

# Analysis of Students' Reflective Essays on Their First Human Dissection Experience

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**Purpose:** Reflection is increasingly being used in higher education, but the criteria to assess the depth of reflection in student essays are difficult to define. This article tested the hypothesis that a good reflective essay contains more terms indicating mental processes.

**Methods:** The authors selected two essays written by first year medical students at The University of Hong Kong, after their first encounter with cadavers in their dissection class. The two essays were perceived by teachers as having different depths of reflection. The transitivity system in Systemic Functional Linguistics was adopted to compare the two essays in terms of percentage occurrence of different process types (mental, material, relational, verbal, behavioral, existential).

**Results:** The analysis showed that the essay with deeper reflection had a higher percentage occurrence of mental and relational processes and a low percentage occurrence of material processes. The other three processes accounted for only a low percentage of processes in both essays.

**Conclusion:** From the transitivity analysis of the two reflective essays, the hypothesis that a good reflective essay contains more terms indicating mental processes is supported. The transitivity system in systemic functional linguistics can thus be used as an objective framework for assessing the depth of reflection in written essays.

**Key Words:** Cadaver, Death, Language, Linguistics, Medical education

## INTRODUCTION

Reflection is increasingly being used in higher education to enhance learning, initially in the professional development of nurses and teachers and now in most other disciplines [1]. Epstein & Hundert [2] have defined competence in medicine as “the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflec-

tion in daily practice for the benefit of the individuals and communities being served.” To develop these domains of competence, informative learning, which is the acquisition of knowledge and skills, is not enough. Formative learning, which is to socialize students around values so as to produce professionals, is also not adequate. What is needed is transformative learning, which is about developing leadership attributes [3]. The assessment of the learning of these domains of competence requires a multitude of tools [4]. One of the most

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powerful of these assessment tools is portfolio which, when used appropriately, can be used for assessing all domains [4]. Reflection is an important component in a portfolio, but it is notoriously difficult to assess since it is time consuming and lacks objective criteria. Scoring rubrics have been used to assess the learner's ability in the area of the reflection [5], but the depth of reflection or their reflective skills is very difficult to assess [6]. At Li Ka Shing Faculty of Medicine at The University of Hong Kong, we ran into the same problem in assessing the reflective essays medical students wrote on their first encounter with cadavers.

Cadaveric dissection has long been a standard part of the gross anatomy component of medical programmes around the world. In recent years, some medical programmes have done away with cadaveric dissection for various reasons, the most common being the difficulty of obtaining enough human cadavers, the high cost of running the facilities for embalming and storing cadavers [7], and the belief that other pedagogical means (such as computer technologies) can adequately replace cadaveric dissection. However, at the University of Hong Kong, cadaveric dissection is considered to be an essential and important part of the learning of human gross anatomy, which is necessary for a solid foundation in medicine. Cadaveric dissection also provides an invaluable opportunity for students to learn about the humanistic aspects of medicine [8].

Early in the first year of the medical programme at the University of Hong Kong, medical students have their first session of cadaveric dissection, which includes a ceremony in which students show their respect to the cadavers. The whole class of about 150 students will be divided into about 20 groups, and each group will work on the same cadaver for the rest of their first year. At the beginning of the first session, before students begin their dissection, the anatomy department holds a

non-religious ceremony which is about 15 minutes long. It aims to highlight the fact that the dissection cadavers are not just biological specimens. They were once human beings, with parents, and perhaps siblings and children. They laughed, worried, cried, and fought to overcome disease, although they finally succumbed. It is hoped that the ceremony will encourage medical students to treat the cadaver as their first patient from which they will learn. The ceremony ends with a moment of silence for the students and teachers to reflect on these ideas.

In order to promote the medical students' reflections on their first encounter with cadaver and also enhance their English-language writing skills, all the first-year medical students are required to write an essay in English on the experience of their first encounter with the cadaver, including the cadaver respect ceremony. The students are told that they can write about their thoughts and feelings before, during, and after their first encounter with the cadavers. On reviewing the essays submitted by the students, the teachers can usually distinguish essays with different depths of reflection, although the factors leading to such perceptions are subjective. The assessment standard on the reflective component of these essays is difficult to define.

We therefore propose to use the concept of transitivity in Systemic Functional Linguistics [9,10] as a tool to analyze the depth of reflection in the medical students' essays. Systemic Functional Linguistics views language as "a network of systems, or interrelated sets of options for making meaning" [9] (hence the term "systemic"), and focuses on the contextual use of language (hence the term "functional"). The three main functions of language, under Systemic Functional Linguistics, are the ideational, interpersonal, and textual metafunctions. The ideational metafunction concerns the representation of the speaker's experience of the world, which includes the world outside and inside the speaker. The transitivity

Table 1. Percentage Occurrence of Different Process Types in Essays A and B

Essays	Processes					
	Mental	Material	Relational	Verbal	Behavioral	Existential
Essay A	29	35	26	6	3	1
Essay B	19	57	17	1	1	4

system is a network of options a speaker needs to choose from in order to express his/her experience of the world. There are six kinds of “processes” for describing such experiences. The mental process includes such sensing processes as perception, affection, and cognition. The material process refers to actions in the physical world. The relational process includes identifying and describing attributes of carriers. The verbal process refers to the use of language to describe certain things or events. The behavioral process refers to physiological or psychological reactions, such as crying, smiling, dreaming, etc. The existential process refers to the existence of certain entities. Since reflection is a mental process, it is postulated that a good reflective essay contains more terms indicating mental processes. The aim of this paper is to test this hypothesis, and to find out other characteristics of essays showing deeper reflection.

## SUBJECTS AND METHODS

Two reflective essays on student's experience with the cadaver were selected (Appendix 1). Essay A was considered by all the teachers involved in the cadaver reflective writing exercise to show deeper reflection than essay B. The essays chosen were of similar length, because the length of the essay may affect the perception by the teachers on the quality of reflection. The difference in the depth of reflection in the two essays of similar length is thus more likely to be due to

differences in the style of writing than to their difference in length.

To test the hypothesis that a good reflective essay contains more mental processes, the transitivity system [9,10] in systemic functional linguistics is adopted to compare the two essays. Such a system is used since it was designed to construe the world of experience into a manageable set of process types, one of which (the mental process) can indicate a deeper reflection in the cadaver reflective essay. Moreover, the two essays belong to the same genre (narrative), with the similar stages of orientation, description of the event, and emotional reactions towards the event. The transitivity system thus provides the appropriate tool to test the hypothesis that a good cadaver reflective essay contains more mental processes.

The participants, processes, and circumstances in the two essays were identified. The different process types of the two essays were then counted. The percentage occurrence of a process type in an essay was then calculated by dividing the number of occurrences of that process type by the number of all process types in that essay.

## RESULTS AND DISCUSSION

The total number of processes in essays A and B are very similar, being 111 and 109, respectively. The percentage occurrence of different process types of the

two essays are presented in Table 1.

## 1. The mental process in the two essays

The results showed that the percentage occurrence of mental processes in essay A (29%) is higher than that in essay B (19%) (Table 1), thus supporting the hypothesis that a good reflective essay contains more mental processes. Furthermore, if the mental processes in essay A and B are examined in detail, it can be seen that essay A not only contains more terms indicating mental processes, but it actually contains more terms that indicate the specific mental process reflection.

For students to write a good reflective essay on their first encounter with a cadaver, it is essential that they look back at themselves and examine their own feelings and thoughts. This is in fact the original meaning of reflection: looking back at oneself. The students can also try to imagine the thoughts and feelings of the donor of the cadaver before they died, in order to connect with and understand that person. These are obviously mental processes that can be identified by the transitivity system in systemic functional linguistics. However, the so-called mental process in the transitivity system also include other processes that are not so reflective in nature, e.g., sight, hearing, and smell. These are mental processes that are in fact passive sensory processes.

Essay A contains only two examples of such passive sensory mental processes:

*Now I can see a person*

*When I hear people joking over the cadaver.*

The other mental processes in essay A indicate processes that aim to explore the thoughts of either the student himself/herself, such as *experience, remembered, understand, felt, think, learn, know, imagined, process (feelings), realized, respect, hope*, etc.

Essay B contains seven examples of passive sensory mental processes:

*it was an interesting experience to look at the delicate organs*

*I could not wait to look at the inside*

*As we unzipped the bag, I started to smell formalin,*

*At the end of the dissection table, I saw the face open his chest wall and look at his internal organs*

*I looked at my mentor again.*

*Thank you, and see you next semester*

Therefore, the transitivity analysis showed that essay A contains more mental processes than essay B. And a more detailed analysis of the mental processes contained in these two essays showed that the deeper reflection in essay A is not only quantitative, but also qualitatively. It contains more mental processes that indicate reflection and exploration of the thoughts and feelings of others.

## 2. The material process in the two essays

The percentage occurrence of material processes in essay B (57%) is much higher than that in essay A (35%). The material processes in essay B are used for narrating the activities in the encounter with the cadaver. Examples of such material processes in essay B are:

*Before walking into the dissection lab*

*I have dissected rats and frogs in my secondary school*

*the cadavers were all put inside grey plastic bags we were going to cut through his skin*

*I did not even know how to deal with the instruments*

*lying on the table peacefully and quietly*

This result is not simply a necessary consequence of a

higher percentage occurrence of mental processes in essay A, since there are other processes apart from mental and material ones (if there were only mental and material processes, more mental processes would necessarily imply fewer material processes, since they would be complimentary in that case). This result is in fact a separate piece of evidence for differentiating the depth of reflection in the two essays.

While the mental process indicates experience with the inner world of thoughts and feelings, the material process indicates experience with the outside world. The higher percentage occurrence of material processes in essay B indicates that it spends a higher percentage of processes on describing experience with the outside world, which does not directly indicate reflection. This may have contributed towards it being perceived by the teachers as being not as reflective as essay A.

However, quantity does not always reflect quality. It is possible for a reflective essay to have a high percentage of material processes than mental processes, but still have a strong and profound impact on its readers. The description of the outside world may serve to lay the groundwork for the reflection. This proportion of material to mental processes is commonly seen in some types of published writing, e.g., literary works. However, when comparing essays submitted by students, who have more or less the same writing style and skills, the transitivity data can serve as an objective tool for assessing the quality of reflective essays.

### 3. The relational process in the two essays

The percentage occurrence of relational processes in essay A (26%) and essay B (17%) also differs quite significantly. However, the relationship of relational process to the quality of reflection in an essay is not immediately clear. Therefore, it is not clear how the difference in the percentage occurrence of relational

processes in essays A and B could have affected their quality. A more detailed examination of the relational process in the two essays is needed.

There are twenty-nine occurrences of relational processes in essay A, and they are:

*Every Cadaver was once with memories, hope and happiness.*

*I felt they once were so alive, why they now ended up lying here?*

*But it is not a question to work out the solution now.*

*death is not a matter that could be commented fair or not*

*that's the truth could never be changed unless*

*The point is after we dissected them, we*

*That's really what mattered.*

*I could not possibly imagined what he was [look] like.*

*There lied a real body with human size, it's big.*

*Everything I had landed my hands in it was 'small'*

*When I really opened the bad, the feeling is even more strange.*

*But he was not alive.*

*However, one thing is clear, I must learn the most*

*I now understand my life ahead will not be an easy one.*

*One day, the person lying there will be a human*

*You will be responsible for their lives.*

*Lectures made me felt my only mission was to study*

*my real job is to deal with real people*

*You are life-savers.*

*We are future doctors*

*But I know we are powerless doctors.*

*Even though people think we are rainbows and sunshine.*

*Soon we will know how powerless we are.  
Yes, it's true that we are powerless,  
But we are not that powerless.  
Dam is not a thing we can build alone.  
The dam will be stronger than ever.  
Yes, we will be stronger.*

There are nineteen occurrences of relational processes in essay B, and they are:

*it was an interesting experience to look  
A human is totally different from a rat.  
My mentor was a 61-year-old male.  
He was thin and skinny  
was it a gun shot that caused his death?  
The muscles were thinner than what I have  
imagined.  
Perhaps it was because my mentor was thin.  
The next thing we had to do was to cut the bones  
and open the chest wall.  
It was the first time for me to use a saw  
my task was to cut human bones!  
shocked by how delicate the ribs were.  
our rib cage is a rigid structure  
Our mentor's right lung was collapsed  
which was consistent with the hole on his skin  
discovered earlier.  
was it possible that our mentor died of traumatic  
lung puncture?  
Overall, it was an experience in which no words  
could describe my feelings.  
It was the first time I have ever witnessed the  
complexity of the human body  
I was confused and lost, but the feeling was gone  
after the dissection session*

process in essays A and B is that most of the occurrences of relational process in essay A are for statements on the student's inside world (i.e., the student's opinion, thoughts, and feelings), such as "Every cadaver was once with memories, hope and happiness", "I felt they once were so alive", "You will be responsible for their lives", etc. But in essay B, the relational process occur in statements on the external world, such as "My mentor was a 61-year-old male", "He was thin and skinny", "The muscles were thinner than what I have imagined", etc.

Whether the statements containing the relational process are on the inside or the outside world is not reflected in the quantitative data of the percentage occurrence of relational processes. The data only indicate the number of times a statement containing a relational process has occurred. They do not indicate whether the statements are about experiences in the inside or the outside world. In assessing the quality of reflection in the essays, it is the number of statements about the inside world that is important.

It was found that essay A, the one judged by teachers to show deeper reflection, contains more relational process, but that by itself does not indicate more reflection in that essay. Even if essay B had contained more relational process, the teachers would probably still consider essay A to show deeper reflection than essay B, because the relational processes in essay B mostly deal with the outside world experience, while those in essay A mostly deal with inside world experience, indicating a stronger reflection. Therefore, the percentage occurrence of relational processes does not indicate the quality of reflection of an essay. Even if the number is high, it does not necessarily mean that there is more reflection. Therefore the percentage occurrence of relational processes should not be used to judge the quality of reflection in the essay.

The most striking difference between the relational

#### 4. Other processes in the two essays

The remaining processes (verbal, behavioral, and existential) account for only 10% of the processes in essay A and 6% in essay B, and probably have not contributed much to the judgment of the depth of reflection of the two essays. But of these three processes, the verbal is of particular interest in the setting of a reflective essay, since speech could reflect thoughts and hence reflection.

There are seven occurrences of verbal processes in essay A, and they are:

*I remembered the professor standing there to hold the ceremony said,*

*death is not a matter that could be commented fair or not and could be concluded in a second the professor asked us to start our dissection*

*I would like to thank all cadavers.*

*Thank you cadavers.*

*Thank you cadaver,*

There is just one occurrence of a verbal process in essay B, and it is:

*Thank you, and see you next semester, Mr. Cadaver my silent mentor.*

In essay A, five of the seven verbal processes came from the student, while the other two were quotes taken from the anatomy teacher running the dissection session. In essay B, there is just one occurrence of a verbal process, and it came from the student. The more numerous verbal processes coming from the student in essay A could have given the impression of deeper reflection because they indicate the inside world experience of the student, such as the emotion of the student towards the cadaver. But once again, like the

percentage occurrence of relational process, a higher percentage occurrence of verbal process does not necessarily indicate deeper reflection. It depends on the content of the verbal process. Therefore, the percentage occurrence of verbal process should not be used to judge the quality of reflection.

Reflection is an important component in medical education. A reflective essay, be it a stand-alone essay or part of a portfolio, can be assessed on two different aspects: the learner's abilities in the areas of the reflection and the depth of reflection itself. There are very little works on the assessment of depth of reflection in written essays. Our study reported in this paper showed that the transitivity system in systemic functional linguistics can be used as an objective framework for that purpose. The most reliable indicator of the depth of reflection of an essay is a high percentage of occurrences of mental processes. A higher occurrence of material processes is usually perceived as not conducive to a reflection. A higher occurrence of relational processes may indicate deeper reflection if the statements containing those relational processes deal with the inside world experience. As for verbal processes, a higher percentage occurrence may also indicate deeper reflection if the verbal processes are used to express the inner world of the writer's experience.

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## Appendix 1. Original Essays A and B

**Essay A: "Experience with Cadaver"**

I had known on that day, I would experience something I had never experienced before.

I remembered the professor standing there to hold the ceremony said, "Every Cadaver was once with memories, hope and happiness." When I heard that, I actually had tears in my eyes. I felt they once were so alive, why they now ended up lying here? In fact, not only them, what about all those getting sick and finally died? I don't understand why people died, I can't understand how come the vive ends up a hollow death. C'est la vie?

But it is not a question to work out the solution now. Although I would like to be a philosopher too, death is not a matter that could be commented fair or not and could be concluded in a second. If they lied there, and that's the truth could never be changed unless I become a physicists and invented a time machine to dealt with the problem of 4 dimension, I am going to make the life of them becomes more meaningful. You could challenge that perhaps the cadaver won't think being dissected will make their life more meaningful. Yes, being dissected will make their life more meaning or not, I really don't know. The point is after we dissected them, we could learn something and could use them to save more life in the future. That's really what mattered.

They body was lying there, on the steel table, with eyes closing and breath ceased. As he was still in the bag, I could not possibly imagined what he was look like. I could only felt very strange. There lied a real body with human size, it's big. Everything I had landed my hands in it was 'small', like holding pencil, making small figures in my 'design and technology lesson', dissecting 'frogs', doing experiment with test tubes. My hands had never been working with something as big as human size. And the smell of formaldehyde. I felt really strange.

When I really opened the bad, the feeling is even more strange. Now I can see a person. He still looked like a human. But he was not alive. Not having processed my feeling and deepened my feeling, the professor asked us to start our dissection. So we followed the instructions, so we dissected, and so we finished the dissection. I waited until I finished dissection to proceed my feeling. I don't really know how to proceed the feeling. However, one thing is clear, I must learn the most from the cadaver, so that I can make everything more meaningful.

I now understand my life ahead will not be an easy one. One day, the person lying there will be a human, I mean on the operation table. You will be responsible for their lives. Lectures made me felt my only mission was to study, while the cadaver made me realized my real job is to deal with real people. And I am not turning more people to cadavers.

I would like to thank all cadavers.

Thank you cadavers.

You are life-savers.

Life has no formula,

Wind came and take whoever it wants without mercy.

We are future doctors,

But I know we are powerless doctors.

We cannot stop the wind,

Even though people think we are rainbows and sunshine.

Soon we will know how powerless we are,

when we really have a hard on collision with the wind.

Yes, it's true that we are powerless,

But we are not that powerless.

At least, we can delay the wind, with the dam of knowledge.  
Dam is not a thing we can build alone.  
With your bones,  
The dam will be stronger than ever.

Thank you cadaver,  
Yes, we will be stronger.

I respect all the cadavers, for they allow us to learn from them. Therefore, I hope all classmates do the same thing as me. When I hear people joking over the cadaver, I feel a little bit angry.

#### **Essay B: "See you next semester, Mr. Cadaver"**

Before walking into the dissection lab, I was excited. Dissection of a real human! I have dissected rats and frogs in my secondary school, and it was an interesting experience to look at the delicate organs and tissues in an animal. I could not wait to look at the inside of a human body.

In the dissection lab, the cadavers were all put inside grey plastic bags, zipped up and placed neatly on each dissection table. As we unzipped the bag, I started to smell formalin, the typical smell that many have described as the smell they would remember for life. At the end of the dissection table, I saw the face of my silent mentor.

Before that moment, I was excited, but the next moment I felt confused.

A human body was right in front of me. The body of a person who had been living in the same world as mine, and we were going to cut through his skin, open his chest wall and look at his internal organs. I have never really thought of how it was going to be dissecting a real human body.

I started to panic. In spite of the blue lines drawn on the body, indicating where to cut through the skin, I was confused. A human is totally different from a rat. How should I start? I did not even know how to deal with the instruments – how do I attach the blade onto the handle of the scalpel?

I tried to calm myself down. I looked at my mentor again.

My mentor was a 61-year-old male. He was thin and skinny, lying on the table peacefully and quietly as if he was assuring me that he had confidence in me.

There were wounds on his hand and his chest wall. In particular, there was a hole above his clavicles – was it a gun shot that caused his death?

With the help of others, we successfully put the blade onto the scalpel. We soon began removing our mentor's skin, separating the fascia, removing the muscles and fat, and exposing the chest wall.

The muscles were thinner than what I have imagined. Perhaps it was because my mentor was thin. I was amazed by how such small pieces of muscles could work together and generate forces for our daily life activities - from walking to lying down, from lifting a load to simply moving our limbs.

The next thing we had to do was to cut the bones and open the chest wall. It was the first time for me to use a saw, and my task was to cut human bones! The idea itself frightened me, and I was shivering while sawing the bones. I was shocked by how delicate the ribs were. Using the bone cutting shears, "clip", and the ribs were cut within seconds. Yet with the collective strength of twelve pairs of ribs, our rib cage is a rigid structure that can well protect the vital organs in our thoracic cavity.

(PTO)

We took turns in our group, and soon the lungs were exposed. Our mentor's right lung was collapsed, which was consistent with the hole on his skin discovered earlier. Together with the peeled off skin on his arms and hands, was it possible that our mentor died of traumatic lung puncture? Perhaps not, but we would never know.

Overall, it was an experience in which no words could describe my feelings. I entered an unfamiliar room, used new instruments, and completed an uncommon task. I have never dissected a cadaver, never touched the skin, never felt the texture of the internal organs. It was the first time I have ever witnessed the complexity of the human body - the muscles, the blood vessels, the nerves, and the sophisticated organization.

I was confused and lost, but the feeling was gone after the dissection session. As I walked out of the dissection lab, other than the smell of formalin, I have brought home a challenging and unforgettable experience which I will remember for the rest of my life.

Thank you, and see you next semester, Mr. Cadaver my silent mentor.