Meeting the Challenges of Teaching Report Writing Using Process-Oriented Guided Inquiry Learning

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ABSTRACT

Engaging undergraduate students when teaching how to write reports or proposals becomes a herculean task considering the time it takes to explain how the content needs to be developed and organized under the various sections. In order to meet this challenge, I conducted an experiment using the Process Oriented Guided Inquiry Learning (POGIL) approach. POGIL entrusts the students with the responsibility for their learning using questions designed to aid them in constructing their own knowledge, while the teacher assumes the role of a facilitator. Having adopted this approach and reaped encouraging results, the teacher researcher is convinced of the efficacy of the approach to the extent that she recommends its use where ever possible.

Key words: English, writing reports, POGIL, teaching approach, Undergraduates

Introduction

The challenges of teaching English to a classroom of non-native speakers are many, and more so in a classroom of English for Specific Purposes. The technical writing course for students pursuing a bachelors' degrees in engineering or management studies involves among other tasks, giving instructions or explanations, and writing an abstract, a proposal or a report, in a direct and easy to understand manner. Students however do not feel the need to master the writing skills and language required for this task. Their goals for this course are simply to score high marks in their core subjects, so that they get selected during campus placement. Thus, their learning and immediate performance goals do not match the learning outcomes expected by the teacher. Also, a majority of the

students have had no work experience with regard to writing reports, nor have they ever attempted to write or present a paper or submit a project report. Hence there is a complete lack of motivation to learn this valuable skill. It is in these circumstances that the task of teaching students how to write a report appears gargantuan. The challenge therefore is that the teacher must teach these students technical writing even though they cannot relate the learning to performing such tasks in their careers.

The problem is further aggravated by the fact that the teacher can either get one hour thrice a week, or three hours at one stretch in a language lab, to teach report writing. There is loss of continuity if the teacher has to teach across two or three one-hour classes and a lot of time is spent in recapitulating the content that has been covered in the previous class. The ideal way then would be to take it up in a three-hour session in the lab. However, holding the attention of the students for three hours becomes a herculean task. The course objectives therefore become difficult to achieve given the fact that the listening and retaining capacity of the students is limited. Following a study in the area of attention span and the retention capacity of students, Horowitz (1988) found that at any given time, just about half the class pays attention to a lecture. Verner (1964) observed that "... 30 minutes appear to be the optimum length". Some researchers express the view that students' learning is hampered when the teacher exclusively adopts the lecture mode (Bonwell & Eison, 1991). Referring to the studies of (Horowitz, 1988; Verner, 1964; Bonwell & Eison, 1991), Spencer (2006) suggests that "The classroom should be a place where the students can become involved in hands-on activities".

THE STUDY

In order to meet this challenge of improve the learning outcomes, the Process Oriented Guided Inquiry Learning (henceforth POGIL) approach was used (Moog & Spencer, 2008; Farrell, Moog & Spencer, 1999). In the POGIL approach, students work in small groups of 3 or 4 on a concept, a model or data. They are given some convergent as well as divergent questions, which guide them to analyse the material provided. The questions are designed to aid them in constructing their knowledge. The process of inquiry involves assigning specific roles to the students, with the instructions that the team answers the questions within a specified time. Through the process of answering the leading questions, learners construct their understanding of the course or topic content and then, through discussion and mutual agreement, arrive at their conclusions. This active learning method uses the learning cycle paradigm of "exploration", "concept

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invention", and "application". Learning happens through the sharing of knowledge as students, teach and learn from each other (Abraham & Renner, 1986; Lawson, 1995).

The freshness and significance of this approach lies in the fact that in the process of comprehending the material, students combine previous knowledge with the one that is being imparted in the classroom. They make an effort to become conscious of the way in which they arrived at the answers to the leading questions. Eunice Yang (2013) posits: "Through metacognition students go through a self-evaluation, management, and regulation process, and they realize that they are in control of their own learning". POGIL entrusts the students with the responsibility for their learning through an assigned task with the goal of mastering the content/ genre, while the teacher assumes the role of a facilitator.

The objective of this paper is to inform and share the POGIL experience with the teaching community to motivate them to adopt this approach. POGIL enables the teacher to achieve improved outcomes by making the students partners in the learning process. The study involved teaching report writing to undergraduate students in the Telugu speaking state of Telangana, India. The results of the study were encouraging, especially when they were compared with teaching the same task through lectures. I will now describe an activity that was conducted for the purposes of this study. The activity was designed according to POGIL principles, and was tested using a learner-centric, interactive and outcome based-approach. The activity was conducted with a group of 36 students in a Language Lab; the duration of each class was 150 minutes. It was repeated with six batches of about 36 students each in a semester, over a period of 3 years.

There were four stages in the activity. In stage 1—the "exploration" stage—the class was divided into groups of four students each. Every member of the group was assigned one of the following four roles—reporter, recorder, observer and manager—as recommended by the inventors of POGIL. The advantage of assigning roles, as per (Trevathan, Meyers & Gray, 2014) is: "The use of roles enforces accountability within the groups, so the outcomes are peer-driven as opposed to instructor-driven where the motivation of completing tasks is to satisfy the instructor". The students were given reports such as school progress reports, diagnostic medical reports and short news reports. They were asked convergent questions such as: 1. What information is included in a report? 2. What is the order in which the information is presented? 3. How is the report used? These questions and the discussion that followed led the students to search for patterns to gain a basic understanding of what a report is and what its structure should be.

In the second stage of the activity — "concept invention/formation stage", the students were given a short model report (Handout 1), along with a set of questions (Handout 2). The questions were framed so that they facilitated an understanding of the structure as well as the content of the report. The report was based on a situation that the students could relate to, in this instance, the requirements for setting up a computer lab. This was done to ensure that everyone in the team was actively involved in the task. The teacher assigned the task of reading the model report aloud to the manager of the group. The observer's role was to gather information on group behaviour and convey the same to the manager so that it would help him/her to improve participation from the group members. This was done to initiate a discussion to facilitate the understanding of what goes into writing an introduction, for example. Once the team arrived at a consensus on the right answer, it was written down in the notebook by the recorder. This process continued for 30 minutes until all the teams answered all the questions.

During Stage 3, the reporter from each team was asked to read out an answer for one of the questions. After each answer, there was a discussion in which the teacher guided and asked the other teams to add to the answer or comment on it so that, collectively, the right answer could be arrived at. The process was repeated for each question, until it became apparent that the majority of the students had understood the structure of the report. Throughout this stage, the teacher kept intervening with additional convergent and divergent questions, designed to help the students enhance their understanding of the structure and content of the report. Zawadzki (2010) too affirms that POGIL entrusts the students with the responsibility for their learning through working on the assigned task with the goal of mastering the content/genre while the teacher assumes the role of the facilitator.

The abstract of the report was not included in the model report. Once the students had understood the structure and content of the model report, they were given an outline for writing an abstract and asked to write one using the content of the model report. When the groups had completed the task and read aloud their abstracts, a discussion ensued, and the class arrived at an understanding of what an abstract must contain. With this, the "concept invention" stage of the activity was completed.

During the "application" stage, which was the 4th stage, a story was narrated to the class. The following is the outline of the story:

Once upon a time, there was a king in India who had a beautiful daughter, who was of marriageable age. She was his only child and he got her educated and

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trained in the skills of warfare. Following the established practice in ancient India, he arranged for a *swayamwaram* (a practice that most students in India know about)—an assembly of invited eligible princes from among whom a princess chooses the bridegroom and indicates her choice by garlanding him. There is a guide who introduces the princes to the princess. Now in this story, the princess could not make up her mind, and so she short-listed four suitors.

The king gave the profile details of these princes to his council of ministers and asked them to choose one from among them as the husband of his only daughter, who would inherit the kingdom from him after his demise. He instructed them to justify their choice.

The profile details of the four princes which were projected on a screen in the class are given in Table 1:

Table 1

Profile Details of the Four Suitors Chosen by the Princess

Details	1	2	3	4
Height	Very tall	Of average height	Tall	Very tall
Complexion	Dark	Fair	Dusky	Very Fair
Size of the kingdom	Small	Large	Small	Extremely large
Education	Highly Educated	Literate	Educated	Not educated
Other Attributes	a. An intellectual b. Not a warrior	a. A great warrior b. Extremely intelligent	a. A brave warrior b. Intelligent c. A great strategist	a. Not interested in warfare b. Of average intelligence
Right to inheritance/ position among the siblings	The eldest son	The eldest son	The second son	The eldest son

Students were asked to put themselves in the shoes of the council of ministers, analyse the details of the four suitors and choose the most suitable groom for the

princess. They were told that there would be no right or wrong choice, but they would have to justify their choice and their recommendations would be evaluated. This activity once again involved team work. The teams were asked to discuss and arrive at a consensus and justify their choice. They were directed to follow up on the discussion by writing an introduction, an analysis of the details of the four suitors, their findings, their conclusion and the recommendations of their report. Data had already been provided in a tabular form. Hence the teams were asked to leave out the part of the report that deals with data and its collection, so that they could complete the activity within the time available to them.

The time allocated for each stage of the activity is mentioned in Table 2.

Table 2

Time Allocated for Each Activity

S. No	Tasks	Time spent in minutes
1.	Scanning other kinds of reports	10
2.	Reading the model report and answering the questions	30
3.	Discussing the answers	30
4.	Discussing abstract writing and writing the abstract	20
5.	Narrating the story and presenting the data	50
	Total time spent on the activity	140
	Buffer time	10

This activity produced encouraging results because of the understanding of the report-structure/layout that the students had gained in the concept invention stage. It was clear that the POGIL approach had resulted in greater student receptiveness and comprehension, which was not witnessed during a conventional classroom delivery. The home assignment the students submitted also reinforced improved learning outcomes when compared with the lecture method that the teacher had adopted earlier.

The challenge of holding the attention of the students while teaching, was thus met through POGIL. In order to answer the questions, the students had to pay close attention to detail while reading, and consequently they were less distracted. Furthermore, they refrained from indulging in small talk when the teacher was circulating between the groups to help them comprehend the model.

For the role of the reporter the teacher had selected a student who was less fluent

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in the language and was also more diffident when compared with the rest of the members.

The intention was to build confidence in such students, as the POGIL activity requires the reporter to make a short presentation. According to Zulkepli (2016), "This activity is an avenue for students to develop their communication skills; an important graduate attribute."

When the grouping was being done, the teacher ensured that each group had a combination of students with good language competence as well as those who had done their schooling in a regional language and not English and were hence not very competent speakers. Some students had good interpersonal skills and others had good team-building skills. This assortment of students led to an interdependence within the group, with students learning from one another. Students who found it difficult to understand the content were helped by the others whose ability to comprehend the language was higher. This also resulted in more practice in using the language as the teacher had instructed the teams to speak only in English during their discussions. This was to overcome the problem of students speaking in their mother tongue in a heterogeneous language group even in a formal setting such as a classroom.

The sense of security that the students got by expressing their doubts and seeking clarifications freely in a peer group encouraged them to gain mastery over the structure of the report. This was especially evident when the teacher compared the performance of the students she had taught earlier in lecture mode with the current groups of students. Furthermore, when they were able to answer the questions correctly, the students got a sense of achievement which increased their confidence levels, especially with regard to self-learning. Considerable evidence of this was found in the reports that the students had written during the application stage and as home assignments. On the other hand, very little evidence of original writing or effort was found in the submissions of the students who were taught using the lecture mode. It was evident from the assignments submitted by students taught using the POGIL approach, that a large number of them had made a sincere effort to apply their learning while writing the report, even though most of them had taken up topics and data which were similar to the one used in the activity done in the class. One student compared the profiles of four engineering colleges and advised his brother on which college to choose to apply for admission. Another student compared four brands of mobile phones available in the market to suggest the best one to her friend. Yet another student studied the winning chances of the political parties contesting the elections in a state in India that was going to the polls.

Lastly, the students understood the advantages of teamwork and cooperation. The team that got the maximum right answers was applauded by the rest of the class and this led to a healthy competition among the groups. In addition to this, when further POGIL activities were conducted for the same class and groups, there was more involvement and enthusiasm to perform better than the other groups. Subsequently, this teacher has used the POGIL approach to help students learn how to write a statement of purpose, a summary, and a paragraph. She has also tried to teach the conditional clauses using the POGIL approach. Although "Writing effective materials with appropriate models and questions is the most difficult and time-consuming aspect of this method," (Johnson, 2001, p. 32), the researcher is so convinced of its efficacy that she recommends it to all teachers to experiment with it.

REFERENCES

Abraham, M. R., & Renner, J. W. (1986). The sequence of learning cycle activities in high school. *Chemistry Journal of Research in Science Teaching, 23*(2), 121-143.

Bonwell, C. C., & Eison, J. A. (1991). Active learning: Creating excitement in the classroom. *ASHE-ERIC Higher Education Report 1991,* ED 340272. Retrieved from http://documents.manchester.ac.uk/display.aspx?DocID=19800

Farrell, J. J., Moog, R. S., & Spencer, J. N. (1999). A guided inquiry to general chemistry course. *Journal of Chemical Education*, *76*(4), 570-574.

Horowitz, H. M. (1988). Student response systems: Interactivity in a classroom environment.

In *Proceedings of the 6th Annual Conference on Interactive Instructional Delivery* (pp. 8-15). Warrenton, VA.

Johnson, C. (2001). Activities using Process-Oriented Guided Inquiry Learning (POGIL) in the foreign language classroom. *A Journal of the American Association of Teachers of German*, *44*(1), Spring 2011, 30-38. Retrieved from: http://www.jstor.org/stable/41302903

Lawson, A. E. (1995). *Science teaching and the development of thinking.* Belmont, CA: Wadsworth Publishing Company.

Moog, R. S., & Spencer, J. N. (2008). POGIL: An overview. doi: 10.1921/bk-2008-0994.choo1.

Spencer, J. N. (2006). New approaches to Chemistry teaching. *Journal of Chemical Education, 83*(4), 528-533.

ISSN: Print 2229-6557, Online 2394-9244

Trevathan, J., Meyers. T, & Gray, H. (2014). Scaling-up Process-Oriented Guided Inquiry Learning Techniques for teaching large information systems. Courses *Journal of Learning Design,* 7(3), 23-38. Retrieved from https://www.academia.edu/9555672/

Verner, C. (1964). *Adult education.* New York, NY: Centre for Applied Research in Education.

Yang, E. (2013). A hybrid approach to teaching material science using POGIL and active learning activities. Paper presented at the 120th ASEE Conference & Exposition, Atlanta, GA. Paper ID 7413. Retrieved from https://www.asee.org/public/conferences/20/papers/7413/view

Zawadzki, R. (2010). Is process-oriented guided inquiry learning (POGIL) suitable as a teaching method in Thailand's higher education? *Asian Journal of Education and Learning*, *1*(2)*,* 66-74. Retrieved from http://www.ajel.info/Abstract/Is%20process-oriented%20guided-inquiry%20learning%20%28pogil%29%20suitable%20as%20a%20teaching%20method%20in%20thailands%20higher%20education.pdf

Zulkepli, N. (2016). Process-Oriented Guided Inquiry Learning (POGIL) based instructional materials for a discourse analysis course. doi: 10.13140/RG.2.1.4896.9849

APPENDIX A

Handout 1: Model Report

Introduction: The software industry is offering a number of employment opportunities with roles that involve planning, designing, developing, testing, deploying and maintenance of software. With the support provided by the State Government, this industry is expanding rapidly and there is a need for a huge work force which has resulted in an increasing demand for Computer Science and Information Technology related courses. Keeping this demand in view, the management of the XYZ Institute of Engineering has proposed to start an additional section of Computer Science Engineering (CSE) with a sanctioned intake of sixty. The objective of this report is to assess the infrastructural requirement and the expenditure that is likely to be incurred to support the additional intake.

Description: A study has been conducted to assess the requirements. There are already two sections of CSE and this third section will need a classroom. There are two vacant classrooms available in the CSE Department. The third section will also need a C Programming Lab. However, the existing programming labs

provide support to all other disciplines in the institute as well and are always occupied. Hence, an additional number of 60 students cannot be engaged in these labs. No vacant room has the required floor area of 120 sq m required to set up a lab. No surplus stock of either computers or the required furniture to furnish the classroom or the lab is available.

Discussion: As there are additional classrooms available, the new section can be accommodated in one of them, but as there is no room large enough to set up the C Programming Lab, a hall with a plinth area of 120 sq. m. needs to be constructed and the required equipment and furniture need to be acquired. In order to meet the infrastructural requirements for the additional intake, the estimated expenditure is as follows:

S. No:	Item	No. s	Cost of One Item Rs.	Total Cost Rs.
1	Computers	60	30,000	18,00,000
2	Server	1	1,00,000	1,00,000
3	UPS	1	60,000	60,000
4	1.5 Tonne Air conditioners	4	30,000	1,20,000
5	Tables	63	1,500	94,500
6	Chairs (Classroom and Lab)	122	500	61,000
7	Desks for the Class room	60	1,000	60,000
8	Cabinets	3	5,000	15,000
9	LCD Projector	1	60,000	60,000
10	White Board	1	5,000	5,000
11	Cost of Constructing the Hall for the Lab	1	10,00,000	10,00,000
			TOTAL	33,75,500

Findings: The study revealed that a hall to set up the lab needs to be constructed adjacent to the existing labs. On the other hand, the class can be accommodated in one of the unused rooms. The required equipment and furniture also need to be purchased.

Conclusion: After examining the existing facilities, it is understood that while a classroom is available, constructing a hall to accommodate a laboratory is necessary. Further, as the existing infrastructure cannot meet the requirements of the new section, additional things need to be procured; hence the approximate

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expenditure to set up the new lab was estimated to be Rs. **33, 75, 500**.

Recommendations: It is recommended that the process of setting up a new lab be initiated immediately so that it will be ready before the commencement of the next academic year. It is also suggested that the management may [*sic*] call for quotations from reputed companies to procure the material for construction and to purchase the required furniture and equipment.

APPENDIX B

Handout 2: Questions

Read the report given to you and analyse its contents and then answer the following questions:

1. The following are the sub-headings under which information in a report is organized. *Findings, Description, Discussion, Abstract, Title Page, References, Appendix, Introduction, Recommendations* and *Conclusion*. Arrange them in logical order.
2. From the introduction in the model report, pick out the sentences that are related to the *background*, *the present situation* and *the objective.*
3. The Description Section of the report contains i) The context in which the report is written; ii) The available factual data to be studied; iii) What needs to be done. Choose the right answer.
4. Why is the word 'Discussion' used along with 'Description'? What has been discussed?
5. In the Discussion section, the available data is i) analysed; ii) revealed; iii) compared. Choose the right answer.
6. In which part of the report do you find the deductions/inferences? What are the inferences in this report?
7. What are the conclusions based on?
8. How are the recommendations different from the conclusions?

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