

ORIGINAL ARTICLE

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Submitted Date: 23-11-2022

Accepted Date: 16-08-2023

To cite this article: Khairul Anhar Holder NA, Nik Nazri NN, Foong CC, Pallath V, Sim JH, Hong WH, Vadivelu J. Academic struggle: a case study on undergraduate first year medical students. Education in Medicine Journal. (early view).

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ARTICLE

ARTICLE INFO

Submitted: 23-11-2022
Accepted: 16-08-2023

Academic Struggle: A Case Study on Undergraduate First Year Medical Students

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ABSTRACT

Academic struggle is a concern for students, medical schools, and the society. As academic struggle is not idiopathic and instantaneous, qualitative research could provide an in-depth understanding on why it occurs. This qualitative research aimed to explore reasons of failure among Malaysian Year 1 struggling medical students through the lens of Theories of Action. This study adopted a single, embedded case design. Six medical students repeating their Year 1 studies performed a written reflection describing their experiences and behaviours during Year 1. Then, semi-structured interviews were conducted with each student, and data were analysed by two researchers. Independent analysis was compared, and discrepancies were resolved through discussions between the researchers. Each student narrative demonstrated difference in behaviours and experiences. Students showed limited learning engagement or demonstrated ineffective learning methods. Narratives indicated various reasons such as being overconfident or unmotivated to study for these behaviours. However, interpreting based on Theories of Action; the students' failures could be explained by three types of invalid governing variables found in the data. Students may have performed their actions based on inadequate knowledge, possessing misbeliefs, or demonstrating no rationales at all. Invalid governing variables may have led to ineffective actions, and subsequently, resulting in unintended consequences. Hence, all students failed the mid-year and/or end-year assessments. Struggling students lacked the valid governing variables in rationalising their actions. Based on the Theories of Action, to deeply assess and alter their governing variables, struggling students are recommended to perform double loop learning.

Keywords: *Academic struggle, Undergraduate, Medical students, Theories of action, Qualitative*

CORRESPONDING

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INTRODUCTION

There are students who struggle in the medical programme and are at risk of failing in their studies, with one systematic review summarising the attrition rate ranging from 2.4% to 26.2% in medical schools (and at an average of 11.1%) (1). These struggling medical students were those who failed to fulfil the minimum requirements to progress to the next year of medical studies due to either insufficient knowledge, unsatisfactory skills, problems with their professionalism or all of the reasons mentioned (2). Existence of struggling students in medical schools is a concern for many of the stakeholders involved. And yet, struggling medical students are under-researched in the medical education (3, 4). Students who struggle may experience emotional distress, stigma, and poor self-esteem after putting in substantial amount of time and energy into the medical programme (5, 6). These students may potentially drop out and raise the attrition rate, in turn affecting the reputation of medical schools. In addition, resources would need to be channelised by schools to remediate and reassess struggling students (5). Attrition could result in suboptimal utilisation of public funds, as it is used to subsidise tuition fees for public medical schools.

Theories of action (7) is a theory that explains the link between causes and consequences in human actions (Figure 1). Governing variables (why the person does what the person does) decide the action strategies (what the person does), and subsequently the actions result in consequences (what the person receives as an outcome).

Humans demonstrate mental maps to react to life situations. Their system of beliefs (e.g. philosophy of life, ethics, motives, or value), organise how they would plan and implement actions to achieve their goals. Humans might question their system of beliefs and actions when they encounter unfavourable outcomes (i.e. mismatch between intention and actuality) (8). In order to achieve intended outcomes, human begin to (re-)design their (new) actions through detecting and correcting errors in their (existing) actions and beliefs (9). Using terminologies as used by Argyris and Schön, actions of a person present its consequences and these actions are driven by governing variables (i.e. why a person does what he or she does, or the system of beliefs) (7, 8, 10). The relationships between consequences, action strategies, governing variables, or the Theories of Action, enables one to understand human actions (11). Interpreting Theories of Action, if a student in a group project possessed invalid governing variables such as maximising winning and minimising losing, he or she would perform action strategies such as advocating his or her position to win, and the possible consequences could result in miscommunication, escalated errors or self-sealing processes (9). Valid governing variables lead to effective action strategies, and effective action strategies will eventually lead to intended outcomes and vice versa. If the student made an informed choice, and he or she encourages colleagues to examine the choice, then miscommunication and putting blame on others may be avoided (9). Theories of Action may be able to identify invalid governing variables and ineffective action strategies that lead to unintended outcomes. Consequently, the student/human? learn the lessons and avoid repeating the mistakes. However, the process of detecting and correcting errors in governing variables could become difficult because human are often unaware of the governing variables they do use (12), or their behaviours are contradicting to those governing variables that they espouse (13).

Adopting ineffective action strategies (i.e. what the students did) might cause medical students to fail in their studies (i.e. consequences). Ahmady and colleagues (2019) reported a number of ineffective action strategies (e.g. bad study habits, mismanagement of time) related to academic failure (14). Their study urged careful planning in remediating the struggling students, in which it should correspond to the cause of academic failures. Patel and colleagues found that struggling medical students continued to fail as they used maladaptive strategies (15). The conclusion may exist that students might strive to alter their action strategies aiming to cope the failures, but unless their invalid

governing variables upheld were revealed and corrected, they tend to change from abandoning an ineffective action strategy to using another ineffective action strategy, subsequently they continue to fail (8, 9). Hence, identifying the invalid governing variables (i.e. why the students did what they did) would be useful as it could be the key to alter ineffective action strategies.

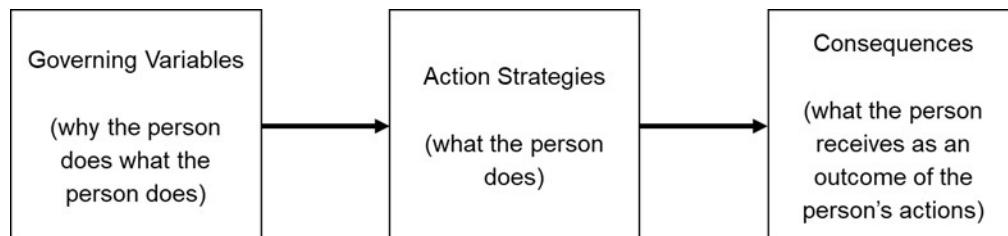


Figure 1: Theories of Action to explain human actions (adapted from the ideas of Argyris and Schön).

A Malaysian study reported that 2.1% to 12.1% Year 1 students failing to progress to Year 2 (16). To possess a strong association with attrition, academic struggle of students at the early stage of the medical programme had been observed (1, 17). A longitudinal study reported that medical students who failed at least one of the basic science courses or scored low grade-point averages in Year 1 possessed greater chances of attrition during the later stages of the medical programme (17). Therefore, more research is imperative to explore an in-depth understanding of what leads to academic struggle at this particular stage. This understanding would be crucial for struggling students to cease them from entering the cycle of failure (i.e. a situation of an initial failure and subsequent repeated failures due to the same reasons) (18).

Qualitative research was an appropriate approach to gain an in-depth understanding of a phenomenon (19). Despite that, published qualitative evidence was limited. The few that exist were the following: one qualitative study exploring the impact of motivation in academic failure (20), and two other qualitative studies (15, 21) applying semi-structured interviews to investigate issues contributing to academic failure, where the informants were students from all stages of a medical programme (Year 1, $n = 7$; Year 2, $n = 14$; Year 3, $n = 13$; Year 4, $n = 11$; Year 5, $n = 10$). Consequently, to enrich the existing body of knowledge on academic struggle among medical students, this qualitative research aimed to explore reasons of failure among Malaysian Year 1 struggling medical students through the lens of Theories of Action.

METHODS

The Case

This study was a single, embedded case design (22) where the authors' institution was the case, and each participating student was the embedded units of analysis. Case study design was adopted because it could provide rich and holistic descriptions of a complex process being investigated in real-life situations (19).

All students who enrolled into this institution achieved the maximum Cumulative Grade Point Average for their pre-university programme. Other admission criteria included satisfying panel

interviews of faculty members. As such, this investigation was a typical case representing public medical schools where the students were arguably the ones with high cognitive and non-cognitive abilities (22).

The institution embraces a vertically- (i.e. early clinical exposure) and horizontally- (system-based) integrated undergraduate medical curriculum. The Year 1 curriculum involved foundation, musculoskeletal sciences, cardiovascular sciences, and respiratory sciences. The foundation studies cover the basic clinical sciences of different subjects such as anatomy, physiology, pathology, molecular medicine, immunology, pharmacology, and infectious diseases. Next, in each system – for instance the musculoskeletal system, it focuses on specific topics relating to normal and abnormal human structure, function and behaviour in relation to the diagnosis, principles of management and prevention of health problems of the system. Conventional large-group lectures, interactive multidisciplinary seminars, and laboratory sessions are the instructional delivery methods. In addition, one problem-based learning session and one clinical (i.e. history taking/communication skills, physical examination, or procedural skills) learning session occurred weekly throughout the academic year. The medium of instruction for the medical programme was English. All students achieved entry requirement for English proficiency level of the medical programme. In term of student support system, upon entering the medical schools, Year 1 students were assigned academic advisors who met and discussed with students about their examination results. Counselling services were also made available to students.

The Year 1 study consists of separate assessments in knowledge (an accumulated final score of 30% mid-year written assessment and 70% of end-of-year written assessment), skills (objective structured clinical examination, anatomy and pathology spot tests, mini clinical exercises) and attitudes (portfolio and interview, medical ethics, and laws test). Additionally, to progress to Year 2, students must pass each individual assessment.

Data Collection

Ethical approval was received from the institution to conduct this study (UM.TNC2/RC/H&E/UMREC-89). 148 Year 1 students were registered for the medical programme. At the end of the academic year (August), six students were notified that they failed one or more assessments, and they were required to repeat Year 1 in the following academic year (September). A time gap of two weeks was given. The six students were identified as target population.

In September, more than two weeks after students were notified of their academic failures, hoping that they would receive some time to process the bad news, the third author contacted and arranged a meeting with the six students. The purpose, procedures, possible benefits, and risks were explained to students, and students were informed that their participation was voluntary. All authors did not demonstrate any prior relationships with the students. All authors were attached to the office of planning, implementation, and evaluation of the medical programme. Also, students were informed that their honest responses during the data collection will not result in any kind of penalties, and they may withdraw from the study at any time. At the end of the meeting, all six students consented to participate in this study. Since the meeting, important dates (conducting meetings and interviews), procedures (developing codes) and decisions (revising a lens/theory for investigation) were documented.

First, a semi-structured interview was arranged with each student. The interviews were conducted at a room at the authors' office. Rapport was established for the students to feel at ease. The environment was quiet and relaxed (i.e. interviewees were informed that they could refuse questions if they wished to) and non-threatening (i.e. re-assurance of anonymity of the interviewees). Prior to the audio

recording of interviews, the interviewer informed each student on the purpose of the interview, why the interview was recorded and how the identifiable data would be managed. Upon consent, the interview commenced.

For students to elaborate on their learning experiences, the interviews were initiated with open questions such as ‘What happened?’ and ‘How did you study’. Their responses were prompted with the use of hypothetical, devil’s advocate, ideal position and interpretive questions, to guide students in expressing their feelings and rationales (23). In addition, student’s willingness to share their personal experiences of academic struggle is essential as these answers will contain their personal and genuine feelings on the failures. Each interview lasted approximately one to 1.5 hours. All interviews were audio-recorded and transcribed verbatim. Interview questions are shown in Table 2. These questions were developed, piloted, and revised based on interviews with struggling students from previous cohorts, who were not participants of this study.

Second, each student was required to write an essay which acted as a cathartic tool to record fears, frustrations, anxiety, anger, and weaknesses. Students were expected to write 1,000 words within a week duration. They were allowed to write at home/hostels where they were able to convey their feelings in a safer environment, rather than sitting at the office of the authors. Through this task, personal insights into some of the challenges faced by the students were revealed (24). Questions were developed using Driscoll’s model (25), and questions asked were as follows: (1) You failed Year 1. What happened? (2) Any other matters that you would like to express your feelings on? (3) You are repeating Year 1. What are you planning to do, if any, to make a difference? Students submitted their essays approximately one or two weeks after the interviews were conducted.

Data Analysis

The analysis was guided by the Theories of Action, and stories of each student (i.e. embedded unit of analysis) were assembled (i.e. the case) for evaluation, should there be any shared ideas which correspond to the theory. The data were read multiple times by the first and second authors to familiarise themselves with the content. Next, codes were generated from the interview transcripts and essays from each student. The first and second authors identified excerpts that may explain academic struggle. Each excerpt was labelled to describes what, how or why to a student’s action or feeling. Data in the interview transcripts were compared with what was written in their essays for the purpose of corroboration whenever applicable. Subsequently, the researchers compared the independent coding results, discussed, and resolved any discrepancies until a consensus was reached between the two researchers. Meanwhile, the third author who was not involved in the process of data analysis reviewed all codes and ensured that the codes were supported by the excerpts from the interview transcripts and essays.

Next, the data (codes) were rearranged where the events were connected in a chronological order, presenting each student’s experience as a story. This aided the researchers in making sense of the events that occurred leading up to their failures. Method and analyst triangulation informed and validated the students’ perspectives on their reasons for failing their Year 1 studies (26). A priori thematic saturation was achieved as the students’ experiences exemplify the pre-determined categories (i.e. governing variables, action strategies, consequences) in the Theories of Action (27).

Also, it was understood that the sentence structure and word choice in the students’ excerpts may not be in perfect English. Nonetheless, the authors wished for the excerpts to be maintained in the Malaysian English style to preserve the students’ genuine expression and the tacit cultural understanding behind what the students wrote and spoke.

RESULTS

Each student was given a pseudonym to avoid identifiable data; Interviewee 1, Interviewee 2, Interviewee 3, Interviewee 4, Interviewee 5, and Interviewee 6.

Interviewee 1, 21-year-old, male

When being prompted during the interview, Interviewee 1 described that he was ‘very confident’ that he can ‘pass Year 1 without breaking a sweat’, and even if he ‘studied at the last moment’, he ‘can still ace this medicine course’.

In the essay, Interviewee 1 introduced himself as a student who grew up in a small village. Then, he met seniors in the medical school who were ‘*nice and kind*’ to him and ended up spending most of his time doing leisure activities such as ‘*going out, enjoying, playing, eating outside, watching movies*’. As he spent much of his time doing leisure activities, Interviewee 1 ended up spending relatively less time in studying. He eventually failed the mid-year written assessment.

After failing the mid-year written assessment, Interviewee 1 lost his confidence. He felt that he demonstrated low motivation to study and doubted his abilities to pursue the medical profession. If he was not fit for the profession, then why should he study? (Excerpts 1 and 2, Table 1). Subsequently, he did not produce a timetable to guide him on his daily activities and followed no specified timetable to study. Then, Interviewee 1 recalled his previous study methods during his pre-university days when he was more disciplined (Excerpt 3, Table 1). In addition, Interviewee 1 skipped the difficult content and did not make any attempt to comprehend it. Furthermore, lecture notes were his only sources of information as he ‘*very rarely*’ referred to recommended textbooks (Excerpt 4, Table 1).

Also, Interviewee 1 failed the end-of-year written assessment. As a result, Interviewee 1 was required to repeat Year 1 as he failed to obtain a satisfactory accumulated score for the mid-year and end-of-year written assessment.

Interviewee 2, 21-year-old, female

Interviewee 2 entered university with full of anticipation and promises (Excerpt 5, Table 1). However, something seemed to distract her from her studies. An informal orientation was conducted by the senior medical students at her residential college in which she was forced to participate in. Interviewee 2 commented that the orientation was ‘*a waste of time*’. Although she made negative remarks regarding the informal orientation activities, she still conformed (Excerpts 6 & 7, Table 1).

Meanwhile, although she disagreed with the social culture and learning styles of her new peers in medical school, once again she followed the ways of her peers (Excerpts 8 & 9, Table 1). It seemed that Interviewee 2 compromised her beliefs to avoid conflicts with her seniors and peers, and as a result, she neglected her studies. She skipped classes or slept during lectures as she was either too exhausted from the previous nights’ orientation activities or likely to be adapting to the ways of her peers. Eventually, she failed the mid-year written assessment.

Despite Interviewee 2 claiming that she loved medicine, Interviewee 2 was not ‘*brave to face*’ the workload of studying medicine. Hence, she kept procrastinating in her studies (Excerpt 10, Table 1). When she made notes from the lectures, she was also careless, constantly misplacing the notes she made. Furthermore, she complained about the overwhelming number of topics she had to revise and was selective of the topics she studied, even though she knew she must read all; ‘... *(there are) too*

many things so I have to concentrate on other things... but *I will wait for the last – until the last minute to study.* In addition, she joined extracurricular activities, which only made her busier and gave her less time to study (Excerpt 11, Table 1).

Interviewee 2 did not explain why she engaged less in her studies after her mid-year written assessment. In the end, Interviewee 2 also failed the end-of-year written assessment. As a result, Interviewee 2 was required to repeat Year 1 as she failed to obtain a satisfactory accumulated score for the mid-year and end-of-year written assessment.

Interviewee 3, 21-year-old, female

Interviewee 3 altered her learning methods after entering medical school and simply read her lecture notes, abandoning methods that worked for her since primary school. Interviewee 3 analysed the cause of her failure as not constructing her notes *in a way that* she *would understand* (Excerpt 12, Table 1). However, she did not explain her reason for altering her learning methods. Interviewee 3 eventually failed the mid-year written assessment.

After her failure in mid-year assessment, Interviewee 3 modified her learning methods once again where she *decided to not print lecture notes anymore* and made her *own notes* (Excerpt 13, Table 1). Also, she informed that during lectures she *will listen. I will concentrate and I will listen*. Her rationale implied that she believed in passive learning in which the lecturer talks, and learners listen.

Interviewee 3 did not explain why she changed her learning methods without rationalising on its effectiveness. However, she said *I was thinking I was progressing.* It was only during the interview when Interviewee 3 realised that she *didn't know whether I was really progressing or I was just thinking I was progressing*. Also, Interviewee 3 was asked to reason her actions several times during the interview (e.g. why did she seek advice from seniors and how did she know if the advice is useful). However, she gave no reasons and informed *I don't know. It didn't cross my mind*. Interviewee 3 eventually failed the end-of-year written assessment. As a result, as she failed to obtain a satisfactory accumulated score for the mid-year and end-of-year written assessment, Interviewee 3 was required to repeat Year 1.

Interviewee 4, 21-year-old, female

Interviewee 4 admitted that she chose to study medicine simply because she wanted *to give a try*. For her, the *passion will come by itself* when she enrolled in the programme, implying she lacked the motivation to study medicine in the first place (Excerpt 14, Table 1).

Upon entering medical school, Interviewee 4 confessed that she was a *lazy* person. She infrequently studied during the first two-month period of the Foundation Block for medical and clinical sciences as she thought it was a bore and only studied according to her mood (Excerpts 15 & 16, Table 1). Meanwhile, when Interviewee 4 demonstrated the mood to study, it seemed that she read the lecture notes without comprehending the content. She *just read* (Excerpts 17 & 18, Table 1).

In contrast to her medical studies, Interviewee 4's extracurricular activities dominated much of her time. More time was spent to participate and practice for a competition, as well as being a committee member in planning and running student programmes at her residential college. In addition, Interviewee 4 represented her college in a sport event which scheduled regular training sessions (Excerpt 19, Table 1).

Teaching and learning activities in this medical school were typically scheduled from 8 am to 5 pm. When being probed on the reasons why she attended the classes late, Interviewee 4 explained that night practices and sport matches from the previous night made her exhausted the next day. It was implied that Interviewee 4 demonstrated neither the time, nor the energy to revise lectures of the day, nor the time for preparation for the next day's lectures (Excerpt 20, Table 1).

Meanwhile, Interviewee 4 mentioned that her time management was *'really bad during Foundation Block'*, with the mid-year assessments being conducted immediately after this block. She recalled rarely attending morning classes and going out almost every weekend to watch movies and going hiking with friends.

Interviewee 4 failed both the mid-year and end-of-year written assessments. As a result, as she failed to obtain a satisfactory accumulated score for the mid-year and end-of-year written assessment, Interviewee 4 was required to repeat Year 1.

Interviewee 5, 21-year-old, male

Interviewee 5 admitted that he disliked studying and was someone who easily panics. However, he pursued medicine to make his father happy. As the study of medicine required a substantial amount of reading, this caused him a great deal of stress (Excerpts 21, 22 & 23, Table 1).

When being prompted on the reason why he did not seek help, Interviewee 5 answered *'I never thought it could be that serious'*. He recalled his experience during the mid-year written assessment when the panic attacks began. According to Interviewee 5, during the nights leading up to the assessment, the assessment questions appeared in his dreams and tested him. Interviewee 5 was unable to answer these questions in the dreams, so he woke up and read. After verifying his understanding on the topics, he resumed sleeping. Interviewee 5 did not seek for help as he felt he could cope with the panic attacks, in which he defined *'coping'* as still being able to sleep after experiencing the dreams. He was still able to calm himself down and convinced himself that he can pass the mid-year assessment (Excerpts 24 & 25, Table 1).

Interviewee 5 passed the mid-year written assessment, albeit merely fulfilling the minimum requirements. The assumption exists that the passing of this assessment gave him a false sense of security, vindicating his reluctance in seeking help for his panic attacks. Then, he proceeded making the necessary preparations for the end-of-year written assessment. Unexpectedly for Interviewee 5, what followed was the worsening of his panic attacks one week before the assessment. Once again, the assessment questions tested Interviewee 5 in his dreams, and he woke up to verify his understanding of the questions. The difference this time was his inability to answer these questions. To worsen matters, Interviewee 5 failed to resume sleeping and stayed awake for three days. Consequently, Interviewee 5 failed to handle the overwhelming pressure and abstained himself from the end-of-year written assessment altogether (Excerpts 26, 27 & 28, Table 1).

Eventually, Interviewee 5 decided not to attend the examination and failed the end-of-year written assessment (as per the Examination Regulation). As a result, Interviewee 5 was required to repeat Year 1 as he failed to obtain a satisfactory accumulated score for the mid-year and end-of-year written assessment.

Interviewee 6, 21-year-old, male

Interviewee 6 failed the mid-year anatomy spot test where he informed during the interview that he demonstrated '*overconfidence*' and he '*underestimated the paper... (the) anatomy (spot) test*'. When the end-of-year assessments were approaching, he made a conscious decision to focus less on studying anatomy as he prioritized studying and passing his written assessment instead (Excerpt 29, Table 1).

Also, Interviewee 6 failed the end-of-year anatomy spot test, and he began to realise that his studying method was '*ineffective*' (Excerpt 30, Table 1). He realised the differences (e.g. colours) of the specimens during the assessment and the specimens he studied in the reference books only after he attempted to identify them during the end-of-year anatomy spot test. With the limited amount of time that he received during the assessment to identify the specimens which greatly contrasted to the one he studied from the reference books, he panicked and struggled to answer the assessment questions (Excerpt 31, Table 1).

He was provided the opportunity of a supplementary anatomy spot test (i.e. second chance). However, Interviewee 6 informed that he attended merely '*one or two*' of the remedial classes provided preceding this supplementary chance. He even mentioned that he '*didn't ask help from others*' as he explained that he '*can come up with a solution*' by himself. Overconfidence seemed to overtake Interviewee 6 once again (Excerpts 32 & 33, Table 1).

Interviewee 6 failed his supplementary anatomy spot test. As a result, Interviewee 6 was required to repeat Year 1 as the institution required students to pass each individual assessment, and Interviewee 6 failed in all attempts.

The Case

The second layer of analysis involving relating results to the Theories of Action. In this study, stories of each student (i.e. embedded unit of analysis) will be assembled as a case. The case matched the Theories of Action: unintended consequences (e.g. failing the mid-year or end-of-year assessments), ineffective actions (e.g. study at the last minute, did not seek for help) and invalid governing variables (e.g. overconfident). People design specific actions in order to achieve intended outcomes based on their governing variables (i.e. why a person does what a person does, or the system of beliefs) (8, 10). However, a person's governing variable may not always be valid. Invalid governing variables, at often times, lead to ineffective actions, and these actions subsequently resulted in unintended consequences (8). In this study, failing the mid-year and end-of-year assessments were the unintended consequences of ineffective actions taken by struggling students. Based on the findings, this study discovered that ineffective actions were likely driven by three kinds of invalid governing variables.

The first invalid governing variable was that some struggling students reasoned their actions based on inadequate self-knowledge. Self-knowledge is defined as the act of being aware of one's strengths and weaknesses (28). From the results, Interviewee 1 misjudged his strengths (i.e. being overconfident on his abilities) and performed ineffective actions (i.e. spent more time on leisure activities and studied at the last minute). While Interviewee 6 misjudged his weaknesses (i.e. being unaware that he was weak in the anatomy subject) and designed ineffective actions (i.e. studied and focused on other subjects). Similarly, for Interviewee 3, she misjudged the effectiveness of her new learning method, and it was only during the interview that she realised that she was unsure if she was progressing or not. As for Interviewee 5, he misjudged his ability to cope with his panic attack and hence, the ineffective action (i.e. not seeking help).

The second type of invalid governing variable was the reasoning of their actions based on their misbeliefs. Interviewee 2 seemed to believe that a better way to resolve conflicts with seniors and peers was to suppress her negative feelings, one of the invalid reasoning mentioned by Argyris (8, 11). As such, her following actions included obeying seniors to participate in late night orientation activities, following the ways her peers learnt, and skipping the lectures. While Interviewee 4 demonstrated no genuine motivation to study, she believed that she would become motivated once she enrolled into the medical school. Without motivation, she took ineffective actions such as spending much time on extracurricular activities, which she was more interested in.

The third type of invalid governing variable was the absence of rationale for some of the students' actions. Interviewee 2 did not explain why she over-engaged in extracurricular activities as compared to spending time in her studies after her failure in the mid-year written assessment. As for Interviewee 3, she performed well during her pre-university education indicating her use of effective learning methods previously. However, upon entering medical school, she changed her learning method without providing a rationale for her actions. Mentioned by Argyris, the process of detecting and correcting errors failed to operate when some people were unaware of the system of beliefs that uphold their action strategies (13).

DISCUSSION

In comparison to past studies, stories of each student in the present study are known among struggling students. Struggling students demonstrated higher test anxiety (29), and they lacked study plan and effort (29, 30), poor time management (18, 31, 32), ineffective learning strategies (14, 15, 18), and lacked self-reflection (33). Despite encountering these problems, struggling students were hesitant to seek help (15, 32) or they only sought for help after failing more than one assessment (34), which would then be difficult to intervene.

Conversely, what may be novel to the literature is on how these struggling students may be concluded using Theories of Action. In this study, the struggling students demonstrated three types of invalid governing variables; they reasoned actions based on inadequate self-knowledge or misbeliefs, and the absence of rationales for actions. The present study shows that reasons for failing assessments could be traced back to their invalid governing variables. Hence, while a number of remediations are being discussed and proposed (35), the present study suggest future remediations to first address invalid governing variables of struggling students before they can effectively participate in other remediations.

Through the lens of Theories of Action, implications for future intervention are to intervene struggling students using single and double loop learning (13) (Figure 2).

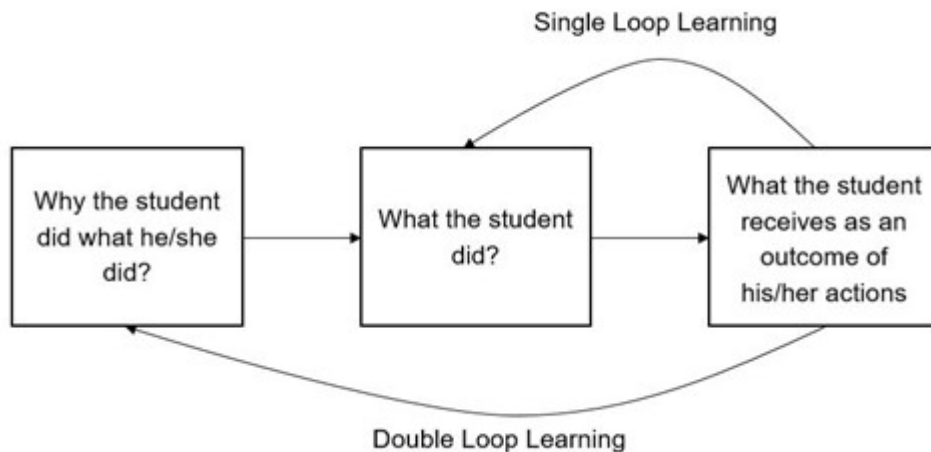


Figure 2: Single and double loop learning in the context of this study.

Single loop learning refers to taking actions to correct a particular problem (academic struggle) without challenging one's own governing variables, assuming he or she demonstrates a valid reason for attempting such actions (9). Examples of single loop learning in this study were observed in Interviewee 1 and Interviewee 3 where they continued using ineffective learning methods. Conversely, Interviewee 4 neglected her studies and participated in extracurricular activities as she lacked the motivation to study medicine. Although some struggling students recognised their own limitations and made attempts to correct them, they still failed. Therefore, it could be deduced that only single loop learning had taken place. Meanwhile, double loop learning involved a deep assessment and the identification of 'false' or irrational reasons, followed by the appropriate amendment on actions (9). Double loop learning was not identified in the present study. Unless the struggling students re-assessed their existing governing variables and were aware of its 'invalidity', their subsequent actions would not be modified accordingly and will remain to be ineffective. Interpreting on Argyris and Schön's idea (8, 9, 13), unless Interviewee 2 realises that making free and informed choices were valid rationales that should govern her living style (as opposed to suppressing negative feelings on seniors and peers), she would continue to adapt the living styles of her seniors and peers. Thus, the cycle of failures continues.

Most medical students are not accustomed to failure as they were 'used to succeeding' (36). To this end, non-judgmental conversations with struggling students (35) and structured written reflection guides (37, 38) were useful tools for them to assess their past actions and initiate corrective measures. Afterwards, remediation coaches must help students to instil the correct system of beliefs to correct their ineffective actions. While reading through the individual stories in this study, educators may recognise that these students were likely going to fail, but failing an assessment was often a surprise for the students. It was likely because the students failed to recognize that their respective governing variables were invalid. Therefore, introducing reflection as a remedial strategy could enhance self-knowledge (39) together with double loop learning (40).

Strengths and Limitations of the Study

The present study demonstrated strengths and limitations. Method and analyst triangulation were used to enhance the credibility of the study. Important dates, procedures and decisions were documented to

enhance its confirmability. To enhance the dependability of the qualitative research, preliminary findings were peer reviewed. Also, the description of the case would clarify on the transferability of the findings. It was a typical case and its findings were likely transferrable to other medical schools with similar contexts (22).

Limitations were present in this study. First, although the present study demonstrated rich data, future studies involving a larger sample, students from other years of study or other programmes, or multi-institutions may substantiate understanding of invalid governing variables. Second, the present study was an explanatory study. The use of double loop learning as a possible intervention was derived from the data interpretation. Hence, it is recommended for future studies to use experimental designs in order to provide empirical evidence for the effectiveness of double loop learning.

CONCLUSION

The present study explored the process of academic struggle through the lens of Theories of Action. Findings of the study revealed that struggling students based their actions (i.e. what did he/she do) on inadequate knowledge about their strengths and weaknesses, misbeliefs (on how learning occurs) or possessing no rationale for their actions. Lessons were learnt from the present study. To conclude, invalid governing variables are the principal reason for failing the assessments. The findings could be significant to recognise the governing variables as the key to alter ineffective actions. Introductory (or first) steps in future interventions for struggling students should consider correcting system of beliefs that uphold their ineffective actions.

ACKNOWLEDGEMENTS

The research was funded by the University of Malaya Research Fund Assistance (BKP) BK023-2016, the High Impact Research Chancellery Grant UM.C/625/1/HIR/ASH/025, and the Geran Penyelidikan Tabung UMSC C.A.R.E (PV045-2019). We would like to thank all participants for their willingness in sharing their learning experiences. Also, we would like to thank Miss Lye An Jie for reading the manuscript and providing feedback. Last, in memoriam of late Dr. Sim Joong Hiong, she has made significant contributions in preparation of the manuscript.

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Table 1: Supporting experts

Interviewee No	Excerpt
1	1 'Even after that I was not confident in doing anything.' (Essay)
1	2 '...when I'm in doubt, I don't actually have that motivation to study. Because you know that, okay, you have that doubt, if I'm right for this course or not. So for me, I just took it as, what if I'm not right, then why should I study?' (Interview)
1	3 '...discipline is, if you want to study, this is the time that you should do it. Like when I was in pre-university education, after I finished my studies at 5pm, I would come back, rest for a while, like half an hour, then at this specific time, I will do this, at this time, I will do that. I have a timetable so that I can manage my life much easier. Here, when I came, it was all messed up. If that day I didn't want to study, I'll just sleep.' (Interview)
1	4 'If I don't understand anything, I will just put it on the side and move on to the next (topic).' (Interview)
2	5 'At first, when I entered medical school, I was so fresh and I had the spirit, I wanted to finish this medical course in 5 years. I think that's everyone's dream.' (Interview)
2	6 '...but I will be going to the class and will be sleeping there because I would have that stupid session [note: orientation activities] until early in the morning. So (there will be a) lack of sleep. I used to sleep at like, 10 o'clock and wake up in 4 o'clock in the morning.' (Interview)
2	7 'I have to remember all my batch mates' names, (this) means, (those) in my group. They give all kinds of tasks. These kinds of tasks that doesn't make sense, like writing an essay about a senior.' (Interview)
2	8 'I started to adapt myself to their culture but that is not my culture. Like going out and talking and not studying and those kinds of things.' (Interview)
2	9 '...my kind of friends, they won't go for classes. They skip the classes and they won't study. But they are smart. But I thought I can be that kind of person too.' (Interview)
2	10 'I like to procrastinate...I love medicine. But when it comes to a few things, I didn't that brave to face it. Like anatomy classes, like anatomy lectures, there are a few things - there are lots of things in the lectures.' (Interview)
2	11 '(I joined) an extracurricular activity for other universities. Like inter varsity competitions. And even for (my religion) we have to arrange a few things. Like a prayers thing, (...) I was in charge of that (...) I was never used to these kinds of things. It was very new to me.' (Interview)
3	12 '...I was very enthusiastic in printing lecture notes. (Though) I did not construct it in a way that I would understand. I am the type of person who can remember and understand things better when I construct it in a way that I will understand. I am used to doing mind maps and concept maps which are easy and colourful. They make it easier to study. That was how I studied since my primary and secondary studies.' (Essay)
3	13 'I brought my own handbook to note down important things in (the) lecture. I went back to (my) room and constructed my own notes. I made myself consistent. I studied every night.' (Essay)
4	14 'It doesn't matter. Whatever course it is, if you study well, the passion will come by itself, along with your interest. I believe in that.' (Interview)
4	15 'Honestly, I was really bored (at) that time and (have) not prepared anything for (the) foundation (block).' (Essay)
4	16 'I study when I have (the) mood. When I don't have (the) mood, I just sleep or do other things.' (Interview)
4	17 'I didn't look at it properly. I just looked, read a little. And done. That's all.' (Interview)
4	18 'I just read like that, just on the surface.' (Interview)
4	19 'During Foundation block, I (was) also involved with a sport event. I played sport X and sport Y.' (Essay)
4	20 'I think because at that time, (I was) busy with the sport event. And (I was) tired after practicing

- sports.' (Interview)
- 5 21 '...stressful to me means, study(ing) a lot. Because I don't really like to study. I don't really like studying. Studying medicine is all about reading books and it makes me stressed (out).'
- (Interview)
- 5 22 'I think it's my emotions' doing because I tend to panic. I'm a person who tends to get panicked very fast.' (Interview)
- 5 23 'Becoming a doctor is good, and then he [note: Interviewee 5's father] really hopes that I can pursue my study in this medicine (programme). And what makes my dad happy, makes me happy...' (Interview)
- 5 24 'The question came to me (in my dreams), and then asked me and then I forget. And then I wake up and then I read through the book again, and then I close the book, then I sleep again and the question comes again. The cycle repeats.' (Interview)
- 5 25 '...I got insomnia during (the) mid-year assessment. But I can still handle it. So I push myself to sit for the exam.' (Interview)
- 5 26 'I think one week before my exam, I don't know why, but when I tried to sleep, things that I have learned just kept on coming and asking me whether I still (...) remember about that. And then I often couldn't remember them. I keep on waking up and reading through the books. And then the question comes again and then I forget again, and then I wake up again and then the cycle goes like this. I got like 3 or 4 days like that where I didn't sleep at all. And then I just keep on continuing with the cycle. Wake up, read through, sleep and then the question comes (up) again, and then I forget again. And then I wake up and then I read through the book again. And then I couldn't tolerate anymore, and I couldn't cope with that pressure anymore, and then I give up.' (Interview)
- 5 27 'Towards the end-of-year, those questions also come (up during dreams). The difference is just that the mid-year assessment you managed to answer those questions.' (Interview)
- 5 28 'But then I still can cope with that (during mid-year assessment). But I don't know why I couldn't cope when it comes to the end-of-year assessment.' (Interview)
- 6 29 'I didn't concentrate in the anatomy ...because I feel that (the) end of year (written) assessment is more important. I'd rather take (the) risk of failing the anatomy rather than failing my end of year (written) assessment which is more dangerous. The anatomy exam is just like, I go test my knowledge level and test my luck. Just do whatever I can do.' (Interview)
- 6 30 'I memorised all diagrams of the books. Everything is just in colour, red, yellow, everything is separated. When you come into the dissection hall, everything is in the same colour. The muscle, the nerve, everything is in the same colour. So, we need to identify it in a short time.' (Interview)
- 6 31 'For the end of year examinations, everything I (just) read once, (as) I think I can memorise quite well. So maybe that made me too confident that I failed.' (Interview)
- 6 32 'I think for me, maybe few weeks later, or few months later I will try asking. Not for help, but asking my friend what is the best way to study. Because I tend to decide a decision on my own first.' (Interview)
- 6 33 'Maybe (at) that time, I think I memorised well in anatomy. I don't think it's so hard for me. But when I go for the exam, and I realised I have lots of questions, I don't know how to do (the assessment).'
- (Interview)
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Table 2: Interview questions

No	Interview Questions	Mapping with Theories of Action
1	Could you share with me, why did you choose to study medicine?	Governing variable
2	When did you realise that you wanted to become a doctor?	
3	Your pre-university results were excellent; why did you not consider choosing other courses?	Governing variable
4	What was your image of medicine before you entered medical school? As compared to this image, how different or similar is it to the actual image (now)?	Governing variable
5	Did you ever feel that you were going to fail before the final exam?	Consequence
6	When did you realise that you might fail?	Consequence
7	What did you do when you realised that you were going to fail?	Action strategy
8	Now that you have failed, what has happened?	Governing variable
9	What factors may have contributed to your poor achievements? <ul style="list-style-type: none"> How did the (particular) aspect [ask each at a time] influence your studies? 	Governing variable
10	When you failed the main exam, you attended the remediation. How did you feel about the remediation?	
11	How did you study? <ul style="list-style-type: none"> What was your learning and studying style? 	Action strategy
12	How was your attendance at the lectures?	Action strategy
13	You completed continuous assessments before the final exam; did anyone give feedback based on the assessment results? <ul style="list-style-type: none"> What did they tell you? [If students answer Yes] 	
14	It is known that studying medicine is stressful. On a scale from 0 to 5, how would you rank your stress?	
15	Are you aware of student supports/counselling in this medical school? <ul style="list-style-type: none"> Why did you not seek help from medical school? [If students answer Yes] How did you cope with your stress or problems? 	Governing variable
16	Based on your experience, how would you advise your juniors so that they do not fail the exam?	Governing variable
17	I know it is impossible now, but what can the medical school do at that time to help you?	Action strategy
18	Some repeating students say that people look at them differently; what is your personal experience? <ul style="list-style-type: none"> When you told your parents that you had to repeat it, what did they say? What do your friends say when they know that you have failed the exam? 	
19	Given a scale from 0 to 5, how confident do you pass the exam this repeating year?	
20	I will go through a list with you, whether you think this is the reason for your failure. Some students said that they could not master the medical content because they were weak in English [each point will be replaced with a list below]. What was your experience with it? <ul style="list-style-type: none"> Peer pressure, friends' influence, family matters, personal problem, financial problem, health problems, language barrier, religion or culture issue, lack of motivation to study medicine, lack of confidence or over-confidence, lack of discipline, poor time management, procrastination, 	Governing variable

learning difficulties, prior knowledge (weak in Biology), issue with medical
teachers/institution, lack of direction or feedback on performance
