelligence (AI), has an impact on students' beliefs towards lifelong learning because it changes how students learn throughout their lives. AI, as a device, can do tasks that are related to intelligent beings. With recent technological innovation, there are both positive and negative impact about its implications for lifelong learning (LLL). It creates an intense impact on making students future-ready and relevant to their chosen profession (Srivastava *et al.*, 2020). Students are expected to perceive that lifelong learning and education are linked to their personal development, which is directly related to their professional development. Thus, they are expected to ensure that their mindset towards lifelong learning is not influenced by whatever factors surround them. This study aimed to assess the students' mindset and identify the factors that influenced their way of thinking, especially in the age of modern technology like Artificial Intelligence (AI), that shape their lives.

As assessed by the participants, the study sought answers to the following:

- 1) What is the extent of participants' prevailing mindset towards lifelong learning?
- 2) What are the factors that contributed to the participants' mindset towards lifelong learning?
- 3) How does modern technology like AI affect participants' way of thinking?

2. Theoretical Framework

2.1 Mindset as a Key Factor to Student Success

Human beings spend their entire lives trying to cultivate their minds. Although the creation of technology that resembles humans may seem to provide new difficulties for mankind, these technologies also offer a chance to reevaluate human thought processes. According to a recent study, people who have a growth mindset view human brains to respond more favorably than computers, and they have better mental capacities since they are less worried about disclosing their abilities. Growth mind setters believe that human minds are flexible, and according to Pishghadam (2016) the "*individuals become motivated to communicate when their right senses are tapped*". Human minds are more supportive of the advancement of electronic machine minds, viewing the minds of computers as allies who can help them develop their own minds.

For growth mindsets, electronic machines could not pose a danger to human intelligence but rather present chances for human intelligence to advance. People who have a growth mindset are more likely to use methods to advance themselves (Blackwell *et al.*, 2007). Some of these methods include asking for help from others (Fuesting *et al.*, 2019; Heslin *et al.*, 2008). In addition, growth mindsets are linked to viewing computers as human assistants rather than rivals and to generally positive attitudes toward electronic gadgets. Those who have a growth mindset see obstacles as chances to better existing limits rather than as dangers. People with fixed and growth mindsets may use various coping mechanisms to deal with the challenge that electronic machines bring to human minds. On the other hand, people with fixed mindsets try to avoid difficult circumstances because they perceive challenges as threats. Those who believe that human brains are fixed may find that electronic machines pose a threat to humanity since they have the potential to exceed human mental progress and seize human authority over the globe. They may be more inclined to adopt negative strategies, such as inhibiting the advancement of electronic machines, to outperform them (Dang & Liu, 2022). Fixed mindsets use techniques to show off their skills when faced with obstacles. They show off their skills, for instance, by competing with others. To surpass others, they are more likely to act in ways that are advantageous to oneself but detrimental to others (such as cheating; Blackwell *et al.*, 2007), and they place less importance on teamwork (Murphy & Dweck, 2010).

Furthermore, since mindsets' characteristics response patterns can materialize difficult circumstances, the influence of mindsets about human minds on responses to machines would be more noticeable for mindful as opposed to mindless, like computers (Schumann *et al.*, 2014). As a result, when faced with sensible as opposed to thoughtless machine devices, persons with fixed or growth mindsets may react to them precisely in different ways.

2.2 Factors that Influence Students' Mindset

2.2.1 Self-image

The connection of intelligence to the self-image has drawn attention in educational psychology. Some studies have exposed the effects of intelligence on students' self-image. It is described to have great influence on their thinking about self-image and their mindset towards learning. In the study conducted by Dweck in 2017, students with a fixed mindset believe having a fixed and cannot change no matter how much effort is exerted (Smith, 2020). Fixed mindsets develop a negative perception in life, thinking that intelligence is limited and fixed, leading to low self-esteem and feeling helpless (Blackwell *et al.*, 2007).

As growth mind setters were compared to fixed mind setters, the former view intelligence as a capability to be developed and enhanced through persistent effort and learning; thus, it creates a more positive self-image in practicing and improving their abilities (Dweck, 2006). Having a growth mindset, it develops resiliency and fosters positive growth potential. External factors like feedback and praise from parents and teachers focusing on the efforts and strategies undertaken rather than emphasizing on the innate abilities of students are more likely to develop positive self-image and a growth mindset (Gunderson *et al.*, 2013; Haimovitz & Dweck, 2016), contrary to students being praised or receiving feedback based on their fixed traits like intelligence, which will tend to reinforce a fixed mindset and negative self-image (Cimpian *et al.*, 2007; Rattan *et al.*, 2012).

2.2.3 Challenges

Individuals with a fixed mindset think intelligence is fixed and innate and cannot be changed. Fixed mindset setters consider failure as a reflection of their limited intelligence and inborn abilities. A fixed mindset can lead to anxiety, discomfort, and a lack of guts to take on challenges and accept defeats. Smith (2020) points out that people with fixed minds runaway from challenges to avoid failures and usually ignore feedback from other people.

In comparison, growth mindset students view failures as an opportunity to grow and develop, thinking that intelligence can be developed with persistent efforts, resulting in a positive outlook. They are more likely to portray a positive image and resilience amidst the challenges and setbacks (Blackwell *et al.*, 2007). Growth mind setters consider failures as part of and essential to the learning process, which develops motivation and performance by putting more efforts to lifelong learning because they are willing to accept challenges. Feedback and interpretations of the challenges and failures from the external environment can change the way students perceive their self-image.

2.2.4 Obstacles

The mindset of students relative to their abilities and the way they respond to challenges and obstacles could affect their self-image. Students having a fixed mindset are usually apprehensive when faced with challenges and obstacles because they are afraid to fail, and that will confirm their limitations (Dweck, 2016). Consequently, students with a fixed

mindset would rather embark on less challenging and lower-risk activities because their mindset towards intelligence and talents is fixed and they believe that the effort exerted is worthless (Blackwell *et al.*, 2007).

On the other hand, students with growth mindsets have positive views about obstacles as they believe that these are stepping stones for lifelong learning, resilience, motivation and better performance (Smith, 2020). They are likely to accept more challenging and riskier tasks alongside seeking strategies to overcome these obstacles towards a successful academic journey. They consider feedback as a way to support lifelong learning. However, when students are valued based on their efforts and inculcating that mistakes are inculcated as just part of lifelong learning, they develop a growth mindset and positive attitude towards obstacles and failures.

2.2.5 Effort

Feedback from teachers and parents may even influence the mindset of students towards the value of effort to achieve successful learning. The studies of Cimpian *et al.* (2007) and Rattan *et al.* (2012) conveyed that excessive praise based on students' inborn abilities may only strengthen the fixed mindset. Dweck (2006) articulated that students with a fixed mindset tend to portray a negative perception of exerting effort because they consider intelligence and traits to be inborn and unchangeable. On the other hand, she explained that growth mindset students value exerting effort in developing abilities. The growth mindsets underscore the importance of exerting effort as a way of achieving growth and development and achieving competence. Students with a growth mindset are more resilient when faced with challenges. They tend to put more efforts to learn even when confronted with uncertainties and manifest a positive mindset. Students who are classified as growth mind setters receive recognition for their efforts and hard work made may further reinforce their mindset (Gunderson *et al.*, 2013; Haimovitz & Dweck, 2016). Students' mindset affects their perception of the value of exerting effort. A fixed mindset can lead to a negative view of effort and considers worthless to exert further effort since abilities, based on their understanding, are fixed and static as they grow. Since fixed mindsets believe that innate abilities and intelligence cannot be changed, they would rather turn away from exerting extra effort. Promoting a growth mindset environment and instilling the value of effort would develop a more energetic and focused mindset.

2.2.6 Criticism

The perception of students and the corresponding response to criticism affects their mindset. This mindset is enormously critical in influencing students' behaviour. It affects how they feel, think, and behave in a certain situation (Cherry, 2022). Because of this mindset, students' reactions to criticism and outcomes can be affected. Since fixed mindsets consider intelligence and abilities as fixed and static traits, criticisms apparently become a threat and a personal attack on their capacities. It could also be seen as a manifestation of their limited capabilities, which may lead to the feeling of helplessness, shame, and lack of motivation. Students with a fixed mindset avoid the feedback of others

as they think they are being judged and criticized, which may hinder their opportunity to grow (Mueller & Dweck, 1998).

While growth mindset students perceive that their intelligence and other distinct traits can be enhanced; thus, they accept feedback as an opportunity to learn and the views of others as a source of inspiration to further develop their skills (Smith, 2020). Criticism and feedback from others are essential sources of information and inspiration as long as these are provided properly, considering the different mindsets of students. To fixed mindset students, they view criticism as negative and promote negative behaviour and makes them indifferent to accepting challenges and failures. On the part of growth mindset students, criticisms are taken as a motivator to excel further. Positive feedback from the environment and proper interventions can lead to better acceptance and response to criticisms. Providing opinions and criticism is necessary since people are not totally able to comprehend and are not totally aware of everything they do. Criticisms may either boost the spirit to do better since it reinforces positive behaviour to growth mindset students (Haimovitz & Dweck, 2016); or it can validate students with a fixed mindset when harsh or judgmental criticisms are made (Rattan *et al.*, 2012); thus, avoiding challenging tasks to avoid failures.

2.2.7 Success of Others

Students have different mindsets; as such, it will affect how they process the success of others. Their reactions, either positive or negative it may vary in degree. Fixed mindset students believe that their intelligence and talents are fixed and static; thus, they may feel threatened by the success of others as they consider them threats to their self-worth. This mindset may lead a feeling of resentment, envy, and discourage as they see the success of others as a reflection of their limited abilities to compete. Students with growth mindset consider the success of others as inspiration for them to do better. It gives them a source of motivation and encouragement, knowing that they too can do it in the same manner or better. They think that the success of others is only a manifestation of what they can achieve given the opportunity and proper motivation. Proper and positive reference to the experiences of people who became successful can influence the perception of students towards their success. Teachers and parents play a pivotal role in this change of perception of students towards the success of others as they are in primary contact with them (Aronson *et al.*, 2002). It will eventually bolster the spirits of the students and develop a more dynamic and positive approach to excel.

2.2.8 Importance of Lifelong Learning

The term "lifelong learning", as defined by Bagnall (2009), refers to the accumulated learning achievements made by an individual up to a particular point in their educational journey, or the entire learning accomplishments made throughout their lifetime. Barros *et al.* (2013) cited that lifelong learning has pressures with consequences for educational practices and theoretical-scientific priorities. According to Demirel (2009), a learner who is faced with a constant flow of assignments is better served by lifelong learning. These kinds of situations offer the chance for beneficial outcomes, which happen when

information is applied to several tasks related to learning (Thrun, 1998). A number of approaches to lifelong learning are assessed in the topic of recognition in order to investigate the usefulness of transferred knowledge. Additionally, McCombs & Marzano (1990) stated that humans have a natural desire to learn, grow, and develop throughout their lives, a predisposition that is supported by "uncovering" one's inherent learning preferences, enjoying the process of learning, and minimising or doing away with unfavorable, insecure ideas and belief systems.

Department for Education and Employment (1998) explained that to maximise young students' job chances and to be part of society's inclusive labor, they have to be responsible for their lifelong learning, p. 11 (as cited in Bathmaker 2001). Dela Harpe & Radloff (2000) held that to be part of the learning society, a greater extent of students' lifelong learning is a must. This indicates that students possessing a varied range of perceptive learning approaches are aware of themselves as learners who are driven to acquire knowledge and can cope with their state of mind while effectively using the available resources. Knapper and Cropley (2000) deliberated lifelong learning in the view of customary perceptions of tertiary education, and claim that educational institutions have important roles in preparing students for lifelong learning before they are exposed to the employment world.

Riley & Claris (2008) referred to lifelong learning as a comprehensive explanation where learners can recognize aims for their education, measure their acquired knowledge progress and mark modifications in their educational journeys for goal achievements. The method is known as self-directed learning, and this started the essential skill set assisting lifelong learning abilities (Candy, 1991), where lifelong learning is viewed as enjoyable and motivational to students themselves as they see the benefit in it. While still in colleges or universities, Cropley & Knapper (2021) advocated that learners must be dynamic students able to plan and evaluate their personal learning engagement, acquire prescribed and informal educational situations from their co-students and their teachers; incorporate the knowledge acquired across specialisations, participating co-curricular events and accustom themselves to the diverse learning schemes in varied circumstances.

2.2.9 Impact of Modern Technology such as Artificial Intelligence (AI) on Students' Mindset

Numerous studies are demonstrating the potential benefits of using AI across numerous industries. Without a precise definition and understanding of AI, researchers will not be able to assess the implications of this technology on growth-mind setters or fixed-mindset individuals. The concept of AI has been published in many articles; some of them have been mentioned in other studies, while others have not. For this reason, the researchers in the current study concentrated on the definition cited by Collins *et al.* (2021) since they believe it has important effects for the issues the study seeks to solve.

The Collins *et al.* (2021) study cites the definition from Minsky (1958), who indicates that intelligence is typically defined as "*the ability to solve hard problems.*" In addition, their citation came from Longoni *et al.* (2019), who defined AI as the algorithms, procedures, processes, or systems that carry out cognitive, perceptual, and

conversational tasks that are typical of the human mind (p. 84). Min *et al.* (2023) stated that AI technologies are drastically changing how people use technology, communicate, and interact with each other and with organisations (as cited in Gholami & Al Abdwani, 2024). The capacity of a computer to carry out cognitive tasks that were identified with human brains, including sensing, thinking, learning, interacting with the environment, solving problems, making decisions, and even exhibiting creativity, is known as artificial intelligence. Conversely, examples of machines with artificial intelligence include computers. A computer is defined as a device that may be configured to automatically perform a series of logical or mathematical operations. The researchers make an effort to relate these definitions to the two types of people's mindsets. These people can be classified as either growth or fixed mind setters. According to Dweck *et al.* (1995), mindsets are people's opinions on the flexibility of psychological traits or moods. A person's mentality may be categorized as either fixed or growth. People with a fixed mindset believe that human qualities are unchanging and immutable, whereas people with a growth mindset believe that human attributes can be changed gradually with work and knowledge (Hong *et al.*, 1999).

3. Methodology

The researchers utilised a descriptive survey method supported by thematic analysis to determine the participants' mindset regarding lifelong learning in the modern era with AI technology. The data were collected through random sampling. The potential participants of the study have equal opportunity as part of the study since random sampling assists in moderating partiality, thus increasing the soundness and consistency of research results.

3.1 Research Design

This study used a mixed methods research design to explore the students' mindset towards lifelong learning in the age of modern technology (AI). Mixed methods is a research method that is utilised to collect and analyse both quantitative and qualitative data within the same study (Creswell & Plano, 2011). The first part was done through the use of a questionnaire. For the second part, interviews were conducted through a Focused Group Discussion (FGD). A thematic analysis was employed to analyze the information gathered from the participants.

3.2 Participants

The 180 officially registered students were the participants of the study. Based on the 180 participants, 91 were males, and 89 were females. One hundred thirteen (113) were from level 4, 29 from level 5 and 38 from level 6. The ages of the participants are not recorded since they are not part of the problems that the researchers would like to address. According to Johnson and Christensen (2004), 6-12 people are enough to appropriately answer questions from a homogeneous sample in a focused group discussion; thus, for

the FGD, 25 selected participants were also chosen randomly to validate and gather additional information in relation to their perceptions expressed in the questionnaire.

3.3 Research Instrument

The tool used in this study is a researcher-made survey questionnaire. The researchers' ideas are inspired by Brassey & van Dam (2017), who authored an e-book entitled *Staying relevant in the workplace: Develop lifelong learning mindsets*. The researchers carefully constructed the indicators, and the survey questionnaire was formulated to fit the needs of the study (See Appendix 1). The formulated questionnaire was validated by experts. After the validation, the contents of the questionnaire were encoded in Google Forms and shared with 25 participants who were randomly selected to dry-run the questionnaire. They were not considered as participants of this study. The comments and suggestions to make the indicators clear, simple and understandable were incorporated. Four qualitative descriptions that express the degree of participants' insights on the indicator were assigned with their corresponding verbal interpretation. To interpret the results, the following qualitative scale of measurements was utilised (Table 1).

Table 1: Qualitative Scale of Measurement

Mean Range	Qualitative Description	Verbal Interpretation
1.00- 1.75	Strongly Disagree (SD)	Extremely a growth minded (<i>High level achiever type</i>)
1.76- 2.50	Disagree (D)	Moderately a growth minded (<i>Achiever type at great extent</i>)
2.51- 3.25	Agree (A)	Moderately a fixed- minded (<i>Less achiever type at low extent</i>)
3.26- 4.00	Strongly Agree (SA)	Extremely a fixed- minded (<i>Less achiever type</i>)

3.4. Procedure

3.4.1 Data Collection

The data for this study were gathered from the 180 participants using Google Forms. The Google Forms link was sent to the participants. They were asked to express their perceptions of their mindset towards lifelong learning in the age of modern technology. Since the questions were structured, the participants had to select the qualitative descriptions that corresponded to the indicators mentioned therein. The FGD was also conducted afterward to validate the participants' feedback.

3.4.2 Data Analysis

3.4.2.1 Phase 1

The 6-item questionnaire was categorised according to the factors and beliefs of the participants on how that affects their mindset, namely self-image, challenges, obstacles, effort, criticism and success of others. The researchers utilised the qualitative scale of measurement, which has its corresponding numeric value from 1 to 4 that would describe their views, namely: Strongly Disagree (SD): 1; Disagree (D): 2; Agree (A): 3; and Strongly

Agree (SA): 4, followed by its corresponding verbal interpretation (Table 1). The weighted mean formula is utilised to statistically calculate the average for each item and the factor average. The factor average of each category was the basis for determining the students' mindset.

3.4.2.2 Phase 2

After the FGD, the researchers recorded, analysed, and interpreted the data. The researchers used theme analysis and scrutinised the data to identify common themes, ideas, and patterns of meaning that came up repetitively. The theme refers to the occurrence of patterns during the coding of the information. The central ideas refer to the specific ideas that suggest the theme. The occurrence of the participants' responses dealt with the rate of occurrence of the idea. The theme includes *General* - if the occurrence of the responses was 50% or more; *Typical* - if the responses occurred 21-49%; and *Variant* - if the responses occurred 20% or less. The researchers also used the following steps and processes in using thematic analysis, according to Caulfield (2019):

- **Step 1. Familiarisation of data.** The first step was to transcribe the responses, make some initial notes, and look over the data in general.
- **Step 2. Coding of responses.** The second step was to highlight sections of the text and label them with codes. Each code describes the participants' views expressed in the text. The data were collated into groups to get a quick look at the main points and common meanings that kept appearing in the data.
- **Step 3. Generating themes.** The third step was to examine the codes created, identify patterns among them, and start coming up with themes.
- **Step 4. Reviewing themes.** The fourth step was to confirm that the themes if accurate by defusing, combining, and discarding if there are inconsistency and creating new ones.
- **Step 5. Naming themes.** The fifth step was to define themes and name them to understand the data.
- **Step 6. Writing up.** The sixth step was to prepare the write-up for the analysis of the data.

4. Results

4.1 Phase 1: Students' Mindset towards Lifelong Learning

Table 2 displays the over-all mean range results of the participants' mindset towards lifelong learning.

Table 2: Student's Mindset towards Lifelong Learning

Students' Mindset	Mean Range	Qualitative Description	Verbal Interpretation
1. Fixed Mindset - Moderately Fixed-minded	2.80	A	Less achiever type at low extent
2. Growth Mindset - Moderately Growth Minded	2.25	D	Achiever type at great extent

- Extremely Growth Minded	1.75	SD	High level achiever type
Overall Mean	2.27	D	Achiever Type at Great Extent

As shown in Table 2, the students' mindsets vary depending on their beliefs and ways of thinking, attitudes and mentality on how to achieve learning both inside and outside the classroom. Statistically, from the overall mean shown above, it can be gleaned that the participants are achiever type at great extent; thus, they are **moderately growth-minded** ($\mu = 2.27$) students in terms of how they perceived lifelong learning. It implies that undergraduate students who participated in this study are already goal oriented as they manifested in their perception and beliefs. It signifies that they value the effort they exerted, accept criticism that directs them toward change ($\mu = 2.25$), and are inspired if they see others' success ($\mu = 1.75$). According to the study of Vandewalle (2012), goal orientation alone is not enough to predict learning. However, Duckworth and Eskreis-Winkler (2013) stated that people who have a growing appreciation of the efficacy of effort as they aged increases their determination and perseverance. Therefore, students who exert much effort on their academic challenges can change their mindset that intelligence level is not fixed and it can be changed if they are persistent in facing all challenges and obstacles.

On the other hand, students with a fixed mindset are those whose ways of thinking are contrary to those with growth mindedness. It was revealed earlier that fixed-minded students believed that intelligence is constant and static. Furthermore, they believed that failures and mistakes affect their image, and normally they avoid challenges in life ($\mu = 2.80$). Smith (2020) clarified that a person who is fixed-minded usually believes that attributes are fixed and static and usually avoids challenges in life, gives up easily on challenges in life, and is threatened by the success of others. It implies that fixed-minded students think negatively and are not smart enough to overcome challenges and obstacles.

4.2 Phase 2

To support the results of the study, the researchers implemented a thematic analysis of the FGD data. Main themes are shown below, indicating those factors that contributed to the students' mindset towards learning. The researchers categorised the results and presented them as follows:

Table 3: Themes and Core Ideas that Contribute to the Participants' Mindset towards Lifelong Learning

Themes (Factor)	Core Ideas (that lead to Students' Mindset)	Frequency of Response
Self-Image	Fixed-minded - Poor confidence - Self-doubt - Feeling unworthy (untalented)	General (63%)
Challenges	Fixed-minded - Challenges and failures are risky - Easily gives up on life's challenges	General (64%)
Obstacles	Fixed-minded	General

	- Avoid being judged by others - Treats criticism personally	(77%)
Effort	Growth Minded - Efforts are worthy - Efforts lead to mastery	General (66%)
Criticism	Growth Minded - Willing to accept criticism - Views criticism as a challenge	General (51%)
Success of Others	Growth Minded - Source of inspiration - Motivation for improvement	General (78%)
Influence of AI	Growth Minded - Helps improve innate skills - Transforms the way of thinking	General (52%)

4.2.1 Self Image

Generally, students who believe that intelligence is constant are those who have poor confidence. They always have self-doubt and feel they are not talented. The flexibility of their intelligence shows little change. According to Dweck (2007), those who believe that personal qualities are engraved and do not feel the need to create an urgency to prove themselves over and over suggest that they are not smart or talented. It denotes that fixed-minded students assume that their intelligence and creative abilities are static, which they cannot change in any meaningful way. The result of the current study signifies that 63% of the participants are fixed-minded students when it comes to their self-image.

4.2.2 Challenges

In general, the participants are afraid and fear of challenges and academic failures, as it might affect their self-image. They believed that failures are risky and might affect their personality. The findings of the current study support the theory of Smith (2020), which says that perception and response to failures can change the self-image of students and their mindset in learning, acceptance of failures, and in shaping their behaviour and attitude. This implies that fixed- minded students usually avoid challenges, are easily discouraged, and hide flaws for fear of judgment and criticism by others. Additionally, they also have a feeling of giving up when encountering life's challenges. It can also be implied that they are distracted when confronted with challenges and failures. Cimpian *et al.* (2007) pointed out that fixed-minded people tend to be threatened by challenges and failures that have a direct impact on their self-image. The findings of this study show that 64% of the participants are fixed-mindset setters in relation to challenges.

4.2.3 Obstacles

Participants with a fixed mindset avoid being judged by others. For them, the labels and judgments they heard about somebody, like excellent student, clever, smart and so forth, are implicitly a personal criticism of them, which affects them so much. For them, they felt that these are continuous measurements of their beings and it seems their worth as a

person is at stake. As mentioned earlier by Cimpian *et al.* (2007) and Rattan *et al.* (2012), feedback and interpretations by parents and teachers can affect how students react to obstacles, especially when students are commended based on their abilities, and excessive reward-giving will only strengthen a fixed mindset. It implies that a fixed mindset leads to a fixation on labels, and praise is damaging, as students' attitude and behaviour are influenced by their perception and response to obstacles during the academic journey. The 77% of the participants in this study reflected that they are fixed-mindsetters in terms of obstacles.

4.2.4 Effort

In terms of exerting effort as a student, the participants generally considered it a way of development and a means to mastery of a certain skill. They firmly disagreed that putting effort into their studies is unpleasant and unrewarding. Kiendl (2015) articulates that mastery is the execution of a certain skill at a very high level in a given field. The path to mastery starts when students take action too intensely and deeply discover their area of interest dependent on where they are in their journey. It can be implied that one's actual skill level is sometimes high, medium, or even low. But the transformation lies in the attitude we take to obtain and progress our skills. 66% of the participants in this study demonstrated that they are growth-minded students when it comes to exertion of efforts.

4.2.5 Criticism

51% of the participants expressed that they are open to criticism. They view criticism as a challenge that can direct them to change for improvement. This perception shows that they are growth-minded in terms of feedback provided to them, as Mueller and Dweck (1998) said that there is always room for improvement. Smith (2020) argued that people with a growth mindset are willing to accept and embrace challenges brought about by the criticism received, as well as the comments of others, because they take it as a guide and source of information. He added that the manner of providing feedback and criticism, and how these are accepted, can spell the difference depending on the mindsets of the students.

4.2.6 Success of Others

In general, the participants expressed that they are inspired to see others' success. They treated it as a source of inspiration to develop their potential. It implies that the participants are now aware of the importance of lifelong learning as their weapon for success and as a way they see people who have achieved a lot of things due to acquired hard skills. Mangels *et al.* (2006) clarified that proper recognition of the success of others by highlighting the efforts exerted can further inspire and ignite the diligence to work harder and reinforce the growth mindset.

4.3 Impact of Artificial Intelligence (AI) on the Students' Mindset

Of the aforementioned factors that affect students' mindset, it can be gleaned that their perception towards lifelong learning is also affected by the emergence of modern

technology, particularly AI. For fixed-minded students, they believe that exerting effort is unrewarding as everything is now available online. For them, all challenges and obstacles encountered as part of their academic journey are no longer a problem as they rely on the help of AI tools in meeting their academic requirements; thus, exerting effort is believed to be unfulfilling. To a fixed mindset person, if effort is exerted, it is tantamount to manifesting helplessness and incompetence. As a result, fixed mindsets may perceive that success can be achieved effortlessly rather than being aggressive in facing challenging tasks and give up when confronted by difficulties (Blackwell *et al.*, 2007).

On the other hand, for a growth minded students, intelligence and self-image are not static. They believed that intelligence can be developed, and the challenges and obstacles they met on their academic journey made them stronger and prepared them to become more persistent in the face of setbacks. Criticism for them served as room for advancement. Thus, the presence of AI helps them improve their innate skills, which they perceived as strengths and opportunities as students. This is relevant to Djokic *et al* (2024), who highlighted that growth-minded students believed that the leading advantage of AI is the virtual assistance they got, especially the universal access. Moreover, while considering the evaluation process, most students identified constant feedback as the main benefit.

In addition, Canning, Muenks, and Murphy (2019) said that students taught by growth mindset professors have significantly outperformed those students in a fixed mindset classroom. Interventions can make a difference in shifting fixed mindsets to growth mindsets. Inculcating the flexibility of intelligence and the will to develop and grow leads to a more adaptive mindset and enhances self-image (Dweck, 2006; Aronson, Fried, & Good, 2002). It implies that growth-minded students consider the emergence of AI as electronic machines that influence their mentalities. In particular, growth-mindset students respond to electronic machines more positively or less negatively than those who have a fixed mindset. This is similar to what Aisyah *et. al* (2024) concluded: the development of AI has had a substantial effect on students' way of thinking in this digital era. They asserted that AI has transformed the way students think, learn, and relate to knowledge, opening up new opportunities and challenges in the world of higher education

5. Discussion

As revealed in the results of the present study, the extent of students' mindset towards learning in the age of modern technology turned up into three categories, namely: moderately fixed-minded ($\mu=2.80$); moderately growth-minded ($\mu=2.25$); and extremely growth-minded ($\mu=1.75$) (See Table 2). Moreover, in the said Table the overall calculated weighted mean is 2.27, which is interpreted as *Moderately Growth Minded*. This interpretation signifies their prevailing mindset; thus, participants are achiever type at great extent.

Students whose mindset is moderately fixed have the belief that their abilities are unchangeable. It can be noted that their perspective led to the view that success or failure is a reflection of innate proficiency, often limiting personal growth. This is aligned with Pilat and Sekoul (2021), who asserted that those with a fixed mindset are incredibly restrictive and are unable to do something, which causes them to dedicate less effort to accomplish something, as they feel that there is no point in trying. In addition, they mentioned that this lack of effort produces subpar results, which strengthens the idea that the task is simply too challenging. However, students' views of their intelligence are linked to their commitment to engage in active learning (Cavanagh *et al.*, 2018).

Furthermore, the results show that the majority of the participants are both moderately and extremely growth minded on their way of thinking, which can be labeled as achiever type of students at great extent and high-level achiever type, respectively. They are those who perceive that, in search of lifelong learning, there is a need to exert more effort and take criticism positively to achieve excellent academic performance. Generally, they are those who view criticism as a challenge for improvement and success. This finding is supported by Stec (2015), who asserted that students with a growth mindset may view their academic performance as a result of their efforts and experiences. He also added that students with a growth mindset believe that their abilities can be improved with practice, so they do not solely control their own learning and achievement.

The presence of modern technology like AI motivated the growth-minded students to improve their weaknesses more in achieving their academic goals. Using AI on their academic journey can be considered as the gateway to improve their skills. Text-to-text AI generators can provide writing assistance to students, especially non-native English-speaking students. The use of ChatGPT enables students to develop their writing abilities by brainstorming ideas generated by AI tools. This finding is supported by Mizumoto and Eguchi (2023), who stressed that generative AI has the potential to transform the teaching and learning process as well as improve student outcomes in higher education. However, it is advised that these modern technologies must be used with caution, and ethical considerations must not be set aside. This is similar to what Asad and Ajaz (2024) asserted: students have to carefully look at the advantages and downsides of these technologies to avoid restrictions or compromising academic integrity.

This study contributes to the body of knowledge in the field of educational in terms of teaching and learning. Specifically, the study provides benefits to individuals and society, particularly the students, teachers, curriculum planners, and employees. Furthermore, it benefits the Schools, Higher Education Institutions, business organisations, and the government and its regulatory bodies.

To the students, the study makes them aware of their potentialities and enables them to expand their perspective towards a mindset of lifelong learning, thereby making them critical thinkers and productive and responsive in their actions. It provides and empowers students to deal with diversity, complexity and positive changes in learning

motivation, social interaction, general wellbeing and life satisfaction (Manninen & Merilainen, 2011).

For teachers, a wider understanding of learners' and students' mindset on lifelong learning will guide them in establishing appropriate measures and strategies to unlock the mentality of students towards lifelong learning and make them aware of their potential and critical mind.

For the curriculum planners, a clear understanding of the peculiarities of the students' mindset on lifelong learning will guide them to formulate a responsive curriculum that will be implemented to guide the teachers in crafting the appropriate tools and strategies to broaden the understanding of the students and learners towards their mindset of lifelong learning.

For the employees, a broader understanding of the lifelong learning mindset could unlock the curiosity, strategic thinking, and resilience which are associated with career success.

For schools and HEIs, the study opens possible opportunities for them to open programs and activities that will cater for students and learners with difficulties in aspects of learning.

To the business organisations, a better understanding of the mindset of the employees towards lifelong learning could guide them in formulating necessary programs and interventions to further the potential of the employees to achieve productivity.

To the government and its regulatory bodies, the study provides inputs in the formulation of relevant policies and regulations that will support the programs of the academic institutions and business organisations that will encourage and further develop the potential of the students, learners and the employees.

Nowadays, in the era of modern technology, students are moderately growth-minded. Though it can be observed that not every student is exerting enormous attention to enhance their knowledge, comprehension, and abilities to learn, modern technologies are useful to almost all human endeavors. Social media and the internet provide voluminous information that a person needs, although it is the individual's responsibility to ensure that the said information is true and correct. It is ascertained from the output of this study that the mindset of students towards lifelong learning, specifically in terms of integrating technological advancements through artificial intelligence, indicates a significant role in balancing their attitude towards life's chances and academic practices.

Educational institutions can focus on adding more activities to their curriculum. In addition to unique skills, these can help students develop a more positive outlook and encourage realistic meaning in their strength, determination, and perseverance in continuous learning. Teachers and academic personnel who are directly in contact with students can provide valuable feedback, praising and encouraging students' strategic efforts to cultivate an optimistic sense of growth mindset, in addition to developing intellectual capabilities. It is necessary that stakeholders in education work together to foster students' positive outlook, which increases motivation, flexibility, and adaptability in their journey to lifelong learning. Parents can remind their children that cultivating a

positive mindset, setting clear goals, and taking consistent actions can transform thoughts into reality. More enhanced educational strategies integrating judiciously the best technology with artificial intelligence can be provided by educational entities. This way enriches the experiential learning of students and promotes an adaptable mentality in life circumstances. It is recommended that further investigations be conducted to cover more variables, a larger population and a wider scope of the study that addresses additional bodies of knowledge regarding lifelong learning and coping with the current era of technological advancement.

In conclusion, the importance of studying mindset and technology leveraging helps in discovering whether the students are hindered or empowered in their approaches to facing chances and challenges in lifelong learning. This output has a potential contribution to students' development and progress as they navigate difficulties during the current trend of technology-based education. By addressing the influential factors of students' mentality towards education, a beneficial learning system that stimulates long-lasting personal growth and lifelong learning can be crafted by educators.

Funding Statement

The research did not receive any specific grants from funding agencies.

Creative Commons License Statement

This research work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit <https://creativecommons.org/licenses/by-nc-nd/4.0>. To view the complete legal code, visit <https://creativecommons.org/licenses/by-nc-nd/4.0/legalcode.en>. Under the terms of this license, members of the community may copy, distribute, and transmit the article, provided that proper, prominent, and unambiguous attribution is given to the authors, and the material is not used for commercial purposes or modified in any way. Reuse is only allowed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

Conflict of Interest Statement

The authors declare no conflicts of interest.

About the Author(s)

Dr. Anna Bocar is a seasoned academic professional with more than 30 years of experience in higher education, specializing in Business Management and Law. As an Assistant Professor, she has consistently demonstrated excellence in teaching, research, and academic service. She has authored approximately fifty research papers published in reputable national and international journals and conference proceedings. Her scholarly work reflects deep expertise in management practices, and interdisciplinary research approaches. She is an active contributor to academic discourse, having presented numerous papers at both national and international conferences. Her research

contributions have earned her multiple Best Paper Awards, highlighting the originality, relevance, and impact of her work. She is known for combining her teaching practice with active research engagement, contributing to academic development through publications, conference participation, and curriculum-related work in higher education. To view her research articles please visit:

Google Scholar: <https://scholar.google.com/citations?user=D6DANk4AAAAJ&hl=en>

Scopus ID: [57209177594](https://scopus.com/authorid/57209177594)

SSRN: <https://ssrn.com/author=870740>

ResearchGate: <https://www.researchgate.net/profile/Anna-Bocar>

ORCID: <https://orcid.org/0000-0002-3895-7567>

Dr. Ruel F. Ancheta is currently an Assistant Professor and a Module Leader at Gulf College with more than 3 decades of teaching experience at graduate and undergraduate levels. He also has massed industry experience in the field of Human Resources Management, Training and Development. He is a doctorate in Educational Management from Eulogio Amang Rodriguez Institute of Science and Technology, a Master's in English Language Teaching from Philippine Normal University, and a bachelor's in Secondary Education with a major in English from Romblon State University. He published several papers in referred journals including Scopus-indexed journals. His research interest includes English Language Teaching, Educational Management and Leadership, Human Resources Management and Development, and Social Sciences.

Scopus ID: [59748074700](https://scopus.com/authorid/59748074700)

ORCID: <http://orcid.org/0009-0002-2023-8342>

Dr. Gina G. Jocson is currently an Assistant Professor at Gulf College, Oman, with over 30 years of teaching experience in higher education. She holds a Doctor of Philosophy in Management and is a licensed professional teacher. She previously served as a Research Head at a college in the Philippines, where she led institutional research activities and supported the development of a strong research culture. Dr. Jocson has published research articles, conference papers, books, and reviews in international refereed journals. Her research interests include Educational Management, Human Resource Management/Leadership, Social Science and Technology, Business Quality Management and Multidisciplinary research fields. She continues to contribute to teaching, research, and student development through her academic work and professional experience.

Scopus ID: [57280870700](https://scopus.com/authorid/57280870700)

ORCID: <https://orcid.org/0000-0003-0118-6954>

Dr. Agustin Cortez, Jr., is a highly accomplished academic and industry professional whose career in higher education spans more than two decades across basic, undergraduate, and postgraduate education. He holds a Doctor of Philosophy in Management, a Master of Business Administration, and a Bachelor of Science in Accountancy, providing a strong foundation for his multidisciplinary expertise. Beyond academia, his extensive experience in the manufacturing, construction, and cooperative sectors enables him to enrich classroom instruction with practical industry perspectives. Over the years, he has taught a wide range of business disciplines, including management, marketing, operations, accounting, finance, human resource management,

and business law. Prior to joining Gulf College in 2015, he held senior administrative positions in a state college in the Philippines, leading significant accreditation initiatives. A certified trainer, assessor, and registered professional teacher, he continues to pursue research in strategic business operations, marketing, management, and internal control systems.

ORCID: <https://orcid.org/0009-0003-1886-7016>

References

- Aisyah, Dwi Yulianti, P., Yandhini, S., Putri Sari, A. D., Herawani, I., & Oktarini, I. (2024). *The Influence of AI on Students' Mind Patterns*. BICC Proceedings, 2, pp. 183–186. <https://doi.org/10.30983/bicc.v1i1.125>
- Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology*, 38(2), 113-125. <https://doi.org/10.1006/jesp.2001.1491>
- Asad, M.M. & Ajaz, A. (2024). Impact of ChatGPT and generative AI on lifelong learning and upskilling learners in higher education: unveiling the challenges and opportunities globally, *International Journal of Information and Learning Technology*, 41(5), pp. 507-523. <https://doi.org/10.1108/IJILT-06-2024-0103>
- Brassey, J., & van Dam, N. (2017). *Staying relevant in the workplace: Develop lifelong learning mindsets*. 1st Edition. 10-13.
- Blackwell, L., Trzesniewski, K., & Dweck, C. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development*, 78(1), 246-263. <https://doi.org/10.1111/j.1467-8624.2007.00995.x>
- Bagnall, R. G. (2009). *Lifelong learning as an idea for our times: An extended review*. p. 1. <https://doi.org/10.1080/02601370902805395>
- Barros, R., Monteiro, A., Nejmedinne, F., & Moreira, J. A. (2013). The relationship between students' approach to learning and lifelong learning. *Psychology*, 792-797. <http://dx.doi.org/10.4236/psych.2013.411113>
- Bathmaker, A. M. (2001). 'It's the perfect education': lifelong learning and the experience of foundation-level GNVQ students. *Journal of Vocational Education & Training*, 53(1), 81-100. <https://doi.org/10.1080/13636820100200144>
- Canning, E. A., Muenks, K., Green, D. J., & Murphy, M. C. (2019). STEM faculty who believe ability is fixed have larger racial achievement gaps and inspire less student motivation in their classes. *Science Advances*, 5(2). <https://doi.org/10.1126/sciadv.aau4734>
- Cavanagh, A., et al. (2018). Trust, growth mindset, and student commitment to active learning in a college science course, *CBE-Life Science Education*, 17(1), <https://doi.org/10.1187/cbe.17-06-0107>

- Cimpian, A., Arce, H. M. C., Markman, E. M., & Dweck, C. S. (2007). Subtle linguistic cues affect children's motivation. *Psychological Science*, 18(4), 314-316. <https://doi.org/10.1111/j.1467-9280.2007.01896.x>
- Candy, P. C. (1991). *Self-Direction for Lifelong Learning. A Comprehensive Guide to Theory and Practice*. Jossey-Bass, 350 Sansome Street, San Francisco, CA.
- Cropley, A., & Knapper, C. (2021). *Lifelong learning in higher education*. Routledge. <https://doi.org/10.4324/9780203969281>
- Cherry, K. (2022). What Is a Mindset and Why It Matters? Retrieved from <https://www.verywellmind.com/what-is-a-mindset-2795025>
- Collins, C., Dennehy, D., Conboy, K., & Mikalef, P. (2021). Artificial intelligence in information systems research: A systematic literature review and research agenda, *International Journal of Information Management*, 60. <https://doi.org/10.1016/j.ijinfomgt.2021.102383>
- Caulfield, J. (2019, September 6). *How to do thematic analysis: A step-by-step guide*. Scribbr. Retrieved from <https://www.scribbr.com/methodology/thematic-analysis/>
- Creswell, J., & Plano, C. (2011). *Designing and conducting mixed methods research*. Thousand Oaks, California: BMJ Publishing Group, 2011. Retrieved from https://books.google.ro/books/about/Designing_and_Conducting_Mixed_Methods_R.html?id=eTwmDwAAQBAJ&redir_esc=y
- Chrisantiana, T. G., & Sembiring, T. (2017). Pengaruh Growth dan Fixed Mindset terhadap Grit pada Mahasiswa Fakultas Psikologi Universitas "X" Bandung. *Humanitas*, 1(2), 133–146. <https://doi.org/10.28932/humanitas.v1i2.422>
- De la Harpe, B., & Radloff, A. (2000). Informed teachers and learners: The importance of assessing the characteristics needed for lifelong learning. *Studies in Continuing Education*, 22(2), 169-182. <https://doi.org/10.1080/713695729>
- Demirel, M. (2009). Lifelong learning and schools in the twenty-first century. *Procedia-Social and Behavioral Sciences*, 1(1), 1709-1716. <https://doi.org/10.1016/j.sbspro.2009.01.303>
- Dang, J., & Liu, L. (2022). A growth mindset about human minds promotes positive responses to intelligent technology. *Cognition*, 220, <https://doi.org/10.1016/j.cognition.2021.104985>
- Durden, T. (2024). Factors that influence your mindset. Available [Online] <https://fearlessbusinessboss.com/7-factors-that-influence-your-mindset/>
- Djokic, I., Milicevic, N., Djokic, N., Malcic, B. & Kalas, B. (2024). Students' Perceptions of the Use of Artificial Intelligence in Educational Services. *Amfiteatru Economic*, 26(65), pp. 294-310. <https://doi.org/10.24818/EA/2024/65/294>
- Dweck, C., Chiu, C., & Hong, Y. (1995). Implicit theories and their role in judgments and reactions: A word from two perspectives, *Psychological Inquiry*, 6(4), 267-285. https://doi.org/10.1207/s15327965pli0604_1
- Dweck, C. S. (2006). *Mindset: The new psychology of success*. New York, NY: Random House. Retrieved from <https://psycnet.apa.org/record/2006-08575-000>
- Dweck, C. (2017). *Mindset: Changing the way you think to fulfil your potential*, London: Constable and Robinson, Ltd, 2017. Retrieved from

- https://books.google.ro/books/about/Mindset_Updated_Edition.html?id=ckoKDQAAQBAJ&redir_esc=y
- Dweck, C. S. (2019). The Choice to Make a Difference. *Perspective on Psychological Science*, 14(1), 21–25. <https://doi.org/10.1006/jesp.2001.1491>
- Duckworth, A., & Eskreis-Winkler, L. (2013). Self-Control and Grit: Related but Separable Determinants of Success. *Current Directions in Psychological Science*, 23(5). pp 319-325, <https://doi.org/10.1177/0963721414541462>
- Fuesting, M., Diekman, A., Boucher, K., Murphy, M., Manson, D., & Safer, B. (2019). Growing STEM: Perceived faculty mindset as an indicator of communal affordances in STEM. *Journal of Personality and Social Psychology*, 117(2), 260 –281. <https://doi.org/10.1037/pspa0000154>
- Johnson, B., & Christensen, L. (2004). *Educational research: Quantitative, qualitative, and mixed approaches*. Needham Heights, MA: Allyn & Bacon. Retrieved from https://www.researchgate.net/publication/264274753_Educational_Research_Quantitative_Qualitative_and_Mixed_Approaches_Fifth_Edition
- Gholami, M. J., & Al Abdwani, T. (2024). The Rise of Thinking Machines: A Review of Artificial Intelligence in Contemporary Communication. *Journal of Business, Communication & Technology*, 3(1), 29-43. <https://doi.org/10.56632/bct.2024.3103>
- Gunderson, E. A., Gripshover, S. J., Romero, C., Dweck, C. S., Goldin-Meadow, S., & Levine, S. C. (2013). Parent praise to 1- to 3-year-olds predicts children's motivational frameworks 5 years later. *Child Development*, 84(5), 1526-1541. <https://doi.org/10.1111/cdev.12064>
- Haimovitz, K., & Dweck, C. S. (2016). What Predicts Children's Fixed and Growth Intelligence Mind-Sets? Not Their Parents' Views of Intelligence but Their Parents' Views of Failure. *Psychological Science*, 27(6), 859-869. <https://doi.org/10.1177/0956797616640165>
- Heslin, P., Vandewalle, D., & Latham, G. (2008). Keen to help? Managers' implicit person theories and their subsequent employee coaching. *Personnel Psychology*, 59, 871-902. Retrieved from <https://ssrn.com/abstract=1149624>
- Hong, Y., Chiu, C., Dweck, C., Lin, D., & Wan, W. (1999). Implicit theories, attributions, and coping: A meaning system approach. *Journal of Personality and Social Psychology*, 77(3) 588-599. <https://doi.org/10.1037/0022-3514.77.3.588>
- Kiendl, F. (2015). *The Mindset of Mastery: From Exercising to Practicing*. RKC School of Strength, 2015.
- Knapper, C and Cropley, A. J. (2000). *Lifelong learning in Higher Education*. Stylus Publications, Sterling, VA. <https://doi.org/10.4324/9780203969281>
- Mangels, J. A., Butterfield, B., Lamb, J., Good, C., & Dweck, C. S. (2006). Why do beliefs about intelligence influence learning success? A social cognitive neuroscience model. *Social Cognitive and Affective Neuroscience*, 1(2), 75-86. <https://doi.org/10.1093/scan/nsl013>
- McCombs, B. L., & Marzano, R. J. (1990). Putting the self in self-regulated learning: The self as agent in integrating will and skill. *Educational Psychologist*, 25(1), 51-69. https://doi.org/10.1207/s15326985ep2501_5

- Manninen, J. & Meriläinen, M. (2011). *Benefits of Lifelong Learning–Bell Survey Results*. University of Eastern Finland. Retrieved from <http://www.bell-project.eu/cms/wp-content/uploads/2014/06/Bell-Survey-results.pdf>
- Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology*, 75(1), 33-52. <https://doi.org/10.1037/0022-3514.75.1.33>
- Mizumoto, A., & Eguchi, M. (2023). Exploring the potential of using an AI language model for automated essay scoring. *Research Methods in Applied Linguistics* 8(4). <https://doi.org/10.2139/ssrn.4373111>
- Murphy, M., & Dweck, C. (2010). A culture of genius: How an organization's lay theory shapes people's cognition, affect, and behavior. *Personality and Social Psychology Bulletin*, 36(3). <https://doi.org/10.1177/0146167209347380>
- Pilat, D., & Sekoul, D. (2021). Fixed Mindset. The Decision Lab. Retrieved from <https://thedecisionlab.com/reference-guide/psychology/fixed-mindset>
- Pishghadam, R. (2016). *Emotioncy, Extraversion, and Anxiety in Willingness to Communicate in English*. Proceedings of the 5th ICLEI London. Pages 1-5. Retrieved from <https://icsai.org/procarch/5iclei/5iclei-4.pdf>
- Rattan, A., Good, C., & Dweck, C. S. (2012). "It's ok—Not everyone can be good at math": Instructors with an entity theory comfort (and demotivate) students. *Journal of Experimental Social Psychology*, 48(3), 731-737. <https://doi.org/10.1016/j.jesp.2011.12.009>
- Riley, D., & Claris, L. (2008). Developing and Assessing Students' Capacity for Lifelong Learning. *Pedagogies*, 3, pp. 1-11. Retrieved from https://www.ijee.ie/articles/Vol24-5/s9_ijee2062.pdf
- Schumann, K., Zaki, J., & Dweck, C. (2014). Addressing the empathy deficit: beliefs about the malleability of empathy predict effortful responses when empathy is challenging. *Journal of Personality and Social Psychology*, 107(3) 475-493. <https://doi.org/10.1037/a0036738>.
- Smith, J. (2020). Growth Mindset vs Fixed Mindset: How what you think affects what you achieve. Retrieved from <https://mindsethealth.com/matter/growth-vs-fixed-mindset>
- Srivastava, P. Hasija. T. & Goyal, A. (2020). *Unleashing the potential of artificial intelligence in the education sector for institutional proficiency, Transforming Management Using Artificial Intelligence Techniques*, First Edition, CRC Press. <https://doi.org/10.1201/9781003032410-2>
- Stec, G. (2015). *Encouraging mastery in the classroom: The effect of goal orientation on academic performance*. Goucher College, Baltimore, Maryland. Retrieved from https://mdsoar.org/bitstream/handle/11603/1682/MEd_Stec_actionres_Su2015.pdf?sequence=1&isAllowed=y
- Thrun, S. (1998). Lifelong learning algorithms. In *Learning to learn* (pp. 181-209). Boston, MA: Springer US. pp 181-209. https://doi.org/10.1007/978-1-4615-5529-2_8
- Triantis, J. E. (2013). Culture, Mindset, Processes, and Principles. In *Navigating Strategic Decisions* (pp. 96–111). Productivity Press.

Vandewalle, D. (2012). A growth and fixed mindset exposition of the value of conceptual Clarity. *Industrial & Organizational Psychology*, 5(3), 301-305.
<https://doi.org/10.1111/j.1754-9434.2012.01450.x>

Appendix: Survey Questionnaire

Mindset Indicators	SD	D	A	SA
1. I believe that intelligence is constant.				
2. I believe that failure affects my image.				
3. I try to avoid obstacles.				
4. To exert effort is unpleasant and unrewarding. ®				
5. I think criticism leads to less chance of improvement.				
6. I feel bad if I see others' success.				

Source: Brassey, J. & van Dam, N. (2017). *Staying Relevant in the Workplace: Develop Lifelong Learning Mindsets*. 1st Edition. pp 10-13. bookbon.com. ISBN 978 87 403 1882 1.