INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN PROGRESSIVE EDUCATION & DEVELOPMENT

OPEN ACCESS JOURNAL

Vol 12, Issue 3, (2023) E-ISSN: 2226-6348

# An Analysis of Assignment Using Evaluative and Interpretative Information Processing: A Case Study of Selected Electrical Engineering Students

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**To Link this Article:** http://dx.doi.org/10.6007/IJARPED/v12-i3/19099 DOI:10.6007/IJARPED/v12-i3/19099

**Published Online:** 18 September, 2023

**Abstract**

This case study scrutinizes the written assignment-handling proficiency of selected electrical engineering students by employing Reynders et al.'s rubrics, within the framework of Bereiter & Scardamalia's Knowledge Transforming and Knowledge Telling model. The research discerns distinctive cognitive approaches in good and weak writers, illuminating their performance in terms of evaluative and interpretative processing. Good writers exhibit a mastery of Knowledge Transforming, demonstrating creative thinking, critical analysis, and innovative problem-solving skills. Their assignments display originality and an adept integration of established knowledge with fresh insights. In contrast, weak writers lean towards Knowledge Telling, emphasizing the communication of existing information without substantial transformation. They may face difficulties in achieving analytical depth and adapting writing styles to different audiences. In addition, the use of writing assessment rubrics, such as the ones developed by Reynders et al., is also crucial. Students will benefit from having clear goals for their academic writing and receiving constructive criticism on their draughts.

**Keywords:** Knowledge Transforming, Knowledge Telling, Good Writers, Weak Writers, Electrical Engineering

## Introduction

### Background of Study

Writing is an important ability that is necessary for effective communication, furthering one's education, and advancing one's personal growth. However, not every writer is produced with the same amount of talent. Others have a difficult time articulating their views in a way that is clear, coherent, and powerful, while others are very good at conveying their thoughts.

Writing is a complex cognitive process that involves numerous stages and extensive mental operations. Despite the common perception that writing is a solitary activity, it is actually quite the opposite. Flower and Hayes (1981) put up a revolutionary concept that completely changed understanding of how individuals' approach and carry out the process of writing. A cognitive model that describes the various mental processes writers go through when they write is the Flower and Hayes (1981) model of the writing process. The model is predicated on the notion that writing is a complex, iterative process that entails planning, translating, and reviewing as can be seen in Figure 1.

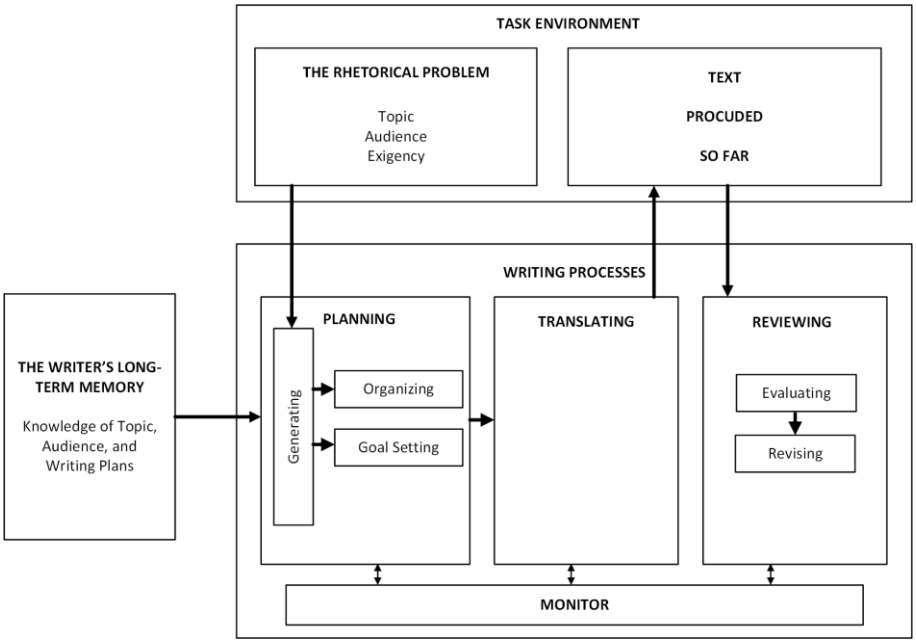



Figure 1- Writing Process
(adapted from Flower & Hayes, 1981)

Planning is the process of deciding what to write about and how to organise your ideas. This requires generating ideas (ideation), organizing, and goal-setting. In this phase, the writer may also engage in sessions of brainstorming, collect information pertinent to the work, and outline an outline of the structure of the piece. The process of translating is putting your thoughts into words. This entails utilising language skilfully and selecting the appropriate words to convey your meaning. Reviewing involves evaluating your writing and making any necessary changes. This includes checking for errors in grammar, spelling, and punctuation, as well as ensuring that the writing is clear, concise, and well-organized. This could also involve reorganizing ideas, refining language, adding or deleting content, and ensuring coherence and logical flow.

Flower and Hayes (1981) argue that these three processes are recursive, meaning that they can occur in any order and that writers may cycle back and forth between them as they write. For example, a writer may start by planning their essay, then begin translating their ideas into words, but then realize that they need to go back and revise their plan.

There are three key considerations in the Flower and Hayes (1981) model. To begin, there is the model's Dynamic and Recursive Nature, which highlights the fact that writing is not a sequential process. Instead, writers may switch back and forth between stages, returning to previous stages to revisit and revise their work as necessary. The model then moves on to Metacognition, where it emphasises the importance of metacognition, or the

ability to reflect on and regulate one's own thought processes. Writers must keep track of their own progress and make necessary adjustments. Finally, Task-Specific Adaptations are where the approach to writing can differ depending on the specific task, purpose, and audience. Writers may need to modify their strategies and approaches as a result.

In the context of engineering, students of engineering absolutely need to be able to communicate clearly and concisely in writing form. When presenting design concepts, technical reports, or the findings of research, having the ability to communicate complicated ideas in a way that is both clear and well organised is of the utmost importance. The model of the writing process that Flower and Hayes (1981) developed offers useful insights into the ways in which different people approach and carry out the work of writing.

**Problem Statement**

Previous research has demonstrated that engineering students frequently struggle with their writing abilities. As writing is an essential skill for engineers in their professional careers, this can pose a problem. According to Pushpa (2012), a large number of engineering students struggle with writing. Furthermore, it is found that found that these students, at least in the beginning stages of their course, do not develop the critical thinking skills necessary to improve. Students in engineering have a propensity to let the undeniable significance of oral communication in the workplace divert their attention from the value of good writing, despite the fact that this is not acceptable in the profession. The course will provide opportunities throughout the semester to focus on writing skills through the use of a variety of shorter written assignments. However, by adhering to some of the mechanics, stages of writing, and tips of writing as well as regularly practising their writing skills, one can improve the effectiveness of their writing.

Isnin (2018) states that the students' perceived level of technical writing competency showed the lowest mean score in terms of the skills associated with technical writing. This study was carried out with the purpose of investigating the technical writing competency needs that were perceived by Malaysian polytechnic engineering students in terms of knowledge, skills, and attitudes towards technical writing in English. However, the students were certain that there is a need to improve their technical writing competency, and they were aware that their ability to improve their technical writing competency is essential for their future career in engineering professions.

**Objective and Research Question**

The main objective of this study is:

- To investigate the writing skills of selected electrical engineering students through a writing assessment using information processing rubrics adapted from (Reynders et al., 2020).

The following questions are hoped to be answered by this research

1.3.1 How is evaluating done in electrical engineering students' assignment?

1.3.2 How is interpreting done in electrical engineering students' assignment?

1.3.3 How does the frequency of evaluative and interpretative components differ across learners?

## Literature Review

### Difficulties in Academic Writing

Bereiter & Scardamalia (1987) proposed a model of writing that distinguished between Knowledge Telling and Knowledge Transforming writing processes. These distinctions between experts (good) and novices (weak) were encapsulated by Bereiter & Scardamalia (1987) as a comparison between a knowledge-telling model of writing and a Knowledge Transforming model of writing. The extent to which content retrieval is strategically controlled to meet rhetorical objectives determines how ideas develop during writing, according to this model.

It is assumed that novice writers use a knowledge Telling strategy in which the organisation of the text is solely determined by the associations between the content as it is stored in long-term memory, with text production being guided by the direct retrieval of content from long-term memory. Transferring knowledge from one form to another, such as from one's mind to paper, is the definition of knowledge-telling. Knowledge-sharing writers focus on reiterating information they already know, without much reflection or analysis. They may use simple language and sentence structures, and they may not care much about their audience's needs. Figure 2 shows the knowledge-telling writing strategy by (Bereiter & Scardamalia, 1987).

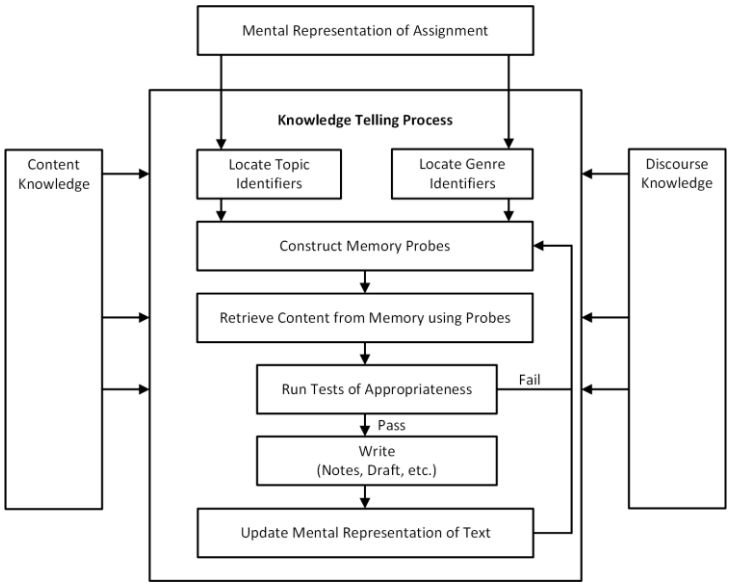



Figure 2- Knowledge Telling Model (adapted from Bereiter and Scardamalia, 1987)

A Knowledge Transforming strategy as can be seen in Figure 3, on the other hand, is used by more experienced writers. It entails developing a representation of the rhetorical or communicative issue that needs to be resolved and using the objectives deriving from this representation to direct the creation and assessment of content while writing. This strategy involved a fundamental shift in how the writer defined and approached the writing task, and that should not be viewed as merely an evolution of the Knowledge Telling model. As a result, while the Knowledge Telling model is still used to describe the process by which information is retrieved from memory, it is embedded within a dialectic between rhetorical and content problem spaces. Two aspects of the writing process are intended to be captured by this. First, it illustrates how ideas are presented in the text in terms of both their rhetorical function and as a reflection of the writer's knowledge (content space) (rhetorical space). Second, writing is

an emergent process in which content is formulated as the text develops rather than merely a matter of adapting the content to the rhetorical context. As a result, information is not only retrieved in response to a more detailed representation of the assignment as a rhetorical problem, but it is also created within the context of and as a contribution to the series of rhetorical acts that are gradually appearing in the text.

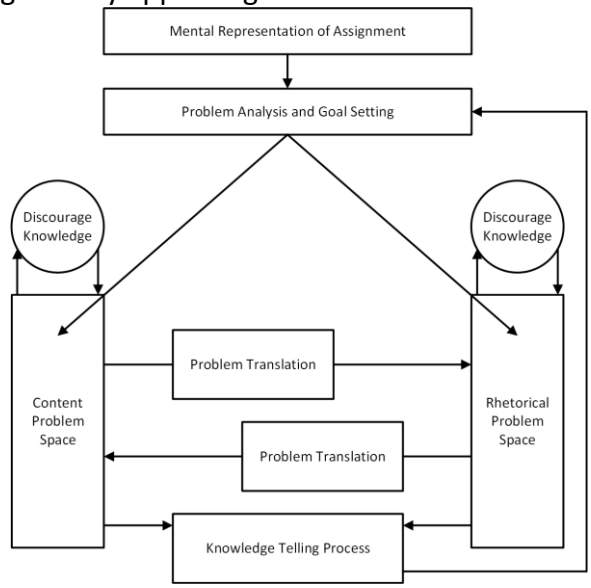



Figure 3- Knowledge Transforming Model (adapted from Bereiter and Scardamalia, 1987)

In their model of writing, Bereiter and Scardamalia (1987) argue that writing that involves knowledge transformation is more complex and requires more effort from the writer than writing that involves Knowledge Telling. Writers who focus on knowledge transformation need to be capable of juggling multiple objectives simultaneously, including the communication of their ideas, the engagement of their readers, and the cultivation of their own understanding of the subject matter. Additionally, Bereiter and Scardamalia (1987) assert that writing that involves knowledge transformation is more beneficial to the learning process. When writers transform their knowledge through the act of writing, it forces them to think critically about their own ideas and to consider other points of view. This can lead to a greater depth of comprehension as well as more sophisticated thought.

The model of good and weak writers developed by Bereiter and Scardamalia (1987) offers significant insights into the aspects that contribute to a writer's level of writing skill. This model provides a framework for understanding the essential qualities that distinguish proficient writers from less proficient ones. These characteristics distinguish proficient writers from those who are not as proficient.

**Past Studies**

Scholarly attention has been focused on the improvement of writing abilities for many years. Previous research on writing abilities has shed light on the complexity of this vital academic and professional skill. Writing's cognitive processes, pedagogical approaches, and the impact of technology on written communication have all been investigated by scholars through extensive research and in-depth analyses. These studies have not only expanded knowledge of efficient writing, but also made way for fresh approaches to education.

Aldabbus & Almansouri (2022) identified the significant challenges faced by some university students when writing academically. It is also discovered what hinders their

academic writing abilities. This study involved 36 English majors from the Faculty of Education. The research questions were addressed using a 25-item questionnaire. The data analysis showed that both graduate and undergraduate students struggle with some aspects of academic writing, including selecting the right academic words, coming up with a strong thesis statement, organising ideas, and creating paragraphs that make sense. These difficulties were influenced by a dearth of resources, followed by a limited command of the English language and a lack of opportunities for writing practise.

The difficulties college students have with academic writing were examined by (Sajjad et al., 2021). To achieve this, a qualitative descriptive analytic investigation was used. University students were given questionnaires to fill out to gather information. There are 40 students in the sample, 20 of whom are male and 20 females. The main conclusions demonstrate that students face a variety of difficulties when it comes to academic writing, particularly in terms of word choice, vocabulary, and paraphrasing.

The study by Rahmat (2020) examined the relationship between critical thinking skills and the writing process. 20 postgraduate students who participated in a research writing course had their free-text responses categorised according to the critical thinking skills they employed during the writing process. The findings have intriguing implications for the learning and instruction of academic writing for postgraduate students. The findings of this study will first demonstrate how writing mirrors the thought process. Second, the results of this study will encourage writing instructors to place equal emphasis on thinking and process when teaching writing.

## Methodology

### Research Design, Population and Sample

This research methodology employs a mixed-methods approach, incorporating both quantitative and qualitative research techniques, in order to investigate exhaustively the assignment-handling processes of our chosen participants. This methodological synthesis permits us to capture both quantitative metrics and nuanced qualitative aspects of student written assessment. The population is comprised of undergraduate students majoring in electrical engineering. This study involved the purposeful selection of 4 samples (2 weak writers and 2 weak writers). The rubrics provided by the resource person of the evaluated written assessment were used to assign grades to good and weak writers.

### Instrument

Content analysis is a qualitative method that is utilized to analyse qualitative data. It was done on the written assessment the students had to complete. The content was coded using the written assessment's reoccurring patterns as the basis for classification. The instrument used is adapted from Reynders et al. (2020) and is presented in Table 1. The data will be then analyzed to obtain the frequency of evaluative and interpretative information processing.

Table 1
*Information Processing Rubric (adapted from Reynders et al., 2020)*

| PROCESS | SUB-CATEGORY | DESCRIPTOR | CODE |
|---|---|---|---|
| **Evaluating** | Evidence | Show evidence | E-E |
| | Relevance | Indicating IF the information is relevant | E-If |
| | | Indicating WHY the information is relevant | E-Why |
| | | | |
| **Interpreting** | Prior Knowledge | Interpret information using prior knowledge | I-Pk |
| | Explain | Explain the meaning of something | I-Ex |
| | Predictions | Match data predictions | I-Pr |
| | Patterns | Extract patterns from data | I-Pat |
| | | | |
| **Manipulating or Transforming (Extent)** | Extent | Display minimal manipulation of data | MTE-Min |
| | | Display major manipulation of data | MTE-Maj |
| | | | |
| **Manipulating or Transforming (Accuracy)** | Accurate | Accurate manipulation of data | MTA-Acc |
| | | Inaccurate manipulation of data | MTA-Inac |

Evaluating and Interpreting are the two processes of information processing that are the primary focuses of this study, which was adapted from (Reynders et al., 2020). This research also adds a subcategory to each of these two processes. Table 2 shows evaluative and interpretative information processing used in this study.

Table 2
*Evaluative and Interpretative Information Processing Rubric (adapted from Reynders et al., 2020)*

| PROCESS | SUB-CATEGORY | DESCRIPTOR | CODE |
|---|---|---|---|
| **Evaluating** | Evidence | Show evidence | E-E |
| | Relevance | Indicating IF the information is relevant | E-If |
| | | Indicating IF the information is relevant (Weak) | E-If-Weak |
| | | Indicating IF the information is relevant (Wrong) | E-If-Wrong |
| | | Indicating WHY the information is relevant | E-Why |
| | | | |
| **Interpreting** | Explain | Explain the meaning of something | I-Ex |
| | | Explain the meaning of something (Weak) | I-Ex-Weak |

**Findings**

In the pursuit of understanding the intricate processes that underlie assignment handling among selected electrical engineering students, these findings stand as culmination

of empirical investigations. The findings presented herein provide a comprehensive insight into information processing skills that shape responses to written assignment task.

**Findings for Evaluating**

This section presents data to answer research question 1: How is evaluating done in electrical engineering students' assignment? In the context of this study, evaluation is sub-categorise into (a) Evidence and (b) Relevant. The writing skills of good writers will feature a significant amount of E-E, E-If, and E-Why constructions as can be seen in Figure 4.

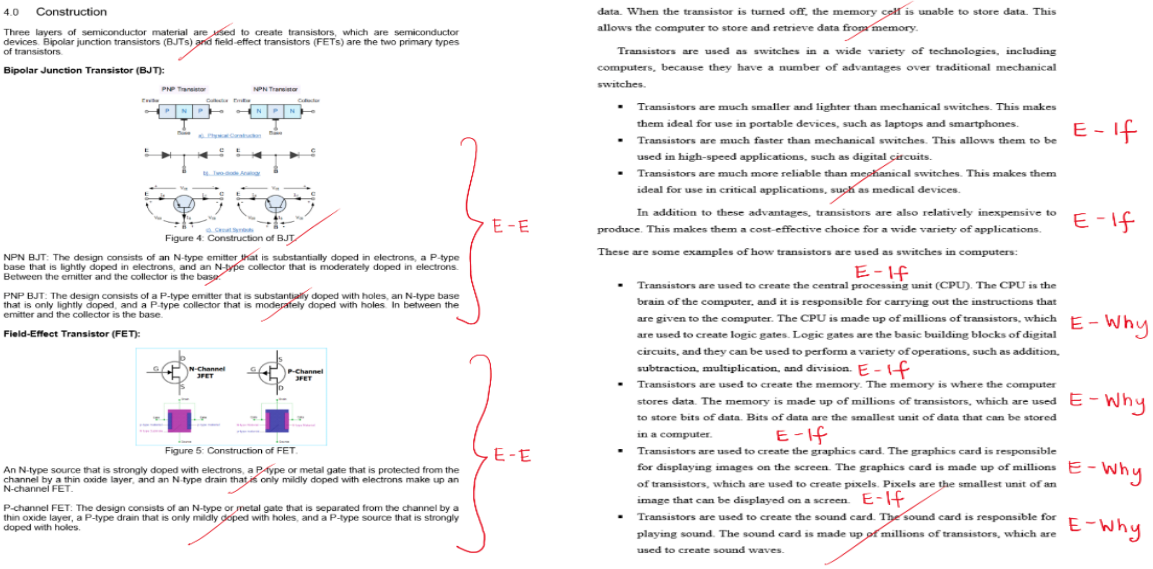



Figure 4- Good Writers' Samples for Evaluating

On the other hand, weak writers will make frequent use of E-If-Weak and E-If-Wrong in their written assignment as shown in Figure 5.

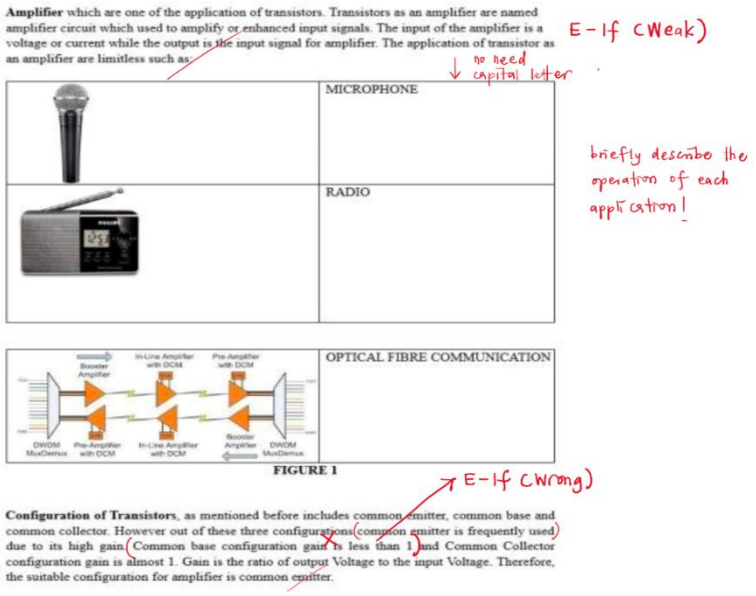
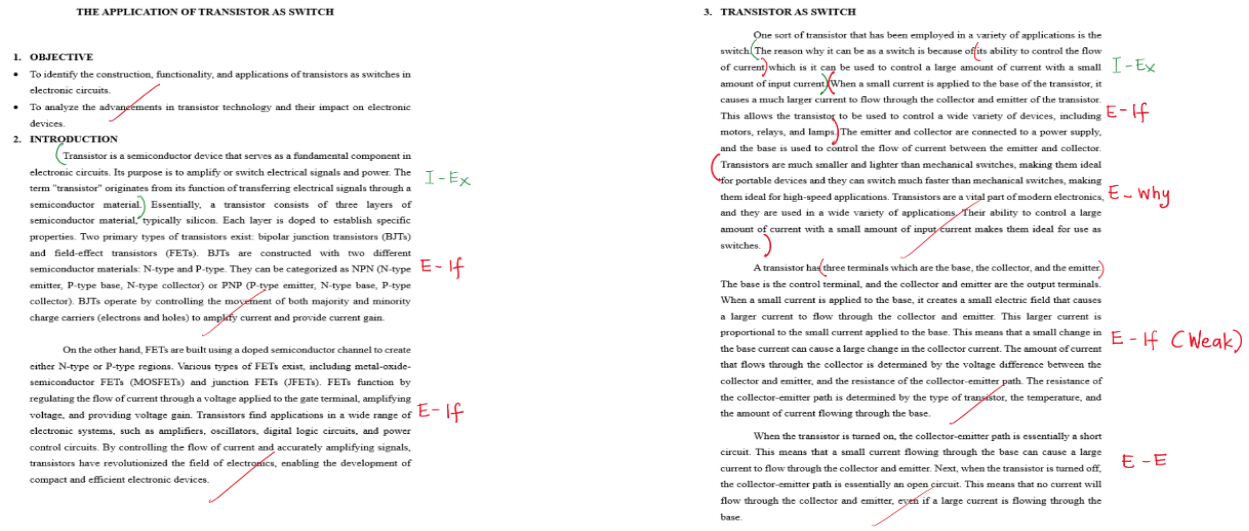



Figure 5- Weak Writers' Samples for Evaluating

**Findings for Interpreting**

This section presents data to answer research question 2: How is interpreting done in electrical engineering students' assignment? The term Interpreting will be broken down further into Explain only for the purposes of this investigation. Figure 6 demonstrates that good writers will have a significant amount of I-Ex in their writing, as shown in their abilities.



THE APPLICATION OF TRANSISTOR AS SWITCH

1. OBJECTIVE
- To identify the construction, functionality, and applications of transistors as switches in electronic circuits.
- To analyze the advancements in transistor technology and their impact on electronic devices.

2. INTRODUCTION

Transistor is a semiconductor device that serves as a fundamental component in electronic circuits. Its purpose is to amplify or switch electrical signals and power. The term "transistor" originates from its function of transferring electrical signals through a semiconductor material. Essentially, a transistor consists of three layers of semiconductor material, typically silicon. Each layer is doped to establish specific properties. Two primary types of transistors exist: bipolar junction transistors (BJTs) and field-effect transistors (FETs). BJTs are constructed with two different semiconductor materials: N-type and P-type. They can be categorized as NPN (N-type emitter, P-type base, N-type collector) or PNP (P-type emitter, N-type base, P-type collector). BJTs operate by controlling the movement of both majority and minority charge carriers (electrons and holes) to amplify current and provide current gain.

On the other hand, FETs are built using a doped semiconductor channel to create either N-type or P-type regions. Various types of FETs exist, including metal-oxide-semiconductor FETs (MOSFETs) and junction FETs (JFETs). FETs function by regulating the flow of current through a voltage applied to the gate terminal, amplifying voltage, and providing voltage gain. Transistors find applications in a wide range of electronic systems, such as amplifiers, oscillators, digital logic circuits, and power control circuits. By controlling the flow of current and accurately amplifying signals, transistors have revolutionized the field of electronics, enabling the development of compact and efficient electronic devices.

I-Ex

E-If

E-If

3. TRANSISTOR AS SWITCH

One sort of transistor that has been employed in a variety of applications is the switch. The reason why it can be as a switch is because of its ability to control the flow of current which is it can be used to control a large amount of current with a small amount of input current. When a small current is applied to the base of the transistor, it causes a much larger current to flow through the collector and emitter of the transistor. This allows the transistor to be used to control a wide variety of devices, including motors, relays, and lamps. The emitter and collector are connected to a power supply, and the base is used to control the flow of current between the emitter and collector. Transistors are much smaller and lighter than mechanical switches, making them ideal for portable devices and they can switch much faster than mechanical switches, making them ideal for high-speed applications. Transistors are a vital part of modern electronics, and they are used in a wide variety of applications. Their ability to control a large amount of current with a small amount of input current makes them ideal for use as switches.

A transistor has three terminals which are the base, the collector, and the emitter. The base is the control terminal, and the collector and emitter are the output terminals. When a small current is applied to the base, it creates a small electric field that causes a larger current to flow through the collector and emitter. This larger current is proportional to the small current applied to the base. This means that a small change in the base current can cause a large change in the collector current. The amount of current that flows through the collector is determined by the voltage difference between the collector and emitter, and the resistance of the collector-emitter path. The resistance of the collector-emitter path is determined by the type of transistor, the temperature, and the amount of current flowing through the base.

When the transistor is turned on, the collector-emitter path is essentially a short circuit. This means that a small current flowing through the base can cause a large current to flow through the collector and emitter. Next, when the transistor is turned off, the collector-emitter path is essentially an open circuit. This means that no current will flow through the collector and emitter, even if a large current is flowing through the base.

I-Ex

E-If

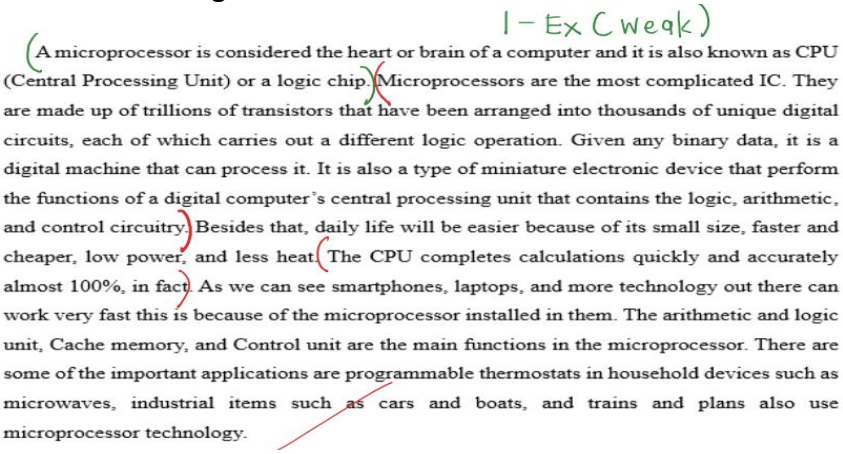
E-why

E-If (Weak)

E-E

Figure 6- Good Writers' Samples for Interpreting

On the other hand, in their written assignments, weak writers will make frequent use of I-Ex-Weak as illustrated in Figure 7.



I-Ex (Weak)

A microprocessor is considered the heart or brain of a computer and it is also known as CPU (Central Processing Unit) or a logic chip. Microprocessors are the most complicated IC. They are made up of trillions of transistors that have been arranged into thousands of unique digital circuits, each of which carries out a different logic operation. Given any binary data, it is a digital machine that can process it. It is also a type of miniature electronic device that perform the functions of a digital computer's central processing unit that contains the logic, arithmetic, and control circuitry. Besides that, daily life will be easier because of its small size, faster and cheaper, low power, and less heat. The CPU completes calculations quickly and accurately almost 100%, in fact. As we can see smartphones, laptops, and more technology out there can work very fast this is because of the microprocessor installed in them. The arithmetic and logic unit, Cache memory, and Control unit are the main functions in the microprocessor. There are some of the important applications are programmable thermostats in household devices such as microwaves, industrial items such as cars and boats, and trains and plans also use microprocessor technology.

Figure 7- Weak Writers' Samples for Interpreting

**Difference in the use of Evaluative and Interpretative Information Processing**

This section presents data to answer research question 3: How does the frequency of evaluative and interpretative components differ across learners? This section is structured to provide a comprehensive overview of the frequency distributions, allowing for a systematic comparison of the utilization of evaluative and interpretative processing methods. Each category and subcategory will be presented with corresponding frequency counts, and percentages representations to facilitate a detailed examination of the data as can be seen in Table 3.

Table 3
*Frequency of Evaluative and Interpretative Information Processing*

| NO | SUB-CATEGORY (CODE) | GOOD | WEAK |
|---|---|---|---|
| **1** | **Evaluating** | | |
| a | Evidence (E-E) | 4 | 1 |
| b | Relevant (E-If) | 22 | 1 |
| c | Relevant (E-If-Weak) | 2 | 3 |
| d | Relevant (E-If-Wrong) | 0 | 1 |
| e | Relevant (E-Why) | 10 | 0 |
| | **Total for Evaluating** | 38 | 6 |
| | **Percentage for Evaluating** | 74% | 12% |
| **2** | **Interpreting** | | |
| a | Explain (I-Ex) | 4 | 0 |
| b | Explain (I-Ex-Weak) | 0 | 3 |
| **Total for Interpreting** | | 4 | 3 |
| **Percentage for Interpreting** | | 8% | 6% |
| **Overall Percentage** | | 82% | 18% |

Figure 8 depicts the overall percentage for the information processing used by good and weak writers. Good writers (82%) used more information processing compared to weak writers (18%). Information processing complies with knowledge-transforming by Bereiter and Scardamalia (1987). It can be seen that good writers apply knowledge-transformation writing of Bereiter and Scardamalia (1987) is more beneficial for learning. When writers transform their knowledge through writing, they are forced to think critically about their own ideas and to consider alternative perspectives. This can lead to deeper understanding and more sophisticated thinking.

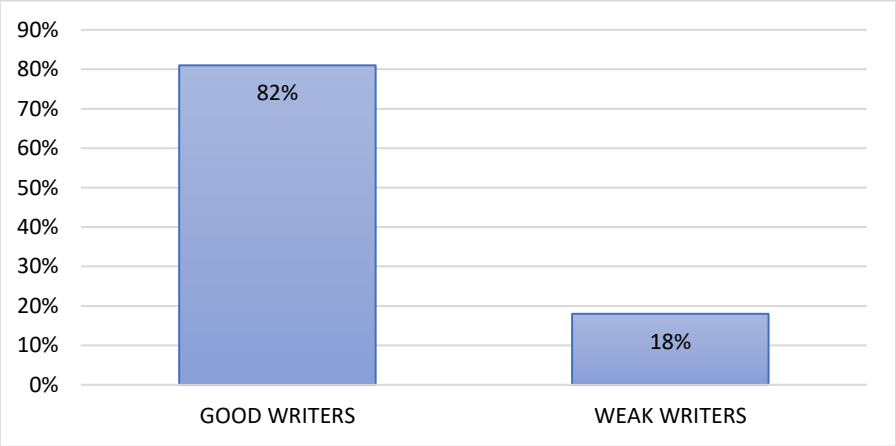



Figure 8- Comparison for Information Processing's for Good and Weak Writer

Figure 9 below shows the breakdown of evaluating and interpreting components used by good versus weak writers. Good writer used more evaluating (74%) compared to interpretating skills. Next, weak writers too used more evaluating (8%) compared to interpretating (5%).

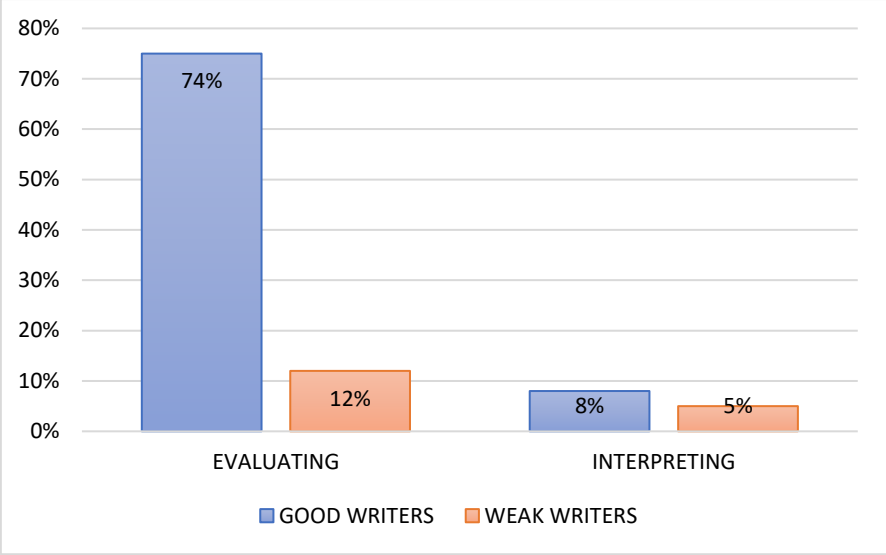



Figure 9-Comaprison of Evaluating and Interpreting of Good and Weak Writers

Table 4 summarizes the key differences between good and weak writers in terms of their writing process.

Table 4
*Summary of good and weak writers*

| **Characteristic** | **Good writers** | **Weak writers** |
|---|---|---|
| **Writing process** | Knowledge Transforming | Knowledge Telling |
| **Focus** | Developing understanding of the topic | Reproducing information |
| **Engagement with the topic** | Deeply engaged | Limited engagement |
| **Audience awareness** | Aware of audience and tailors writing to meet their needs | Not aware of audience or does not tailor writing to meet their needs |
| **Reynders et al. (2020) Rubric Scores** | Higher scores | Lower scores |

## Conclusion

*Summary and Discussion*

The Bereiter & Scardamalia (1987) model of Knowledge Transforming and Knowledge Telling is used to analyse written assignment handling among selected electrical engineering students. This provides valuable insights into the cognitive processes that underlie written assignment completion in this specialised field.

Good writers demonstrated a remarkable ability to generate original ideas, critically analyse information, and offer innovative solutions, as evidenced by their proficiency in knowledge- transforming. Their written assignments demonstrated a depth of comprehension by seamlessly integrating existing knowledge with novel insights. These individuals demonstrated a high level of adaptability and communication skill by adapting their writing style to diverse audiences and contexts.

On the other hand, weak writers, characterised by a focus on knowledge-telling, displayed a tendency to primarily convey existing knowledge without significant transformation or original contribution. Their assignments frequently lacked analytical depth,

and they struggled to adapt their writing to various audiences or purposes. These individuals could benefit from further development of their critical thinking and creativity when approaching writing assignments.

In conclusion, it is essential to note that the distinction between competent and incompetent writers is not indicative of general intelligence or skill. Instead, it emphasises differences in cognitive approaches to written assignments in the context of electrical engineering education. To promote the development of both groups, instructional strategies must be adapted to meet their particular requirements (Rahmat, 2023). Possibilities for advanced problem-solving and creative expression can be made available to improve the knowledge-transforming skills of proficient writers. For weak writers, targeted interventions focusing on critical thinking and the development of original insights can be implemented to facilitate their transition towards a more knowledge-transforming perspective.

**Theoretical Contributions**

*Integration of Cognitive Processing Models*: The paper makes a contribution by integrating the ideas of evaluative and interpretative information processing into the realm of assignment completion within the context of electrical engineering education. This integration provides a valuable understanding of the ways in which students engage with the coursework they are required to complete.

*Application of Bereiter & Scardamalia's Models*: This paper expands upon previously established theoretical frameworks by employing models developed by Bereiter and Scardamalia titled "Knowledge Telling" and "Knowledge Transforming." These models are extended into the context of electrical engineering assignments, demonstrating their applicability in a particular domain, as a result of this research.

**Contextual Contributions**

*Insights into Electrical Engineering Education*: This case study offers extremely helpful insights into the ways in which students in the field of electrical engineering approach their assignments. In the context of their particular field, it sheds light on their learning strategies, problem-solving techniques, and critical thinking skills.

*Pedagogical Implications:* The results of this research could have important pedagogical repercussions for educators working in the field of electrical engineering. It can be used to inform instructional strategies, the design of curricula and assignment structures, making it possible to more effectively cater to the cognitive processes and learning styles of students.

*Enhanced Understanding of Knowledge Transformation:* The paper advances understanding of how students in the field of electrical engineering may transition from knowledge telling (simply reproducing information) knowledge transforming by linking the study to Bereiter & Scardamalia's Knowledge Transforming model. This contributes to a better overall understanding of knowledge transformation (engaging in critical thinking and knowledge synthesis).

*Potential for Generalization:* Despite the fact that the study's primary focus was on students majoring in electrical engineering, the findings may have broader implications for students majoring in other technical fields or even for education in general. It is conceivable that it could act as a template for studies of a similar nature conducted in other fields.

**Significance to Existing Knowledge**

*Augmented Application of Cognitive Models*: This paper enhances the application of cognitive models such as evaluative and interpretative information processing within the context of educational assessment and the completion of assignments. As a result, the reader is provided with a deeper understanding of the processes by which students learn.

*Enriched Understanding of Knowledge Transforming*: The research improves understanding of how students in technical fields such as electrical engineering interact with and transform knowledge. This has the potential to contribute to the development of educational strategies that are more effective in these specialised areas.

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