Basic Academic Writing in Engineering Studies: Research, Documentation, Progress

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Abstract: - This article displays additional types of academic technical writing implemented in the Faculty of Power Engineering from the Polytechnic University of Bucharest during foreign language course&seminars, together with data documenting students’ results and didactic effectiveness over a four-year learning cycle. The present research is closely related to the previous one in the article Foreign Language Technical Writing Abilities for Power Engineering Students in the Polytechnic University of Bucharest, presenting statistic results for both sets of academic writing templates. The set presented below contains scholarship essays, timed compositions, review and expository essays, analytical texts, division, classification and comparative essays, as well as cause and effect drafting. Text components and required transferable skills are explained, alongside with indicators such as content relevance, success rate, and pattern compliance.

Key-Words: - academic writing in engineering studies, foreign language competence, student production of scientific and technical texts, formal professional documents

1 Introduction
Engineering students’ academic evolution and future career opportunities depend on their learning styles, which are greatly influenced by their writing and research abilities. A clear and effective range of previously acquired patterns for technical communication & scientific documentation leads to increased professional competence and accelerated progress.

2 Problem Formulation
The data presented & analyzed below deal with additional basic types of essays needed in engineering, such as: review, scholarship, comparative, timed, division&classification, analytical, cause&effect, and expository student compositions.

Such information and the resulting statistics are part of the larger ensemble of academic writing templates for engineering, whose initial set was explained in the previous article entitled Foreign Language Technical Writing Abilities for Power Engineering Students in the Polytechnic University of Bucharest, which I remind below:

Foreign Language Technical Writing Abilities for Power Engineering Students in the Polytechnic University of Bucharest

<table>
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<th>1. Deductive essays</th>
<th>2. Technical &amp; Scientific reports</th>
<th>3. Lab reports</th>
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Pattern Compliance • Relevance of Content • Success Rate • Style • Editing and Logical Flow

Success Rates in Basic Academic Writing in Engineering Studies

Scholarship essays
Timed essays
Review essays
Expository essays
Analytical & Comparative essays
Division & Classification essays
Cause & Effect essays

0 10 20 30 40 50 60 70 80 90 100
All data are integrated in the synthetic centralized graph displayed before the conclusion. Research on foreign language academic writing for engineering is useful & relevant, as the aim of tertiary education for technical fields is to produce competent & flexible professionals, able to face the challenge of a globalized economy with mobile work force of all nationalities. Scientific writing organizes the mind, giving wider access to life long learning.

3 Problem Solution

I investigated basic writing patterns in engineering education and post-graduate activity, I listed key features, and I computed compliance & success rates emerging from my students’ texts over a study cycle of 4 years. Information & statistics are shown below.

3.1 Scholarship Essays

They are written for convincing the review panel to award a scholarship to that specific candidate; therefore, the text should be both well-written and interesting. Essay requirements vary according to the scholarship committee, without any specific, unique format to follow: personal narrative, research paper, critical essay, or persuasive writing. Writing prompts or questions are given, and it is imperative to address them completely.

The essay has to stand out above the competition: interesting introduction encouraging the evaluator to continue reading, original question followed by answers throughout the essay, or an extraordinary fact, without revealing cause or solutions from the start, are all good strategies for successful compositions that keep the assessor focused on the message and increase the applicant’s chances. Unless there is a maximum word count, the rule of thumb is to write a five-paragraph essay. Each of the three paragraphs in the body has a topic sentence supporting the thesis stated in the introduction, and the remaining sentences in each paragraph serve to further support the topic sentence. The conclusion summarizes previously presented ideas, restates the thesis in a new and interesting way, without introducing new information, and inserts a memorable piece; it should match the introduction and leave a lasting impression. After completion, the scholarship essay is set aside, to be read again later, in order to identify potential flaws and improve the final version.

3.2 Timed Essays

Writing timed essays is a demanding experience, with additional challenges coming from nervousness under test circumstances, improper writing skills and lack of practice in solving timed tasks. The easiest way to begin an essay is to ask the reader a question, which can be done by simply turning the given topic into a question. As there is no time to develop a perfect thesis, clearly stating the topic and briefly enumerating the ideas to discuss in the essay will be enough. After writing the introduction, 3 paragraphs for the body must be drafted. Each paragraph introduces one idea proving the thesis statement and containing additional supporting data. When writing a conclusion under pressure, the first sentence of the last paragraph becomes a re-statement of the thesis and it is followed by one sentence summarizing each paragraph in the body of the essay. In other words, the second sentence in the conclusion summarizes the second paragraph, the third sentence summarizes the third paragraph, and the fourth sentence summarizes the fourth paragraph. After completing this basic template, the check for clarity & errors comes. Writing under a restricted amount of time does not mean skipping this last verification. Time must also be allotted to proofreading for logical flow in ideas, to improving the transitional sentences and to inserting additional interesting details. If time still permits, a final memorable sentence connected with the introduction can be added, in order to leave a lasting impression on the reader.
3.3 Review Essays

The book report dedicates more than half the space to story retelling and is a simple document in which a student reiterates themes, ideas, and events that occurred in a book in an objective manner. On the other hand, a book review essay is a subjective document in which the student analyzes these themes, ideas, and events and how they were conveyed using literary tools. Review essays provide an overview of the most significant points raised by the author of a literary work. Unlike book reports, which simply summarize the content and provide a brief opinion on the story, review essays engage in a critical discussion of the literary text. Not all literary pieces are suitable for review essays: an edited collection is difficult to review because the various contributors had different viewpoints or addressed different sides of the same issue. Therefore, it is better to select a piece of work that was written by a single author. Older pieces are usually easier to review because the significance of the work over time can be discussed, a task that is almost impossible with new texts. First, the main thesis of the work and a preview of the reviewer’s critical response are defined in the introduction. A summary of the book follows, with dimensions commensurate with the overall length of the paper, usually covering one third of the whole space. Only central arguments and key information in the text are addressed, as they will help lead into the critical discussion, which is the next section of the review essay. This portion evaluates the contribution of the text to its discipline area, assessing the advance of the demonstration and identifying problems or controversies, as well as the adequate support for the thesis. Evidence from the text will be used in order to support the argument in the review essay. The conclusion restates the thesis and summarizes the critical analysis. The student has to be dedicated to reading, researching and understanding the book to be reviewed, which means detailed notes prove useful.

3.4 Expository Essays

They give the reader information, explaining an issue, or providing a definition to a particular topic. In order to properly develop an expository essay, one must develop a strong thesis that is supported by relevant facts and statistics, examples, or other pertinent information. Since the purpose is to convey factual data, the text should be written from a neutral perspective and without emotion, in the third person, on a pre-designed plan. During the pre-writing stage, brainstorming and prioritizing ideas occur, according to the following strategies:

- Making a list
- Creating a web
- Developing a map
- Engaging in free writing
- Drawing a tree diagram

They also help in defining and further clarifying the thesis, which expresses the essence of the essay. Conducting research in order to develop the ideas is the next stage, and then the first draft comes. The introduction contains the thesis focuses the readers’ attention providing the reader with the main idea of the essay. Each of the subsequent paragraphs is used to support the thesis statement and begins with a topic sentence, which expresses the main idea of that
paragraph, and must support the thesis. The rest of the sentences within the paragraph are used to further explain and to support the topic sentence. These supporting paragraphs are referred to as the body of the essay (at least 3). The conclusion restates the thesis and summarizes the main data in differently worded sentences, never introducing new material, and using a memorable/meaningsful formulation, to obtain a lasting impression on the reader and make the text stand out from the rest.

3.5 Analytical Essays

These are specialized forms of texts that help all readers gain thorough understanding of particular objects/events/literary works/personalities. They aim at conceptually dismantling the issue so as to closely inspect each component: background, historical context, time intervals, categories, key features, relevant details, artistic trends, styles, contemporary & future impact on the corresponding field. This type of document is also meant to discuss the message, and provide critical assessments of texts, concepts, or behaviors, in academic form, at high conceptual standards. The objective is to analyze implementing various critical thinking skills.

The topic is examined in a scientific manner, seeking to uncover how the analyzed device operates and acts. Unlike persuasive essays, such writing does not include the author’s views and does not attempt to convince the reader about the merits of particular issues or ideas. Brainstorming ideas is the first step, and it proves useful later on as well, in the stage of connecting and refreshing logical relations between components. Essays with new and unusual ideas have the greatest impact on readers and receive the most positive feedback. After completely analyzing the item, a thesis must be developed and stated in the introduction. It is the main idea of the essay (topic & analysis methods) and will be supported by body paragraphs displaying all the facts or evidence gathered that far. Each paragraph begins by a topic sentence, which serves to support the thesis; what comes next further illustrates and proves the topic sentence right. The conclusion restates the thesis and summarizes the demonstration. Professors often give this assignment because completing it requires critical assessment, sharp attention to detail, and keen insight, and such homework can be understood as an examination of different cultural and artistic phenomena. The object of analysis is being placed under a microscope, and the job of the learner is to report on what is seen.

3.6 Division and Classification Essays

They break a larger, more complex subject into smaller ones, making the topic easy to understand. As such, the division portion of the essay is a bit different from the classification portion, though both are of equal importance. The division segment of the essay is meant to investigate effective modalities of identifying classes, groups and sub-groups in a large issue. The classification segment, on the other hand, takes those smaller items and puts them into various categories, showing the relationships among them. The learner is called upon to categorize the smaller divisions of the larger topic, and decide on ways to classify the items. In order to do this, the student has to determine which elements are the most important to the subject, how they are related to one another, and how they affect the larger subject. When defining categories in such essays, there is no right or wrong answer. As long as items are related in an observable and logical way, categories may rely on any pertinent criteria. The purpose of dividing and classifying the smaller concepts is to help reach a greater understanding of the initial subject; therefore, the developed categories should be easily tracked back to the bigger subject. The introduction is poignant, focusing the reader’s attention and precisely explaining the intention of the essay, which is to break a larger concept down into smaller parts, to make it clearly and easily grasped. At least one paragraph should be devoted to each of the categories developed by breaking the larger concept down into smaller pieces. The category and all its composing elements should be described. In addition, each paragraph provides explanations of how these smaller elements connect with each other into the ensemble. The conclusion states the purpose of the essay again, differently worded as compared to the introduction. Something is left for the reader to ponder by tying the big concept to a real life application. The writing process includes a pre-plan...
(essay layout and major points outline). A rough draft fills in the details, covering all ideas intended in the plan. After completing this draft proofreading starts, to ensure logical flow is and absence of grammar or punctuation errors. Ideally, the essay is set aside for at least few days before a new re-reading, to spot any remaining inconsistencies or errors.

### 3.7 Comparative Essays

They are academic papers which compare two or more topics, items, or concepts. The number of subjects is usually set by the course instructor when the assignment is given. Comparative essays seek to discuss similarities between items or concepts, not differences. The introductory part has to define the topic and should contain a thesis statement which will be supported throughout the remainder of the paper. The body discusses similarities between the items in question, with very few basic references to differences, so that the essay does not change into a compare and contrast type. The conclusion restates the thesis and rounds up the discussion. This is the most difficult stage for the students, who generally find it difficult to decide when to stop comparing and draw a conclusion. It is also difficult for the professor to guide them in selecting which aspects to parallel, as it is not necessary to compare each and every factor of the items or concepts in the paper, but to prioritize and focus on the relevant ones, depending on the substance, on paper length, and on the importance of the features discussed. The number of comparisons coincides with the number of body paragraphs (three), but another situation can occur as well: one in-depth comparison, debated in all three paragraphs. Longer papers invite longer discussions and more comparisons.

Authors should proof their papers to ensure that they have followed the citation guidelines given to them by the instructor. The paper should also be proofed for grammar, spelling, and punctuation errors. Paragraphs should hold complete thoughts and the paper should be clearly written, to ensure the best grade possible.

### 3.8 Cause and Effect Essays

They constitute a basic type of writing students are required to undertake ever since early school. Solid understanding of cause and effect, their interdependence and their logical development constitute the key of successful academic development.

As learners begin to grasp these connections, they can be encouraged to think critically about the issues on question. Such skills are transferable, since the stages of this thinking process are similar for each school subject, so by the time students have reached college, they are prepared to understand cause&effect relationships in many areas. The idea is to ultimately encourage exploration of cause and effect connections, which might be multi-faceted rather than mono-dimensional, in their own way, as different authors might view cause&effect impacts in different ways: hence there is no unique pattern for such essays. Students should ensure that they have presented a well-documented argument within a well-structured paper, containing information pertinent to the topic, following the format required by the instructor, and including solid documentation from credible sources. The introduction states the topic, which is either the cause or the effect. Beginners are required to deduce effects from causes, but, as students develop higher reasoning skills, they might be asked to think about what events cause certain effects, so, in essence, they might be required to work backwards. The professor will occasionally allow the learner to select the way of presenting the exploration. The structure follows the standard one-three-one rule of text design and the author can gauge how much space to dedicate to any segment of the paper by multiplying the number of pages required for the assignment by this ratio (e.g. a two-page paper has 2 paragraphs in the introduction, 6 in the body, 2 in the conclusion). Citation guidelines given by professors must be followed thoroughly and the paper has to be free of punctuation and spelling errors, and grammatically correct. It is important for students to pay attention to both the content of their paper, and the mechanics of paper-writing. If the task is to write a thousand-word essay, the focus will be just on the cause, or just on the effect of a certain topic, or on one relationship (one cause, one effect). If the format is a twenty-page text, the learner might explore the causes and effects extensively. The layout is varied; hence length is the key decision factor. Regardless of the topic and the text dimensions, all causes and all effects should be clear in the author’s mind, even if they will not be discussed entirely throughout the essay; a complete list helps in organizing thoughts and in narrowing down the investigated issue. Selection of causes and effects is followed by developing a thesis statement and researching for the supporting details. Each of the subsequent paragraphs includes a topic sentence...
monitoring my engineering students’ progress in performing academic writing tasks for science & technology over a four-year learning cycle has helped me understand their difficulties and find more effective & active teaching formats, so as to stimulate both their learning skills and their motivation.

References: