

## TEACHING ACADEMIC JOURNAL WRITING FOR UNDERGRADUATE ENGINEERING STUDENTS: PROBLEMS AND STRATEGIES

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**Abstract:** *An academic journal is a journal associated with a specific discipline which is published periodically. It serves as a platform for presenting as well as sharing knowledge and research regarding an academic discipline. However lecturers find that the quality of journal writing among students are sometimes poor. Many employers also complained about the quality of writing among graduates. By providing guidance and encouraging students to write academic journals, weaknesses in writing among students can be addressed. This paper presents an investigation on the problems faced by the engineering students at the Faculty of Electrical Engineering, Universiti Teknologi Malaysia in producing high quality academic journal writing and proposed strategies in order to remedy the problem.*

**Keywords:** *Academic, Engineering, Journal, Writing, Undergraduate*

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### Introduction

One of the major elements of the engineering and scientific process is communicating the results of an engineering investigation to other people in order that the discoveries are transferred to the engineering or scientific community which can be utilized for the advancement of mankind. Although academic journal writing is an important part of the engineering process, it is often ignored in undergraduate programmes as most of the teaching and learning hours are allocated to engineering and scientific concepts. Many still do not realize that communicating their research innovations is vital for success in engineering. In order to become professional engineers, one of the criterion is to have a number of publications as well as citations As such undergraduate students must be prepared as early as possible in the aspects of academic journal writing. According to Turbek (2016), exposing engineering undergraduate students to the academic journal writing process will provide them with a better preparation for postgraduate study and careers in engineering.

For engineering students, writing academic journals is also a tool to improve their engineering and science literacy. In research it is vital for a researcher to keep asking questions related to the research, perform literature review, make sure that the problem statement is clear, design experiments, carry out indepth analysis of the data or results obtained from the experiments and perform critical connections. The whole process will not achieve its objective if the results are not conveyed or communicated to others in a written form or in the form of publication in journals. Prior to publication the article describing the research will undergo peer review and will be subjected to criticism. This is good for the researchers as it will them more mature in their research as well as in their engineering and scientific concepts as stated by Hesselbach, (2012).

In many countries, there is also a pressure in the academic world to publish. Lecturers rely on the students they supervised in order to carry out research and published their research findings. As such they have to find dedicated students who are smart and willing to work hard. The situation is not easy however as lecturers find that the students are not well-equipped with good academic writing skills. In many universities this aspect is ignored with the argument that there is not much time to train students to be competent in academic writing since there are so many technical knowledge to be acquired. This resulted in deficiencies in the students' soft skills as the students have no clear and detailed guidelines on how to produce the best academic writing. As such it is important that higher education institutions view seriously this matter and programme on academic journal writing should be introduced in order to solve this problem. The objective of this paper is to discuss the problems in teaching academic journal writing and propose suitable strategies that can be employed to solve them.

### **Literature Review**

From time to time the quality of the graduates have always been criticised such as the lack of communication and writing skills. If the students can be trained to write good academic papers, they will be able to advance themselves, be a good communicator of ideas and train them to have a critical thinking. Paulston (1972) expounded that writing academic papers is not an easy task and it may be the last and probably the toughest skills students learn.

There are many literatures on academic journal writing (Gonye 2012). Various scholarly work have been written on academic writing, the challenges faced by students and the strategies to solve these problems. Among the literatures are Mallia (2017), Tuomainen (2016), Norris (2016), Ismagulova (2016), Derntl (2014), Belt et al (2011), and Socolofsky (2004). These research have encouraged and motivated this investigation on academic writing among students utilizing Universiti Teknologi Malaysia (UTM) as a case study. Those research have indicated that students faced various problems when undertaking the task of academic writing and as such they should taught how to manage the problems professionally which can prepare them when graduated. Gopee (2013) emphasized that students need support in order to succeed as academic writers. Students should have a tentative plan for the academic article before gathering vital information. The initial plan involved devising a scheme on how to organize information (Hashimoto 1982). It is vital for them to prepare a draft and obtain feedback on the draft. They should be focused on the main ideas and not sidetracked into other unrelated issues. Subsequently they should revised the draft based on the feedback they obtained (Leki 2008). Kellogg (2008) emphasize the need for learning by observing and learning by doing to enhance writing skills. Spivey (1990) states that academic writing involves strategies of organizing, selecting, and connecting in order to develop coherence

Osman and Abu Bakar (2009) said that one of the major problems facing engineering students in Malaysia when writing academic journals is to write in English since for most of them it is not their

first language. They might have the necessary ideas about how to solve engineering problems but since English for most of them is their second language they have problem communicating and expressing themselves in the form of an academic journal. The problem is compounded by the fact that they also have to make sure that the academic paper they wrote do not contain grammatical mistakes. It is a huge disadvantage for many of them since they are not fluent and proficient in the English. For most students in Universiti Teknologi Malaysia (UTM) technical or engineering knowledge for most of them is not a problem. In fact they are some of the best engineering students in Malaysia as they are chosen from the top students who obtained good grades at secondary schools and when they further their study at UTM they have to achieve a high standard in order to graduate. As such the major problem is not the subject content but the language. This is why teaching academic journal writing is a challenge although English is not new for them since they are taught beginning from pre-school but they still do not achieve good proficiency.

### **Theoretical Framework**

In teaching students on how to write academic journals, at the beginning students are taught the importance of writing academic journals. They are informed that writing academic journals will improve their writing skills, make them a good communicator, benefit them when they write their final year project thesis and will be a good skill when they graduated, apply for work and become engineers. This is to motivate them so that they will see the link between writing academic journals and the multifarious benefits that they will get.

The students are then taught step-by-step instructions on what an academic journal composed of. They are informed that academic journal is unique and should not be confused with other writing tasks such as laboratory reports that they have to do. Engineering journals have an accepted structure which make it slightly easier to write comprising the title, abstract, keywords, introduction, literature review, and a general outline of the paper, a methods section detailing the methods used, separate or combined results, discussion and application sections, and a final summary and conclusions (Socolofsky ,2004). The students are given two journal writing assignments and they will be assessed and given feedback in order to improve their writing skills.

It is important that the students understand that the title of a paper is the part that is read first and the most (Derntl, 2014) and as such students must be careful in choosing the appropriate words for the title. Many researchers do not have much time to scrutinize the whole content of an academic paper and as such the first thing they look for when searching for relevant papers is to refer to the title of the paper. A good title should have the fewest words but sufficiently describe the contents of the paper (Day, 1983) Students should also be trained to summarize the content of the paper in the abstracts section. All relevant information must be placed in abstract which facilitates the potential readers to understand what the paper is all about. The introduction leads the reader from a general subject to a specific area of research. It should also provide information on the latest development in the field. In engineering or scientific papers, the paper body expounds the material and data used for the research, the methodologies utilized to solve the research questions and the results. The paper should be described such that anyone who carries out the research using the same apparatus and material, should be able to reproduce it (Day, 1983). The references section should list out relevant literatures and should include the latest literatures which reflect the writer's seriousness in monitoring the latest development in the research.

## **Methodology**

As part of the research design, the students were given the task of conducting experiments and they have to write articles describing the experiments in the form of a journal. Fifty students from the Faculty of Electrical Engineering, Universiti Teknologi Malaysia, were given the tasks of carrying out two experiments. One of the experiments is entitled 'Basic Measurement of Electronic Circuit' and the other experiment is entitled 'Resistance Measurements'. The experiments were meant to teach them research skills. During the experiments a lecturer supervised them and answered any questions that they have while carrying out the experiments.

Prior to the experiments they have been taught with the concepts related to their experimental work as well as given guidelines on academic journal writing. Samples of high quality journal articles were also discussed with the students as references. The students have been taught the basics related to the experiments. With the knowledge given to them, they should be able to write the content of the paper. They were asked to write two papers describing the experiments they carried out. They have been given guidelines on how to write scientific papers based on the Institute of Electrical and Electronic Engineers (IEEE) format. The students were given feedback on what they have written.

Since each students has to write two journal articles, the total number of articles that the students wrote is one hundred. Analysis is made on all academic papers that the students write. Each section i.e. title, abstract, keywords, introduction, materials and methods, result, discussion, conclusions, acknowledgement and references were scrutinized. The content were analyzed to observe how the students synthesize the knowledge they have and the experimental results they obtained and described them in a coherent way. The structure and format of the papers will also be observed. The language proficiency of the student when they write the articles is also important. Any possibility of plagiarization will be analysed. The writing skills were observed on observance of the guideline given to them, content, organization of ideas and language proficiency.

Feedback is also obtained from students on what they think about the assignments. The feedback is obtained based on articles which contain ambiguous content such as possibility of plagiarization and poor level of English proficiency.

## **Results and Analysis**

The scientific papers written by the students were marked and analysed. Overall the students exerted their best to produce the best articles as possible. However there are weaknesses and mistakes which they should take into account if the articles are to be considered worthy to be published in the scientific journals. Students are informed about their weaknesses and they responded positively with an open mind stating that they will try to improve.

In the abstract section, the students clearly write the purpose of doing their project. However some of them do not described the problem statement in which they should identify the problem being solved or the hypothesis being investigated. Most of them briefly described the procedures being used in the experiment. However, most of them do not state the results as well as the conclusions in their abstracts. In the acknowledgement section, one student acknowledge another lecturer who taught the same subject but for the other section. This could possibly be attributed to the fact that the student discuss with students from other sections and copy parts of the articles from other students. Ten of the students placed the acknowledgement section

between the abstract and the introduction sections when they should place it between the conclusions and references sections.

The level of the English language for most articles written by the students are generally moderate except for a student whose language proficiency is very poor. When the student was asked whether he used the Google translation software in order to write his article. The level of the English language for the article is poor as the student totally rely on the software to translate from Bahasa Malaysia to English. This means that the students themselves have to enhance their language proficiency and ask those who are proficient in the language to proof read the article.

In terms of the formatting of the article, most of the students used the template based on the IEEE given to them. Two of the students write the articles having one column instead of two columns. They put a front cover page stating that the articles are laboratory reports instead of journal. Although students have been informed many times about the journal content as well as format and were given the journal template, both students do not comply with the instruction. It seems both are confused because although they described their articles as laboratory reports but the structure of the articles was written based on the journal structure.

The assignments provide ideas on how to improve the strategies for academic writing. In the future the students need more training. More samples of journal papers will be given to them and more discussion should be conducted on how to write high quality academic journals. The rules concerning academic writing will be also explained in more detail.

## **Conclusions**

Research on academic writing on engineering undergraduate students provide valuable insight into the student's thinking. Through the research the lecturers can understand how the students think, what their strengths are and what are their weaknesses. This research will utilize whatever findings that have been obtained to further improve the students academic writing in the future. Students also benefitted from journal writing as it enhanced their engineering and scientific enquiry.

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