Assessing Students’ Learning Experiences Using Reflection Essays and Word Count Application

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Extended Abstract

Introduction

A good learning experience has been the key element that education institutions strive to provide to students, where such effort has become the institutions’ strategy (University of Victoria, 2010; National Union of Students, 2008).

The pursuit of experience is in line with students’ desire to acquire learning experience as reported in several studies (Kennet et al., 2011), as well as the educators’ realisation that different students are after and will have different kinds of learning experiences even when put through the same education process (Brennan et al., 2009).

Capturing the student learning experience is typically conducted by asking them to narrate their experiences in oral or written form (Lachmann et al., 2013). While this approach is valid in achieving the objective, it poses a problem in distilling information from a huge pile of narration. Depending on the number of students and the level of engagement, this method can be extremely labourous.

In this paper, we present our method of collecting such information and distilling the insights about students’ learning experiences. We use reflection essays to collect the information and word count to distill its insights.

Method

We define the student learning experience as an endeavour “that brings a student to cognitively, affectively, and behaviourally process knowledge, skills and/or attitude in a learning situation characterized by a high level of active involvement” (Gentry, 1990).

The modules of interest are engineering design modules which are project-based in nature. As these are project-based modules with continuous (i.e. non-examinable) assessment, a consideration of the
nature of the learning experience students acquire becomes more crucial and relevant. At the end of the modules, students are expected to:

1. Acquire the ability to translate ideas into engineering design.
2. Build and test their solutions through appropriate validation methodology such as simulations and experiments.
3. Perform iterative design process.
4. Work effectively in a multidisciplinary environment.

Hence, there are elements of subject content and team dynamics to consider as well, among other aspects of the student learning experience.

At the end of the modules, students were requested to reflect on their learning experiences and to write it as an essay. This reflection has little to no bearing on their overall marks, so that students would not have the opportunity to “manipulate” their experience. However, the benefit of writing a reflection was emphasised to the students at the start of the modules, to ensure that they had the right mindset and objective when writing the essay.

The essays were submitted to the lecturer-in-charge, after which they were processed.

Prior to word counting, such that the word counting yields meaningful results, each essay was pre-processed according to the following rules:

1. Removal of singular-plural differences, by changing each noun into its singular form.
2. Removal of verb tenses, by changing all verbs into their present form.
3. Removal of auxiliary verbs and be, e.g. “am”, “is”, “can”.
4. Removal of articles, e.g. “the”, “a”.
5. Removal of pronoun subjects and objects, e.g. “I”, “we”, “me”.
6. Removal of adverbs, e.g. “at”, “on”, “of”.

After such processing, each essay was then put through two word counting freeware:

1. In tabular form, the Word Counter and Text Analyzer from Sporkforge (http://sporkforge.com/text/word_count.php).
2. In visual form, Wordle from http://www.wordle.net/

The tabular form is to provide the exact count, while the visual form is to provide a relative picture of the results. In reality, the visual form analysis can be conducted ahead of the tabular form analysis to provide a general picture ahead of the accurate picture.

Results

We studied the reflection essays of 39 students who took a project-based design module. These students formed a group of 4-5 students. The reflection essays were submitted at the end of the module as a mode of formative assessment.
We shall now elaborate, through example, the method that we employed to analyse the essays. For illustration purposes, Table 1 and Figure 1 presented the word count results of the essays of two particular students in the same project group; namely Student 1 (with a 778-word long essay) and Student 2 (with a 1326-word long essay).

**Table 1. Five most frequently used words by 2 sample students.**

<table>
<thead>
<tr>
<th>Student 1</th>
<th>Student 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Words</td>
<td>Frequency</td>
</tr>
<tr>
<td>solution</td>
<td>18</td>
</tr>
<tr>
<td>time</td>
<td>11</td>
</tr>
<tr>
<td>understanding</td>
<td>10</td>
</tr>
<tr>
<td>teammates</td>
<td>7</td>
</tr>
<tr>
<td>problem</td>
<td>6</td>
</tr>
</tbody>
</table>

**Figure 1. Frequency of words used in the essays of 2 sample students.**

The results presented in Table 1 and Figure 1 show the different words that are used frequently in the reflection essays of the two students. We predict that these results represent the different learning experiences of the two students in this same project-based module. Student 1 seems to have gained and valued the experience pertaining to “solution” the most, while Student 2 seems to have gained and valued the experience pertaining to “group” the most. Both the ability of devising a solution and working in a group are the intended learning outcomes of the module, among other things, and yet it is interesting to observe how each student valued one experience more than the other. The prediction deduced from word counting indeed matches the actual reflection of the students; hence it follows that word counting can be used to predict the experience gained by students.
Table 2 presents a summary of the word counting results of all 39 students that were studied (including Student 1 and Student 2 in the above illustration). The summary provides an overview of the proportion of students in the class whose learning experience falls within the classification of technical-based and team-based.

Table 2. Summary of word counting results.

<table>
<thead>
<tr>
<th>Technical-based</th>
<th>Team-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>18</td>
</tr>
</tbody>
</table>

**Conclusions**

This study accentuates the notion of different learning experiences by different students, even when these students learn the same subject/module. The method presented in this paper allows for quick and systematic capturing of such experiences, although the results might only be able to differentiate limited dimensions of these experiences.

**References**


