

The Perceived Impact of Critical Thinking on Student's Learning Performance

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Abstract

As we transition to an endemic phase past the Covid-19 fiasco, the impact of those events still rings clear within the education field. The aftermath of the pandemic in the education field is everlasting, as research swarmed on the effects it had on students. Nevertheless, studies have shown that critical thinking skills are still intact regardless of the learning mode. Consequently, critical thinking is a vital factor in a student's repertoire, which is also a sought commodity among employers. Therefore, the objective of this study is to determine whether critical thinking has an impact on student learning performance in both academic and non-academic contexts. Hence, this study first, set out to determine the students' perception of critical thinking. Secondly, it explored the students' perception of critical thinking on their learning performance in academic and non-academic contexts. A qualitative research design was employed during the conduct of the study. The findings were retrieved from focus group interview sessions among 15 final-year degree students from two public universities in Malaysia. The findings suggest that students are indeed aware of their critical thinking skills. Furthermore, findings show that critical thinking impacts student learning performance in several distinctive ways. These include improving their learning styles, strategies, and thinking skills. In the non-academic context, critical thinking provides further exposure and training for individual development in terms of survival skills and self-efficacy. Therefore, it is important for instructors to note the urgency for the inclusion of critical thinking in the teaching and learning process regardless of mode, be it in a physical or online classroom. This paper could benefit educators who seek to inculcate critical thinking in their lessons, programme developers who plan to embed critical thinking within the curriculum, and students themselves who prepare their learning journey with relevant critical thinking strategies.

Keywords: Academic & Non-Academic Context, Critical Thinking, Focus Group, Learning Performance, Perception

Introduction

The post pandemic scene had witnessed an abundance of studies regarding the fate of the education field for the foreseeable future. Educators worldwide managed to maintain composure during said pandemic. They had since proceeded to revert to “normalcy” pre-covid pandemic. However, what the pandemic showed was the education field had not been entirely prepared for such unexpected and abrupt events. Nevertheless, some aspects still remain. Although the mode and approaches educators use will continue to change and evolve, certain skills are still required for students to be equipped with. Critical thinking has always been part of the forefront skills that employers sought after (Alzghoul et al., 2018). Despite critical thinking being such a hot commodity among graduates, are people actually aware of what critical thinking is? Generally speaking, critical thinking is the ability to apply knowledge in certain situations, accounting for each factor and providing a rational and logical solution (Tulgan, 2023). Educators should be aware of this, as they implement critical thinking in their content. On top of that, they are also responsible for evaluating students’ critical thinking skills.

Nevertheless, Mattison and Ramberg (2015) claimed that critical thinking is virtually impossible to objectively evaluate as high or low leveled. If critical thinking has proven anything, it is how subjective it is and how different people have different perspectives. Therefore, apart from the teaching models that instructors attempt to implement critical thinking, students’ readiness in receiving such approaches are in question, too. While educators and instructors flock about how to appropriately prepare their students for such skills, have the students been able to receive and apply this knowledge accordingly? Although there have been mixed findings on whether critical thinking positively impacts learning performance, Liu et al (2016) have proven that a prominent way to attain critical thinking skills through online learning is to participate and engage in discussions. The pandemic which resulted with open distance learning, predominantly through online mediums, have proven that students display high inhibitions. Consequently, they participate less actively in online classrooms.

The screen barriers make students more accustomed to hiding from voicing out and just focus on merely completing tasks instead. Be that as it may, it does not necessarily prove that students are unaware of such transactions. This transaction refers to instructors, scrambling instilling approaches to teach critical thinking in their curricula. Having said that, critical thinking is just as subjective as the students who are expected to harness this skill. Hence, it is important to determine the perception of students who underwent online learning, and how critical thinking has impacted their learning performance. Thus, the research questions for this study is as followed

1. What are the students’ perceptions of critical thinking?
2. What is the perceived impact of critical thinking on learning performance in terms of academic context?
3. What is the perceived impact of critical thinking on learning performance in terms of non-academic context?

For the purpose of this study, learning performance refers to the academic and non-academic contexts. To further elaborate, academic context in this study represents how students applied critical thinking skills into their learning experiences. Consequently, improving their academic performances. On the other hand, non-academic context relates to self-growth and development through more personal means. This context illuminates how

critical thinking skills affected their overall personality, behavior and attitude toward any given issue.

Literature Review

Learning Performance

In this context, learning performance is referred to as the ability to acquire, retain and apply new knowledge, information and skills. For the purpose of this study, learning performance is defined as the process on how students learn. Critical thinking has always been observed on its impact on learning performance, often associated with higher academic results (Mattison & Ramberg, 2015). However, this study's objectives lie more towards the students' perceptions rather than what they achieve in any formal assessment or how they demonstrate their knowledge in assessments and evaluations. Nevertheless, improvement in academic performance is also considered as a result of an impact from critical thinking. This body of literature resonates with Nur'azizah et al (2020) as their study reflected positive and significant correlation between student's critical thinking skills and their academic achievements. In addition, learning performance is also the ability to see connections between ideas instead of taking information merely from face level (Cottrell, 2017). Although critical thinking is vital in learning, there are also several challenges that would hinge students' learning performance. Some of the factors that affect learning performance include motivation, learning style and prior knowledge (Roohr et al., 2019). Critical thinking requires attention, interaction and engagement which all can be directly impacted by students' motivation. Furthermore, failure to identify specific and effective learning styles would stunt the development of critical thinking skills, as well as receiving any other information. Part of critical thinking is the openness to receive new knowledge but if prior knowledge interferes, a learner cannot fully develop or learn effectively.

Critical Thinking

Critical thinking has always been a prominent presence in the education field (Liu et al., 2016). The knowledge of content proves to be insufficient when not paired with the appropriate ability to think and apply based on a given situation (Cloete, 2018). Hence, it is no alien information when this skill is well sought after by employers worldwide. Generally speaking, critical thinking is a cognitive process. This process, according to Liu et al (2014) allows a person to analyze information or a situation, evaluate arguments rationally then make well-informed decisions. Critical thinking is also a sign of cognitive maturity. This explains why it is such a valuable skill to have in students and fresh graduates. To a certain extent, critical thinking compensates for lack of experience, providing a gauge of how a student would solve a problem they have never faced, presumably problems that will occur at the workplace (Rahmat et al., 2019). Hence, it is important to not only the students but also for the instructors and the institutions altogether, to appropriately instill critical thinking. Studies have shown that critical thinking is associated with higher-leveled thinking. This association is argued because of how certain studies have proven critical thinking positively impacting academic performance in higher education.

Teaching critical thinking poses its own set of challenges. Instructors are essentially preparing their students on a more efficient method of thinking. As Prat-Sala & Van Duuren (2022) mentioned, critical thinking is apparent in all sorts of educational domains whether it is mathematical or philosophical. Instructors must provide teachings that cover prominent factors of critical thinking including comprehension, problem solving, creativity,

communication skills as well as positive academic performance (Barnett & Francis, 2012; Nur'azizah et.al., 2020). These skills must be incorporated in the existing curriculum content. Nevertheless, it is an ongoing debacle that there is no concrete model in measuring critical thinking skills for sure. Despite rubrics and guidelines that can be set, any gray area form of answers outside said rubrics, prove to be subjected to what instructors see fit. At the end of the day, evaluating critical thinking can just be as fickle as providing critical answers. In order to evaluate critical thinking, instructors must consider key elements. Firstly, defining the acceptable criteria and setting appropriate assessments that would reflect critical thinking. Next, critical thinking must involve the skill of sourcing information in the way of collecting evidence concrete enough to support a motion (Izwan, 2023). Furthermore, providing feedback from both ends. As mentioned earlier, critical thinking heavily involves interaction (Liu et al, 2016). Finally, instructors must reflect with their students. Consequently, students still require some form of validation and availability from their instructors despite how autonomous the learning mode allows them.

To reiterate, studies have argued over the impact of critical thinking on learning performance. This spans across traditional classrooms as well as during online learning. A rough consensus can be made that the impact of critical thinking is personal and based on self-efficacy.

Critical Thinking in Academic Context

A phrase played as much as a broken record; critical thinking is essential in education. Roohr et al (2019) have proven that critical thinking can have positive effects on academic performance. However, Watson and Glaser (2018) noted how critical thinking positively impacts the process of learning as well. Critical thinking allows a learner to analyze situations in a more thorough manner. Hence, they have more evaluated arguments and comments before jumping the gun on any rash decisions. One method that academics, especially in tertiary education, provide students in application for critical thinking is research. In research, students are required to provide evidence, synthesize ideas that are not their own and evaluate information (Lie et al., 2016).

Critical thinking prepares students in handling different information on the same matter. Hence, the application of critical thinking allows students to evaluate this information through comparing and contrasting., forming their own synthesis of an argument. On top of that, part of critical thinking is in evaluating sources of information, which is done in an ethical way, teaching values such as integrity and theft. Furthermore, critical thinking also involves the identification of gaps or problems. This skill also piques curiosity in an academic setting. Evidently by Hasnunidah et al (2015), learners are more prompted in classroom engagement through asking questions and participating in discussions. The exchange of ideas and perspectives is considerably a prominent value within the critical thinking arsenal. Concurrently, these are skills that students ought to keep with themselves in application for other problems they may face.

Learning Styles

Critical thinking is present in any learner. It continues to develop to its potential at the height of tertiary education. And its uses will continue to be impactful thereafter. These skills are prominent to a student as it provides a window to better understanding on being a more engaged, active learner. Students must be more open-minded in approaching the learning process. They will be more likely to develop a deeper understanding of the materials and

content. Furthermore, this heightens the creativity in application of theories and knowledge. Learning styles are determined by the individualistic learner. However, critical thinking would be beneficial to interactive and practical learners.

In essence, critical thinking is promising to students with deeper interests in considering multiple perspectives. In a nutshell, critical thinking involves the utilization of active engagement to the material. Nevertheless, Benzanilla, Fernández-Nogueira, Poblete and Galindo-Domínguez (2019) have proved that although there are significant relationships found between the effect of critical thinking and learning styles. They highlight how different levels of critical thinking affects the students' choice in learning styles. In turn, these learning styles also reflect the level of their critical thinking skills. Typically, learning styles measured in higher education refers closely to Kolb's (1984) model for learning styles. These learning styles include diverging, assimilating, converging and accommodating. Although there is no fixed learning style that determines better critical thinking skills, the two are indeed intertwined. As found by Sanjabi and Montazer (2020), personalizing online learning environments based on individualistic learning styles saw significant improvement in their critical thinking skills.

On the other hand, Ata and Cevik (2019) had found that pre-service teachers' critical thinking skills were a factor in their appropriation to their respective learning style. In the context of Kolb's (1984) learning styles, diverging refers to the act of feeling and watching, assimilating is the act of watching and thinking, converging as the act of doing and thinking, and finally, accommodating is regarded as the act of doing and feeling (Idkham & Idris, 2021). These distinct learning styles are a reflection on the individualistic traits of students and whatever styles that fit their repertoire of learning appropriately.

Learning Strategies and Thinking Skills

For the purpose of this study, the terms learning strategies and thinking skills will be two alike. This generalization precedes by how closely the two intertwine with each other's definition. Learning strategies and thinking skills are both prominent features in applying cognitive and metacognitive strategies in the learning process. As claimed by Maulani et al (2022), thinking styles have a tremendous effect on problem solving skills, similarly linked to critical thinking. Their study had also revealed that there are significant findings that prove a positive correlation between learning strategies and thinking styles on learning outcomes. Effective learning requires particular skills such as being an active learner. This includes engagement with the material and content.

Besides that, critical thinking assists in organizing information. An appropriate organization strategy would account for a more efficient learning process. Critical thinking skills are also detrimental in problem solving. Nevertheless, problem solving is a process entirely on its own which would require effective strategies. Generally, the presence and effective application of critical thinking skills has an immensely positive effect on learning skills and overall, the way a person thinks. Critical thinking has also proven to be directly associated with improving creativity and imposing creative thinking styles. Moreover, a study has also acknowledged that the generational gap between instructor and students could also be a factor in the hinging of learning performance. Seibert (2021) claimed that Gen Z students also have different perspectives thus, possessing different individualistic learning strategies. For instance, Gen Z students independently learn critical thinking skills in distinct ways, like how they settle on an effective learning strategy. Nevertheless, the implementation of

modern, up-to-date teaching models would also integrate the approach of problem-based learning.

The appropriate general approach in instilling critical thinking skills is to accommodate the common problem based learning style. This is because of the need for interaction and engagement with the content, in order for students to fulfill their potential and land on their preferred learning strategy. This is supported by Chicca and Shellenbarger (2016) as they found that the current generation of students are able to push boundaries in how they learn and develop important skills due to their openness and technological exposure.

Critical Thinking in Non-Academic Context

The complexity of critical thinking is a lifelong skill. It should be a skill that is religiously part of one's personality and overall thought process. Blatantly, Siddique, Ahsan, Azizi, & Haass, (2022) explained critical thinking is not bound to an academic setting . It has been iterated on how there is no fixed approach in teaching critical thinking. Hence, people can develop this skill through personal life experiences as well. Conversely, critical thinking learnt in academic settings can be applied in everyday life situations. Critical thinking is impactful in several domains in life such as followed

Workplace

This should be a no-brainer, as obviously, employers have mass demands for graduates with critical thinking skills. That is possibly because of how taxing a workplace environment can be without the appropriate thinking skills (Siddique et al., 2022). One perspective, instead of viewing the workplace as a landfill of problems that need solutions, it can be viewed that critical thinking skills are what helps an employee to complete their daily tasks. In any realm of life, we will be given information, be it in a classroom or at a workplace. Hence, the act of evaluating the information before blindly consuming it can help point out details or avoid mistakes. Workplaces also require quick decision making. Not only does the decision have to be quick, it has to be the smart choice. Therefore, critical thinking helps with the weighing of different ideas and concepts. In addition, critical thinking also affects communication skills. Being able to have appropriate semantics, discourse and context awareness are useful skills to have at the workplace and outside of it.

Personal

To a certain extent, critical thinking also shapes a learner's personality. It shapes a learner's cognitive process. Consequently, the same perspectives would transfer outside academic settings, as founded by (Cottrell, 2017). In the age of globalization, the internet and social media has been plagued with unreliable and untrustworthy information. Hence, it is important to consume such information critically and to not be fooled or conned. On top of that, critical thinking generally allows a person to weigh pros and cons in any given situation. Critical thinking grants people the ability to make more calculative decisions. Moreover, to think critically, one must be open minded enough to accept any form of information willingly and then evaluate it. Since the skill of critical thinking is heavily revolved around evaluating information, one must first be open to receive and accept information or knowledge (Huber & Kuncel, 2016). Besides that, this skill also ensures smarter consumerism. Differentiating needs from wants, aware of false advertising and calculating sustainability among others. Finally, critical thinking can positively impact communication skills. As mentioned earlier, it provides more informed discourse and context, which could also be associated with heightened sensitivity.

Methodology

Research Design

With regards to the research topic, a set of research objectives and questions were constructed to fulfill the optimal results. Hence, this study applies a qualitative research approach for its research design. In the event of analyzing the impact of critical thinking, the researchers believed that perception based data would hold more details in certain areas. Therefore, a focus-group interview was applied to retrieve participants' perceptions. As claimed by Aspers and Corte (2019), qualitative data elicited from focus-group interviews could provide rich, thick data that is required all at once from various participants at one time. Focus groups is the approach where a group of participants discuss the specific issue, drawing personal experiences, perceptions and even attitude towards the matter in the presence of a moderator (Nyumba et al., 2018; Kitzinger, 1995; Morgan, 1997).

Participants

This study incorporates the involvement of participants from two public universities in Malaysia. A total of fifteen students from the Faculty of Education, all in their final year of the degree programme. These participants had all experienced online learning throughout the pandemic from circa 2020 to 2022, and physical face-to-face learning before and after the pandemic, too. Based on their personalized experience with the different modes of learning, the participants were selected to share their experiences with critical thinking in their lessons. The participants then discussed how they experienced the impacts of critical thinking in their learning performance. This research had taken every precaution in obtaining these data in an ethical and confidential manner. According to Tümen-Akyıldız and Ahmed (2021), one of the main concerns in relation to focus group interviews or any form of qualitative approach in general, is the matter of privacy. They have also stated that the number of participants tend to vary but to maintain a small enough group for a moderator to handle. According to Tümen-Akyıldız (2020), focus groups are also a useful tool to collect qualitative data through open distance mode.

Instruments

The research focuses on addressing the impact of critical thinking on students' learning performance. Therefore, a semi-structured interview approach had been selected to fulfill this objective. The semi-structured interview aligns well with the objective of exploring perspectives among the participants. Also, the interview questions allowed the participants freedom with their responses, with its open-ended questions. The open-ended questions were applied to ensure and prompt more genuine responses, with the inclusion of opinions and experiences. As reported by Lune and Berg (2017), the conversational nature of a focus group interview allows the group of participants to share and relate to each other's experiences in a safer environment.

Trustworthiness

In order to maintain trustworthiness in this study, a course of action was taken to apply two methods; inter-rater checks and member-checking. According to Holley and Harris (2019), these methods are commonly executed in qualitative research designs to ensure trustworthiness and validity in its data. Firstly, member-checking was also applied in this study. At the end of the focus group interview sessions, the researchers clarified the data with the participants, verifying their perspectives before proceeding with the findings. Next, inter-

rater checks involved an inter-observer to facilitate the reliability of the instrument and data. This method involved independently coding the data retrieved from the focus group interviews (Fischer & Guzel, 2023). This trustworthiness method involved two separate coders. This effort was to ensure consistency and reliability in the coding process such as resolving any discrepancies and inconsistency with the data, and forming a consensus solution among the researchers.

Findings and Discussions

The data collected through the semi-structured focus group interview sessions was analyzed. The findings were then to answer the research questions as followed;

1. What are the students' perceptions of critical thinking?
2. What is the perceived impact of critical thinking on learning performance in terms of academic context?
3. What is the perceived impact of critical thinking on learning performance in terms of non-academic context?

a) Students' perception of critical thinking

Upon analyzing whether there is any direct relation between critical thinking and learning performance, the introductory objective of this research is to identify students' perception on critical thinking. The research question is to explore how final year students perceive critical thinking skills. Their perception on this matter is essential, as it shapes how these students learn. It also mirrors what exactly students look for in learning and applying critical thinking. The semi-structured interview fits well in this as it allows the participants to be more candid. This would also refrain from receiving responses that are too articulated which could be a telling of the inability to form their own synthesis or understanding on this particular matter (Crabtree & Miller, 2022). As final year tertiary students, awaiting to enter the working sphere, students must be aware of critical thinking, how it can shape their thought process. As the findings suggest, the participants voiced out that critical thinking involves an enhanced thought and cognitive process, and enhanced problem solving skills. In terms of an enhancement in their cognitive processes, a popular response is the idea that critical thinking promotes a deeper thought process.

For me, critical thinking is different from thinking. Critical thinking is like, you analyze it, evaluate it and then resolve the problem, if there is a problem. So, you think more deeply on the analysis and yeah.

Participant 13

Critical thinking is when we use our brains to work extra hard rather than to think about what is on the surface.

Participant 3

The data reveals that Participant 9 and Participant 3 associate critical thinking as a higher form of thinking. Candidly distinguishing between critical thinking and "normal" thinking. Although Participant 13 responded with more details, both these participants are essentially meaning the same; there is thinking and there is thinking critically, with the latter involving a more complicated and complete process. Participant 13 notes critical thinking as an ability to analyze information above dealing with a problem. Generally speaking,

Participant 13 believes that critical thinking can be applied not only when a problem occurs. Moreover, Participant 3 mentions that critical thinking provides a broader perspective instead of just focussing on a matter at face level. Whereby, Participant 3 supports that critical thinking is the act of a deeper thought process. These findings concur with Mahanal et al (2019) in their study where academically different leveled students displayed different levels of critical thinking but all agree that critical thinking is along the line of thinking deeply. The process of critical thinking requires the focus to be on concepts rather than procedural training (Fahmi et al., 2019)

In addition, the final year students also regarded critical thinking as the ability to think faster. In relation to Nurakhir, Palupi, Langeveld and Nuramalia (2020), their study shows how conducting classroom debates would help enhance critical thinking skills. Hence, one of the factors that affect critical thinking skills was the ability to think faster. These participants described problems as unexpected and that critical thinking helps keep everything under control instead of feeling overwhelmed. In essence, it could also be drawn to a sense of independence, where the two participants felt the need to overcome their problems with their own solutions at any given time. Their response is as the following

Critical thinking is an analytical thinking that requires a person to think spontaneously but rationally in order to find a solution to solve a problem.

Participant 2

In my opinion, critical thinking is, let's say given a situation, someone can like, think on the spot what to do in that situation.

Participant 14

As stated by Yazgan (2021), lateral and vertical thinking was developed by De Bono (1986) which essentially showcases the duality in thought. Vertical thinking refers to logic to draw conclusions whereas lateral thinking involves more creative ideas and ultimately, lateral thinkers tend to be more active. Another popular response appraised by the participants was describing with the phrase “*thinking outside of the box*” in their definition of critical thinking. Although these participants refused to elaborate further on what they meant, it is a rather common expression. The ability to *think outside the box* can often be associated with critical thinking. This resonates with studies claiming that lateral thinking is not the process of following the appropriate procedures but to find multiple different approaches to find a solution at any cost (Cole, 2023; Al-Momani & Obeidat, 2023). In brief, it extends the meaning of finding new and different ways to solve problems. In essence, broadening your horizon for thinking and how you see things. The participants went on record for the following

In my point of view, critical thinking is the ability to think outside the box; the ability to think something that is beyond normal

Participant 4

The ability to think of something outside the box and solve the problems that have been given.

Participant 12

The next association in description of critical thinking is in relevance to problem solving. These participants regularly included solving problems in their definition. Despite these

responses reflecting closely to an enhanced thought process, these participants only associated critical thinking with having a problem, and having the need to solve it.

Critical thinking is one's ability to think whenever he/she hit a sudden problem and manage to solve the problem successfully.

Participant 5

Critical thinking to me is evaluating a problem and coming up with an answer supported with reasoning.

Participant 6

The excerpts indicate that these participants view critical thinking as a tool in problem-solving. According to Rahman (2019), critical thinking and problem solving skills are two alike. He had also found that critical thinking often comprises features similar to that of problem solving. The same study also stated that problem solving can be broken down into two distinct main skills; observation and critical thinking skills. Participant 6 included the phrase “*supported with reasoning*” which is a clear cut feature of critical thinking. It is concluded that despite the technicalities, the students perceive critical thinking as an enhanced thought process and enhanced problem solving skills.

b) Impact of critical thinking on learning performance in terms of academic context

Learning performance can be prompted by different factors. Each learner has their respective individualistic characteristics and learning styles. Consequently, the same applies with critical thinking skills. There is no fixed way to learn these skills but critical thinking can have an immense effect on academic performance. The data retrieved from the semi-structured interview sessions shows that critical thinking does impact some of the participants' learning performance. Sequentially, the final year students revealed that critical impact can directly and indirectly impact their learning performance. However, these responses were all uttered by students from the same university.

Having to critically think during online learning helps me keep up with the lecture as I am curious of what the answer might be.

Participant 6

It will boost my analytical skills and make me read more to know more. This will give me more insights into the topics.

Participant 11

I can easily manage to visualize more during learning and able to digest the information smoothly.

Participant 12

The excerpts above display the views of participants who believed that critical thinking has a direct impact on their learning performance. In this sense, the three excerpts above indicate how these participants directly apply their critical thinking into their learning patterns and styles to be more efficient students. This finding resonates with Ma and Li (2022) as their study displayed that there is a direct correlation between critical thinking skills and academic performance. Other than that, the most popular response is that critical thinking has indirectly impacted their learning performance. In essence, these participants explained how critical thinking instilled healthier habits, improved their cognitive process and they applied these skills into their learning. The following excerpts provide more details;

Through critical thinking, it boosts up the way I think to solve simple and hard problem in learning and make my performance better. Participant 4

The more I involved myself in online learning activities that involve critical thinking skills, the better I am in my learning performance. Participant 5

It allows me to come out with creative and unique ideas, which inspire me to reflect on myself. It gives me time to reflect on my experience and helps me to think on good and bad aspects. It helps me to think clearly and have good insights, which improves my learning performance. Participant 7

Critical thinking activities boost my skills to be more analytical than logical. It allows me to read more and more data hence increasing my learning performance. Participant 8

It can increase my learning performance as I can receive different types of answers from other students too. This situation can help me to broaden my knowledge and perspective on certain issues. Participant 9

In contrast, these responses entail how these students found the critical thinking skill primarily as a real-world tool in opposed to exclusively developing critical thinking skills for learning purposes. This goes to show how critical thinking can impact academic learning performance in different ways. This is in line with Dumitru's (2019) finding that a learner should understand a concept beforehand, and the presence of critical thinking allows a person to create meaning that is most appropriate to the context. Besides that, critical thinking has shown to improve student performance also due to their own efficacy to source and create materials consequently, improving other areas like creativity (Awan et al., 2021)

c) Impact of critical thinking on learning performance in terms of non-academic context
Besides critical thinking having impact learning performance in an academic setting, it also positively impacts learning performance outside the classroom. It was apparent that almost half the participants associated learning to a more holistic entity instead of just bounded by an academic setting. In a non-academic context, these participants described the impacts of critical thinking involving their growth and feeding a different food for thought. According to Shanta (2022), critical thinking skills are equally important to develop for context outside of the classroom. The study states that critical thinking skills may not be entirely able to be trained in the classroom alone as it does not provide much authentic problems to solve besides in theory or a controlled experiment. Similarly, a study showed that students displayed higher level of critical thinking based on skills they picked up from outside the classroom (Kusmaryani, Musthafa & Purnawarman, 2019). Therefore, the responses generally included how critical thinking improved confidence and other skills, such as creating habits essential for thinking and learning. For instance, the excerpts below display how the participants credited critical thinking for their personal growth;

It helps me to create habits to think deeply and see the after effects of certain things. Participant 1

I can reason and includes my learning skills, such as speaking and listening. Participant 3

Sometimes, when I think critically, it also helps with our confidence in answering questions or something like that. It does not necessarily have to be academic. Yeah, I agree with that.
Participant 13

Throughout online learning, it helped me in terms of academically as well as my own personal growth. Because I know that with every problem, there's a solution. So, let's say I don't understand what I learnt that day the, I can use Youtube to search for answers.
Participant 8

Next, we can conclude some of the participants believed critical thinking is defined by the openness to different other perspectives. They view critical thinking as a window to a broader view. As iterated by Álvarez-Huerta et al (2022), students who are more open to diversity have shown significantly higher levels of critical thinking skills. The feature of openness in critical thinking has also shown a positive impact on a students' creativity and self-efficacy (Álvarez-Huerta et al., 2022; Gong et al., 2020). Furthermore, these students exhibited signs of preferring to consume instead of executing. The below excerpts demonstrate the participants' takes on the matter

In order to critically respond to someone's opinion, we must first read his/her statement. Hence, I can say that, the more I read, the more perspective I can see, and the more critical and creative I can think.
Participant 2

I think it makes you think differently. It improves your performance by thinking differently and quick. It doesn't have to be academic focused. Cause', when we're talking about thinking critically, it's a (bigger) view.
Participant 15

The remaining two participants managed to provide similar responses. They assured their definition of critical thinking involves the survival skills such as sourcing their information. Their statements were given is demonstrated in the excerpts below;

I'm able to find more resources online as a self-study and comprised it with the notes or lectures given by lecturers.
Participant 10

Throughout online learning, it helped me in terms of academically as well as my own personal growth. Because I know that with every problem, there's a solution. So, let's say I don't understand what I learnt that day the, I can use Youtube to search for answers.
Participant 14

To sum up, Participants 10 and 14 had associated their definition of critical thinking with a sense of increased diligence and proactivity. They utilize this skill to treat their curiosity. Contrariwise, their curiosity is also accredited to their critical thinking skills. In this context, self efficacy is commonly attributed to critical learning because of problem based learning. It is believed that problem based learning is part of constructivism, consequently allowing students opportunities to develop their own understanding of a concept thus, providing a feasible solution (Saputro et al., 2020; Kuvac & Koc, 2018).

Motivation and contributions of the study

The present study was conducted with a sheer intention of understanding how students perceived critical thinking and what impact critical thinking could have on their learning performance. Much have been discussed and researched on critical thinking and students' performance. However, one research that solely investigate this concern by focusing on the 'voices' of the students could still be conducted to further add relevant empirical data and information to what is already known about critical thinking and learning performance. Interestingly, the findings have shed some lights to what must still be done to ensure critical thinking is an obvious package in the teaching and learning process.

Contributions from the present study could be seen from several implications derived from the salient findings discussed. The implications are those that should be considered by the students themselves, the instructors and the curriculum developers. The following discussions highlight the potential contributions of the study in terms of its implications to the identified groups.

a) The students

As critical thinking is an essential skill to be competitive in the industry, students need to be trained the various features that signal their ability to be critical thinkers. From the academic context, the students should be exposed to cognitive challenging tasks which indirectly form healthier learning habits for better learning performance while in the non-academic contexts, they should be encouraged to be involved authentic problem-solvings in which they would learn relevant survival skills as well as to be open minded, proactive and curious.

b) The instructors

As it is of prime iportance for the instructors to train their students critical thinking through the tasks and activities, it is inevitable for them to be upskilling their competencies to train critical thinking to their students through various learning platforms, that is either in class, online or through digital media. In-house training and relevant hands-on workshops on diversifying their teaching startegies through the use of media and real problem-based learning could be included in the training list.

c) The curriculum developers

In aliging what students and their instructors should do in the teaching and learning process, it is almost inevutable for the current curriculum be revised to include the opportunities for critical thinking exposure and training. Relevant topics that would reuire real application in solving meaningful problems should be embedded within the curriculum. Likewise, the assessment need to be re-designed in ensuring the real intention of assesing the students is to highlight the critical thinking competency.

Conclusion

In brief, students generally have the right idea on what critical thinking is. It should not be undermined that the importance of identifying critical thinking skills could very well impact a student's learning process or even their own personalities altogether.

Ultimately, this study has shown the impact of critical thinking on learning performance to be rather significant and positive. It is eye opening to know that students generally have high regards for critical thinking. They collectively understand the fundamental values that

critical thinking possesses. The development of critical thinking skills enable learners to enhance their cognitive abilities, creativity and their problem solving skills.

As this research demonstrates, the final year students have voiced out that they *believe* in two schools of thoughts. The participants of this study were almost split down to the middle between how critical thinking impacts their learning performance academically, and non-academically. Academically positive impacts refer to how their acquired critical thinking skills make them better learners. This involves them improving their learning effectiveness, being more analytical, logical and organized. Overall, critical thinking improves their thinking skills which they can apply to be better learners.

On the other hand, this group of final year students described critical thinking positively impacting their lives in a different manner. This group of students explained how critical thinking skills have secured them a healthy personal growth development. This is present in them forming new healthy habits and gaining confidence. They also claimed that critical thinking skills broaden their minds in being open to different views and perspectives. This can considerably be a form of cognitive maturity. Finally, they also claim critical thinking skills increased their curiosity. Hence, they credit their increased diligence and proactivity. To summarize, the findings have clearly displayed how positively critical thinking impacts learning performance in students.

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References

- Al-Momani, S. D., & Obeidat, H. H. (2023). Effectiveness of employing the lateral thinking strategy during the teaching of geography in developing problem-solving skills. *resmilitaris*, 13(1), 703-708.
- Alshare, K. (2018). A gap analysis of business students' skills in the 21st century: A case study of Qatar Academy of Educational Leadership Journal 22(1) 1-22
- Álvarez-Huerta, P., Muela, A., & Larrea, I. (2022). Disposition toward critical thinking and creative confidence beliefs in higher education students: The mediating role of openness to diversity and challenge. *Thinking Skills and Creativity*, 43, 101003.
- Alzghoul, A., Elrehail, H., Emeagwali, O. L., & AlShboul, M. K. (2018). Knowledge management, workplace climate, creativity and performance: The role of authentic leadership. *Journal of Workplace Learning*, 30(8), 592–612. <https://doi.org/10.1108/JWL-12-2017-0111>
- Aspers, P., & Corte, U. (2019). What is Qualitative in Qualitative Research. *Qualitative sociology*, 42(2), 139–160. <https://doi.org/10.1007/s11133-019-9413-7>
- Ata, R., & Cevik, M. (2019). Exploring relationships between Kolb's learning styles and mobile learning readiness of pre-service teachers: A mixed study. *Education and Information Technologies*, 24(2), 1351-1377.
- Awan, A. A., Shah, N. H., Siraj Bashir, M. A., Iqbal, B., Thalho, N. P., & Mutupha, J. F. (2021). CRITICAL THINKING AND CREATIVE THINKING: STUDENTS'READING COMPREHENSION. *Webology* (ISSN: 1735-188X), 18(6).

- Barnett, J. E., & Francis, A. L. (2012). Using higher order thinking questions to foster critical thinking: A classroom study. *Educational Psychology, 32*(2), 201–211. <https://doi.org/10.1080/01443410.2011.638619>
- Bezanilla, M. J., Fernandez-Nogueira, D., Poblete, M., & Galindo-Dominguez, H. (2019). Methodologies for teaching-learning critical thinking in higher education: The teacher's view. *Thinking skills and creativity, 33*, 100584.
- Birt, L., Suzanne, S., Debbie, C., Christine, C., & Fiona, W. (2016). Member checking: A tool to enhance trustworthiness or merely a nod to validation? *Qualitative Health Research, 26*, 1802– 1811.
- Burke, B. L., Shears, S. R., Kraus, S., & Roberts-Cady, S. (2014). Critical analysis: A comparison of critical thinking changes in psychology and philosophy classes. *Teaching of Psychology, 41*(1), 28–36. <https://doi.org/10.1177/0098628313514175>
- Candela, A. G. (2019). Exploring the function of member checking. *The qualitative report, 24*(3), 619-628.
- Cloete, M. (2018). The impact of an integrated assessment on the critical thinking skills of first-year university students. *Accounting Education, 27*(5), 479–494. <https://doi.org/10.1080/09639284.2018.1501717>
- Cole, M. J. (2023). Evaluative thinking. *Evaluation Journal of Australasia, 1035719X231163932*.
- Cottrell, S. (2017). *Critical thinking skills: Effective analysis, argument and reflection*. Palgrave-Macmillan
- Crabtree, B. F., & Miller, W. L. (2022). *Doing qualitative research*. Sage Publications.
- Deloitte 2018 Deloitte Insights – 2018 Deloitte skills gap and future of work in manufacturing study (New York NY: Deloitte Development LLC)
- Dilekli, Y. (2017). The relationships between critical thinking skills and learning styles of gifted students. *European Journal of Education Studies*.
- Dumitru, D. (2019). Creating meaning. The importance of Arts, Humanities and Culture for critical thinking development. *Studies in Higher Education, 44*(5), 870-879.
- Fahmi, F., Setiadi, I., Elmawati, D., & Sunardi, S. (2019). Discovery learning method for training critical thinking skills of students. *European Journal of Education Studies*.
- Fischer, E., & Guzel, G. T. (2023). The case for qualitative research. *Journal of Consumer Psychology, 33*(1), 259-272.
- Gong, Y., Kim, T. Y., & Liu, Z. (2020). Diversity of social ties and creativity: Creative self-efficacy as mediator and tie strength as moderator. *Human Relations, 73*(12), 1664-1688.
- Hasnunidah, N., Susilo, H., Irawati, M. H., & Sutomo, H. (2015). Argument-driven inquiry with scaffolding as the development strategies of argumentation and critical thinking skills of students in lampung, Indonesia. *American Journal of Educational Research, 3*(9), 1185–1192.
- HCM Technology Report. (2023). How is Technology Changing Work of the Future? [Internet] Available from <https://www.hcmtechnologyreport.com/how-is-technology-changing-work-of-the-future/>
- Holley, K. A., & Harris, M. S. (2019). *The qualitative dissertation in education: A guide for integrating research and practice*. Routledge.
- Huber, C. R., & Kuncel, N. R. (2016). Does college teach critical thinking? A meta-analysis. *Review of Educational Research, 82*(2), 431–468. <https://doi.org/10.3102/0034654315605917>

- Idkhan, A. M., & Idris, M. M. (2021). Dimensions of students learning styles at the university with the kolb learning model. *International Journal of Environment, Engineering and Education*, 3(2), 75-82.
- Izwan. (2023). #TECH: Workplace trends after the pandemic [Internet] Available from <https://www.nst.com.my/lifestyle/bots/2023/03/889870/tech-workplace-trends-after-pandemic>
- Kitzinger, J. (1995). Qualitative research: introducing focus groups. *Bmj*, 311(7000), 299-302.
- Kusmaryani, W., Musthafa, B., & Purnawarman, P. (2019). The influence of mobile applications on students' speaking skill and critical thinking in English language learning. In *Journal of Physics: Conference Series* (Vol. 1193, No. 1, p. 012008). IOP Publishing.
- Kuvac, M., & Koc, I. (2018). The effect of problem-based learning on the environmental attitudes of preservice science teachers. *Educational Studies*, 45(1), 72–94.
- Liu, O. L., Frankel, L., & Roohr, K. C. (2014). Assessing critical thinking in higher education: Current state and directions for next-generation assessment. *ETS Research Report Series*, 1, 1–23.
- Liu, O. L., Mao, L., Frankel, L., & Xu, J. (2016). Assessing critical thinking in higher education: The HIEghten™ approach and preliminary validity evidence. *Assessment & Evaluation in Higher Education*, 41(5), 677–694. <https://doi.org/10.1080/02602938.2016.1168358>
- Lune, H., & Berg, B. L. (2017). *Qualitative research methods for the social sciences*: Pearson.
- Ma, F., & Li, Y. (2022). Critical thinking ability and performance in argumentative essays of the education major students. *Theory and Practice in Language Studies*, 12(1), 143-149.
- Mahanal, S., Zubaidah, S., Sumiati, I. D., Sari, T. M., & Ismirawati, N. (2019). RICOSRE: A Learning Model to Develop Critical Thinking Skills for Students with Different Academic Abilities. *International Journal of Instruction*, 12(2), 417-434.
- Mahmood, M. S., & Othman, M. K. (2020). Learning style practices and critical thinking of students in Malaysia. *Universal Journal of Educational Research*, 8(8), 3570-3578.
- Meena, R. S. (2020). The effect of cooperative learning strategies in the enhancement of EFL learners' speaking skills. *Asian EFL Journal Research Articles*, 27.
- Mustofa, R. F., & Hidayah, Y. R. (2020). The Effect of Problem-Based Learning on Lateral Thinking Skills. *International Journal of Instruction*, 13(1), 463-474.
- National Association of Colleges and Employers. (2019). Career readiness defined [Internet] Available from: <https://www.nacweb.org/career-readiness/competencies/career-readinessdefined/>
- Nurakhir, A., Palupi, F. N., Langeveld, C., & Nurmalia, D. (2020). Students' views of classroom debates as a strategy to enhance critical thinking and oral communication skills. *Nurse Media Journal of Nursing*, 10(2), 130-145.
- Prat-Sala, M., & Van Duuren, M. (2022). Critical thinking performance increases in psychology undergraduates measured using a workplace-recognized test. *Teaching of Psychology*, 49(2), 153-163.
- Rahman, M. (2019). 21st century skill'problem solving': Defining the concept. Rahman, MM (2019). 21st Century Skill "Problem Solving": Defining the Concept. *Asian Journal of Interdisciplinary Research*, 2(1), 64-74.
- Ramberg, U., Edgren, G., & Wahlgren, M. (2021). Capturing progression of formal knowledge and employability skills by monitoring case discussions in class. *Teaching in Higher Education*, 26(2), 246-264.

- Roohr, K., Olivera-Aguilar, M., Ling, G., & Rikoon, S. (2019). A multi-level modeling approach to investigating students' critical thinking at higher education institutions. *Assessment & Evaluation in Higher Education*, 44(2), 1–15.
<https://doi.org/10.1080/02602938.2018.1556776>
- Sanjabi, T., & Montazer, G. A. (2020, April). Personalization of E-learning environment using the Kolb's learning style model. In 2020 6th International conference on web research (ICWR) (pp. 89-92). IEEE.
- Saputro, A. D., Atun, S., Wilujeng, I., Ariyanto, A., & Arifin, S. (2020). Enhancing Pre-Service Elementary Teachers' Self-Efficacy and Critical Thinking Using Problem-Based Learning. *European Journal of Educational Research*, 9(2), 765-773.
- Seibert, S. A. (2021). Problem-based learning: A strategy to foster generation Z's critical thinking and perseverance. *Teaching and Learning in Nursing*, 16(1), 85-88.
- Shaari, N., Subramaniam, G., & Hassan, R. (2020). WORKPLACE DIVERSITY IN MALAYSIA MULTICULTURAL SOCIETY: PROSPECTS AND CHALLENGES. *International Journal Of Business And Economy*, 2(1), 10-19.
- Shanta, S. (2022). Assessment of Real-World Problem-Solving and Critical Thinking Skills in a Technology Education Classroom. In *Applications of Research in Technology Education: Helping Teachers Develop Research-Informed Practice* (pp. 149-163). Singapore: Springer Nature Singapore.
- Siddique, S., Ahsan, A., Azizi, N., & Haass, O. (2022). Students' workplace readiness: Assessment and skill-building for graduate employability. *Sustainability*, 14(3), 1749.
- Tulgan, 2023 Master the 3 Basics of Critical Thinking [Internet] Available from <https://www.psychologytoday.com/intl/blog/navigating-the-new-workplace/202303/master-the-3-basics-of-critical-thinking>
- Tumen-Akyildiz, S., & Ahmed, K. H. (2021). An overview of qualitative research and focus group discussion. *Journal of Academic Research in Education*, 7(1), 1-15. DOI: 10.17985/ijare.866762
- Watson, G. B., & Glaser, E. M. (2018). *Watson-Glaser™ critical thinking appraisal: User's guide and technical manual*. Pearson.
- Yadav, D. (2022). Criteria for good qualitative research: A comprehensive review. *The Asia-Pacific Education Researcher*, 31(6), 679-689.
- Yazgan, A. D. (2021). Investigation of the Relationship Between Pre-service Teachers' Lateral Thinking Levels and Problem Solving Skills. *Journal of Theoretical Educational Science*, 14(1), 20-37.