

Analyze Students' Difficulty Learning Course DAS16403 Cell Biology of Diploma in Applied Science

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Abstract

The students of Diploma in Applied Science (DAU) had been struggling to learn the Cell Biology (CB) course established. Same goes to learning any course, it is not always as simple as 'if it breaks, repair it' and based on our research, the difficulty learning a course which is CB in DAU might increase substantially. Thus, the purpose of this project that we handled is to prevent the students from difficulty in learning and also to avoid them from repeating a course or experiencing a substandard pointer and to keep the student's performance in university. The objectives in this project are to determine the most difficult course to score among students of DAU in Universiti Tun Hussein Onn Malaysia (UTHM), to determine the reasons why it is hard for students of DAU in UTHM to excel the CB course and to determine the difficulty of learning the course experienced by the students of DAU in UTHM. The targeted society for our project is the student of DAU in UTHM in session 2021/2022 and 2022/2023. The study focuses on the difficult course based on the data of student's grade in other to make a conclusion. Besides, this project also focuses on several ways to overcome the problem to learn the course so that the students will not fail and repeat the course for the next semester which could delay their time to graduate on exact time same as other students. The quantitative research methodology used for this project successfully implemented. We found that majority students have same opinion that CB is a course that has many facts to memorise and take time to understand it. In conclusion, the students of DAU in UTHM had some difficulties in order to learn and excel the CB course.

1. Introduction

The students of Diploma in Applied Science (DAU), Universiti Tun Hussein Onn Malaysia (UTHM) had a hard time to learn as well as excel the Cell Biology (CB) course. This matter must be emphasized because during Diploma study, most students must learn the basics and the concepts of CB course in order to strengthen their basics of the course. In addition, general anxiety is one feeling that students suffer through, and it may have detrimental effects on how well they do and how persistent they are and this is also one of the many reasons why some students could not excel in CB course [1]. Therefore, it is very crucial for this research to be done to find the reasons as to why the students of DAU found that CB course is hard to excel. CB mostly concentrates on the structure and the function of a cell, from the most common traits shared by all cells to the distinctive, extremely complicated activities solely to the specialized cells [2]. This course is known as one of the most difficult courses among student of DAU in

Universiti Tun Hussein Onn Malaysia (UTHM). Based on the grades data of Pusat Pengurusan Akademik (PPA) UTHM, this course has the lowest Cumulative Grade Point Average (CGPA) which is 2.63. Thus, this course is too stressful and too difficult for the students of DAU to comprehend.

Furthermore, there are many reasons to why CB is one of the most difficult courses. For instances, this course is complex and difficult due to its nature of the topic, teacher’s style of teaching, student’s learning, and studying habits, student’s negative feelings and their attitudes towards this course and a lack of resources regarding this subject. By figuring out the factors as to why CB is a difficult course, this will prevent the students from repeating this course which could affect the students’ performance in university [3].

The main objective of this project: to determine which course is the most difficult among students of DAU in UTHM to score, which is CB. On the other hand, this project also to identify the reasons why this course is the most difficult for students to excel in. Lastly, this project needs to determine the difficulty of learning the course experienced by the students of DAU. The scope of this project is this project focused on the students of DAU in UTHM from session 2021/2022 and 2022/2023. This is because, the CB course is only learned by the students of DAU in UTHM Pagoh.

2. Methodology

The methodology that is used for this project is quantitative research methodology. The process of gathering and interpreting numerical data is known as quantitative research [4]. This research method is used to discover averages, generalizing results to larger groups and to make predictions. After gathering the data, it may be necessary to organize it before analyzing it. For instance, survey or test data need to be converted from qualitative data to quantitative data [5]. Therefore, we decided to make a questionnaire question by using the Google Form platform which involves respondents from students DAU 2021/2022 and students DAU 2022/2023.

Table 1 CGPA and Level of Difficulty for Each Chapter in Cell Biology

CGPA	Level of Difficulty
1-1.33	Low
1.34-2.66	Medium
2.67-4.00	High

Then we blast the questionnaire within 2 weeks in social media which is WhatsApp to the targeted respondents. There are 3 sections including demographic question which are students’ gender and year of study in DAU. The next section is the level difficulty in each chapter in CB DAS16403. The last section is the open question including the students’ opinion in CB course and students’ solutions to overcome difficulty in this course, and quantitative research about students’ study method in CB course. Lastly, we analyze the data from open question by using Table 1.

The flow chart for this survey included the four stages conducted in study. First and foremost, it begins with preparing the Google form section which is the first step in our research. This project explores across a broad spectrum of sources to generate the questions that are both relevant and particularly useful for respondents. Furthermore, the distribution of the Google form was completed successfully because the targeted respondents received this Google form successfully. Moreover, data analysis occurs when the researcher has gained the necessary number of respondents who have successfully filled out the form. Lastly, the gathered data was presented.

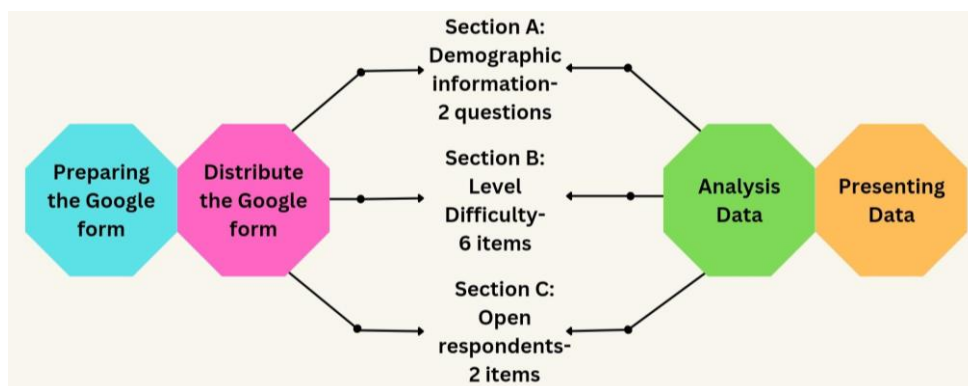


Fig. 1 Flow chart of research activity

To achieve the objectives in this project, data from Academic Management Office (PPA) and calculate by using this equation:

1. Total average calculation (CGPA) for each course:

$$\frac{\text{Total average of all grades (in pointer)}}{\text{Total number of students in each course}} \quad (1)$$

For analyze the data of open question in our Google Form questionnaire, data was calculated by the equation below and identify the level of difficulty by Table 1.

2. Cumulative Grade Point Average (CGPA) each chapter in Cell Biology course:

$$\frac{\text{Number of respondents} \times \text{Level of difficulty}}{\text{Total respondents}} \quad (2)$$

3. Result and Discussion

Table 2 Data of average CGPA in each course of students Diploma in Applied Science UTHM semester 1 and semester 2 (2013-2022)

COURSE	CGPA
DAS10103 Algebra	3.18
DAS12303 Physical Chemistry	3.03
DAS16403 Cell Biology	2.63
DAS20803 Calculus	3.31
DAU10103 Physics Mechanics	3.12
DAS10503 Statistics I	2.96
DAS12503 Organic Chemistry	3.32
DAS26503 Microbiology	3.06
DAU10203 Fundamental of Electric and Electronic	2.76
DAU10303 Optic	3.35
DAS20703 Statistics II	3.18
DAS22403 Analytical Chemistry	3.29
DAU16103 Computer Technology and Multimedia	3.42
DAU18102 Occupational Safety and Health	3.29
DAU21303 Fundamental of Food Science and Technology	3.52
DAU 24202 Introduction to Modern Physics	3.60
DAN20103 Business Entrepreneurship	3.37
DAU 22102 Waste Management	3.14
DAU 22303 Environmental Chemistry	3.52
DAU 34403 Ordinary Differential Equation	2.30

Data regarding each course's CGPA of students in semester 1 and semester 2 (2013 until 2022) have been received as shown in Table 2. Then, CGPA for each subject is obtained, and CB course has the lowest CGPA with 2.63 among other courses. This concludes that CB is the most difficult subject to score among the students of DAU in UTHM.

For achieve the objectives in this project, a questionnaire through Google Form survey have been prepared. As stated in the Fig. 2, the percentage of respondent is 51.1% which is 24 students from 1st year and 48.9% which is 23 students from 2nd year. Based on Fig. 3, 47 responses from students of DAU in UTHM have been received. There are 76.6% of female represent 36 students and 23.45% represent 11 students.

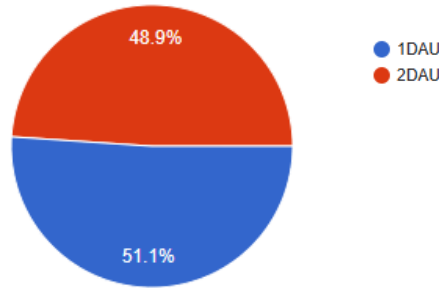


Fig. 2 The Respondents' Year of Study

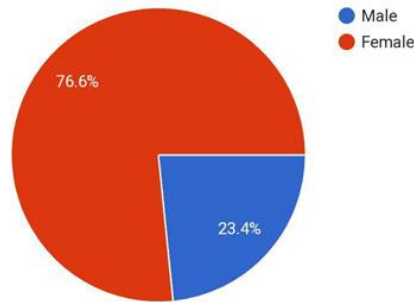


Fig. 3 The Respondents' Gender

3.1 Opinion the level of difficulty in each subtopic in DAS 16403 Cell Biology

By referring to the syllabus of CB course, there are 6 chapters including the Chemistry of Living Things (Chapter 1), Biological Molecules (Chapter 2), The Cells (Chapter 3), Membrane (Chapter 4), Energy and Metabolism (Chapter 5) and Cell Continuity (Chapter 6).

Table 3: CGPA in Each Chapter Cell Biology

Chapter	CGPA	Level
1	1.29	Easy
2	2.10	Medium
3	1.78	Medium
4	1.89	Medium
5	2.32	Medium
6	2.51	Medium

By using Table 1 and Eq. 2, it is found that the level of difficulty for Chapter 1 is easy, Chapter 2 until Chapter 6 are medium level of difficulty as shown in Table 3. However, Chapter 6 got the highest and nearest CGPA with a high level of difficulty.

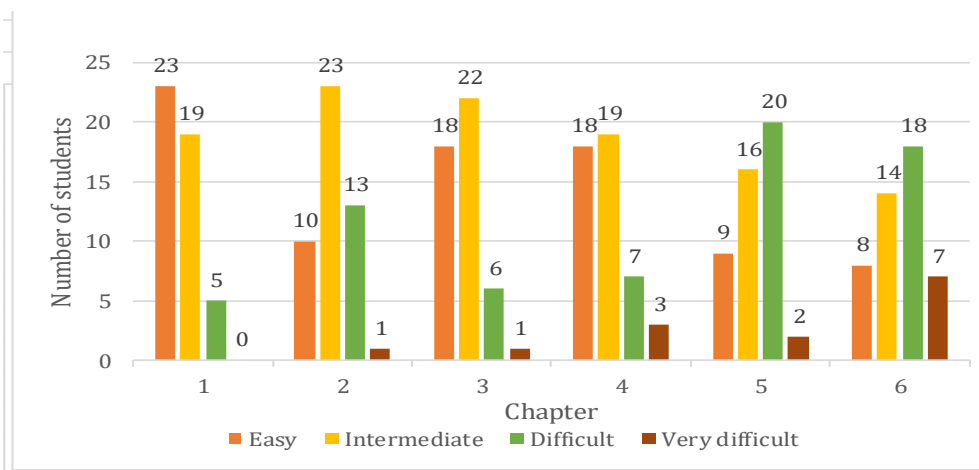


Fig. 4: Level of Difficulty in Each Topic Cell Biology Course

This is also proven from the bar chart in Fig. 4, the respondents agree that they had trouble in learning and memorizing facts and information such as enzyme structures in DNA replication in Chapter 6.

3.2 Opinion about Cell Biology course

Table 4: *Students' opinion in Cell Biology course*

Reasons	Percentage (%)	Number of Respondents
Need to memorize/remember	70.21	33
Dives study of cell in system and organism	12.77	6
Depends on study method	4.26	2
Too much information/facts	2.13	1
Lack of interest	2.13	1
English usage	2.13	1
Diverse topics need to study	2.13	1
Not too difficult	2.13	1
No opinion	2.13	1

As shown in the Table 4, the percentage of students that think it needs to memorize and remember larger than percentage of other reasons which is 70.21%. This indicate that majority of the respondents agree with the statement that CB has lot of facts, theories, definitions to remember and understand it such as in subtopic concerned of cell cycle and DNA replication. Furthermore, lecturers' teaching method is one of the reasons why CB become difficult because attractive teaching method can get students easier to learn. 12.77% of respondents agree that the CB course has dives study of cell in system and organism. This proven many topics included the information and facts abouts cells in this course. Furthermore, the type of study method in learning CB course influenced students to remember what has been learned in the cost.

3.3 Students' solution to overcome difficulty in learning Cell Biology

Table 5: *Students' solutions to overcome difficulty in Cell Biology course*

Solutions	Percentage (%)	Number of Respondents
Reread	31.91	15
Revision/study earlier	23.40	11
Do mind map & notes	21.28	10
Watch YouTube videos	6.38	3
Flashcard	6.38	3
Study with friends	4.26	2
Find suitable study method	2.13	1
Ask friends and lecturer	2.13	1
No opinion	2.13	1

As tabulated in Table 5, majority student more prefers to read the facts more frequently in CB course. It might happen because re-reading method can enhance and develop a deeper understanding.

This situation also could help students in improving memory by increasing mental stimulation and allowing new neurons to be produced in the brain. Rereading can help students gain more confidence to attempt any related question in the exam. This is because reading exercises the brain. Next, 11 respondents agree with revision and study earlier helps them recall the details of the topic they have studied. Some of the respondents also prefer to do flashcards and watch YouTube videos about this CB course to get more additional information. This also shows that the students are categorized as visual learners.

Table 6: *Students' study method in Cell Biology Course*

Study Method	Percentage (%)	Number of Respondents
Individual	76.6	36
Study group	23.4	11

From the Table 6, the respondents are more likely to study individually rather than to study in group. This is because self-studier can think about topics more deeply and make connections between what they are learning.

Additionally, students are better able to retain information when they are engaged and excited about what they are studying. Study individually enables students to learn at their own pace while concentrating on the topics they are most interested in studying alone allows student to set the perfect study environment, so they will get to focus on studying. Besides, it enables students to use the study tactics that are the most effective for their learning style. Some students learn best with flashcards, while others learn best when they reread chapters. On the other hand, 23.4% of students more prefer study group method because it has been proven that those who participate in study groups feel more confident and comfortable about reaching their academic goals. Overall, most professional careers require collaboration with colleagues on projects, so study groups are excellent practice in preparation for the work world.

4. Conclusion

In nutshell, the main reason that made this CB course become hard to learn for students are because this course needs strong memory to memorize the facts, theories, definitions, cell structures, cycles and many others. Based on the result from the Google Form data, the subtopics regarding the cycle and cell in the system are the most complex for students to comprehend. The data also shows that most students agreed that by studying individually is the best method to excel this course.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

This journal requires that all authors take public responsibility for the content of the work submitted for review. The contributions of all authors must be described in the following manner:

*The authors confirm contribution to the paper as follows: **study conception and design:** Nurazrina Faeiza , Nur Najihah, Norbaizura Nordin; **data collection:** Nurazrina Faeiza , Nur Najihah, Norbaizura Nordin; **analysis and interpretation of results:** Nurazrina Faeiza , Nur Najihah, Norbaizura Nordin; **draft manuscript preparation:** Nurazrina Faeiza , Nur Najihah, Norbaizura Nordin. All authors reviewed the results and approved the final version of the manuscript.*

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